



## SERVICE OVERVIEW

# OUT-TASKING ETHERNET SERVICES HELPS BUSINESSES SCALE NETWORKS FAST AND REDUCE COSTS

*Flexible Ethernet-based network architecture delivers high bandwidth and incorporates well with existing infrastructure*

The present economy has significantly influenced the global business environment by reinforcing the need for businesses to improve productivity, increase revenue, create competitive differentiation, and respond quickly to market opportunities and shifts—while preparing for business emergencies and disaster recovery. Directly affected by this focus, IT and communications organizations are challenged to do more with reduced budget and resources. They must extract the most value from past infrastructure investments, while becoming more nimble, flexible, and scalable to meet changing business needs. For business customers in metropolitan areas where fiber optic networks are generally available, Metro Ethernet technology provides an ideal solution.

Metro Ethernet solutions deliver flexibility, practically unlimited bandwidth, and quality of service (QoS) to optimize data, voice, and video traffic across the network; provide immediate, on-demand scalability; and interoperate with current network topologies and services. By providing a robust network architecture that delivers flexible, scalable multiservice capability and broadband access, these solutions provide the return on investment (ROI) that business organizations seek. Metro Ethernet also offers varying levels of network security, depending on the application needs.

Deploying Metro Ethernet networks for enterprise applications with assistance from a service provider brings distinct advantages. Out-tasking lowers implementation costs and helps ensure ongoing cost savings as the network scales to accommodate growth. It also frees up internal resources to focus on strategic IT initiatives.

## CHALLENGE

Today's IT executives must maximize return on capital investments and minimize the total cost of ownership (TCO). At the same time, they must effectively serve the communication needs of their lines of business by doing the following:

- Meeting the organization's strategic requirements.
- Delivering quality of service and network security.
- Maximizing the value of current investments.

An increasing number of companies face the following challenges:

- An ever-increasing need to share data and applications across the organization. Every year a greater percentage of enterprise data traffic makes its way onto the WAN.
- The need to rapidly adjust to changes in the business environment cost effectively without waiting lengthy intervals to provision additional bandwidth to access and create networks between locations. The highly competitive business environment and increasingly mobile workforce demand a network infrastructure that can be rapidly adapted.
- Heightened requirements for QoS. As businesses increasingly converge applications over a single networking infrastructure, their networks support more application-specific (voice, video, and data) and bandwidth-intensive traffic, making QoS increasingly important.

- Resource constraints that impact IT overhead and workload. IT organizations require solutions that support and interoperate with the existing resources, can be deployed quickly, and are easy to manage.
- Cost constraints that require more to be accomplished with less. Maximizing ROI while reducing the overall cost per unit of measurement (such as reducing the cost per Mb of bandwidth) is mandatory.

At the same time, enterprise technology requirements are more rigorous than ever. Technical requirements include:

- Network uptime—Enterprise applications and e-business processes must remain active 24 hours a day, 365 days a year, requiring a highly available and reliable network.
- Rigorous network security—Transmission of data must be secure and all potential vulnerabilities of the network must be safeguarded.
- Converged network support—Networks must support multiple services over the same physical infrastructure. To minimize overhead and maintenance costs require technologies that use existing infrastructure investments and interoperate with the current resources and applications.
- Cost containment—The pressure to find the lowest-cost, most capable solution has never been greater. Cost structures that allow you to increase investment as revenue grows are often more desirable than alternatives that require a substantial initial investment.

A few of the difficulties of existing networks and networking alternatives include:

- Providing QoS despite the limitations of the existing network architecture. Achieving QoS can require investment in additional network components, which increases cost, consumes additional management time and effort, and adds complexity to the infrastructure.
- Difficulty scaling up or down rapidly in response to business requirements. As a result, many organizations do not make optimum use of their bandwidth (too much for nonpeak times, too little for peak times).
- Increasing network capability without outpacing budget and resource constraints. Adding components to support increased bandwidth consumes both capital and human resources (for installation, configuration, and ongoing maintenance).
- Interoperating and interworking with traditional and established networking protocols, such as SONET, SDH, ATM, Frame Relay, and others. Acquiring the knowledge base to support and integrate new protocols is time-consuming and expensive.

