EXECUTIVE SUMMARY

ABSTRACT:
Multiservice provisioning platforms (MSPPs) present service providers and carriers around the world with a classic "risk/reward" technology conundrum.

On the one hand, the business case for MSPPs speaks for itself. These devices have the potential to deliver huge financial benefits to service providers operating metropolitan area networks (MANs) by simultaneously saving them money on capex and opex outlays and making it for them by enabling activation of new revenue-generating services – all without having to make wholesale changes to their embedded legacy metro infrastructures.

On the other hand, choosing the right MSPP from the right supplier is hugely challenging. There are no industry standards for designing MSPPs. Vendors differ widely in their interpretations of what an MSPP for the metro market should comprise; thus, there are nearly as many variations on the technology as there are vendors of it.

The pace of change in the MSPP market only exacerbates the evaluation process; today's MSPPs embrace a range of technologies and capabilities that was unheard of only three years ago, including:

- Generic Framing Procedure (GFP/G.7041) for efficient mapping of packet data protocols into Sonet/SDH capacity
- Virtual concatenation to provide tailored bandwidth provisioning and greater transport efficiency
- Link Capacity Adjustment Scheme (LCAS/G.7042) to provide on-demand bandwidth variation
- IEEE 802.17 for Resilient Packet Ring (RPR) architectures
- Increasing standardization and use of MPLS/GMPLS for traffic engineering and Layer-2/3 VPNs
- Wavelength functions (switching, add/drop, wavelength services) and optical integration of network and services
- 10-Gbit/s Ethernet and SAN capabilities

Despite this confusion, service providers know they cannot afford to wait for the market or the technology to settle down. Use of MSPP technology is already mandated by most leading carriers, which are using MSPPs at critical junctures in their next-generation telecom infrastructures – in particular on the metro edge – to support two key functions:

- Building converged networks that carry multiple data types (IP, Gigabit Ethernet, Frame Relay, and so on) over one infrastructure via technologies such as MPLS
- Rolling out new revenue-generating data services, such as IP VPNs and Ethernet private-line services
**METHODOLOGY:**

*Multiservice Provisioning Platforms: Empowering the Metro Edge* delivers the most comprehensive analysis of multiservice provisioning platforms yet undertaken. It will be of tremendous value to service providers needing to evaluate the latest MSPP offerings, to equipment manufacturers that want to assess their competitors’ products, and to component and communications chip vendors looking to evaluate the metro market opportunity.

Product data was gathered over the course of four months via a 105-question survey of telecom equipment manufacturers in North America, Asia, and Europe. Twenty-eight companies responded to the survey, providing detailed product information about 61 MSPPs.

The final results are described in a statistical analysis table containing more than 6,000 data fields – and dissected in another 70 pages of text and 32 diagrams.

The companies whose products are evaluated in this report include:

**Public companies**
- Alcatel SA (NYSE: ALA; Paris: CGEP:PA)
- Ciena Corp. (Nasdaq: CIEN)
- Cisco Systems Inc. (Nasdaq: CSCO)
- ECI Telecom Ltd. (Nasdaq/NM: ECIL)
- Telefonaktiebolaget LM Ericsson (Nasdaq: ERICD)
- Fujitsu Network Communications Inc. (OTC: FJTSY)
- Lucent Technologies Inc. (NYSE: LU)
- Marconi Corp. plc (OTC: MONIY)
- Nortel Networks Corp. (NYSE/Toronto: NT)
- Riverstone Networks Inc. (Nasdaq: RSTNE)
- Siemens Information and Communications Networks Inc. (NYSE: SI; Frankfurt: SIE)
- Sycamore Networks Inc. (Nasdaq: SCMR)
- Tellabs Inc. (Nasdaq: TLAB; Frankfurt: BTLA)

**Private companies**
- Anda Networks Inc.
- Appian Communications Inc.
- Atrica Inc.
- Axerra Networks Inc.
- Coriolis Networks Inc.
- Corrigent Systems Inc.
- Internet Photonics Inc.
- Luminous Networks Inc.
- Mahi Networks Inc.
- Native Networks Ltd.
- PacketLight Networks
- Photonic Bridges Inc.
- RAD Data Communications Ltd.
- Tejas Networks India Ltd.
- Turin Networks Inc.
- White Rock Networks Inc.

As with all *Heavy Reading* research, interviews with leading service provider decision-makers were also used to provide a reality check on vendors’ claims. This report includes feedback from three carriers, each of which confirm the importance of MSPPs within their own networks:

"*We think of [MSPPs] as a first step in the migration to converged network elements.*"
– Michael Pepe, Executive Director, Broadband Transport Systems, SBC

"*[MSPP technology] more than cuts in half our provisioning time.*"
– Steve Plote, Director of Technology, Looking Glass Networks

"*MSPP products are critical to the success of BellSouth.*"
– Nancy Starcher, Product Manager, BellSouth Interconnection Services
OVERVIEW OF FINDINGS:

Major findings of the report include:

- Transport-based MSPPs must support GFP/G.7041 and LCAS in order to effectively support packet services over Sonet/SDH.
- Growth in MSPP sales has given rise to an important new product category – MSPP core aggregation platforms.
- Both HVAC capacity and safety regulations place practical limits on products' theoretical port counts/capacity.
- MSPPs can give large capacity gains (2x and over) on existing fiber rings through statistical gain, protection-capacity reuse, elimination of unused capacity, and idle-packet suppression.
- Prices vary from $5,000 for a bare-bones MSPP installed in a metro access network to over $400,000 for a fully outfitted core MSPP.
- MPLS is gaining support from MSPP vendors as a key mechanism for enabling packet services, QoS, and traffic engineering in the metro.
- There is only limited support for SAN protocols – which is surprising, in view of the growing interest in enterprise data security and recovery.

