The Future of Multiservice Switching in Converged IP/MPLS Networks

EXECUTIVE SUMMARY

The multiservice switch (MSS) market has matured and stabilized over the years in response to the shifting demands for corporate WAN and Internet services infrastructure, residential broadband aggregation and backhaul, and enterprise and government networking. Ultimately, however, the MSS market failed to deliver on one of its key promises: the lasting, all-encompassing networking paradigm once envisioned by the original cast of broadband ISDN gurus.

That promise unfulfilled, the MSS market is now slowly but surely giving way to the forces of IP and Ethernet. MSS suppliers must now make agonizing decisions about how to "evolve" their platforms to support IP and Ethernet requirements in the remade multiservice edge (MSE) environment – while remaining competitive with router vendors from a price/performance standpoint.

There's still plenty of life in the MSS market. MSSs can serve as a critical bridge between two worlds, supporting legacy applications and customers while providing the necessary hooks to enable the transition to new IP/MPLS core networks. Established suppliers of MSSs are leveraging their incumbency in large data networks, the sophistication and feature-richness of their platforms, and the stability of their management systems, while MSS newcomers are adding MPLS features such as pseudowire technology and the MPLS control plane to simplify the transition from legacy to next-gen.

Important challenges lie ahead for any supplier in this market. Enterprise customers are clamoring for cheaper communications services, and service providers are responding with a mix of Ethernet access and IP-based telephony and VPNs. The focus on convergence of services onto IP has so insinuated itself into the thinking of customers and service providers alike that most talk of multiservice switching sounds antiquated to their ears. Router vendors have their attention, so that within the same service provider, one can typically find advocates of an all-IP vision and a multilayer vision, all squabbling over turf, purchasing rights, and network roadmaps.

The Future of Multiservice Switching in Converged IP/MPLS Networks tracks this critical period of transition for the MSS market – a transition in which the large incumbent equipment suppliers continue to support their traditional base of customers while pursuing emerging opportunities in wireless packet networking, packet telephony migration, and secure government and enterprise networking.

The few newcomers to this space – Ciena, Hammerhead Systems, and Mangrove Systems – aim to exploit advances in silicon and software to create from scratch new, denser systems with modular software architectures that promise more cost-effective implementations, improved reliability, and economical scaleability. For both the incumbents and the new competitors, enabling
carriers to migrate their networks to IP and MPLS and away from ATM is a primary method of positioning and differentiation.

Excerpt 1: Multiservice Switching Market Summary

<table>
<thead>
<tr>
<th>SEGMENT</th>
<th>FEATURES</th>
<th>OUTLOOK</th>
</tr>
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<tbody>
<tr>
<td>Carrier Broadband Aggregation</td>
<td>Traditional aggregation of ATM-based DSLAMs for backhaul to Internet POPs.</td>
<td>Diminishing in mature markets, where many operators are embracing a model that employs IP DSLAMs or IP-based PONs and Ethernet aggregation routers. Still strong in markets where ATM-based DSL is expanding.</td>
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<tr>
<td>Carrier ATM/Frame Relay WAN Switching</td>
<td>Support for corporate WAN services. Comprised of concentrators, multiservice edge switches and core ATM switches.</td>
<td>Evolving. New switch shipments rare, but plenty of linecard business, with new demands for Ethernet linecards and IP/MPLS support.</td>
</tr>
<tr>
<td>Enterprise Networks</td>
<td>Private data networks for large enterprise, government agencies, municipal, education, local governments.</td>
<td>Continued growth, driven by requirements for highly reliable, secure networks, and the convergence of voice, video and data onto a common infrastructure. Facing competition from metro Ethernet in some cases.</td>
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<td>Wireless Networking</td>
<td>Supporting wireless and mobile services that combine TDM and data services.</td>
<td>Strengthening in the face of a global transition to 3G, which in many cases requires MSSs in the access network and core for efficient convergence of TDM, ATM and IP/MPLS.</td>
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<tr>
<td>Packet Telephony</td>
<td>Creating a reliable packet core with guaranteed QOS. Supporting media gateway functionality at the edge/access network.</td>
<td>Moderate. Some successes here in cases where operators prefer and ATM component to their solution, though competition exists with pure-IP solutions.</td>
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The report is based on extensive interviews with leading network operators and equipment manufacturers, as well as an exclusive online survey of 87 carrier professionals, representing nearly 75 different network operators worldwide, gauging their company’s strategic plans for multiservice switches. Together, the direct interviews and survey results deliver deep insight into how carrier deployment of MSS technology is likely to change in the coming months as carriers move closer to converged networks and services.

