

NOKIA

Fixed-Wireless Access Gateway

Solution brochure



Expanding broadband service coverage

Broadband access is an essential utility, but many remain unconnected to the digital world or are underserved by slow connections. While fiber is the preferred and future-safe broadband access technology, the transition from legacy copper and coaxial access loops to fiber will take years and require costly investments in mature and low-density residential areas.

The deployment of 5G fixed-wireless access (FWA) in the last mile can complement fiber deployments and help to expand broadband connectivity and capacity. Using radio frequencies below 6 GHz allows network operators to efficiently deliver broadband internet over large areas with peak rates in the order of several hundred megabits per second. This approach can be effective in rural areas with low subscriber densities.

5G mmWave radio at high frequencies between 6 and 100 GHz can enable operators to deliver fiber-grade broadband with gigabit peak rates. This can help them manage cost and lead times of greenfield fiber-to-the-home deployments and for spot coverage in mixed demographics

Enhancing wireline broadband coverage and capacity with 5G fixed-wireless access



Connect underserved homes with no/legacy wireline access

Manage cost and lead times of greenfield fiber deployments

Optimize broadband capacity and coverage in mixed demographics

Sub 6 GHz radio

5G mmWave (FWA)

Fixed-wireless convergence

Scaling 5G fixed-wireless broadband delivery

Fixed-wireless broadband essentially delivers fiber-grade broadband services to homes and businesses over wireless access. Its service characteristics are fundamentally different from mobile broadband.

Residential broadband services don't require mobility because user devices are stationary and sessions are static and always on. Each home may contain up to a dozen devices with high bandwidth requirements, such as TVs, PCs, game consoles and tablets. Multiple residents may use these devices concurrently for several hours per day. Aggregate bandwidth demand for home users is 20 to 30 times higher than that of mobile broadband users, with monthly data volumes in the order of terabytes since there are no usage caps.

The design and dimensioning of fixed-wireless access gateways are driven by user plane requirements for very high bandwidth and low-cost-per-bit access to internet, IPTV and cloud content. Unless home broadband traffic is offloaded, even a small number of users will quickly consume most of the mobile core capacity.

How do mobile and residential broadband differ?

