Keysight Technologies Recognized for

2021

Market Leadership

Global Network
Packet Brokers Market
Excellence in Best Practices

F R O S T *&* S U L L I V A N

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 companies. Keysight Technologies excels in many of the criteria in the network packet broker space.

AWARD CRITERIA

Growth Strategy Excellence	Technology Leverage
Implementation Excellence	Price/Performance Value
Brand Strength	Customer Purchase Experience
Product Quality	Customer Ownership Experience
Product Differentiation	Customer Service Experience

Strategic Excellence

Frost & Sullivan finds Keysight Technologies (Keysight) continues to weather the COVID-19 pandemic and deliver higher than expected quarterly results through its strategic excellence and technological savviness. Keysight's top performance rests on five pillars that form its key focus: market insight, capital allocation, first-to-market solutions, operational excellence, and employee growth; however, the company also identifies customer value as the most critical driver for its own success. To this end, the company developed the Keysight Leadership Model to ensure it continues to deliver end-to-end value to customers, shareholders, and employees. For example, with network complexity on the rise and several network operations (NetOps) and security operations (SecOps) teams struggling to accommodate the influx of data, Keysight identified a significant need to prevent packet loss and the residual poor performance that follows. Since rebranding itself in 2014 following the separation from Agilent, Keysight continues to build out its strong brand portfolio, expanding into new product categories. Additionally, the company strengthened its position in the network performance monitoring space through its 2017 acquisition of Ixia, now integrated into Keysight's Commercial Communications Group. This acquisition directly impacted Keysight by enabling

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the company to leverage Ixia's industry-leading technology, such as the Vision network packet broker (NPB) product portfolio, including Vision ONE and Vision X, or its virtual visibility solution family, CloudLens. The NPB platform offers wide range of options including NetStack, PacketStack, AppStack, SecureStack, MobileStack and TradeStack. These capabilities offer market-specific solutions for their customers. Vision X offers key architectural advantages and features that differentiate the product from its direct competitors. Keysight's SecureStack provides real-time visibility for its customers across their secure networks. It offers inline traffic decryption, out-of-band decryption, malicious activity detection and data masking. Missing network packets can translate to missing parts of an active security breach or event. PacketStack has 2.5 times more packet processing power than the competition with zero network packet loss, which is critical in security forensics and threat hunting scenarios. AppStack provides a direct way to classify hundreds of applications running on customer networks to understand network behavior to quickly and accurately filtering traffic of interest for further analysis. Vision X delivers stable and consistent intelligence and performance using high performance onboard processing for its Stacks. Further, the Vision X NetStack module leverages two switch silicon pipelines, enabling it to double its filter storage, and its packet processing capability translates to zero dropped packets under load. In addition, Keysight also launched MobileStack, which is a new subscriber session monitoring capability that provides subscriber-aware visibility into 4G and 5G packet core for service providers. This enables service providers to enhance quality of service monitoring while reducing operational costs.

High-quality Design

Frost & Sullivan finds network packet brokers play a critical role in network performance, retrieving live data from production networks and performing various traffic filtering and processing to send the right data to the right network and security analytics tools. As these networks grow increasingly complex, monitoring and sustaining proper functioning becomes difficult. The lack of end-user awareness in terms of product features, interconnection between networks, and security, plays a major role in determining NPB vendor success. With so many players in the market, it is difficult for enterprises to select the right system.

To ensure it continues to deliver NPB technology that is both reliable and high-quality, Keysight adheres to a robust quality policy focused on delivering high value to customers. Through this robust process, the company strengthens customer confidence and bolsters customer loyalty. This process includes:

- Complying with all appropriate safety and regulatory requirements

- Meeting or exceeding published specifications for solutions and products

- Improving business management system effectiveness

- Maintaining high standards to improve the total customer experience

- Holding suppliers, partners, and contracts accountable for quality compliance

- Keeping customers informed through direct communication according to Keysight's Standards of Business Conduct and Privacy policies

Industry-leading Performance

Keysight's Vision X possesses industry-leading technology that differentiates it from the competition. The company's NPB features a proprietary and patented filtering engine that delivers best-in-class reliability and quality as the fully automated compiler results in zero errors, while traditional human-based compilers often result in more than 1,300 errors in the final configuration. The system also offers hitless changes, translating to zero dropped packets, concurrent changes by different administrative users, and simple integration with external provisioning systems through automation. Keysight also identified advanced packet processing capacity as a critical performance area. As a result, the company leveraged field-programmable gate array (FPGA) hardware to deliver customers advanced packet processing functions to suit their needs. Using FPGA for repeated tasked such as packet processing is highly efficient in power/thermals and performance; Keysight leads with a 250% higher performance than the competition. This significantly differentiates the company, as many competitors opt for onboard CPU software for similar functions. More importantly, Keysight's hardware-based implementation avoids packet drop, which supersedes software-based performance that varies based on packet sizes, translating to increased reliability.

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> **- Samantha Fisher, Best Practices Research Analyst**

Moreover, Keysight identified performance under pressure as a critical need. Vision X's performance remains stable under load with zero dropped packets, with CPU usage having no impact on the application engine. In this area, Vision X outperforms the competition in various areas, including Netflow generation in light (0.6 Gbps) and high traffic (50 Gbps) loads, application detection speed and accuracy, and Netflow export. Based on Broadcom Tomahawk II switch silicon, Keysight delivers greater flexibility and scalability. This flexibility in port breakout is important when selecting NPBs with five speed capabilities on each port, enabling users to benefit from highly condensed network designs. Customers can use 10G, 25G, 40G, 50G and 100G on the same platform to monitor various network segments in different stages of their technology lifecycle.

