

# MSOs TAKE ETHERNET BUSINESS SERVICES BY STORM

How to capture a share of an \$8 billion U.S. market

## Introduction

According to market research firm Ovum, an estimated \$7.6 billion of Ethernet Business Services (EBS) revenue was recorded in the U.S. alone in 2011. With the U.S. retail market forecasted to hit \$11.4 billion by 2014 (\$37.6 billion globally)<sup>1</sup>, the nation's largest service providers are placing big bets on EBS. Despite intensifying competition, the rapid growth of this market provides plenty of opportunity for Multiple System Operators (MSOs) looking to expand their offerings.

Business bandwidth requirements and mobile device transmissions are driving this expansion. Enterprises need increasingly more bandwidth to support applications, including video conferencing, online training, and data storage replication, and mobile carriers have seen an explosion in data transmissions from smartphones, primarily driven by video streaming.

MSOs have already begun offering EBS—mostly to small businesses—by leveraging existing hybrid fiber/coaxial networks already located near existing residential holdings. However, to truly capitalize on this expanding market and structurally support that growth, MSOs need to start making significant technology and infrastructure investments now.

This paper contains valuable information and insight for MSOs and related companies, such as suppliers, that are pursuing this high-growth market. It discusses the rise of EBS as an appealing alternative to traditional business services, the evolving competitive landscape, and the primary considerations for market entry. It also highlights the five strategic areas in which MSOs must invest to successfully capture market share in the competitive EBS space: 1) Carrier Ethernet technology; 2) fiber expansion and carrier partnerships; 3) field operations investments and back-office operations; 4) sales force training and hiring; and 5) brand-building to emphasize business services. Finally, this paper outlines a live example of a customer deployment.

## Drivers for EBS Adoption

The Metro Ethernet Forum (MEF) has defined, standardized, and certified Carrier Ethernet services to allow providers and consumers a convenient, clear understanding of each service type. E-LINE (point-to-point), E-LAN (multipoint-to-multipoint), and E-TREE (rooted multipoint) services are now well known among enterprises worldwide. These may be implemented over a variety of infrastructures (such as Wavelength Division Multiplexing [WDM], switched, and microwave) and either as a private service (such as Ethernet Private Line [EPL], in which a dedicated, non-shared connection is made) or virtual private service (such as Ethernet Virtual Private Line [EVPL], in which more than one traffic flow, customer, or class of service shares a dedicated connection under prescribed rules). The roster of providers offering Carrier Ethernet services has grown from a handful a decade ago to literally hundreds today. The entry of MSOs into this market demonstrates that demand is high for competitive alternatives to the traditional carrier-based offerings.

Enterprises have several motivations for adopting EBS. Generally, an Ethernet service offers more bandwidth at a lower cost, with the resulting performance improvements applied in a variety of ways. Some examples include:

- Legacy migration: Enterprises that want to migrate from traditional Frame Relay (FR), ATM, or low-capacity SONET/SDH services for Wide Area Network (WAN) connectivity between their sites or to the Internet are interested in Ethernet services because video, storage, and other applications are pushing the limits of legacy platforms. E-LINE solutions are popular for legacy migration since they can accommodate the legacy traffic transparently and be rolled out site by site, avoiding a costly wholesale upgrade.
- Local Area Network (LAN) extension: E-LAN services are especially useful to connect regional offices, such as within a metro area, that require moderate- to high-bandwidth interconnect with any-to-any traffic patterns. School districts,

<sup>1</sup> Enterprise Ethernet Service Forecast Report: 2011–16." Ovum, January 2012.

medical facilities, and government agencies are prime examples. These networks are often referred to as “transparent LANs,” as their purpose is simply to extend the role of the LAN within a building to multiple facilities.

