EXECUTIVE SUMMARY

The concept of extending the Ethernet standard (IEEE 802.3) for frame-based computer networking to the metro area has been around for decades. Service providers first began seriously exploring Ethernet as a last-mile, Metro Area Network (MAN) service in the 1990s, with the first installations coming mid-decade. By 2000, new providers had emerged with revolutionary business models based on "Metro Ethernet" technology. Now, market conditions and provider innovations are coming together, and the market is finally starting to mature. Based on extensive research of the service providers, vendors, and end-users that make up the current Metro Ethernet market, we find that the market should continue its fast growth over the next several years, as it begins to supplant TDM as the preferred data transport platform, bit-by-bit.

As it has matured, with Ethernet now extending beyond the metro area and, indeed, nationally, the term "Metro Ethernet" no longer conveys the entire story. Many providers choose to characterize their services as "Carrier Ethernet"—in other words, "carrier-grade Ethernet"—to illustrate that they reach not only to the metro area, but also to the wide area with inter-city Ethernet transport.

The evolution of Metro Ethernet for access and transport can be gleaned just by looking at the service providers now competing in the segment. When we last examined the industry, in our *GigE/MAN Report* in 2001, the provider universe included fiber layers and about a dozen competitive providers, mostly companies whose business models were built solely on Gigabit Ethernet service. This Report includes data from 29 major service providers.

Table 1: Segmentation of Metro Ethernet Service Providers			
ILECs	**CLECs (Broad portfolio)**	**Cable MSOs**	**Competitive Providers (Narrow portfolio)**
AT&T Inc.	Broadview Networks	Charter	AboveNet
BellSouth	Broadwing	Cox Communications	Alpheus Communications
CenturyTel	Level 3 Communications Inc.	General Communication (GCI)	American Fiber Systems
Cincinnati Bell	One Communications	Optimum Lightpath (Cablevision)	Cogent Communications
Embarq	Time Warner Telecom	Time Warner Cable	Expedient
Qwest	XO Communications		Globix
Verizon Business			IP Networks

Windstream			Met-Net Communications
			PPL Telcom
			Yipes Enterprise Services Inc.

Source: New Paradigm Resources Group, Inc.

It is striking how universal carrier interest in Metro Ethernet has become in the last few years. Not only are narrowly-focused "Ethernet specialists" offering service, but so are incumbents (large and small), competitive carriers, and cable system operators.

Although some familiar faces top our 2006 Ethernet service revenues analysis, no single provider segment can claim Metro Ethernet as its sole domain: each of the four segments has multiple representatives in the top ten. Perhaps this should come as no surprise, since as a "convergence-enabling" technology, Ethernet is the basis for a range of other technologies and services, and Metro Ethernet is being deployed in support of applications ranging from corporate Wide Area Networks and 3G mobile backhaul to enhanced gaming for residential triple-play.

What's more, business models run the gamut from single-metro alternative access providers to regional or national service. Every carrier, it seems, has some rationale for incorporating Metro Ethernet into its product suite.

Looking deeper at the services currently offered, we see that there are a variety. Customers can select switched services to support a multipoint network, cost effectively, or they can purchase dedicated point-to-point "E-Line" services for guaranteed bandwidth. They can establish VLANs to segregate traffic and create virtual networks. They can find services that cross the metro, and ones that connect offices coast-to-coast. Depending on their needs, they may opt for Layer 2 networking rather than Layer 3. Fiber-based transport may be supplemented with Ethernet over copper technologies.

If cost is a primary consideration, they may go with a "best efforts" service; if reliability is most important, they can now find a range of service levels. And for special situations, customers may want a service that offers "on demand" bandwidth. This array of service options illustrates how far Metro Ethernet has evolved, and how competitive the market has become, in recent years.

As Metro Ethernet's advantages begin to overcome the inertia of a transport industry at rest, forward progress appears easier. Its technical viability has been demonstrated, business models look feasible, and customers—both businesses and network operators—view it as a credible access method.

The Present

Industry-wide, Metro Ethernet appears to have hit its stride. After stalling somewhat when the telecom bubble burst—a sudden glut of all types of bandwidth deflated prices, leading to financial difficulties among some of the technology's early pioneers in the tough 2001-2003 telecom market—Ethernet revenue growth has accelerated in 2004-2006.

Today, Metro Ethernet carriers are quite simply riding a wave of demand. Some providers tell us that they expect to have "as much business as [they] can handle" in 2007. While much of the demand is still concentrated in specific industries and particular applications, a snowballing record of success is breeding additional customer interest—and as interest becomes genuine demand, more providers and provider investment will be drawn into the market.