KEY TRENDS:

The survey at the heart of Multiservice Provisioning Platforms: Empowering the Metro Edge provided a wealth of quantitative data, which in turn pointed to a number of key trends in the MSPP market.

A primary finding of the report is that the entire MSPP market can be divided into two clearly delineated technology categories: transport-based MSPPs and data-based MSPPs.

These are encapsulated in the figure below. On the left, transport- or circuit-based MSPPs are descendants of Sonet/SDH add/drop multiplexers, or ADMs. They provide advanced Sonet/SDH capabilities, extending them up the network stack with higher-layer data capabilities, typically Ethernet switching.

Unlike the transport-based products, which are based on Layer-1 platforms, data-based MSPPs, shown on the right, take the opposite architectural approach, using as their basis a data switch – either packet- or frame-based – then extending it down the network stack by adding some underlying transport functions – DWDM, CWDM, Sonet/SDH, and so forth.

The differences between transport- and data-based MSPPs amount to much more than semantics. Heavy Reading’s analysis is that the genus of the product critically affects how it performs circuit-based functions and data functions.
Transport-based products can handle traditional circuits natively, but employ framing processes to handle data traffic. Conversely, data-based devices require the use of circuit emulation techniques to deal with traditional services.

While both types of MSPPs are capable of supporting transport and data functions, vendors of transport-based MSPPs claim that their products offer tighter integration of Layers 1 and 2 than do the data-based products. They argue that this difference makes their wares a better fit with today’s service provider infrastructures, which tend to be dominated by circuit-based, or TDM-Sonet/SDH, technology.

However, vendors of some of the latest data-based devices heatedly refute this claim, pointing to their own extensive support for a slew of Sonet features. These outfits are looking to disassociate themselves from data-based companies that are selling “metro Ethernet switches” with limited Layer-1 integration. Instead, they say it is just as effective to use advanced packet switching architectures (rather than modified Ethernet switches) to accomplish both transport and data functions.

Though based on different building blocks, both categories of MSPP present component and comms chip manufacturers with a huge market opportunity. Transport-based solutions will drive sales of chips that improve the use of TDM bandwidth via multiprotocol mappers, framers, and MACs, while integrating advanced packet-handling capabilities. Data-based devices present comms chip manufacturers with an especially rich revenue vein, driving demand for chip-level solutions that support circuit emulation, class of service, and quality of service – essentially “packetizing” the MSPP while supporting a full range of legacy and next-gen services.

Within the overarching transport- and data-based definitions, there are huge variances among MSPP products. Some of these are outlined in the chart below. Major technologies such as WDM (mainly DWDM), Gigabit Ethernet, and Sonet/SDH are widely supported. One surprise finding in our survey was the speed of takeup in next-generation Sonet/SDH technologies such as LCAS, Virtual Concatenation, and G.7041 (GFP).

**Major Technologies Used in MSPPs**

<table>
<thead>
<tr>
<th>Technology</th>
<th>Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonet/SDH</td>
<td>80%</td>
</tr>
<tr>
<td>Gigabit Ethernet</td>
<td>60%</td>
</tr>
<tr>
<td>Sonet/SDH Virtual Concatenation</td>
<td>40%</td>
</tr>
<tr>
<td>DWDM</td>
<td>40%</td>
</tr>
<tr>
<td>Sonet Link Capacity Adjustment Scheme (LCAS)</td>
<td>40%</td>
</tr>
<tr>
<td>MPLS</td>
<td>40%</td>
</tr>
<tr>
<td>IP</td>
<td>40%</td>
</tr>
<tr>
<td>Packet Ring (RPR or other)</td>
<td>40%</td>
</tr>
<tr>
<td>CWDM</td>
<td>20%</td>
</tr>
<tr>
<td>10-Gigabit Ethernet</td>
<td>20%</td>
</tr>
</tbody>
</table>

**Source:** Heavy Reading

*Heavy Reading* counsels that vendor claims to “support” IP should be taken with caution, as many mix up Ethernet and IP under a general “packet” capability. Most transport-based MSPPs do not currently integrate Layer-3 routing functions, meaning that service providers that want IP services will need a separate router, either collocated with the MSPP or back-hauled from it.

Product information in the report includes:

- Advanced Ethernet service capabilities
- ATM capabilities / switch fabric
- Carrier-class reliability features
- Client-service and network interfaces supported
- Engineering and business tools
CONCLUSION:

Growth in data and multimedia services is catalyzing change in the telecom industry. Service providers are under intense pressure to maintain revenues from legacy services while finding cost-effective paths to additional revenue.

MSPPs provide a solution, but the MSPP market is both vast and complicated. As yet, there are neither clear points of comparison nor standardized product sets or pricing.

In the meantime, service providers must sweat the details of the devices on offer from vendors – evaluating both external capabilities and internal architectures, and then matching these to their legacy infrastructures and technological roadmaps – before issuing RFIs or RFPs.

Multiservice Provisioning Platforms: Empowering the Metro Edge provides competitive analysis that is essential to this process.

The report is published in PDF format; the Product Survey Table is available in Excel format and in a searchable online database.