FROST & SULLIVAN

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2007 Global Frost & Sullivan Award for Most Valued Product (MVP)
Award Recipient: Foundry Networks

I. Market Overview/Key Challenges

Businesses, residential, and wholesale markets are driving the carrier switch and router markets. There are several conditions concurrently present in this industry. High-bandwidth and ultra latency sensitive applications ranging from Internet Protocol Television (IPTV) to online gaming, download/upload of short media clips to video conferencing traffic generated by businesses is compelling service providers to increase the capacity of the network core. The increase in capacity in the core, is leading to a corresponding change in the network edge. In short, there are numerous opportunities in the market on a global level for equipment vendors.

There are, however, challenges and restraints that vendors have to overcome. Most of the challenges are related to the carriers' inexperience when deploying new infrastructures. At this point, carriers are considering a range of new technologies to address the CAPEX/OPEX and Quality of Service (QoS) issues. Some technologies are related to delivering IPTV, while others have to do with cost-effectively scaling the access and the metro networks. Carriers want a converged network to support multiple services for all of their customers. These requirements raise complex network and service interworking issues. Additionally, carriers need to provide high QoS for real-time, always-on applications. Carriers expect demand to grow and expect to sign-on subscribers over the next three or four years and upgrade the existing customers to higher bandwidth services. Thus, all service provider requirements pertaining to the carrier infrastructure are being developed with the network requirements vital to support growth over the forecast period of 2007 to 2013. Service providers are, thus, most concerned about future-proofing the network to support emerging demands.

Service providers, in the post-telecom bust era, are more than ever concerned about controlling capital and operations expenditures. Service providers need to make the most of current opportunities in the market, but are also placing stringent price-performance requirements on vendors. The primary basis for vendor selection in some cases is based on incumbent relationships; however, the carriers are seeking more from vendors, starting from network design to business development. The vendor selection criteria is based on a mix of the following factors: technologies supported, compliance with standards, total cost of ownership, service and maintenance support, price-performance, product road-map, form factor, density, feature set and interoperability with other vendors' proprietary software. It is usually not considered an engineering feat to be able to provide a broad and advanced technology and feature set at a high price. Hence, price-performance or more broadly price-feature is a hard to

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achieve attribute in the wireline infrastructure market and highly valued by service providers. Price-feature along with total cost of ownership and investment protection, usually offered via backward compatible interfaces or interfaces that can be used across different product portfolios, are often used by vendors to differentiate the products on the commercial front. Though, most Tier-1 service providers are willing to pay the price premium for a full-suite of robust feature sets, for the remaining large service provider community the balance between price and feature and getting more for an equal or lower price is very important.

II. Award Categories & Relevance

The Most Valued Product (MVP) award in the world carrier switch and router markets is a very strong indication of a company's commitment to innovation to cost-effectively meet service providers' requirements. Vendors have been adding a lot of features to the products in the carrier switch and router markets, as service providers' continue to seek more features to future-proof the networks. Currently, there are a many standards that are still in the works at the various standards bodies and which ones will become standards is not certain. Vendors go by service providers' demands and have to support a wide range of technologies in their products and/or the product road map. Hence, being able to provide more features for less in this industry is a true indication of success with regards to innovation in engineering design.

III. 2007 Global Frost & Sullivan Award for Most Valued Product

Award Description

The Frost & Sullivan Award for Most Valued Product of the Year is given to the company that has provided customers with the solution and/or service that provides the highest ratio of value to cost. The recipient has provided customers with a product that provides quality, while staying extremely competitively priced.

Research Methodology

To choose the recipient of this Award, the analysts track competitor features and prices within the industry. This is achieved through interviews with all market participants and extensive secondary research of proprietary data sources. Finally, the competitors are compared and ranked for relative position. Frost & Sullivan then presents its Most Valued Product Award to the company that received the number one industry rank.

Measurement Criteria

In addition to the methodology described above, there are specific criteria used to ascertain final competitor rankings in this industry. The recipient has excelled by staying competitive in the following criteria:

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- Product price
- Product features

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Frost & Sullivan is pleased to present the 2007 Most Valued Product Award in the World Carrier Switch and Router Markets to Foundry Networks®, Inc. This award is presented to Foundry in the Service Provider Core, Multiservice Edge Router, Ethernet Services Edge, and Ethernet Aggregation segments. The award is presented to Foundry Networks' for its NetIron® MLX and NetIron XMR product families. The NetIron XMR is deployed as a service provider core router. The NetIron MLX is deployed in the Multiservice Edge Router, Ethernet Services Edge, and Ethernet Aggregation segments. With these two product families, Foundry Networks has been able to provide very high density, features and innovation cost-effectively.

The NetIron XMR router series includes four flavors; four-slot, eight-slot, sixteen-slot and thirty-two slot and supports MPLS, IPv4 and IPv6 on all four models. The NetIron XMR offers up to 3.2 Tbps data capacity and approximately 2 Bpps per system processing capacity. The slot-density offered by the NetIron XMR offers service providers incredible investment protection along with scalability and hence enable future-proofing of the networks. On a per system basis, the NetIron XMR provides up to 128 10-GbE / 640 1-GbE / 64 OC-192 / 256 OC-48 ports. Foundry Networks has designed the NetIron XMR Series from the ground up to support high performance and scalability and can provide wire-speed, low latency, and low jitter routing for IPv4, IPv6, MPLS, and MPLS VPN services. The NetIron XMR supports Foundry Direct Routing (FDR) technology. The FDR technology is the full Forwarding Information Base (FIB) programming in hardware.