→ Data center access and interconnect: Larger enterprises are finding increased value in centralizing their servers and storage farms, then sharing them among end-users. This application includes the much-publicized cloud infrastructure trend. Here again, E-LINE services provide the optimal cost-point and performance metrics required to maintain the quality of service required by these often highly demanding applications, in which the network is as much part of the solution as the application itself. E-LAN services can be particularly useful to connect multiple data centers to provide reliable backups in case of system failures and the load-balancing needed to distribute tasks and data among the data centers. As IT infrastructure begins its move to the cloud, enterprises will heavily use Ethernet services to access the cloud or to build the cloud’s backbone.

→ Broadcast and content distribution: MSOs are well-versed in video distribution, given the origins of their business model around residential services. Businesses are increasingly interested in these applications, as well as distance learning, database synchronization, and teleconferencing, which are becoming popular in large and small business environments. E-TREE services are built specifically to accommodate these usage patterns, avoiding costly customized solutions.

The Application	The Old Connectivity	The New Connectivity
Dedicated Internet access, IP VPN access Circuits	ATM, FR, SONET/SDH services	Ethernet Private Line (E-LINE) services
Business connectivity	Transparent LAN or IP-VPN services	Ethernet Private Line and LAN (E-LAN) services
Mobile backhaul wholesale	TDM, ATM backhaul	E-LINE services TDM, ATM Pseudowires over Ethernet
Wholesale core network	TDM transport services	E-LINE services

Figure 1. Connectivity evolution

Vertical Systems Group has found that within the service type mix of EBS, the majority of services are being used for EPLs for wholesale or business site connectivity, business connectivity in a metro area (Metro LAN), and dedicated Internet access.

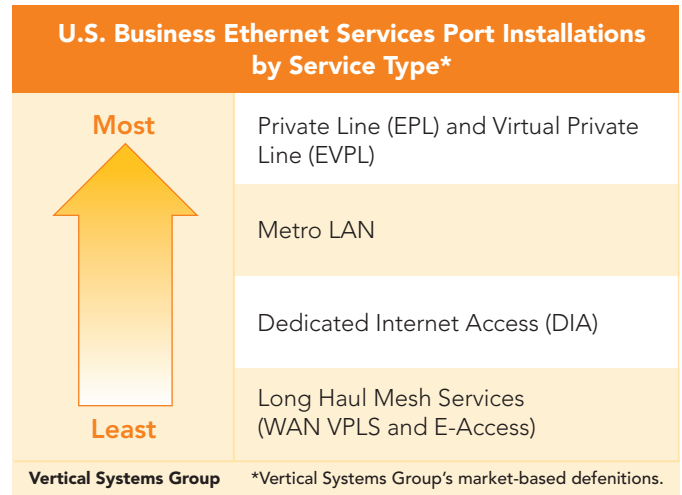


Figure 2. U.S. EBS service type mix

### The EBS Competitive Landscape

The providers of EBS in United States are subdivided into three main categories: incumbent carriers, competitive providers, and MSOs.

- Incumbent carriers are telecom companies, including inter-exchange and local exchange providers. AT&T and Verizon are included in this subset. Incumbent carriers currently hold the largest market share, supplying 46 percent of enterprise Ethernet ports today.
- Competitive providers own fiber networks or resell competitors’ local access facilities and include CLECs, regional and global providers, and specialized carriers. They are the second-largest EBS provider segment, with a 36 percent market share.
- Cable MSOs including Cox, Time Warner Cable, and Comcast own the remaining 18 percent of installations. They differentiate through geographic reach, service portfolios, and target markets.

