

Navigating the Fibre Frontier:

EXPLORATION OF GPON VS XGS-PON



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IN AN ERA DEFINED BY AN INSATIABLE APPETITE FOR HIGH-SPEED BROADBAND, THE RIVALRY BETWEEN GIGABIT PASSIVE OPTICAL NETWORK (GPON) AND XGS-PON (10-GIGABIT SYMMETRIC PASSIVE OPTICAL NETWORK) TAKES CENTRE STAGE. THESE TECHNOLOGIES, REPRESENTING DISTINCT EVOLUTIONARY STEPS, ARE ENGAGED IN A NUANCED BATTLE TO PROVIDE THE OPTIMAL SOLUTION FOR THE EVER-GROWING DEMAND FOR BANDWIDTH. IN THIS COMPREHENSIVE EXPLORATION, WE DELVE DEEPER INTO THE KEY DIFFERENCES, ADVANTAGES, AND CONSIDERATIONS IN THE ONGOING GPON VS XGS-PON DEBATE.



UNDERSTANDING GPON

Gigabit Passive Optical Network (GPON), a stalwart in the fibre broadband realm for over a decade, first emerged in 2003 as an ITU-T standard (G.984). Its purpose was clear: to deliver high-speed broadband access with asymmetrical data rates, prioritising faster downstream speeds over upstream. The success of GPON is attributed to its cost-effectiveness, scalability, and widespread deployment across residential and small business networks globally.

THE RISE OF XGS-PON

Stepping into the ring as the next evolution in PON technology is XGS-PON, based on the ITU-T G.9807 standard. Introduced to the world in 2016, XGS-PON seeks to provide symmetrical 10Gbps speeds for both upstream and downstream data transmission. Positioned as an extension of GPON, XGS-PON aims to address the escalating need for higher bandwidth in applications such as 5G backhaul, enterprise connectivity, and residential broadband services.

KEY DIFFERENCES

SYMMETRY OF SPEED

- GPON: Asymmetric speeds with a higher downstream rate (up to 2.5Gbps) compared to upstream (up to 1.25Gbps).
- XGS-PON: Symmetrical speeds of 10Gbps for both downstream and upstream, ensuring a balanced and higher-capacity connection.

UPGRADABILITY

- GPON: Upgradable to 10Gbps downstream (XG-PON1), but upstream speeds remain limited.
- XGS-PON: Engineered with 10Gbps symmetrical speeds from inception, ensuring a higher baseline for future upgrades.

USE CASES

- GPON: Predominantly deployed in residential and small business settings due to its cost-effectiveness.

- XGS-PON: Strategically positioned for demanding applications such as enterprise connectivity, 5G backhaul, and scenarios requiring higher symmetrical bandwidth.

ADVANTAGES OF XGS-PON

HIGHER SYMMETRICAL BANDWIDTH

XGS-PON's standout advantage lies in providing symmetrical 10Gbps speeds, adeptly meeting the surging demand for upstream bandwidth in applications like video conferencing and cloud services.

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FROM THE INDUSTRY

FUTURE-PROOFING

Designed with future upgrades in mind, XGS-PON offers a higher baseline, making it well-suited for emerging technologies and bandwidth-intensive applications that evolve over time.

ENTERPRISE AND 5G BACKHAUL

XGS-PON emerges as the go-to technology for enterprises and 5G backhaul scenarios where symmetrical high-speed connectivity is not just a luxury but a necessity.

CONSIDERATIONS IN THE GPON VS XGS-PON DECISION

COST

While GPON boasts established deployment and cost-effectiveness, the decision between GPON and XGS-PON involves considering the cost implications. On average, XGS-PON infrastructure tends to incur a higher initial investment compared to GPON, primarily due to the increased equipment costs associated with symmetrical 10Gbps capabilities.

ESTIMATING THE COST DIFFERENTIAL

The implementation of XGS-PON often involves more advanced and costly optical line terminals (OLTs) and optical network terminals (ONUs) to handle the symmetrical 10Gbps speeds. On average, XGS-PON may cost operators approximately 20-30% more than deploying GPON infrastructure.

LONG-TERM COST CONSIDERATIONS

It's essential to factor in the long-term benefits of XGS-PON, including its future-proofing capabilities and potential for higher revenue generation from premium services. While the initial investment is higher, XGS-PON's symmetrical bandwidth and adaptability may offset the costs over the network's lifecycle.

INFRASTRUCTURE CHANGES

The transition from GPON to XGS-PON necessitates certain infrastructure changes, primarily focused on accommodating the increased symmetrical bandwidth. These changes include:

OPTICAL LINE TERMINALS (OLTS)

Upgrading OLTs to support the new wavelengths and symmetrical transmission is crucial. OLTs in an XGS-PON deployment must be capable of handling higher data rates seamlessly.

OPTICAL NETWORK UNITS (ONUs)

End-user premises equipment, ONUs, need to be upgraded or replaced to support the symmetrical 10Gbps speeds. Compatibility between existing GPON ONUs and XGS-PON infrastructure is a key consideration.

FIBRE DISTRIBUTION

While the existing fibre distribution may be leveraged, adjustments may be needed to accommodate the increased bandwidth demands, ensuring optimal signal quality and minimal signal degradation over longer distances.

CONCLUSION

In the ongoing GPON vs XGS-PON discourse, the choice is an intricate dance between the unique needs and priorities of network operators, service providers, and end-users. While GPON stands firm as a reliable and cost-effective solution for residential and small business broadband, XGS-PON emerges as a powerhouse for enterprise connectivity, 5G backhaul, and applications demanding symmetrical 10Gbps speeds. As the digital landscape continues to evolve, the decision between GPON and XGS-PON will undeniably shape the trajectory of fibre broadband networks, defining the next frontier of high-speed connectivity for years to come.

WHAT'S THE DIFFERENCE BETWEEN EUROPEAN FIBRE ROLL OUT AND WHAT'S HAPPENING IN AUSTRALIA?

The biggest difference is we do not use blown fibre. We haul our cable directly in conduits, which is also done in the UK. It is just not as common as your blown fibre. As for the technology, both the UK and Australia use GPON and XGSPON through the fibre. And we have better weather of course...

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