## **SOLUTION**

Technology managers are increasingly considering networking architecture that can deliver multiservice capability and broadband access while interoperating with their current network topology and services. In metropolitan areas globally, optical terminations into building and office parks have increased significantly with steady growth projections, opening the door to Metro Ethernet access services. These services use familiar Ethernet technology as the subscriber interface to deliver converged voice, video, and data services. An extremely scalable and cost-effective alternative to the existing broadband access technology, Metro Ethernet meets enterprise needs for greater internal cohesion and more economical wide-area connectivity. Metro Ethernet is suitable for both high-speed Internet access and the interconnection of multiple corporate sites in one or more metropolitan areas.

Managed Metro Ethernet access service offers highly scalable bandwidth in flexible increments, simplified management, and fast, low-cost provisioning. Bandwidth can be easily and precisely increased or decreased, from less than 1-Mbps to multiple-Gbps speeds, under software control—which is significantly faster and less expensive than the hardware upgrades that traditional broadband technology requires. In some cases, service providers offer a software utility program that allows the enterprise to directly control its bandwidth allocation. With flexible software controls, enterprises pay only for the bandwidth they use—and yet have the option to increase capacity quickly to cope with unexpected demand, changes in QoS requirements, and other forms of network inflation.

Traditional Frame Relay and ATM-based enterprise networks are typically complex and expensive to maintain. In contrast, Metro Ethernet provides a straightforward Ethernet interface for delivering high-speed access to many applications such as dedicated Internet access or secure VPN access to other sites. It can coexist with existing network elements and interoperates with existing Frame Relay and ATM networks. Based on industry-standard Ethernet protocols and interfaces, Metro Ethernet is compatible with nearly all IP applications and is a scalable foundation for emerging voice and video over IP services. The standards-based solution is mature and reliable and can be architected and delivered by any service provider.

Metro Ethernet access supports a full range of bandwidth-intensive services including:

- Hosted telephony—Managed IP PBX, IP CENTREX
- Voice over IP (VoIP)
- Streaming and broadcast video
- Real-time application operation (such as collaborative development applications)
- Layer 2 and/or Layer 3 VPNs
- Business intranets and extranets
- Network security
- Storage area networking and hosting
- Disaster recovery

Managed Metro Ethernet access service providers may offer online provisioning and management for business-class networks. The services can be adapted to particular business requirements for bandwidth, network security, and QoS, which allows services to be cost-effectively tailored to meet an enterprise's specific immediate needs. In addition, managed Metro Ethernet access allows service upgrades across an organization's geographical locations to be made simultaneously from one location, greatly simplifying network management.

The three main types of Metro Ethernet access services are:

- **Transparent LAN services (TLS), more recently referred to as Ethernet LAN services (ELS)**—These services create a virtual LAN (VLAN) that spans multiple branch locations and delivers multipoint connectivity. Ethernet LAN simplifies interoffice communications and can be used to interconnect multiple LANs dedicated to specific functions.
- **Ethernet-based dedicated Internet access (DIA)**—DIA can be used to offer scalable connectivity to the Internet. The service is capable of accommodating varying bandwidth, QoS, and security metrics, depending on the application needs. For example, for an e-commerce application requiring Internet connectivity, DIA can be configured to provide highly available and highly secure connectivity.
- **Ethernet Line Service, also called Ethernet Private Line**—Ethernet Line Service is a symmetrical point-to-point connection between two customer locations that provides the same bandwidth performance for both sending and receiving. With Ethernet Line Service, businesses can manage their own bandwidth on a private, dedicated, and secure connection.