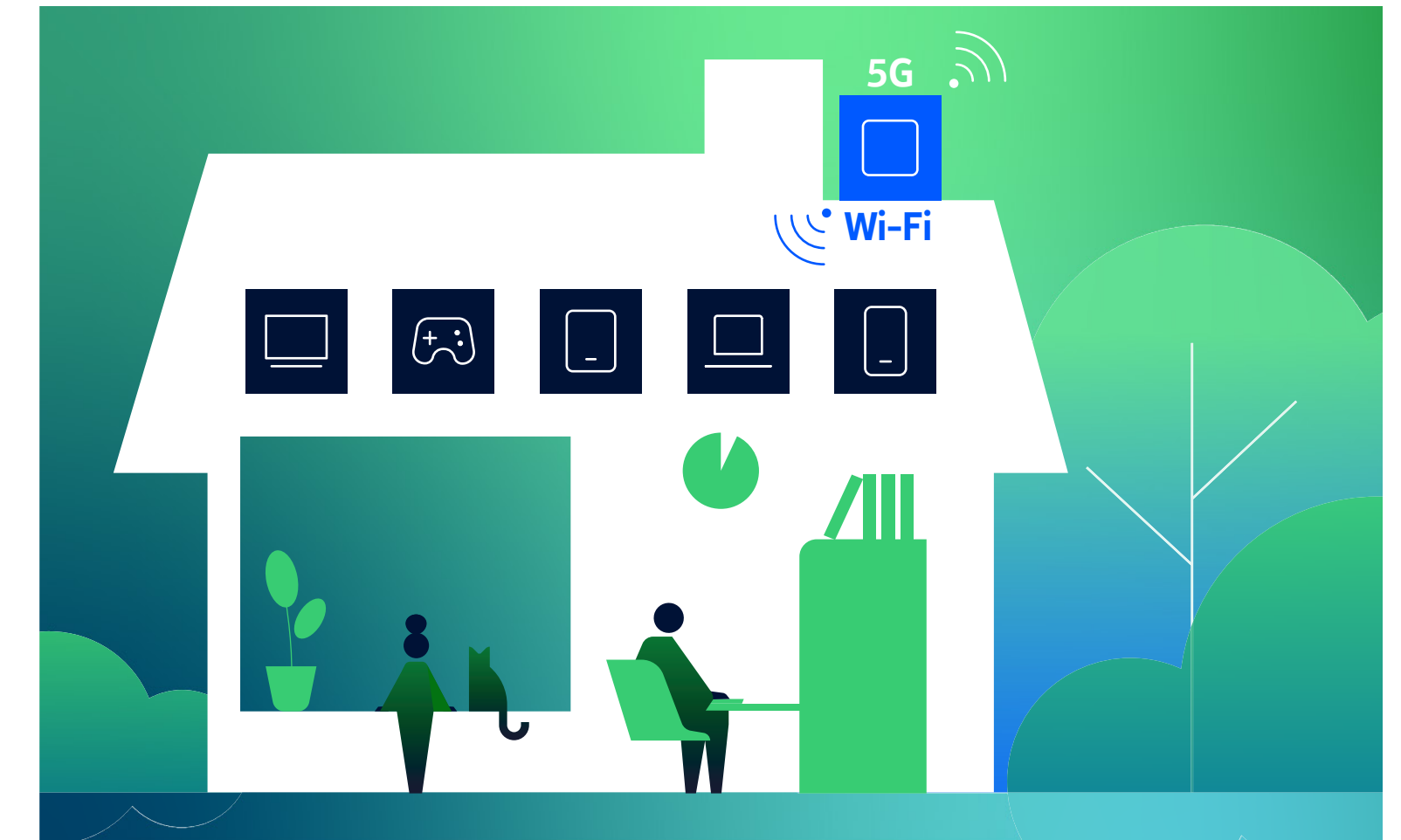


High transaction rates

Short, dynamic sessions. 1 device per session.

Low bandwidth

Order of Kb/s on average. Gigabytes/month (usage plan)



Low transaction rates

Always-on, static sessions. 10+ devices per session.

Very high bandwidth

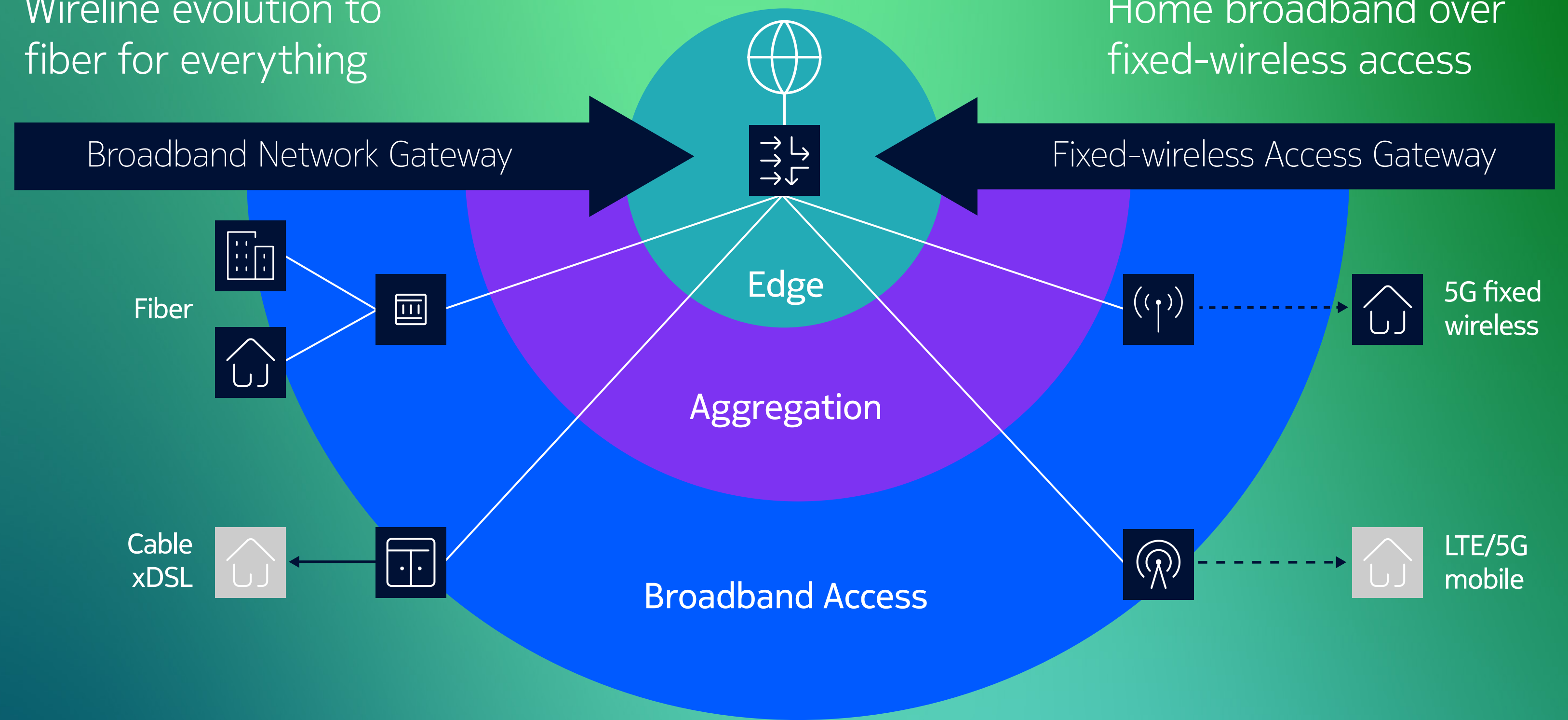
Order of Mb/s on average. Terabytes (unlimited)

