



*Xena Networks Recognized for*

**2021**

**New Product Innovation**

Global Terabit Ethernet

Testing Solutions Industry

*Excellence in Best Practices*

## Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each award category before determining the final award recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. Xena Networks excels in many of the criteria in the global Terabit Ethernet (TbE) testing solutions space.

AWARD CRITERIA	
<i>New Product Attributes</i>	<i>Customer Impact</i>
Match to Needs	Price/Performance Value
Reliability	Customer Purchase Experience
Quality	Customer Ownership Experience
Positioning	Customer Service Experience
Design	Brand Equity

### *The Need for Integrated Testing Solutions for High-speed Ethernet Technologies*

The demand for higher network bandwidth grows in tandem with technological advancements and the number of hyperscale data centers globally. These factors drive Ethernet technologies to transition beyond 100 Gigabit Ethernet (GbE) to 400 GbE, 800 GbE, and 1.6 TbE. The move to 100 GbE about a decade ago was a major achievement in stretching available technology at that time to its limit. The ongoing shift to 400 GbE involves multiple new innovations and approaches that could set the platform for true TbE speeds as they already enable 800 GbE solutions today even before standards from the Institute of Electrical and Electronics Engineers (IEEE) are available. However, these new innovations and approaches have also made testing more challenging. Ethernet testing is no longer concentrated on the data link layer as extensive testing on the physical layer is now required.

The need to test the physical layer and the availability of higher-speed Ethernet solutions (such as 800 GbE) even before IEEE standards are ratified has led to major interoperability issues. The 800 GbE solutions available today operate at the performance edge of existing technology capability, requiring certain trade-offs to be made more sensitive to errors. Traditionally, Ethernet testing of the physical layer and data link layer requires two separate tests. However, with the introduction of forward error correction (FEC) in TbE speeds of 800 GbE, the data link layer now relies on insights from the physical layer as well. As such, flexible and integrated 800 GbE testing solutions validating products throughout the different network layers and phases of product development are strongly needed.

Companies operating in the TbE testing solutions market must enable customers to test and measure stress performance of network devices, data forwarding behavior, and interoperability as well as perform validation of network equipment as per existing standards. Testing solutions also need to be flexible enough to accommodate any future revisions in the standards. By introducing holistic solutions, companies reduce the need for third-party integration to measure network performance. Holistic solutions can significantly mitigate customers' errors rates in network performance tests and ensure a higher return on investments. With no official IEEE standard for 800 GbE, all developments in the market rely on industry consortiums and multisource agreements (MSA) such as the Ethernet Technology Consortium, QSFP-DD MSA, and Optical Internetworking Forum. To accommodate varied configurations in baud rates, number of lanes, module formats, and modulation schemes, testing solutions for 800 GbE need to be adaptable.

### ***Meeting Industry Needs through Brand Equity and Product Positioning***

A forerunner in the Ethernet test and measurement market, Xena Networks is an emerging market leader for high-speed Ethernet testing solutions. Founded in 2007 and headquartered in Copenhagen, Denmark, the company focuses on GbE traffic generation across research and development and production environments. Xena Networks achieved success through five main products: Valkyrie and Vulcan for high-speed Ethernet traffic generation, Chimera for high-speed Ethernet emulation of network impairment, Vantage for testing Ethernet-based components during production, and Safire for

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testing enterprise firewall performance. Through its 400 GbE (Thor) and 800 GbE (Freya) network high speeds, the company has made significant inroads in the market. Its customer base includes contract manufacturers, network equipment manufacturers (NEM), government and defense organizations, automotive participants, network service providers, data centers, and enterprise information technology (IT) and security companies.

Xena Networks's newest addition to the Valkyrie product line is the Freya family of 800 GbE testing solutions. Based on the Ethernet Technology Consortium specification and the IEEE 802.3ck draft specifications for 800 GbE, they are the industry's first and only traffic generation and analysis (TGA) solutions for 800 GbE. The Freya test modules can handle both optical transceivers and direct attach copper (DAC) cables and support four different Ethernet speeds using 112G SerDes (PAM4 112G): 800, 400, 200, and 100 GbE. The modules consist of two physical transceiver cages, one supporting QSFP-DD800 and the other supporting QSFP112-compatible transceivers. The modules are also flexible to accommodate potential revisions or corrections to 800 GbE standards. Freya modules can help customers validate the performance, interoperability, and integrity of any networking devices or chips designed and developed for 800 GbE.