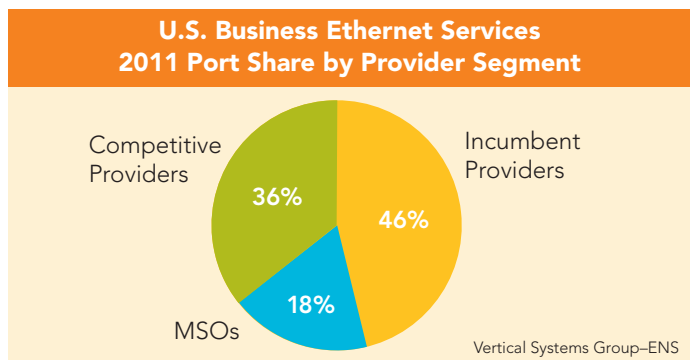


Figure 3. U.S. port share by provider segment


 <b>LEADERBOARD 2011</b> <b>U.S. Business Ethernet Services</b>	
RANK	ETHERNET PROVIDER
1	AT&T
2	Verizon
3	TW Telecom
4	Cox
5	XO
6	CenturyLink
7	Time Warner Cable
8	Level 3
9	Cogent
www.verticalsystems.com	

Figure 4. U.S. EBS 2011 leaders

As shown in Figure 4, AT&T and Verizon currently top the leaderboard as measured by billable port installations. Cox and Time Warner Cable are the only MSOs on the leaderboard, although Comcast no doubt has its sights set on entering the top tier of EBS providers in the near future. Given Vertical Systems' recent announcement that U.S. Ethernet port growth was 31%

in 2011, all providers are benefiting from demand for EBS.<sup>2</sup> Because of Comcast's recent entrance into the market, the MSO category can expect to see a noticeable spike in market share simply due to Comcast's size. The MSO share of the Ethernet services market could be expected to rise from close to 18 percent to up to 30 percent at the expense of incumbent carriers and competitive providers because of Comcast's entrance onto the playing field.<sup>3</sup>

### EBS Market Penetration Considerations for MSOs

As MSOs seek to compete against other providers, they must deal with basic variables that will influence their ability to penetrate the EBS market. These variables—geography, speed, and pricing—can be considered “table stakes” that will determine the degree of their long-term success. In some areas, MSOs come out ahead of telecom companies, but in others, they lag behind. Either way, these factors must be part of any strategic business plan focused on gaining EBS market share.

### Geography

Typically, MSOs have been able to sell business services where their hybrid fiber-copper networks already exist, because small businesses are often aligned geographically with residential communities where MSOs have installed fiber. From an EBS perspective, this means MSOs are strongest in large local markets because they can comfortably capture accounts like hospitals and universities that have a small geographical footprint but may still encompass many users and multiple locations within that footprint.

## BUSINESS ETHERNET DEFINITIONS

**Ethernet Dedicated Internet Access (DIA):** Single-ended point-to-network Ethernet connection from an enterprise site to an Internet Service Provider (ISP)

**Metro LAN:** Multipoint switched Ethernet LAN service interconnecting three or more enterprise sites within a metro area. Metro LAN services are delivered using many technologies, including Virtual Private LAN Service (VPLS)

**Ethernet Private Line (EPL):** A dedicated point-to-point Ethernet connection between two enterprise sites. EPL services include metro and long-haul applications.

**Ethernet Virtual Private Line (EVPL):** A dedicated point-to-point Ethernet connection that supports multiple virtual connections between two enterprise sites. EVPL services include metro and long-haul applications.

**Long Haul Mesh:** WAN VPLS + E Access Multipoint switched Ethernet *Wide Area Network* (WAN) service interconnecting three or more enterprise sites. The long-haul mesh segment includes WAN VPLS plus *Ethernet access* (E-Access) to IP/MPLS VPN services. WAN VPLS offerings cover services delivered using VPLS or other technologies.

Source: Vertical Systems Group

<sup>2</sup> Vertical Systems Group: 2011 U.S. Business Ethernet LEADERBOARD; February 13, 2012.

<sup>3</sup> “Cable Operators & Ethernet: Serious Business.” Heavy Reading Insider, Vol. 11, No. 5, July 2011.

This focus on regional markets and the related geographical limitations currently hamper the ability of many MSOs to compete with incumbent carriers. For example, without the geographical reach necessary to serve all the physical locations of a larger enterprise, companies in the financial services, retail, and government sectors see MSOs as weaker EBS providers. Nonetheless, larger and more geographically dispersed businesses represent an enormous opportunity for MSOs seeking to expand their addressable market. As such, fiber installations in large business complexes, high-rises, and dense urban areas may be viewed as a viable investment strategy to grow revenue and market share.

