



signetbreedband redefines business services in the Netherlands

The evolution of the network for businesses services

White paper

The changing demands of enterprises are driving network service providers to evolve their networks. Spurred on by two major market forces, many providers are rethinking their underlying network architecture to accommodate these new demands now and well into the future.

First, enterprises are demanding much faster broadband access. Network service providers are making enormous investments in fixed broadband access to transform existing DSL access to fiber to the user (FTTU) and other passive optical network (PON) access methods. There is also ubiquitous growth in 5G mobile access and fixed-wireless access (FWA) investments to serve consumers and enterprises.

Second, driven by rapid economic growth, international ambitions, cloud integration and further digitalization such as high-definition video streaming, video conferencing, augmented reality, remote surgery, drone delivery, and emerging AI-based applications, enterprises are increasingly demanding scalability and high performance from their network. These mission-critical applications are driving existing network services to their limits, making it much more difficult for networks to deliver.

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signetbreedband's new networking requirements for enterprise services

signetbreedband is an independent network solutions provider that operates in the Netherlands and a wholly owned subsidiary of team.blue, Europe's leading digital services provider. The company uses a unique network- and carrier-neutral approach to design network solutions that address the specific business needs of customers while exceeding their performance and service expectations. signetbreedband offers a range of redundant business internet options, including DSL, fiber and mobile. It also offers a range of managed networking solutions, including datacenter and cloud connectivity services, managed WAN, private IP networking, SD-WAN and point-to-point networking.

With networking experience spanning more than 25 years, signetbreedband viewed the new networking requirements as both a challenge and an opportunity. To continue innovating, they decided to develop an entirely new core built with an architecture that not only meets today's existing demands but has the headroom, and scale to meet whatever future demands will exist. As the company transformed its architecture, its teams focused on meeting several key implementation requirements:

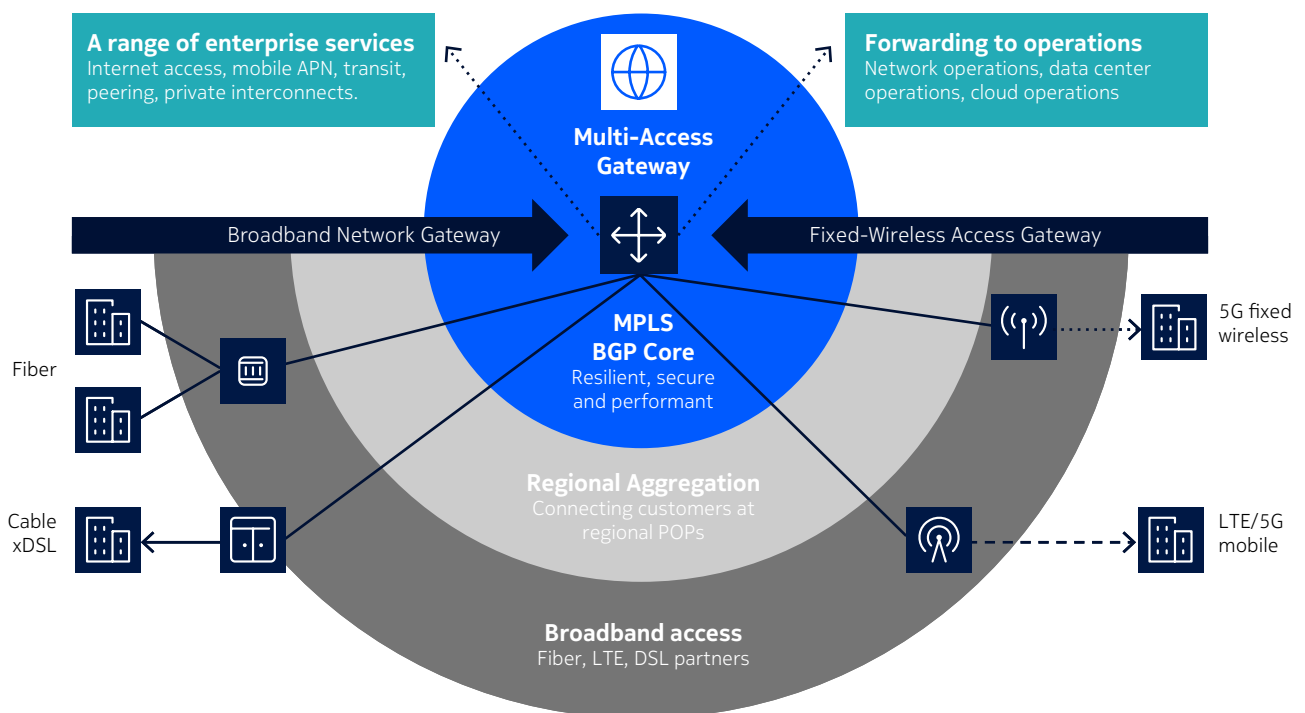
- Providing a **universal termination point** for authenticating and authorizing network service users over any broadband access method.
- Architecting the network core for **resiliency**, which is paramount for meeting SLAs for a new generation of traffic-intensive business services.
- Building the network to deliver traffic at scale and with **high performance**, and to provide capacity headroom to enable **future growth**.
- Providing enterprises with **ubiquitous access to broadband** through convenient local "on-ramps" at a reasonable cost point
- **Embrace automation** to improve productivity, reduce human errors and keep pace with the expected increase in operational scale.



