Metro Ethernet Strategies in a Web 2.0 World
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1. The Metro Ethernet Sector in Context
2. A Closer Look at the Metro Ethernet Arena
3. Metro Ethernet’s Evolving Role in a Web 2.0 World
4. Metro Ethernet Market Summary & Outlook
5. Question and Answer -- Along the Way
The Big Picture: Putting the Metro Ethernet Sector in Context
The Metro Ethernet Sector In Context:
What is Metro Ethernet?

• What is the “Metro Ethernet sector”?  
• What are the differences between Metro Ethernet services? Which show the most promise?  
• Is Metro Ethernet being used as a replacement for basic data connectivity?  
• What long term impacts will service providers feel due to continued growth and adoption of Metro Ethernet solutions?  
• What are the general prospects for Metro Ethernet?
The Metro Ethernet Sector In Context: The Communications Services Universe

U.S. Services Sector Market Size & Direction (2008)

Source: New Paradigm Resources Group, Inc.

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The Metro Ethernet Sector in Context:
Key Provider Categories

- Incumbent LECs
  - AT&T
  - Verizon
  - Qwest

- Competitive Providers
  - TW Telecom
  - XO
  - Level 3

- Pure Play / Fiber Network
  - Optimum Lightpath
  - Cogent Communications
  - American Fiber Systems

- Cable System Operators
  - Cox Business Services
  - Time Warner Cable
  - Bright House Networks

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The Metro Ethernet Sector In Context:
Metro Ethernet History 101

- 1980: 10 Mbps Ethernet 1.0 Standard
- 1980s: Initial "Ethernet" LANs
- 1980s: Client-server paradigm dominant
- 1990s: BellSouth is first RBOC to roll out Ethernet over Copper
- 1996: Cox offers Metro LAN service
- 1999: Ameritech introduces GigaMAN
- 2000: Cox offers Metro Ethernet service
- 2002: MCI deploys Tellabs’ Converged Packet Architecture gear, foundation for WAN Ethernet
- 2003: MEF 100th member
- 2004: U.S. Ethernet revenue exceeds $1 Bn
- 2005: Optimum Lightpath goes all-Ethernet
- 2006: AT&T global VPLS launch
- 2007: Reliance Globalcom buys Yipes Enterprise Services
The Metro Ethernet Sector in Context: Comparing Services

### Services Comparison

<table>
<thead>
<tr>
<th>Service Characteristics</th>
<th>DSL/Cable Modem</th>
<th>T-1</th>
<th>Metro Ethernet</th>
<th>Wavelengths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth Potential</td>
<td>↑</td>
<td>⇐</td>
<td>↑ ↑</td>
<td>↑</td>
</tr>
<tr>
<td>Bandwidth Range</td>
<td>&lt; 15 Mbps</td>
<td>1.5 Mbps</td>
<td>2 Mbps to 10 Gbps</td>
<td>&gt; 1 Gbps</td>
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<tr>
<td>Scalability</td>
<td>None</td>
<td>Limited</td>
<td>High</td>
<td>Limited</td>
</tr>
<tr>
<td>Price per Bit</td>
<td>Moderate</td>
<td>High</td>
<td>Low to Moderate</td>
<td>Low to Moderate</td>
</tr>
<tr>
<td>Service Quality</td>
<td>Limited</td>
<td>High</td>
<td>Low to High</td>
<td>Carrier-class</td>
</tr>
<tr>
<td>Paradigmatic Equipment</td>
<td>Modem</td>
<td>CSU, IAD</td>
<td>Router</td>
<td>Multiplexer</td>
</tr>
<tr>
<td>Barriers to Entry</td>
<td>Moderate</td>
<td>Low to Moderate</td>
<td>Low to Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Web 2.0 Potential</td>
<td>Moderate but falling</td>
<td>Moderate but falling</td>
<td>High</td>
<td>High</td>
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Source: New Paradigm Resources Group, Inc.
A Closer Look at the Metro Ethernet Arena
### A Closer Look at the Metro Ethernet Arena: Predominant Metro Ethernet Strategies

<table>
<thead>
<tr>
<th>Carrier Set</th>
<th>Strategic Objective</th>
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</table>
| Pure Play / Fiber Network Oper. | • Disruptive: No legacy infrastructure/services to support  
                                    • Target low-hanging fruit, scalable prospects |
| RBOC                         | • Wide net: Ethernet part of diversified portfolio  
                                    • Migration: Bridge customers to next-gen services |
| Other ILEC                   | • Retention: Preempt disruptive competitor entry                                     |
| CLEC                         | • Challenge: Enterprise capabilities to mid-market at lower price-points              |
| Cable MSO                    | • Equalizer: Scalable business services with incremental upgrade to existing architecture |
| Global Providers             | • Beachhead: Offer comparable international networking on the RBOCs’ own turf       |
## A Closer Look at the Metro Ethernet Arena: Providers & Target Customer Sets

<table>
<thead>
<tr>
<th>Provider Sector</th>
<th>Customer Segment</th>
<th>SMB</th>
<th>Large Enterprise</th>
<th>Wholesale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure Play / Fiber Network Operators</td>
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<tr>
<td>RBOC</td>
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<tr>
<td>Global Providers</td>
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</tbody>
</table>