Additionally, MSOs need to stay on top of the issues in their existing regional markets. For example, an MSO that serves a large metropolitan area will have different opportunities than one that operates in a mostly rural region. The large metropolitan area presents more large businesses in a concentrated location, while a rural region may mean a focus on fiber expansion.

### **Speed and Latency**

With the increased need for bandwidth, speed is another factor MSOs cannot overlook in their quest for EBS market share. Ethernet offerings run from below 10 Mb/s to 10 Gb/s, with 100 Gb/s on the horizon (but currently limited to large-backbone interconnections).

As enterprise bandwidth needs are increasing, there is an increased shift to higher-capacity services. For example, only a few years ago, 100 Mb/s services dominated the EBS market. Today and going forward, the majority of the services will be 1 Gb/s, 10 Gb/s, and higher.

In the quest to up the speed ante, telecom operators are beginning to deploy 100 Gb/s in select markets. For example, having already deployed a first-to-market 100G link in Europe in 2010, Verizon announced in September 2011 that it was deploying Ciena's coherent 100 Gb/s technology in its U.S. network on its Chicago-to-New York, Los Angeles-to-Sacramento, and Minneapolis-to-Kansas City routes.<sup>4</sup> Verizon is the first service provider to initiate a 100 Gb/s deployment on a U.S. network. While these are backbone links and not end-user EBS, the progression of one Ethernet generation to the next is a clearly established pattern that will continue into the future.

Meanwhile, the demands of their own networks are driving MSOs to test even higher speeds. Driven by its burgeoning EBS business, Comcast is already placing bold bets and

making long-term investments to address its own network's demands. It has begun testing 100 Gb/s services and preparing for general availability and deployment across its networks. While 100 Gb/s still is considered an early-adopter move, it will be a growing consideration as bandwidth demands inevitably continue to increase.

### **Performance**

As part of the speed challenge, MSOs are also including latency and network availability standards in their Service Level Agreements (SLAs). Comcast offers three classes of service (Basic, Priority, and Premium) and full SLAs. Its SLA standards are 99.99 percent availability for all three classes, but standards for one-way latency are 45 milliseconds, 23 milliseconds, and 12 milliseconds, respectively. These offerings, whether EPL- or EVPL-based, are built on switched or native Ethernet-over-fiber infrastructure because of the cost-effectiveness and simplicity of the technology.

But the bar is already being raised for the highest performing services offered in key application spaces such as high-frequency trading and real-time database mirroring. According to CenturyLink, the gold standard in 2009 for two-way latency was 10 milliseconds or less, with 99.995 percent or greater network availability and 1 millisecond or less jitter. Today, we see service providers offering real-time class of service with 5 ms two-way latency and 99.995 percent availability.

### **Pricing**

Pricing could be a critical differentiator for MSOs competing against incumbent carriers and competitive providers. As defined by the MEF, Carrier Ethernet allows for a lower cost per bit, something that greatly appeals to business customers looking to do more with less. Additionally, Ethernet can be provisioned at precise capacity levels, giving the flexibility customers need.

Vertical Systems Group predicts a downward pricing trend for EBS due to increased competition, but there is still a great deal of revenue up for grabs due to the increasing demand for Ethernet.

Geography, pricing, and speed are not necessarily barriers to entry for MSOs in the rapidly growing EBS market. With an eye toward what their limitations are and how to overcome them, MSOs are just as capable of seizing a share of the market as any other provider. The key to gaining that market share lies in strategic planning, which ensures the MSO has the infrastructure, technology, and human resources to compete.