The evolution of signetbreedband's Connectivity Core

signetbreedband's newly evolved network is called the Connectivity Core and this new network addresses all the emerging enterprise networking requirements. Figure 1 shows a high-level view of the Connectivity Core's evolved architecture.

Figure 1. The signetbreedband Connectivity Core



signetbreedband addressed the need for a universal termination point by partnering with Nokia to deploy a centralized Multi-Access Gateway. The Multi-Access Gateway behaves like a Broadband Network Gateway (BNG) for fiber-to-the-premises (GPON, XGS-PON and 25G PON) and existing fiber-to-the-node (xDSL, hybrid fiber-coax) access technologies. It also provides a Fixed-wireless Access Gateway to support 4G/5G FWA and wireline access requirements for converged wireline and fixed-wireless broadband delivery. The Multi-Access Gateway authenticates and authorizes subscriber access to network services and content, enforces bandwidth policies and records usage data for accounting purposes.

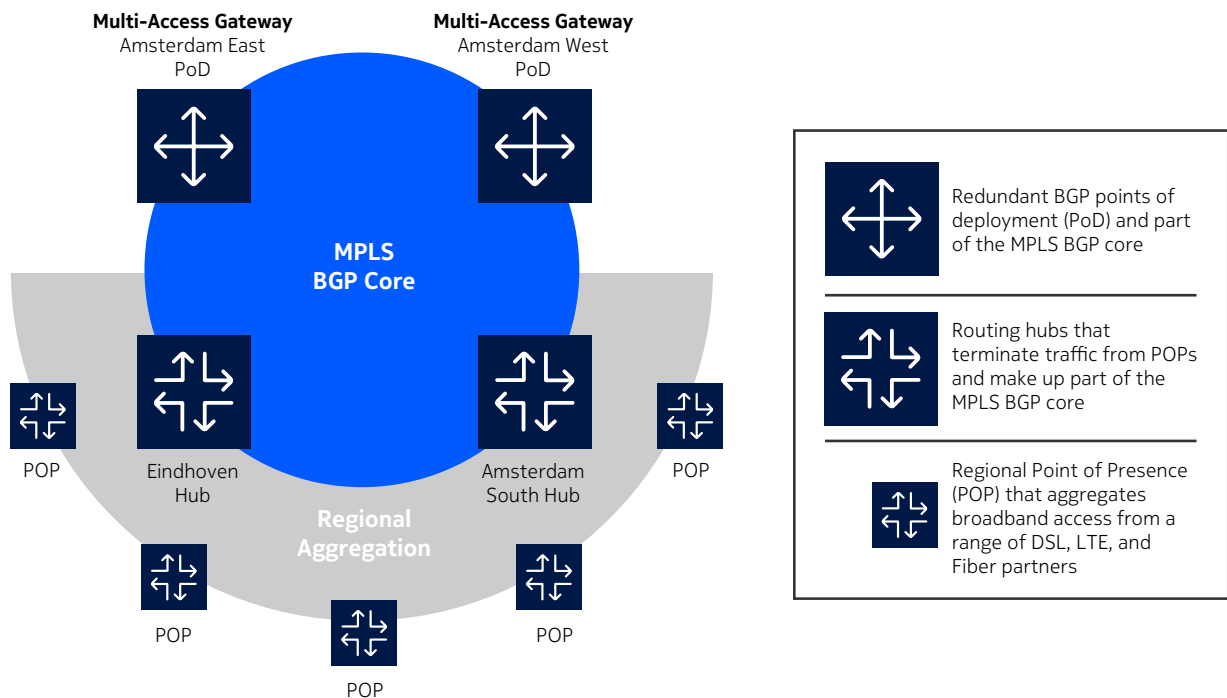
Nokia also helped signetbreedband evolve its network with resiliency in mind. Resiliency is a hallmark of the Connectivity Core, which features three different deployments of Nokia routers: redundant Multi-Access Gateways, multi-homed aggregation routers and core routers that provide a resilient and self-healing MPLS BGP core.