■ **No mobility** ■ **20x more data**

Universal broadband edge: Nokia Multi-Access Gateway

Wireline evolution to fiber for everything

Home broadband over fixed-wireless access



Introducing the Nokia Multi-Access Gateway

The [Nokia Multi-Access Gateway](#) (MAG) is a converged broadband edge solution designed to deliver universal broadband services over wireline and FWA networks.

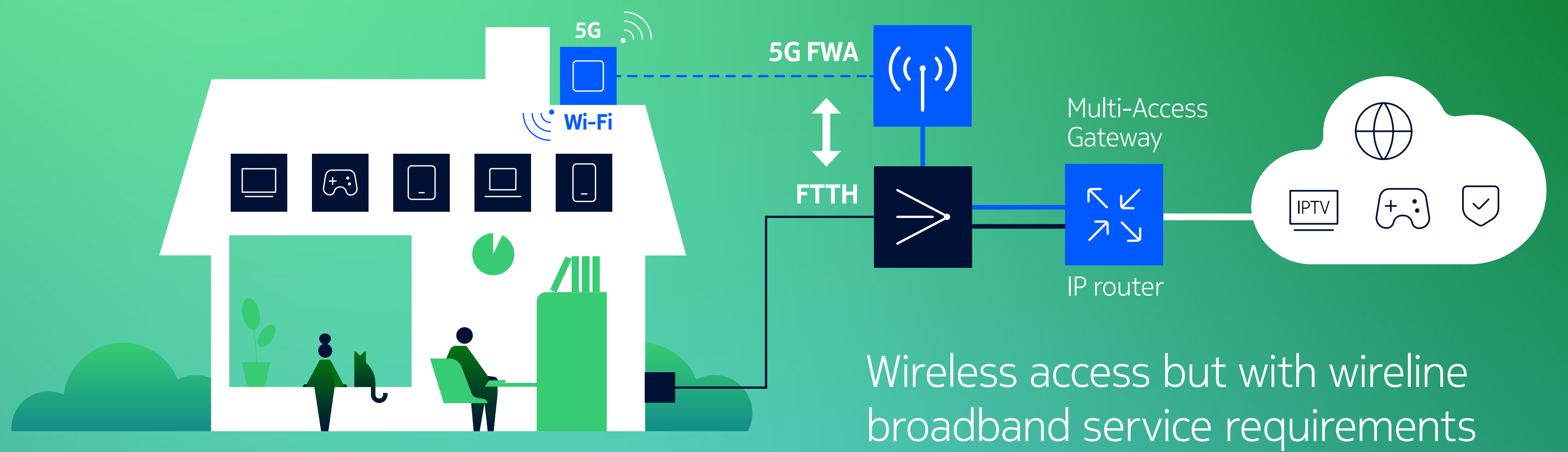
Operators can deploy the MAG as an FWA gateway for 4G (SPGW) and 5G (SMF/UPF) on a wide range of [Nokia 7750 Service Routers](#) to efficiently meet the capacity requirements of residential broadband services. Powered by our industry-leading [FP routing silicon](#), the MAG enables superior bandwidth scaling and throughput with granular quality of service for individual subscribers and services.