- `👍` = Primary Target
- `👍` = Secondary Target

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A Closer Look at the Metro Ethernet Arena: Key Metro Ethernet Services

- Ethernet Private Line (EPL)
- Ethernet Virtual Private Line (EVPL)
- Ethernet Virtual Private LAN (VPLS)
- Dedicated Internet Access (E-DIA)

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# A Closer Look at the Metro Ethernet Arena: Key Metro Ethernet Services Trends

**Ethernet Service** | **Application Trends**
---|---
**EPL** | • Medical / Healthcare (imaging, patient data)  
• Education (E-Rate K-12, videoconferencing)  
• Data centers, storage, disaster recovery

**EVPL** | • Enterprise branch offices (retail, banks)  
• Financial services & transactions (data transfer)  
• Mobile backhaul

**VPLS** | • Extend any-to-any communication across MPLS network  
• Enterprise VoIP networks

**E-DIA** | • Content delivery  
• Small business (web-centric, multimedia, engineering)
Critical Market Drivers include:

- Growing end-user acceptance
- Bandwidth demand increasing
- Lower service pricing: traffic is “just bits”
- Equipment quality and pricing
- WAN expansion
- Bandwidth-intensive applications
- Robust SLAs and Classes of Service (CoS)
- Services integration / Continued network convergence
Share of Ethernet Revenue by Customer Segment (2008)

- Business (Retail): 76%
- Wholesale: 24%
A Closer Look at the Metro Ethernet Arena:
Metro Ethernet Market by Provider Sector

Share of Ethernet Revenue by Service Provider Set (2008)

ILEC
CLEC
Cable
Pure Ethernet
Fiber Network
Global Provider

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Metro Ethernet’s Evolving Role in a Web 2.0 World
Metro Ethernet’s Evolving Role: Characteristics of the Web 2.0 World

Web 2.0 Elements

- Network as Platform
- Collaborative
- Untethered
- Multimedia oriented
- Integrate + Mashup

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Metro Ethernet’s Evolving Role: Where does it fit?

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Metro Ethernet’s Evolving Role: Shifting the Paradigm

Traditional Paradigm

Ethernet - TDM - SONET - SONET

IT Group | Telco Group | LEC | IXC

Emerging Paradigm

Ethernet - IP / Ethernet

Technology Group | Communications Provider
Metro Ethernet’s Evolving Role: Comparative Pricing

Business-Class Internet Access Pricing

- DIA T-1 (1.5 Mbps)
- T-3 (44.7 Mbps)
- Fixed Wireless (10 Mbps)
- DSL (3 Mbps)
- Cable Modem (15 Mbps)
- Ethernet over Copper (10 Mbps)
- Fast Ethernet (100 Mbps)
- Gig E (1,000 Mbps)

Price Per Bit ($ / Mbps)
Metro Ethernet’s Evolving Role: Segmenting the Providers

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Portfolio Strength

Localized Competitors
- Optimum Lightpath
- Cox Business Services
- Time Warner Cable
- IP Networks

Emerging Threats
- Comcast
- DukeNet
- FPL Fibernet
- Other ILECs
- Fixed wireless providers

Enterprise Leaders
- AT&T
- Verizon
- tw telecom
- Reliance Globalcom

Extensive Challengers
- Level 3
- AboveNet
- Cogent Communications
- Masergy
- Vertical systems integrators

Services Reach

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Market leadership in Web 2.0 era will require:

1. Diverse Ethernet portfolio
2. Scalable bandwidth options
3. Robust inter-market networking
4. Demonstrable QoS and guarantees
   - Including off-net locations (E-NNI)
5. Pricing reflective of value delivered, not legacy pricing assumptions
Metro Ethernet Strategies
in a Web 2.0 World

Metro Ethernet Market
Summary & Outlook
Technical enablers…

- Continued improvement on SLAs and OA&M
- Bandwidth on demand
- Remote monitoring/fault isolation
- Circuit emulation and pseudowires

... for growing revenue opportunities

- Growing wholesale market: Backhaul ready to boom?
- External Network-to-Network Interface (E-NNI)
- Ethernet service over copper
- 10GigE productization
Summary & Outlook: Key Takeaways

Some thoughts to take away from this discussion:

- Metro Ethernet is an established service option
- Pace of adoption exceeding expectations
- Pricing has stabilized, but disruptors still exist
- Facilitator of other products & network services
- Wholesale market growing as mobile backhaul opportunity materializes
Need to Know More About the Metro Ethernet Sector?

If you need it, we probably have it:

- **Metro Ethernet Track** - Continuous Information & Advisory Service
  - **Sector Analyses** (forecasts, market size, trends, emerging strategies, and outlook)
  - **Research Briefs** (strategic analysis of issues affecting the sector as they arise)
  - **Service Provider Coverage & Profiles** (detailed data, information & analysis of the providers)

- **Metro Ethernet Sector Analysis Report**

- **Service Provider Coverage, Analysis & Profiles**

Any of these can be ordered by calling (312) 980-4843