

25G will be just one element in a new toolkit for fibre operators

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Proximus deployed the world's first live 25G-PON network in Antwerp, Belgium in May 2021. It demonstrated a single end-user-path downlink of over 20Gbit/s on a standard PTMP PON network of the kind that it is deploying over much of Belgium. This is a world record for broadband speed. Proximus's technology partner is Nokia, whose Fixed Networks division is based in Antwerp, and the deployment is a continuation of a 20-year-long vendor-operator collaboration. In this article, we assess what 25G means for both Proximus and Nokia and consider how the deployment ties into Proximus's innovative approach to monetising its investment in FTTP.

The deployment is a proof-of-concept that Nokia can deliver super-abundant capacity

The live deployment in Antwerp uses an early specification of 25G-PON; the desired full symmetrical speeds (full 25GS-PON) are expected "to be within reach" by 2022.¹ The deployment demonstrates the practically limitless capacity of fibre access. Indeed, the gap between what optical access can offer and what any other technology, fixed or wireless, can deliver is getting ever wider.

There is an easy evolution path to 25GS-PON from GPON and XGS-PON, the latter of which is rapidly becoming the optical access technology of choice for new FTTP networks. 25GS-PON uses different fixed wavelengths to both GPON and XGS-PON, so can co-exist with them with minimal upgrade disruption. The commercialisation of 25G-PONs in the next year or so could lead to the demise of the alternative approach to next-generation PONs: the multi-wavelength NG-PON2. This is now likely to be too difficult to deliver at a cost that matches its commercial benefits. Fixed-wavelength solutions such as 25GS-PON appear to be the main way forward for next-generation PONs.

Nokia developed 25G by working within the 25GS-PON MSA industry-standard group. Key operator members of this group include AT&T, Chunghwa, Chorus, INEA, NBN and Proximus itself. The stated goal of this group was "to promote and accelerate the development of 25 Gigabit Symmetric Passive Optical Network technology" because the ITU had not reached a consensus to standardise any 25Gbit/s PON, and decided to focus instead on 50G-PON. Nokia's 25Gbit/s technology is powered by its own Quillion chipsets, which are now deployed in new GPON and XGS-PON combo-boards, thereby making all recent Nokia deployments 25GS-PON-ready.

It is too early to speculate on the actual cost of 25G-PON OLTs and ONTs relative to those for GPON and XGS-PON, but there are two cost-related points that we must consider.

¹ Proximus (2021), *World premiere in Antwerp: Proximus and Nokia deploy the industry's first 25 Gbps connection on a live network, the fastest fiber network on earth*. Available at: <https://www.proximus.com/news/2021/20210526-proximus-and-nokia-unveil-world-premiere.html>.

- Most optical access technologies have evolved out of technologies that are used for long-haul transport. However, 25Gbit/s technology components come from the mature data centre ecosystem. By contrast, 50G-PON components require new technology.
- The incremental cost of implementing new fixed-wavelength optical access technologies, once they have matured, is generally a small fraction of the one-off cost of the optical distribution network itself, meaning that huge step changes in capacity come at a low cost, unlike in cable and mobile networks.

25GS-PON is just one part of Proximus's innovative wholesale FTTP strategy

It is unlikely that 25G will be fully commercialised until at least late 2022. If the technology matures quickly enough, some operators with just GPON may consider upgrading to 25G before 2025, so what does this early deployment of 25G offer Proximus?

Proximus wants to be a 'reference operator' with respect to its new fibre networks. 25GS-PON will put Proximus ahead of its main competitors that are using DOCSIS over HFC networks. Irrespective of new use cases, the marketing power of this message should not be underestimated, particularly in the wholesale services domain. DOCSIS4.0 can potentially get to 10Gbit/s near-symmetrical, but at considerable additional expense. Interestingly, the CEO of Telenet's parent company Liberty Global indicated in June 2021 that the cost per premises passed for upgrades of the Virgin Media HFC network in the UK to XGS-PON would not be meaningfully higher than for DOCSIS4.0.

25GS-PON can be seen as a further powerful component of the 'one-fibre' approach that many operators are taking, whereby the same set of active equipment is being used for enterprise, x-haul and broadband. 25GS-PON could easily deliver ostensibly uncontended ultra-low-latency, 10Gbit/s symmetrical access to enterprises. In doing so, it could provide a launchpad for pushing PONs deeper into the enterprise environment. It could also provide low-cost, high-bandwidth x-haul for 5G enterprise small cells, particularly if processing is centralised and a variant of fronthaul is required; this is probably best understood as creating a new opportunity by reducing costs rather than as servicing a need. Finally, 25GS-PON could be used for HFC backhaul and as such, it could be part of a phased migration to optical access.

25GS-PON forms part of a virtualised toolkit

Proximus now has ambitious roll-out targets for FTTP, much like many of its European peers (such as Openreach, KPN and [Deutsche Telekom](#)). What distinguishes its plans is that it is also virtualising its active layer "with full differentiation capabilities". It will thereby offer centralised and virtualised access to its entire FTTP network, while at the same time also offering wholesale customers a degree of operational autonomy that standard centralised wholesale access services never offer in practice.² This is a wholesale model that is far-removed from the much-admired Layer 1-focused model used in neighbouring France.

Centralised, virtualised active access (network-as-a-service or NaaS) tends to often be thought of as a sort of 'bitstream on steroids', attractive only to small-scale service providers (which in any case collectively have a tiny market share in Belgium) or to niche players with non-standard requirements. It is Proximus's explicit aim that NaaS will be enough to attract its largest competitors (Telenet and Orange). For the full-service fixed-

² Note that a passive access option will be available only on those parts of the network that are being constructed as joint ventures, and even there, Proximus will offer up the same virtualised wholesale active connectivity platform on top of the dark fibre.

mobile integrated operator, the additional 25G capability could be a significant additional incentive to adopt the model.

We should not assume that wholesale FTTP access seekers in every market will follow the same path that many took for copper (that is, towards physical unbundling and a more capex-intensive/owner-economics approach). The wholesale market is now bigger, more commercial and no longer the exclusive preserve of regulated and unwilling incumbents. Proximus hopes that the flexibility of its connectivity platform will be enough to discourage major retail broadband players from climbing the ladder of investment in regions where they have no fixed access and to encourage them to adopt a more opex-oriented approach. The critical success factor for the NaaS model is therefore not technology; it is pricing.