4 LIGHTWAVE: "Verizon offers U.S. 100-Gbps deployment details" by Stephen Hardy, September 2011  
<http://www.lightwaveonline.com/networking/news/Verizon-offers-US-100-Gbps-deployment-details-129650943.html?cmpid=EnlDirectSeptember122011>

## Five Strategic Requirements for Competing in the Growing EBS Market

While geography, speed, and pricing will continue to remain variables that affect each MSO differently, there are concrete actions that MSOs can take today to compete as serious EBS providers.

Small business market share is an easy proposition for MSOs because of its similarity to the residential market. However, as MSOs move up-market to compete for enterprise-level business, they need to be able to satisfy more sophisticated buying and bandwidth requirements. They also must have the infrastructure in place to support the challenges of multiple locations.

To be competitive in the EBS market, MSOs must look at the incremental investments needed for long-term success. While these investments can take years to complete, MSOs can gain solid footholds that will position them for long-term growth and success by investing now in the five strategic requirements outlined below.

### 1. Carrier Ethernet Technology

MSOs need to invest in the proper Carrier Ethernet technology, the cornerstone of market share in the EBS market. Without it, MSOs will find it challenging to provision Ethernet services to their new and existing customer bases on the scale of and with the quality of service needed to satisfy customers.

EBS increasingly are replacing legacy services or evolving existing networks to meet the increasing demand for bandwidth. According to Vertical Systems Group, the majority of installed Ethernet customer connections have migrated from dedicated IP VPN and legacy services (ATM, FR, and private lines). DIA has been the third-largest migration source, followed by Greenfield applications and migration from other services (business DSL and satellite). By keeping an eye on technology trends, MSOs can find new opportunities to replace legacy services with robust Ethernet offerings.

Given these growth patterns, EBS is in a “land-grab” state, with multiple providers competing for these profitable customers. MSOs and incumbent carriers have the advantage of an installed base of residential deployments with advanced access networks either already in place or readily upgradeable.

**Reaching the customer first** becomes a key business advantage to the provider who is able to roll out the right service mix quickly and turn up services quickly. Provisioning automation that minimizes steps in the process, especially

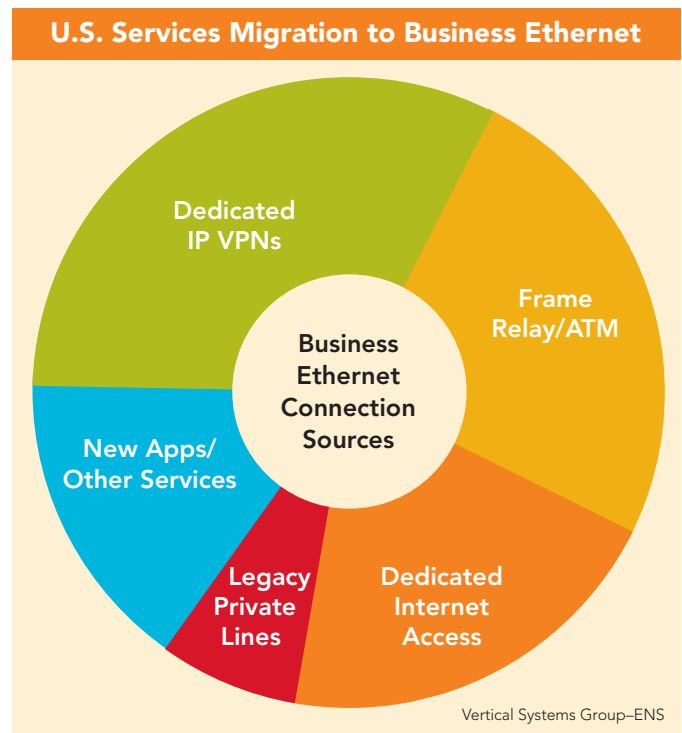


Figure 6. U.S. service migration to EBS

those requiring human involvement, becomes even more important. Carrier Ethernet platforms lend themselves to such automation via scripting for provisioning, software rollout, and other management functions.