Managed Metro Ethernet access service providers deliver QoS based on the metrics specified in a service-level agreement (SLA). Service providers can offer a range of SLAs based on customer application requirements and the metrics listed. The SLA can range from “best effort” capability of the network to strict measurements based on the following:

- **Network availability**—This defines the percentage of services uptime. The metrics that can be included and associated with this aspect of the service guarantee are:
  - User-Network Interface (UNI) service activation time
  - UNI mean time to repair (MTTR)
  - Ethernet Virtual Circuit (EVC) activation time
  - EVC availability
  - EVC MTTRGenerally, network availability is stated as a percentage of uptime for an entire year. This figure then can be translated to potential unscheduled or unplanned network downtime.
- **Network delay**—This metric is associated with the overall network measurement from ingress to egress in either one-way or end-to-end (i.e., ingress UNI to egress UNI). The measurement depends on the UNI and the frame size defined for the application showing the time required to transport the first bit to the last bit on a given frame.
- **Network jitter**—Jitter is used to define network-delay variation. It is also measured in milliseconds.
- **Network loss**—Network packet loss (also known as packet delivery rate) is used to define a measurement of Ethernet frames that are reliably delivered from ingress to egress. This is typically shown as a percentage of packets delivered end to end.

As stated earlier, the needs of applications will determine the SLA to request and negotiate with the service provider.

## BUSINESS BENEFITS

By facilitating bandwidth on demand and extending the LAN capability beyond the current boundaries, managed Metro Ethernet access service provides the following benefits (T = technology, S = services):

- **(T) Supports efficient performance**—Managed Metro Ethernet access services provide the access speeds, bandwidth, and QoS management to maintain high levels of productivity and efficiency. As organizations look to intensive and hosted applications to increase their competitive profile, the cost-effective, reliable bandwidth supplied by Metro Ethernet offers a viable solution. High speeds impact all aspects of network performance from VPN access to data centers and hubs, to campus metropolitan-area network (MAN) or LAN-to-LAN interconnections, to the Internet.
- **(T) Uses in-house expertise**—Many organizations today already deploy Ethernet solutions in their LANs. By choosing Metro Ethernet access services, these businesses can use familiar protocols and in-house experience.
- **(S) Helps enable Internet data centers**—Managed service providers can deploy the latest post office protocol (POP) interconnects, such as Gigabit Ethernet, helping internal backbone networks to keep pace with the high access speeds and increased traffic of Metro Ethernet access.
- **(S) Offers flexible storage**—Enterprises are faced with ever-increasing storage requirements created by Web-based applications and transactions, storage-intensive technologies, and regulatory requirements for data retention. Networked storage allows enterprise data to be duplicated and restored, providing day-to-day availability and capacity monitoring, along with data backup for efficient disaster recovery.
- **(T) Interoperates with existing infrastructure**—Managed Metro Ethernet access service providers can extend and evolve your organization’s existing network assets. For example, businesses with Frame Relay and ATM networks can augment existing capabilities with cost-effective, flexible Ethernet access to specified high-bandwidth locations.

- **(T) Scales as needed to deliver fast provisioning, fast changes**—Metro Ethernet access technologies allow managed service providers to network an organization quickly and to adapt a service package as needed to meet a specific organization’s requirements, supporting fast time-to-market demands.
- **(T and S) Delivers robust network security**—Metro Ethernet access supports a wide range of essential network security services, including security management, VPN, managed firewalls, and intrusion detection systems (IDSs).
- **(T) Provides in-house control**—Out-tasking Metro Ethernet access does not require relinquishing control over critical businesses processes. A managed service provider can work with you to help ensure you maintain control of workflow in your organization. Businesses with in-house IT expertise can determine where control is desirable and where a service provider can free time and resources to devote to widespread infrastructure management and strategic business initiatives.