**Figure 1: Ethernet Services Revenue, 2001-2008
(millions of dollars)**
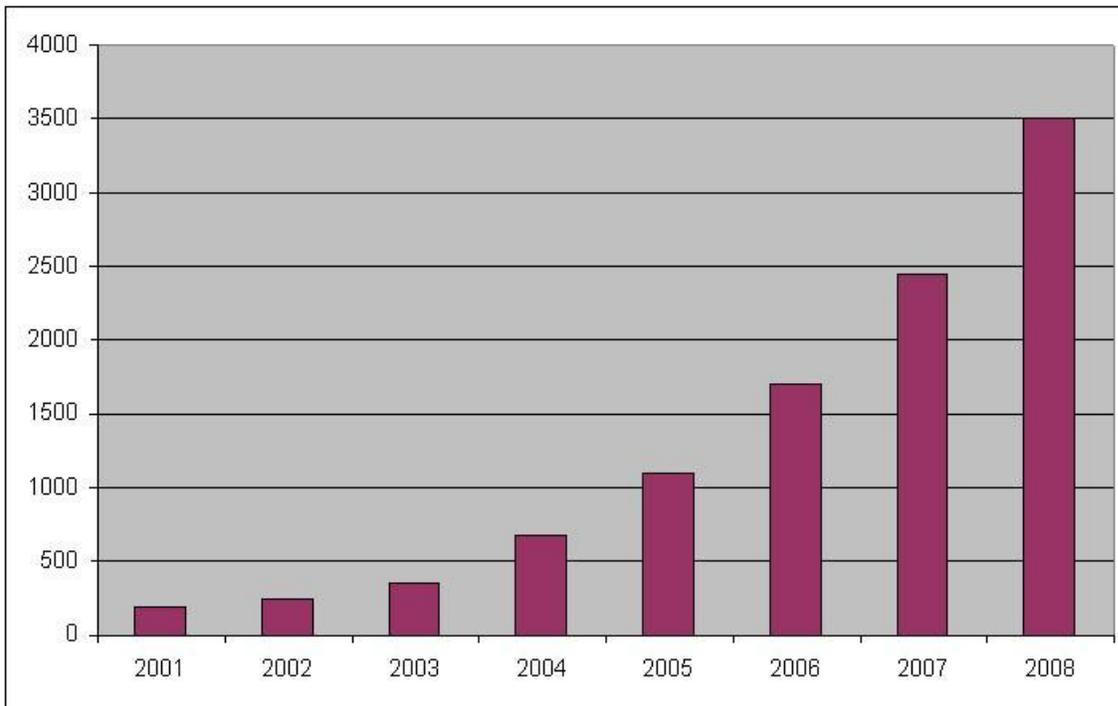
Source: New Paradigm Resources Group, Inc.

Looking Ahead

Metro Ethernet has excellent prospects for the future. Like other technologies before it, now that measurable demand for Ethernet access and transport services has emerged, service providers are doing what they can to meet it. Increased availability is, by itself, enough to fuel growth for the next few years.

Also, because they recognize that they must adopt so-called "next-generation" networks over the next five years or so, and supporting legacy networking technologies like frame relay will be cost-prohibitive, some carriers are dropping older technologies altogether or giving customers incentives to switch to alternative WAN services. Added to existing "demand pull" for Metro Ethernet service, this "supply push" will boost revenues from the technology higher still.

Challenges remain, however. A number of standardization issues remain to be worked out, and provisioning Metro Ethernet is still nowhere near as standardized as familiar services like T-1 and frame relay.

It also remains to be seen what will happen if price pressures become acute as Ethernet availability increases. Customers already expect to pay less for Metro Ethernet than TDM-based technologies; will they expect discounting to continue?

Conclusion

In the past several years, the Metro Ethernet era has progressed from its dawn to mid-morning. The technology has proved itself highly capable for certain demanding applications and is beginning to find broader implementations. Innovation continues apace, extending reach, adding functionality, and bettering its financial case for end-users.

Some of the more encouraging conversations we had with Metro Ethernet providers were about managing their businesses. Asked about their future plans and why they aren't talking about doubling their metros served by two- or three-fold in the next twelve months, several competitive providers said simply that they have learned from past industry mistakes. The watchwords in this market include "success-based builds," "cost-justification," and "sustainability." No one, it seems, wants to be the genius with the great idea who just got ahead of himself.

In the present market, all factors appear to be positive for Metro Ethernet. End-user demand is palpable and growing. Market drivers are creating "pull" for additional services, and providers are responding. Large, established carriers have made Metro Ethernet a highly visible part of their access portfolios, while smaller, entrepreneurial providers have established themselves and appear to be making more prudent business decisions than in years past. With so much to look forward to, one must wonder only how fast and how deeply Metro Ethernet will establish itself in the telecommunications ecosystem.