Xena Networks's commitment to meeting small- or large-scale customer-specific testing requirements is reflected in the Freya test modules, Freya-800G-1S-1P and Freya-800G-4S-1P. These modules are highly flexible in supporting multiple Ethernet speeds and configurations to address existing and future use

cases. Xena Networks has first-mover advantage as its 800 GbE TGA solutions are unrivaled in the market. The solutions’ high flexibility and ability to accommodate varied use cases with multiple interface categories and options (presented in Table 1) also make them resilient to future competition. Frost & Sullivan believes Xena Networks’s agility and product attributes represent the hallmarks of an industry initiator and market leader for 800 GbE offerings.

**Table 1. Port-level features of Freya-800G-1S-1P and Freya-800G-4S-1P**

	<b>Freya-800G-1S-1P</b>	<b>Freya-800G-4S-1P</b>
<b>Interface category</b>	QSFP-DD800: <ul style="list-style-type: none"> <li>800, 400, 200, 100 GbE</li> </ul> QSFP112: <ul style="list-style-type: none"> <li>100GbE</li> </ul>	QSFP-DD800: <ul style="list-style-type: none"> <li>800, 400, 200, 100 GbE</li> </ul> QSFP112: <ul style="list-style-type: none"> <li>400, 200, 100 GbE</li> </ul>
<b>Interface option</b>	QSFP-DD800 cage: <ul style="list-style-type: none"> <li>1x800 GbE</li> <li>2x400 GbE</li> <li>4x200 GbE</li> <li>8x100 GbE</li> <li>2x100 GbE</li> <li>1x100 GbE</li> </ul> QSFP112 cage: <ul style="list-style-type: none"> <li>1x100 GbE</li> </ul>	QSFP-DD800 cage: <ul style="list-style-type: none"> <li>1x800 GbE</li> <li>2 or 1x400 GbE</li> <li>4 or 2x200 GbE</li> <li>8 or 4x100 GbE</li> </ul> QSFP112 cage: <ul style="list-style-type: none"> <li>1x400 GbE</li> <li>2x200 GbE</li> <li>4x100 GbE</li> </ul>
	The modulation scheme for all interfaces in both cages is PAM4	The modulation scheme for all interfaces in both cages is PAM4

The Ethernet evolution is primarily driven by cost per bit delivered considerations. To achieve higher speeds at 400 GbE and 800 GbE, power consumption per bit delivered needs to be considered as well. For instance, 400 GbE optics consumes about three to four times more power than 100 GbE optics, while 800 GbE optics consumes nearly twice the power of 400 GbE optics. It is imperative to achieve a fair balance between cost per bit delivered and power consumption per bit delivered in 800 GbE solutions. This dual requirement has led to multiple approaches such as faster electrical lane speeds, new modulation schemes, and the need for improved FEC mechanisms. Xena Networks is at the forefront of this technology development cycle with its Freya modules accommodating all relevant paths and approaches for 800 GbE.

Apart from basic switch testing and transceiver functional testing, Xena Networks broadened the product features and specifications of the Freya modules with more sophisticated layer-1 test features. The Freya modules are designed for thorough transceiver testing, providing visual information on the quality of received signals and validation features such as FEC statistics with a pre-FEC error distribution graph, payload test patterns, alerts, and comprehensive physical coding sublayer (PCS) and physical medium attachment (PMA) layer test capabilities that facilitate physical layer and transceiver testing. Test results are presented using extensive statistics and graphs for better user understanding. The Freya modules also support auto-negotiation and link training (AN/LT) interoperability testing and are compatible with Xena Networks's ValkyrieBay chassis (Val-C12-2400G).

Xena Networks always prioritizes industry needs for reliable and cost-efficient testing solutions for next-generation Ethernet technologies. The company actively participates in significant industry events and conferences globally while maintaining effective relationships with customer verticals, including NEMs, government organizations, and research centers. For instance, Xena Networks was the gold sponsor for Ethernet Alliance's Technology Exploration Forum (TEF) held in January 2021. In April 2021, the company organized Discover Xena, a global customer event wherein experts from different technology domains are invited to discuss the needs and requirements for next-generation Ethernet technologies and testing solutions.