### Technical Advantages

Managed Metro Ethernet access service provides the following technical advantages:

- Separate, interoperable transport, service, and management architectures
- Up to 10 Gbps of bandwidth on demand or permanently
- Ethernet components that are relatively low-cost, with expenditures typically less than those for SONET, Frame Relay, or ATM
- Integration with existing customer router or switch to connect to the carrier
- Multiple classes of service for any application: voice, video, mission-critical data, etc.
- Option of subscriber self-managed bandwidth on demand
- Faster provisioning time, even faster bandwidth and feature-upgrade time compared to traditional circuit-based networks
- Point-to-point, point-to-multipoint, and multipoint topologies available
- Deployment of any network topology, such as hub-and-spoke versus fully connected network
- Intra- and extranet creation
- Support for existing satellite and remote offices or locations that are currently served by Frame Relay or ATM without having to change the connectivity scheme at those sites

### Implementation Options

Businesses may choose to out-task part or all of the services and applications that they currently support to a Metro Ethernet access service provider. Flexible bandwidth, support for varying levels of QoS, and less costly customer premises equipment (CPE) are a few of the top reasons why managed Metro Ethernet access services are becoming a viable and strategic solution for business. WAN and MAN Ethernet services avoid the overhead and delay that come with traditional broadband technology such as Frame Relay and ATM.

## Benefits of Out-Tasking

The benefits of out-tasking to a Metro Ethernet access service provider include the following:

- **Reduced networking costs**—Businesses are realizing enhanced profitability by adopting a new business model based on out-tasked Metro Ethernet access services, a lower TCO, and technology investments with good ROI. As managed Metro Ethernet access becomes more widespread, economies of scale have lowered costs.
- **Increased productivity**—Managed Metro Ethernet access services save employees time and money. Response time is faster for shared resources including large database and bandwidth-intensive applications. Organizations can accomplish more with less in-house infrastructure, management, maintenance, and monitoring.
- **Addressing uncertainties**—With managed Metro Ethernet access services, businesses are better prepared for the unpredictable. Disaster recovery and network security, along with 24-hour risk management and monitoring, are available through a reliable service provider.
- **On-demand bandwidth**—Variable bandwidth (rather than low, fixed bandwidth) has become more important to support demanding applications and to support intensive network-usage patterns or events, such as video broadcasts, Webcasts, and data backups. Managed Metro Ethernet access service providers can provision bandwidth in flexible increments, so businesses can pay only for what they need, while accommodating high-demand situations. Managed Metro Ethernet access services offer better high-bandwidth access and transport options for MANs and WANs. They are not only scalable and accessible via a single interface, but provide an alternative to complex and costly network upgrades. In addition, high-bandwidth availability brings new opportunities for server and storage consolidation.

## Decision Tree

Determining the type and scope of managed Metro Ethernet access services that a business can out-task requires a rigorous assessment of the organization's current and future status and network requirements. The analysis should encompass the business's objectives and networking challenges, current network configuration, bandwidth and performance requirements, future plans to deploy additional services, proposed timelines, and network security needs.

Assessing network requirements in support of business objectives is an important first step toward finding a service provider that can complement internal IT resources and reduce overall network support costs.

When an enterprise network is very large and highly distributed, IT managers may not always have a comprehensive understanding of what technologies and systems are actually in place throughout an organization. Other contributing factors can include company mergers, on-going changes, a traditional of local decision making for technology, or the time and cost of sending staff into the field to track network assets that have already been in place for years.

Table 1 provides a guide to review an organization’s existing network status and support requirements.