### 2. Fiber Network Expansion and Carrier Partnerships

While MSOs have invested significantly in their network coverage with high-bandwidth cable plant, business users' main concern remains that they cannot get Carrier Ethernet services at all their locations. In instances where building out fiber-based networks is not financially feasible, partnering with local providers can offer the kind of reach needed by far-flung enterprises. With these partnerships, MSOs also can offer end-to-end SLAs to guarantee that high-bandwidth, latency-sensitive traffic will reach its destination.

To that end, the MEF has gone to great lengths to define how an Ethernet External Network-to-Network Interface (ENNI) would function, giving operators guidelines to implement a seamless handoff between their areas of coverage and those of partners.

While the use of fiber to address network expansion requirements has garnered the attention of most of the MSOs, certain customer scenarios will likely warrant the use of microwave radio to connect the “last mile.” MSOs will increasingly turn to microwave when fiber is not readily available or the cost of trenching is

deemed to be too costly or time-consuming. Radios can be deployed in a matter of weeks with a fixed cost. In contrast, depending on the length of the extension, a single fiber installation can easily exceed \$200,000.

### **3. Field Operations Investments and Back-Office Operations**

Business customers need immediate service restoration, as opposed to residential customers, who can wait several hours. Field operations personnel and equipment need supplementation, as do customer service resources. These investments would include more personnel for customer service operations and field operations, as well as equipment such as trucks and hardware for provisioning and repairs.

Additionally, enterprise billing and payment are also more demanding because they are so different from the residential market. Enterprise bills encompass multiple services across multiple locations, and larger companies are accustomed to consolidated and electronic billing. Billing and accounting systems will need serious investments to meet these requirements. Other back-end processes that will need upgrades include order entry and provisioning as Ethernet orders become more complex, particularly for bandwidth provisioning and network locations.

### **4. Sales Force Training and Hiring**

Sophisticated technology buyers expect a certain level of knowledge from sales forces. Mass-market techniques that work for the residential market can be used to sell to the small business market because the buyers often are in many roles and are more interested in making sure the organization runs smoothly. However, selling EBS to enterprises with 500 employees, multiple locations, and more complex data requirements demands more sales leadership experience and more technical knowledge to answer well-versed technology buyers' tough questions.

Many MSOs are expanding their business sales force and hiring new directors and vice presidents to oversee their rapidly-expanding business sales divisions. For example, Comcast has expanded its sales resources as its Ethernet business expands.<sup>5</sup> Other MSOs are looking for vice presidents of sales with experience catering to the business market. These hires solidify MSOs' plans to capture a share of the EBS market.

MSOs are poised to seize a share of the market by leveraging existing fiber networks, increasing fiber penetration in previously untapped markets, and potentially forging alliances

with MSOs located in geographical locations where they do not have a fiber presence. Strategic requirements will include developing not just the hardware and network capabilities but also the front- and back-office support to cater to medium and large enterprises. However, with the right investments in technology, front- and back-end applications, branding, and personnel, U.S. MSOs are perfectly positioned to capture a meaningful share of an \$8 billion (and growing) market.

### **5. Brand-Building to Emphasize Business Services.**

Most MSOs have built their brands around residential customers. According to the National Cable Telecommunications Association (NCTA), at the end of 2011, approximately 77 percent of U.S. households had access to a DOCSIS 3.0-based cable plant, capable of delivering 50 to 100 Mb/s services.<sup>6</sup> It stands to reason that enterprises would have a great demand for this level of service as well. The next step is to invest in brand recognition as providers of enterprise-grade services. Part of that is marketing based on applications, not geographical location or architectures. Marketing based on standards will not resonate with even sophisticated technology buyers, but offering "data center interconnect" services or "high-speed distributed office interconnect" services emphasizes user requirements, rather than carrier definitions that have little to no meaning to end-users.