With the MAG, GPRS tunnels (GTP-U) from 4G and 5G FWA nodes are terminated directly on router line-cards. Native IP multicast support enables efficient delivery of IPTV broadcast services without evolved Multimedia Broadband Multicast Services (eMBMS), and Internet traffic can be directly handed off to ISPs or peering routers.

Bridging the digital divide

Broadband access is essential to connect, collaborate and participate in a fast growing digital economy, but over 2.5B people remain unconnected. Universal broadband unlocks new opportunities for personal and corporate growth, and will help to create a more inclusive society with a higher standard of living, increase productivity and a better quality of life.

Our mission is to help the world act together by supplying the broadband technology needed to bridge the digital divide.



Wireless access but with wireline broadband service requirements

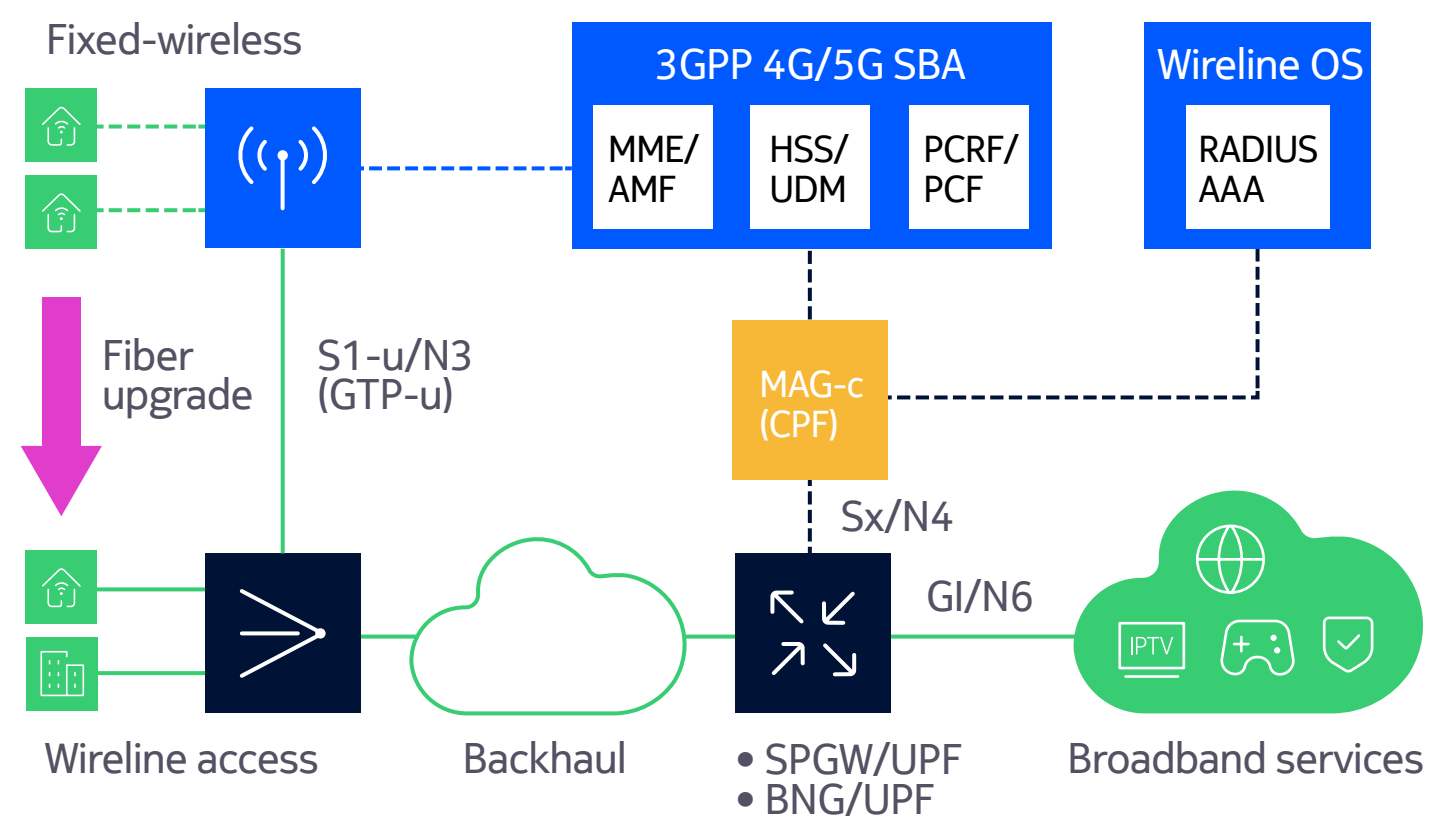
Why scale fixed-wireless broadband on routers?