Xena Networks strives to increase its global presence while focusing on developing strong partnerships with Silicon Valley-based companies. By concentrating on building and strengthening its brand equity, Xena Networks is expected to experience considerable growth in revenue and margins as well as product awareness on its 800 GbE offerings. The Thor 400 GbE testing solutions became the company's best-selling product within two years of their launch; the company has been doubling its sales revenue year on year since 2018. Frost & Sullivan commends Xena Networks for introducing the market's first and only TGA solutions for 800 GbE and positioning itself as an emerging market leader in the TbE testing solutions space.

### ***Enhancing Customer Experience with High Price/Performance Value in Offerings***

Xena Networks offers customers the best value for the price when compared to similar offerings in the market through its Xena Value Pack for the Freya modules, which includes user-friendly software such as ValkyrieManager, ValkyrieCLI, ValkyrieREST-API, Valkyrie3918, Valkyrie2544, and Valkyrie1564, Valkyrie2889. Unlike its competitors, Xena Networks promises about 30% to 50% savings on total cost of ownership for its products with three years of free software upgrades, three years of hardware warranty, and free technology support and training throughout the products' lifetime. The company also offers guaranteed hardware replacement if return merchandise authorization (RMA) is necessary. These customer-centric features ensure quality performance throughout the products' life cycle.

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Xena Networks constantly improves its solutions’ capabilities to satisfy the evolving high-speed network testing and performance measurement requirements of customers. The company offers product feedback mechanisms through online forms, service satisfaction surveys, and constant dialog engagements with partners. The company will soon launch Xena Community, a user-based forum for customers to exchange questions, tips, and experiences with the company’s products. While developing Freya 800 GbE solutions, Xena Networks actively engages with its alpha and beta customers and technology partners for input

and feedback on product features and specifications. This ensures that major areas of concern, such as transceiver reliability and interoperability, are efficiently and effectively addressed and that the solutions match market and customer needs for 800 GbE technologies.

Xena Networks’s customer purchase experience is simple and transparent. The company actively engages in pre-sales qualification rounds to ensure its solutions satisfy customer needs. To streamline and make its product range and pricing structure customer-friendly, the company follows up each purchase with after-sales satisfaction calls. Xena Networks emphasizes customer satisfaction among existing and potential customers. This is evidenced by its ability to compete head-on with publicly listed industry giants. Frost & Sullivan praises Xena Networks for always prioritizing customer needs in its product development and sales strategies.

## Conclusion

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With its first-to-market Freya 800 GbE Ethernet TGA solutions, Xena Networks is favorably positioned for positive future growth as the 800GbE technology matures. The company constantly improves its offerings with new features, such as more sophisticated layer-1 testing capabilities, to compete with more established participants in the market. Through having close dialogs with customers and partners during product development and showcasing its solutions at industry events, the company creates significant buzz in the market for its Freya modules. By addressing customer unmet needs and combining product reliability with robust customer support, Xena Networks paves the way to supporting and enabling TbE technology with its unique Freya modules.

With its strong overall performance, Xena Networks earns Frost & Sullivan’s 2021 Global New Product Innovation Award in the TbE testing solutions industry.

## What You Need to Know about the New Product Innovation Recognition

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Frost & Sullivan's New Product Innovation Award recognizes the company that offers a new product or solution that uniquely addresses key customer challenges.

### Best Practices Award Analysis

For the New Product Innovation Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

#### *New Product Attributes*

**Match to Needs:** Customer needs directly influence and inspire product design and positioning

**Reliability:** Product consistently meets or exceeds customer performance expectations

**Quality:** Product offers best-in-class quality with a full complement of features and functionality

**Positioning:** Product serves a unique, unmet need that competitors cannot easily replicate

**Design:** Product features an innovative design that enhances both visual appeal and ease of use

#### *Customer Impact*

**Price/Performance Value:** Products or services provide the best value for the price compared to similar market offerings

**Customer Purchase Experience:** Quality of the purchase experience assures customers that they are buying the optimal solution for addressing their unique needs and constraints

**Customer Ownership Experience:** Customers proudly own the company's product or service and have a positive experience throughout the life of the product or service

**Customer Service Experience:** Customer service is accessible, fast, stress-free, and high quality

**Brand Equity:** Customers perceive the brand positively and exhibit high brand loyalty

