



Optimizing VoIP Platforms for MSO/Cable Operators

Port Concentration Reduces Service Delivery Costs

The Need to Optimize VoIP Platforms

Cable operators once focused solely on video service delivery and high-speed Internet access. Now, to enhance customer retention and revenue potential, Multiple System Operators (MSOs) also compete aggressively in the telephony business. Investing heavily in voice gateway, switch, router, and supporting transmission technologies enables MSOs to compete with incumbent local exchange carriers for telephony service revenues. When capital investments can easily exceed \$100,000 for a single voice or data service delivery platform, full utilization of each platform is vital for optimal growth and service flexibility, and to maximize ROI. Yet, in real-world operational environments, deploying VoIP platforms creates engineering issues that must be resolved in order for MSO voice delivery networks to operate at acceptable levels of efficiency and profitability.

The Advantages of Port Concentration

One area of concern is inefficient use of voice-enabling platforms such as VoIP gateways. By increasing port densities and port/switch utilization on platforms they have already deployed, MSOs can reduce or defer investment in additional gateways and associated network elements. In contrast, inefficient utilization of these systems consumes more of everything – equipment, space, power, and operational resources – to deliver the same services. Low speed electrical interfaces (e.g., fractional or full T1/E1) produce the greatest inefficiencies on gateway, switch, and router platforms because these interfaces take up more equipment space than high-speed interfaces, resulting in underutilized (“stranded”) switching and routing capacity.

Leveraging higher-capacity port interfaces fills service platforms more completely with revenue-bearing traffic, extending their investment value and useful life. The challenge lies in interconnecting with other networks. Carrier networks (e.g., PSTN) typically require interfaces that are sub-optimal for MSO service delivery platforms. This mismatch compels operators to groom traffic, to ensure the right flow makes it to the right switch or router interface in as concentrated a form as possible.

Optimizing Service Platform Utilization

Sycamore DNX Cross-Connects offer MSOs an efficient, affordable port concentration solution for optimizing VoIP gateway, switch, and router utilization. The DNX aggregates customer traffic from multiple sources and with various bandwidth requirements and grooms these flows into fewer, higher-capacity ports for handoff to the gateway, switch, or router. Consolidating low-density, low-speed electrical interfaces into high-density DS3 and/or OC-3/STM-1 interfaces frees space for additional port cards in the service platform (Figure 1). High-speed port interfaces can be configured as DS3, Ethernet, or OC-3/STM-1, depending on system requirements. DNX extends the revenue-generating life of service delivery platforms while reducing overall port and system costs.

Features and Benefits

- Reduce Service Platform Costs
- Optimize Bandwidth and Traffic
- Increase System Capacity Utilization
- Enhance Deployment Flexibility
- Simplify Testing and Diagnostics

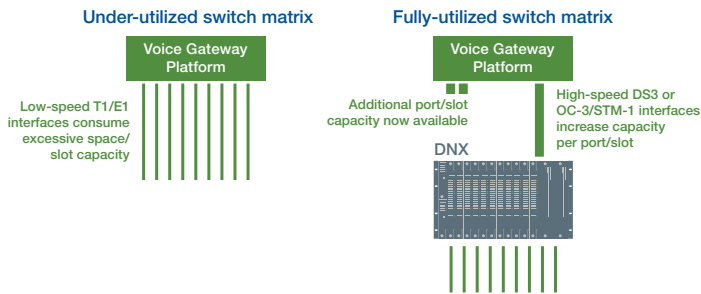


Figure 1: Port Concentration Advantages of DNX Cross-Connects

The DNX-11/88 performs non-blocking narrowband and wideband grooming that easily scales to fit the application. A DNX single-chassis configuration at the edge of the network can service small sites (traffic flow of <160 T1), and seamlessly expand into a multi-chassis system to support up to 8 OC-3/STM-1 (or 24 DS3) connections at larger sites. Each chassis can support DS0 or T1 grooming between T1, DS3, or OC-3/STM-1 interfaces. In port concentration applications at remote locations, the DNX can supply primary or backup timing to insure synchronization of the platforms. This deployment flexibility provides cable operators with a standardized solution for adding voice gateway equipment or routers to the edge of the network.

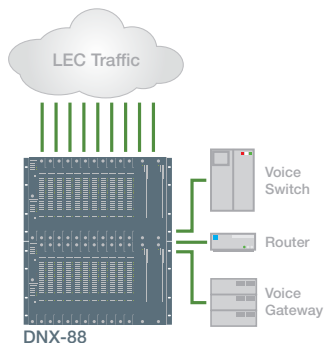


Figure 2: Port Optimization for MSO Voice Delivery Platforms

Network Testing and Operational Advantages

Utilizing DNX Cross-Connects for port concentration also benefits MSOs, from an operational perspective, by providing extended protection and testing functionality. Optical interfaces to the service platforms can be configured for 1+1 automatic protection switching (APS) to protect against both path and equipment failures. In utilizing optical interfaces, the DNX collects and stores performance monitoring statistics that provide valuable network health details. As a result of this constant monitoring for signal degradation, the DNX can perform protection switching before a card fails completely.

To further enhance network operations, Sycamore has engineered extensive test access capabilities directly into the DNX, including support for intrusive and non-intrusive testing on both equipment and facilities, which often eliminates the need for an external testing solution. These capabilities enable the operations team to remotely configure and test failed connections or monitor troublesome ports when provisioning or troubleshooting interfaces to switches and routers.

Optimization Benefits MSO Networks

Sycamore DNX Cross-Connects reduce the cost of delivering VoIP services for MSO/Cable operators. The DNX-11/88 efficiently concentrates low-speed traffic to improve port utilization on gateway, switch, and router platforms and simplify service handoff to other carriers' networks. A bandwidth management strategy that leverages higher-capacity interfaces on expensive voice and data service delivery platforms maximizes efficiency of allotted space and extends their useful life span. Implementing a DNX-based port concentration solution also provides operational enhancements, from equipment consolidation and simplified network design, to centralized management and traffic control, and integrated test capabilities.

Sycamore bandwidth optimization solutions reduce up-front and recurring costs for cable networks, from access to core, while empowering connections that:

- Enhance circuit and packet bandwidth management
- Increase utilization of gateway, switch, and router platforms
- Create intelligent optical high-speed backbones
- Ensure high network availability and SLA support
- Underpin new residential and commercial services
 - VoIP and broadband services
 - VPN and managed IP services
 - HDTV, digital cable, and content delivery

Intelligent networking solutions enable MSOs and other cable system operators to build scalable, manageable transport networks that will support incremental, market-driven growth for years to come.

For more information about our intelligent networking products and solutions, please contact your Sycamore Sales Representative.

Sycamore Networks, Inc. • 220 Mill Road • Chelmsford, MA 01824-4122, USA • Phone: 978-250-2900 • Fax: 978-256-3434 • www.sycamorenet.com

Sycamore Networks, Inc. (NASDAQ: SCMR) is a leading provider of intelligent bandwidth management solutions for fixed line and mobile network operators worldwide. From multiservice access networks to the optical core, Sycamore products enable network operators to lower overall network costs, increase operational efficiencies, and rapidly deploy new revenue-generating services.

Sycamore assumes no responsibility for the accuracy of the information presented, which is subject to change without notice. Sycamore and Sycamore Networks are trademarks or registered trademarks of Sycamore Networks, Inc. in the United States and/or other countries. Copyright © 2009 Sycamore Networks, Inc. All Rights Reserved.