Two of the largest MSOs are emphasizing user requirements for businesses in terms buyers will understand. Time Warner Cable offers EPL, EVPL, and ELAN services, defined from the user perspective. Comcast offers EPL Service, Ethernet Point-to-Point Service, Ethernet Network Service, and Ethernet Dedicated Internet Access Service, again focusing on the user benefits of each type of Ethernet service instead of abstract standards that mean little to buyers.

### **Claiming a Piece of the EBS Pie**

MSOs that want a share of the \$8 billion EBS market can learn from Comcast, which chose Ciena as one of its partners for investment in the EBS market, achieving up to 60 percent faster service provisioning and up to 40 percent operational expense reduction, as well as a 75 percent reduction in install time, compared to deploying services manually.

Comcast recently began using Ciena Carrier Ethernet gear to provide metro Ethernet services to customers in more than 20 major markets across the U.S. Comcast's big push with metro Ethernet services highlights the growing acceptance of Carrier Ethernet as a base technology in business networks. Comcast is offering four services: EPL Service, Ethernet Point-to-Point

<sup>5</sup> Cable360; Communications TECHNOLOGY: "Comcast, Ciena Train Salespeople on Metro E", July 2011. <http://www.cable360.net/ct/47227.html>

<sup>6</sup> FierceCable: "DOCSIS 3.0 to reach 77% of homes by end 2011, NCTA says," October 2011. <http://www.fiercecable.com/story/docsis-30-reach-77-homes-end-2011-ncta-says/2011-10-20>



Service, Ethernet Network Service, and Ethernet Dedicated Internet Access Service. To enable the service, Comcast is using Ciena's LE-311v Service Delivery Switch at customer sites. Comcast also has approved the 3930 and 3931 Service Delivery Switches for network deployment.

Comcast's Metro Ethernet services, which range from 1 Mb/s to 10 Gb/s, come with three different classes of service, backed by SLAs and continuous monitoring from Comcast's dedicated Network Operations Centers (NOCs). The services leverage Comcast's 147,000-mile, IP-based fiber optic network that serves 20 of the nation's 25 largest markets, with plans to expand the service into new markets in the months ahead.

Comcast's Metro Ethernet Service is targeted at the growing number of mid-sized businesses (20 to 500 employees) with multiple sites that are looking to deploy high-bandwidth services such as cloud computing and business continuity/disaster recovery. While Carrier Ethernet-based services currently make up only a small share of the estimated \$5.5 billion the major U.S. MSOs earned from business services in 2010, the market is expected to exceed \$11 billion in 2014.

A host of technical criteria drove Comcast's decision to deploy Ciena Carrier Ethernet switches, including Quality of Service (QoS) to support differentiated services, policy enforcement on inbound and outbound traffic, and enhanced Operations,

Administration, and Maintenance (OAM) capabilities. Furthermore, the addition of the 3931 gives Comcast an environmentally hardened device that can be deployed for both business services and mobile backhaul applications.

In addition to supplying the technology, Ciena has assisted Comcast in developing its marketing strategy and tactics, creating services and supporting materials, educating its business sales force, and other lifecycle engagement activities. This broad-based and ongoing commitment ensures Comcast realizes the maximum return on its investments with Ciena.

#### CIENA TRUE CARRIER ETHERNET®

- MEF Carrier Ethernet with value-added enhancements
- Best-in-breed scalability, resilience, QoS enforcement, and service management
- Deterministic traffic routing with connection-oriented technologies
- Interoperable with a variety of MPLS/VPLS architectures

All Vertical Systems Group charts used with permission from Vertical Systems Group, Inc. Copyright 2010. All rights reserved.

Ciena may from time to time make changes to the products or specifications contained herein without notice. Copyright © 2012 Ciena® Corporation. All rights reserved. WP094 2.2012



Networks that change  
the way you compete.

1201 Winterson Road  
Linthicum, MD 21090  
1.800.207.3714 (US and Canada)  
1.410.865.8671 (outside US and Canada)  
+44.20.7012.5555 (international)  
[www.ciena.com](http://www.ciena.com)