Industry-proven Nokia routers ensure that the Connectivity Core delivers performance at scale and has plenty of headroom to grow, with network capacity already scaled to a minimum of 100 Gb/s and a standardized internet service that scales to 10 Gb/s per customer line. They also ensure deterministic performance at scale for each routing hop in the network.

signetbreedband partners with more than 50 regional access networks (e.g., Fiber, DSL, LTE) to provide a set of broad and diverse on-ramps to the Connectivity Core. This unique approach provides greater choice and performance to signetbreedband’s enterprise service subscribers.

Looking more deeply into signetbreedband’s routing architecture, Figure 2 shows how the company has built resiliency into its routing network. In the heart of the network, signetbreedband selected the Nokia 7750 SR-1e as its Multi-Access Gateway and deployed it in redundant pairs in geographically diverse Points of Deployment (PoDs). This router brings the benefits of Nokia FP-based silicon, which combines a disaggregated chipset architecture and a flexible memory design to provide deterministic packet forwarding performance, even when complex processing-intensive operations are required.

Figure 2. Connectivity Core routing architecture



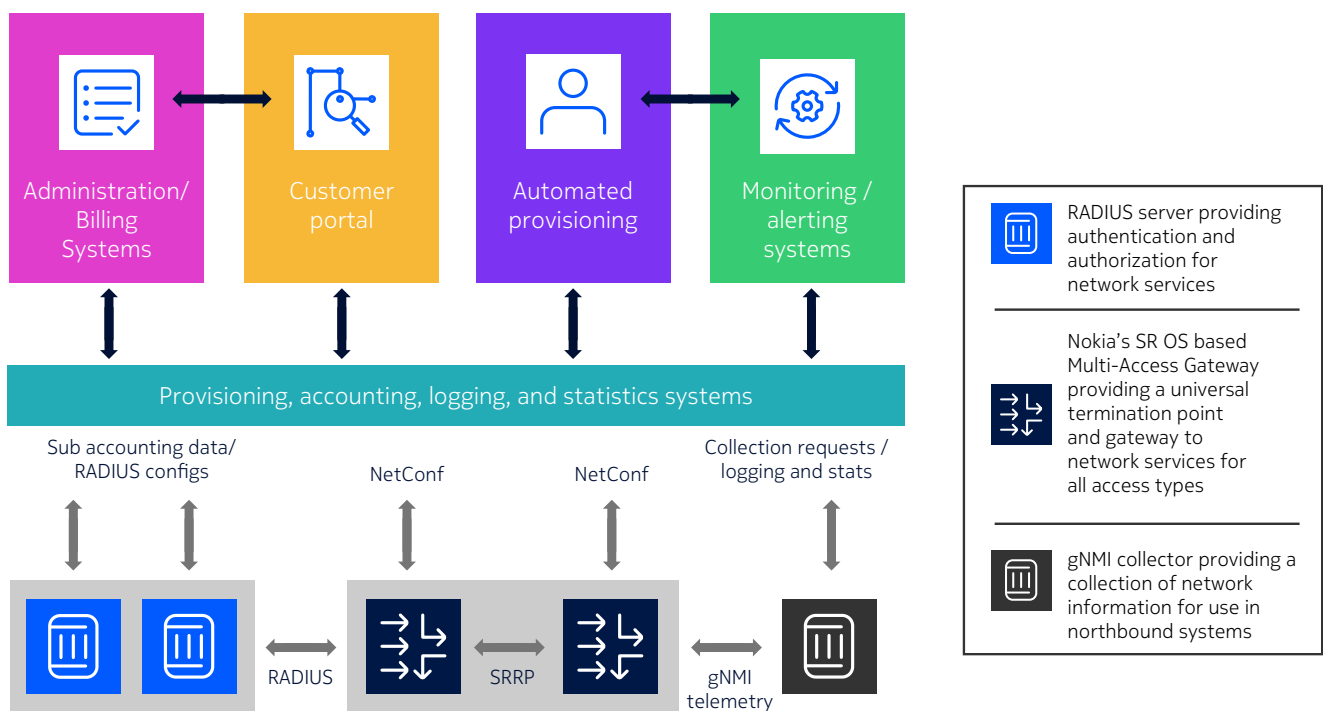
Automated provisioning with the Connectivity Core

signetbreedband has implemented a complete and sophisticated set of integrated operational systems that help the company operate its network in a highly productive and efficient way. As shown in Figure 3, signetbreedband relies on the control plane of the Connectivity Core to operate its network, turn up customers and services, and provide control and transparency to customers.

The control plane architecture contains a layer that collects and aggregates operational data from the network elements, including:

- Customer usage and accounting data collected from the RADIUS servers.
- Network data received from the routers through the NETCONF protocol.
- Network logs and stats sent from the gNMI collector.

Figure 3. Connectivity Core control plane architecture