Best-in-class Technology

Vision X's high density and modularity delivers future-proof scalable visibility for data centers, enabling rapid decision-making. The NPB's modular design empowers customers to select varying capabilities, functions, and speeds as their data center evolves. Vision X enables NetOps/infrastructure teams to upgrade the speed and bandwidth of their visibility solution with their monitoring and security tool capabilities. Frost & Sullivan finds Keysight excels at incorporating leading-edge technologies in its product portfolio to enhance product performance and value, and Vision X is no exception. The Vision X NPB offers features such as real-time processing of up to 6 Tbps of total traffic; flexibility regarding expanding or changing data center monitoring with customizable modules with multi-speed port choices; packet processing up to 2 Tbps of data at speeds from 10 Gigabit (G) to 100 Gbps, ensuring

delivery to the right tool; zero-loss advanced packet processing with a dynamic filter compiler, and compatibility with Keysight's family of packet brokers.

The technology also supports burst protection, enabling end-to-end visibility without dropped packets when traffic exceeds tool bandwidth. The burst protection thus enables users to meet peak traffic needs efficiently, as well as manage microbursts effectively, which means preventing unnecessary drops. It also offers an application module designed as a multi-function platform module (AppStack Module). It runs x86 Docker container applications, and is managed by Kubernetes. Keysight optimized this application module for packet processing, with Netservice instances being AppStack and Active SSL. Each module contains two CPUs represented as nodes.

Maintaining Excellence

Keysight continues to invest time and knowledge in the NPB market, reflected in its continuous product development efforts. As government and industry systems continue to migrate to digital infrastructure, the need for cybersecurity and performance increase exponentially. The reality that most enterprise networks will experience a security breach at some point further compounds the need for security. As a result, in August 2020, Keysight earned new security certifications for its Vision NPB portfolio, bringing network visibility and security to federal and regulated industries. The new certifications include: Federal Information Processing Standards 140-2 Level 1 Validation, Common Criteria (NDcPP v2.1 [Collaborative Protection Profile for Network Devices]), and Department of Defense Information Network Approved Products List. A full suite of products (taps, network packet brokers, bypass and more) are TAA compliant. Achieving these certifications demonstrates Keysight's commitment to enabling government and other regulated organizations to protect their data and networks with resilient architecture. Keysight possesses impressive market reach, working with customers in aerospace and defense, energy, semiconductors, general electronics, automotive, and the communications ecosystem. Frost & Sullivan continues to marvel at Keysight's industry-leading performance, having recognized the company frequently for its market leadership and strategic excellence.

Conclusion

Network complexity has increased as IT moves faster towards their digital transformation goals with a keen view maintaining operational efficiency. Threats to business also have dramatically increased, with ever challenging threat vectors and novel ways to circumvent network defenses. Enterprises must adopt a methodology to inspect their networks, applications and services and network packet brokers play an integral part of their cyber defense strategy. As a leader across several market verticals, Keysight Technologies leverages its strategic excellence and technological savviness to deliver a compelling portfolio of solutions including Vision X, an industry-leading network packet broker that delivers zero packet loss and optimized performance for network and security operations teams. Through keen innovation and insight, the company continues to capture market attention with its impressive portfolio, setting Keysight up for strong future growth.

For its solid reputation, robust portfolio of NPB solutions, innovative and competitive spirit, and strong overall position, Keysight earns Frost & Sullivan's 2021 Global Market Leadership Award for the network packet brokers market.

What You Need to Know about the Market Leadership Recognition

Frost & Sullivan's Market Leadership Award recognizes the company that achieved the greatest market share resulting from outstanding performance, products, and services.

Best Practices Award Analysis

For the Market Leadership Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

Growth Strategy Excellence: Company demonstrates an ability to consistently identify, prioritize, and pursue emerging growth opportunities

Implementation Excellence: Company processes support efficient and consistent implementation of tactics designed to support the strategy

Brand Strength: Company is respected, recognized, and remembered

Product Quality: Products or services receive high marks for performance, functionality, and reliability at every stage of the life cycle

Product Differentiation: Products or services carve out a market niche based on price, quality, or uniqueness (or some combination of the three) that other companies cannot easily replicate

Technology Leverage: Company is committed to incorporating leading-edge technologies into product offerings to enhance product performance and value

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 are proud to 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 of high quality

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The Growth Pipeline Engine™

Frost & Sullivan's proprietary model to systematically create on-going growth opportunities and strategies for our clients is fuelled by the Innovation Generator™. Learn more.

Key Impacts:

- **Growth Pipeline:** *Continuous flow of Growth opportunities*
- **Growth Strategies:** *Proven Best Practices*
- **Innovation Culture:** *Optimized Customer Experience*
- **ROI & Margin:** *Implementation Excellence*
- **Transformational Growth:** *Industry Leadership*

The Innovation Generator™

Our six analytical perspectives are crucial in capturing the broadest range of innovative growth opportunities, most of which occur at the points of these perspectives.

Analytical Perspectives:

- Mega Trend (MT)
- Business Model (BM)
- Technology (TE)
- Industries (IN)
- Customer (CU)
- Geographies (GE)