Excerpt 2: Operator Migration Plans for Multiservice Edge Networks

<table>
<thead>
<tr>
<th>WHAT ARE YOUR COMPANY’S PLANS FOR MIGRATING YOUR MULTISERVICE EDGE NETWORK TO AN IP/MPLS NETWORK?</th>
<th># OF RESPONSES</th>
<th>% OF TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>The migration to IP/MPLS is now underway</td>
<td>42</td>
<td>51%</td>
</tr>
<tr>
<td>We plan to begin the migration to IP/MPLS later this year</td>
<td>9</td>
<td>11%</td>
</tr>
<tr>
<td>We plan to begin the migration to IP/MPLS in 2006-07</td>
<td>12</td>
<td>15%</td>
</tr>
<tr>
<td>We plan to begin the migration to IP/MPLS after 2007</td>
<td>6</td>
<td>7%</td>
</tr>
<tr>
<td>We will keep our multiservice edge and IP/MPLS networks separate</td>
<td>13</td>
<td>16%</td>
</tr>
</tbody>
</table>

Source: Survey Results
Network operators interviewed for this report include:

- AT&T Corp. (NYSE: T)
- Broadwing Corp. (Nasdaq: BWNG)
- Electric Lightwave Inc. (NYSE: CZN)
- Equant NV (a subsidiary of France Telecom SA [NYSE/Paris: FTE])
- Global Crossing Ltd. (Nasdaq: GLBC)
- MCI Inc. (Nasdaq: MCIC)
- New Edge Networks Inc.
- Savvis Communications Corp. (Nasdaq: SVVS)
- Verizon Communications Inc. (NYSE: VZ)
- Vodafone Group plc (NYSE: VOD)
- WilTel Communications Group Inc. (NYSE: LUK)

Equipment vendors surveyed and profiled include:

- Alcatel (NYSE: ALA; Paris: CGEP:PA)
- Ciena Corp. (Nasdaq: CIEN)
- Cisco Systems Inc. (Nasdaq: CSCO)
- Ericsson AB (Nasdaq; ERICY)
- Hammerhead Systems Inc.
- Juniper Networks Inc. (Nasdaq: JNPR)
- Lucent Technologies Inc. (NYSE: LU)
- Mangrove Systems Inc.
- Marconi Corp. plc (Nasdaq: MRCIY; London: MONI)
- Nortel Networks Ltd. (NYSE/Toronto: NT)
- Riverstone Networks Inc. (Pink Sheets: RSTN)
- Siemens AG (NYSE: SI; Frankfurt: SIE)
- Tellabs Inc. (Nasdaq: TLAB; Frankfurt: BTLA)

Report Scope and Structure

The Future of Multiservice Switching in Converged IP/MPLS Networks provides a complete assessment of multiservice edge networking's current and projected roles in converged IP/MPLS networks, with detailed breakouts on the following key market segments:

- Carrier broadband aggregation
- Carrier ATM/Frame Relay switching
- Enterprise networks
- Wireless networking and fixed/mobile convergence
- Packet telephony and VOIP
- Network security
The report is structured as follows:

Section I is an introduction to the report, with complete report key findings.

Section II begins with an assessment of the paths operators are taking to migrate their traditional multiservice networks to MPLS. An examination of the 3G wireless market is provided as a clear example of how MSSs can be ideal engines for this migration.

Section III delivers a detailed look at the evolution of the MSS into a Layer 2 MSE or Layer 3 MSE, with a detailed taxonomy and discussion of our service provider survey.

Section IV summarizes the interviews of operators conducted for this report.

Section V provides assessments of the vendors bringing products to market in the multiservice switching space.

The report is essential reading for a wide range of industry participants, including the following:

- **Telecom equipment manufacturers**: How will changes in the multiservice edge market affect your long-term product-positioning strategy? Does your long-term plan address the key issues that network operators are targeting? Do you have all the bases covered, or are there potentially damaging strategic gaps that need to be filled?

- **Component and subsystem manufacturers**: How will developments in the multiservice edge market affect your role in the telecom supply chain? What new features will your customers be looking to add to their products, and how can you help them meet those needs? Which types of products are most likely to be deployed by network operators as they move toward IP/MPLS convergence?

- **Network operators**: Which suppliers are best positioned to deliver the multiservice edge products you will need? Do you need to cultivate new supply sources to ensure that you can fulfill your long-term network convergence plans?

- **Investors**: Which equipment makers are in the best position to capture market share in this important telecom industry sector?

*The Future of Multiservice Switching in Converged IP/MPLS Networks* is published in PDF format.