Fixed-wireless and wireline broadband services have similar service delivery requirements. By scaling user plane functions on the same edge routing platforms used by wireline Broadband Network Gateways (BNGs), operators will achieve comparable cost and performance benefits for 5G fixed-wireless broadband access.

Fixed-wireless and wireline broadband convergence

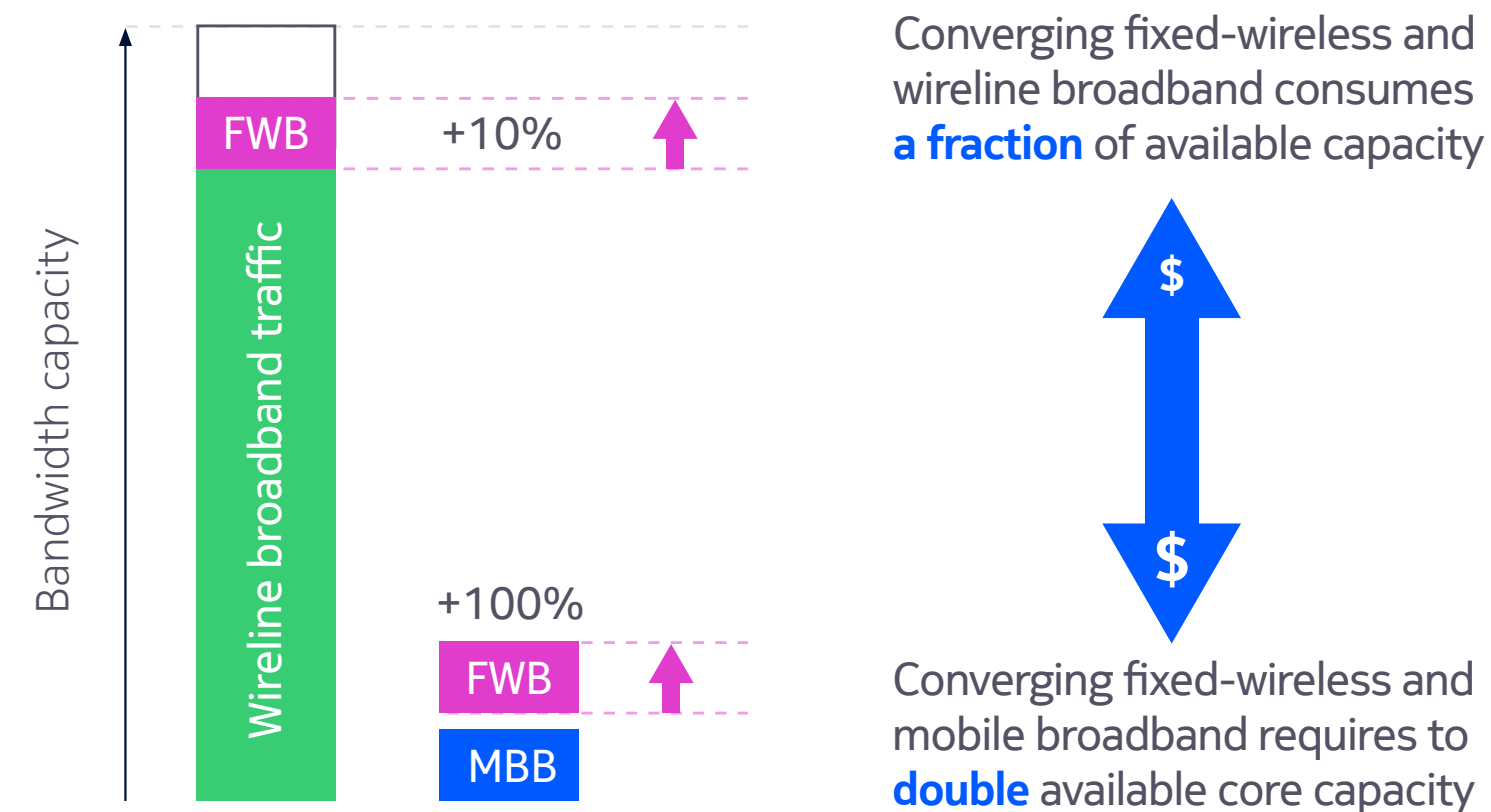
To scale fixed-wireless broadband deployments, operators need to distribute 5G mmWave radios over a larger area. They also need to use fiber access to backhaul fixed-wireless broadband traffic and connect high-density residential areas and businesses. The Nokia MAG supports this evolution with capabilities to leverage the same routing platforms for both fixed-wireless and wireline BNGs.