According to Foundry, this combined with hardware-based wire-speed access control lists (ACLs) and policy-based routing (PBR) enables high-end, robust IPv4, IPv6, and Layer 3 VPN routing. The IPv6 protocols supported include RIPng, OSPFv3, IS-IS, BGP-MP for IPv6 (BGP4+), PIM-SSM, and MLD. To enable smooth migration to IPv6, the NetIron XMR routers provide dual-stack IPv4/IPv6 wire-speed routing, and wire-speed IPv6 over IPv4 tunneling. The NetIron XMR Series supports IP over MPLS as well as MPLS VPN applications. The NetIron XMR Series supports the following MPLS VPN services, Virtual Leased Line (VLL), Virtual Private LAN Service (VPLS), and MPLS L3VPN, on all ports at wire-speed. In addition, the NetIron XMR product series features Multi-VRF Routing. This allows for virtual routing in cases, where the complexity of MPLS is not desired. The operators can create multiple routing protocol instances that peer with each other in completely virtualized domains while sharing the same physical routers and links. The NetIron XMR Series is designed to support the deployment of multi-service and triple-play infrastructures. The routers are able to deliver a comprehensive suite of QoS mechanisms. Operators can support up to eight distinct traffic classes of

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prioritization. As per Foundry, the XMR routers employ an advanced Virtual Output Queuing (VOQ) architecture, and innovative packet buffering and scheduling, and are hence, able to offer non-blocking packet forwarding and capable of handling severe congestion conditions. Additionally, XMR supports Weighted Random Early Discard (WRED) for differentiated packet dropping in case of congestion within a given traffic class. An important service provider requirement is to ensure high availability of networks, especially since one network may be supporting multiple services and running business and residential traffic over it. The NetIron XMR ensures high availability through a combination of highly resilient hardware and software design, and advanced failure detection and traffic protection/restoration schemes. The NetIron XMR routers run on the Multi-Service IronWare operating system that offers advanced capabilities for rapid detection and bypass of link/node failures.

The NetIron XMR offers very high scalability: up to 10 million BGP routes and up to 500 BGP peers, up to 1 million IPv4 routes in hardware and 240,000 IPv6 routes in hardware (FIB), up to 2,000 BGP/MPLS VPNs and up to 1 million VPN routes, up to 16,000 VLLs/VPLSes and up to 1 million VPLS MAC addresses and up to 4,094 VLANs and up to 2 million MAC addresses.

The NetIron XMR includes N+1 redundant switch fabric architecture, through which Foundry is able to offer very high availability and resiliency. Even in the case of multiple fabric card failures, the system continues to operate in a graceful degradation mode, where the system tunes its performance to the remaining fabric capacity.

In addition, for advanced QoS at the edge, the NetIron MLX supports inbound and outbound two-rate three-color traffic-policers with accounting. The NetIron MLX Series includes four-slot, eight-slot, sixteen-slot and the thirty two-slot models. The series offers the same port capacity on a single system as the NetIron XMR. The series supports a wide range of metro applications using a multitude of Layer 2 and MPLS capabilities. The series Layer 2 feature set includes the Rapid Spanning Tree Protocol (RSTP), Foundry's Metro Ring Protocol (MRP), and Provider Bridging (IEEE 802.1ad). MPLS capabilities include IP over MPLS, Virtual Leased Line (VLL), Virtual Private LAN Service (VPLS), and MPLS L3VPN.

The NetIron MLX series provides scalability up to 2 million IPv4 BGP routes and up to 256 BGP peers, 512K IPv4 routes in hardware, 112K IPv6 routes in hardware, 400 BGP/MPLS VPNs and up to 256K VPN routes, 4K VLL/VPLS instances and up to 256K VPLS MACs, 4094 VLANs, and up to 1 million MAC addresses

Both, NetIron MLX and NetIron XMR are MEF 9 and MEF 14 certified and support multiple Pseudowire RFCs and drafts including RFCs 4447 and 4448 for Ethernet transport over MPLS networks.

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IV. Summary of Best Practices

Foundry Networks' NetIron MLX and NetIron XMR address the most critical service provider requirements in a cost-effective way. Both the products provide a way for seamless migration, be it from IPv4 to IPv6 or from legacy to Ethernet networks. The port density offered by the products is very impressive and truly an indication of outstanding engineering design. Foundry Networks has been able to provide service providers features on hardware and software levels. With attributes like redundant switch fabric, terabit-scale architecture, wire-speed dual stack IPv4/IPv6 routing, high scalability, compliance with various IEEE and other standards, Foundry has ensured that service providers are able to receive the best performance, and a broad and comprehensive set of features that will enable future-proofing deployments, and all this in a cost-effective and compact form factor.

About Best Practices

Frost & Sullivan Best Practices Awards recognize companies in a variety of regional and global markets for demonstrating outstanding achievement and superior performance in areas such as leadership, technological innovation, customer service, and strategic product development. Industry analysts compare market participants and measure performance through in-depth interviews, analysis, and extensive secondary research in order to identify best practices in the industry.

About Frost & Sullivan

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