**Table 1.** Assessing Network Requirements

<b>Objective</b>	<b>Network Requirements</b>	<b>Check Your Network Requirements</b>
Bandwidth Required at Each Site (consider both headquarters and remote or branch offices)	<ul style="list-style-type: none"> <li>• Fractional T1</li> <li>• T1</li> <li>• OC-3/STM-1</li> <li>• OC-12/STM-4</li> <li>• OC-48/STM-16</li> <li>• More than OC-48</li> </ul>	•
Network features required	<ul style="list-style-type: none"> <li>• Security (authentication, authorization, and accounting)</li> <li>• Secure (or encrypted) communication</li> <li>• Varying QoS for applications</li> <li>• Reliability (for example, Mean Time Between Failures &amp; Mean Time To Repair)</li> <li>• Availability</li> <li>• Interoperability with other broadband technologies in use</li> <li>• Scalability</li> <li>• Reporting management</li> <li>• Operational and administrative management</li> </ul>	
Metro Ethernet access objectives (for example, Network Topology & Characteristics)	<ul style="list-style-type: none"> <li>• Point-to-point connectivity</li> <li>• Point-to-multipoint connectivity (hub and spoke)</li> <li>• Multipoint connectivity (LAN extension—Extending current LAN or WAN capabilities and boundary)</li> </ul>	
Service Characteristics Needed	<ul style="list-style-type: none"> <li>• Find cost-effective solution for increasing bandwidth and access speeds</li> <li>• Support delay-sensitive applications such as videoconferencing and VoIP</li> <li>• Deploy new IP-based applications</li> <li>• Attain primary WAN service</li> <li>• Implement security measures</li> <li>• Improve scalability</li> </ul>	

Metro Ethernet is the ideal platform for supporting bandwidth-intensive applications. Table 2 reviews bandwidth-intensive applications used in several vertical markets.

**Table 2.** Bandwidth-Intensive Applications

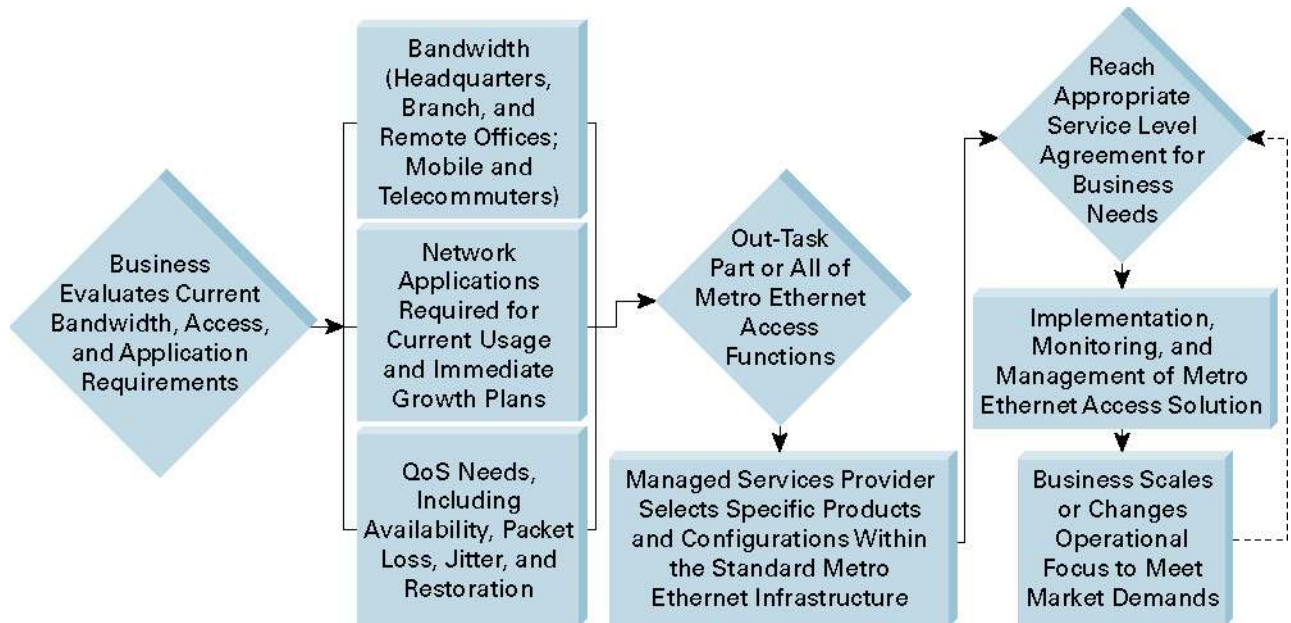
Vertical market	Applications
Education and research	<ul style="list-style-type: none"><li>• Grid computing</li><li>• Imaging</li><li>• Visualization</li><li>• E-learning</li><li>• Multimedia</li></ul>
Retail and consumer	<ul style="list-style-type: none"><li>• Customer relationship management (CRM)</li><li>• Supply chain management</li><li>• Point-of-sale kiosk</li><li>• Multichannel retailing</li><li>• Trading partner collaboration (business extranets)</li><li>• E-commerce (24-hour)</li></ul>
Financial services	<ul style="list-style-type: none"><li>• CRM</li><li>• E-learning</li><li>• Smart branch</li><li>• Data warehousing</li><li>• Outsourcing</li><li>• Financial transactions requiring speed and security</li></ul>
Government	<ul style="list-style-type: none"><li>• E-government</li><li>• Workforce optimization</li><li>• E-learning</li><li>• E-citizen</li><li>• Record management</li></ul>
Manufacturing	<ul style="list-style-type: none"><li>• Enterprise resource planning (ERP)</li><li>• Supply chain management</li><li>• E-learning</li><li>• Product data management</li><li>• Collaborative product design</li></ul>
Media and entertainment	<ul style="list-style-type: none"><li>• Digital publishing</li><li>• Digital media delivery</li><li>• Digital asset management</li><li>• Digital archiving</li></ul>