Converged wireline and fixed-wireless broadband on the Nokia Multi-Access Gateway



Why offload fixed-wireless broadband from a 5G core?

5G fixed-wireless broadband users generate much more traffic than mobile broadband users, and this can quickly exhaust the available bandwidth capacity of a 5G mobile packet core. Internet, over-the-top video and online gaming will consume precious mobile core capacity while contributing no incremental revenues per bit.



Delivering a seamless broadband experience everywhere

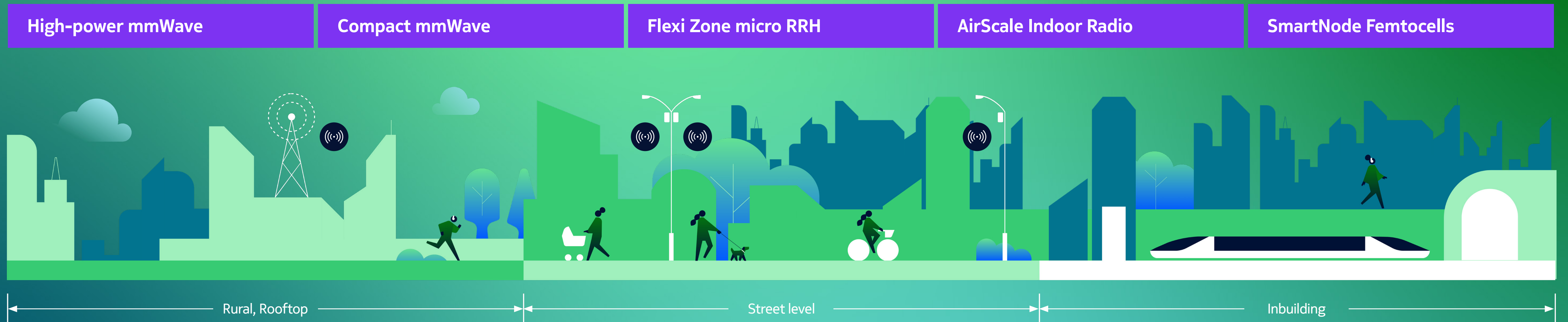
The scalability and versatility of the Nokia MAG enables operators to seamlessly integrate fixed-wireless broadband services into their offerings. Mobile and converged operators will benefit from the superior performance and capacity of Nokia 7750 Service Routers to cost-efficiently deliver fiber-grade broadband services over 5G FWA. The use of purpose-built network processors ensures that user plane functions (UPF) will meet the bandwidth and cost constraints of broadband internet, IPTV, and over-the-top video services.

The MAG can be deployed as an integrated solution on 7750 service routers or as a disaggregated solution with separate control plane functions residing in the MAG controller (MAG-c) that can scale independently on virtualized server appliances in data centers or on the MAG-c Appliance.

Mobile and converged operators can interface the MAG controller with a 3GPP Service-Based Architecture (SBA) in 5G NSA or SA mode using standard-compliant interfaces (S11/N11, N7, N10).

Wireline operators can continue to use traditional RADIUS AAA infrastructure to manage fixed-wireless broadband subscribers.

Nokia complements the Multi-Access Gateway with a full range of Fixed-Wireless Access solutions to expand broadband coverage.



Why partner with Nokia?

Nokia is an industry leader in [5G radio](#) and [broadband access](#). We lead the market in 5G FWA, GPON, XGS PON, and 25G PON. Nokia is also the global leader in IP edge routing, with more than 300 operators deploying 7750 Service Routers for their broadband edge.

We have a global presence and the ability to support you with a complete end-to-end broadband solution portfolio.

Where can I find more information?

A great place to start is our [Multi-Access Gateway web page](#) where you will find related datasheets and more. To learn more about our broadband edge routers, please refer to the [7750 SR product page](#). The [FastMile fixed-wireless solution page](#) is a great resource to learn more about our home broadband gateways.

Please contact a Nokia sales representative if you have further questions or didn't find what you were looking for.

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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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