This data is crucial for powering the northbound systems, which include administration and billing systems, the customer portal, which is still in development, an automated provisioning tool, and the monitoring and alerting systems.



One of the most important, frequent and complex operational processes that signetbreedband executes daily is the provisioning of new customers and their services. By automating this process through a NetOps-based approach, signetbreedband has increased operational productivity while limiting human errors. When a new customer requests a service or an existing customer requests a service change, the operator only needs to specify a few higher-level service parameters to automate the entire provisioning process. Provisioning tasks that are automated include:

- Creating customer profiles for administration and billing records
- Setting up authentication and authorization for specific networking entitlements
- Setting up routing within the network, including provisioning access to the correct networking service.

One of signetbreedband's key requirements is to provide its customers with greater service control and transparency. The Nokia SR OS network operating system (NOS) addresses this need with a model-driven management architecture through the gNMI protocol and an advanced telemetry framework that provide ubiquitous and granular access to network data and state. With near-real-time access to this information, signetbreedband can empower its customers to understand their own services and the performance they receive, while also empowering them to serve themselves.

Conclusion

The evolution of the Connectivity Core has enabled signetbreedband to differentiate by providing the performance, reach and size of a large telco with the flexibility and reliability of a smaller network operator. signetbreedband's mission is to continue innovating to provide the high-performance business services its customers expect. Together with Nokia, an innovation leader and pioneer in IP routing, the essential foundation is being formed to achieve its goals of service excellence now and well into the future.

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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Nokia OYJ
Karakaari 7
02610 Espoo
Finland
Tel. +358 (0) 10 44 88 000

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