Figure 1 outlines the process of choosing and implementing a Metro Ethernet access solution.

**Figure 1**

Process for Out-Tasking Metro Ethernet Access Services



Choosing the right service provider is vital. Table 3 provides a starting point for discussions with managed service providers.

**Table 3.** Assessing a Managed Service Provider

Objectives	Service Provider Requirements	Check Your Service Provider Requirements
Flexible bandwidth	<ul style="list-style-type: none"> <li>Supplies high-speed bandwidth</li> <li>Adjusts bandwidth levels to “ordinary” and intensive-usage requirements and to current and evolving needs</li> </ul>	•
Supported QoS features	<ul style="list-style-type: none"> <li>Ability to handle voice, video, data, and multiple applications</li> <li>Prioritization of traffic and shaping of the traffic</li> <li>Congestion-avoidance mechanisms and techniques</li> </ul>	
Operational measurement	<ul style="list-style-type: none"> <li>Fast provisioning</li> <li>Low latency and packet loss</li> <li>Performance metrics</li> <li>24-hour support</li> <li>Accurate billing and reporting</li> </ul>	
Network security	<ul style="list-style-type: none"> <li>Data encryption</li> <li>Intrusion detection</li> <li>Firewall protection</li> <li>24-hour monitoring</li> </ul>	

Objectives	Service Provider Requirements	Check Your Service Provider Requirements
Compatibility with existing infrastructure	<ul style="list-style-type: none"> <li>• Interoperability with traditional LAN and WAN environments</li> <li>• Interoperability with existing broadband access technology such as Frame Relay and ATM</li> </ul>	•

### Out-tasking Strategies

Creating an effective partnership between internal and external resources requires balancing networking strategies and service options. Table 4 summarizes best practices in achieving this balance.

**Table 4.** Recommended Out-Tasking Strategies

Business	Business Strategy	Managed Metro Services
<b>Enterprise business</b>	Simplify networking operations	<ul style="list-style-type: none"> <li>• IP VPN connectivity to branch offices</li> <li>• Remote access to mobile workers and telecommuters</li> </ul>
	Support demanding applications	<ul style="list-style-type: none"> <li>• VoIP and business voice services</li> <li>• Streaming video, multicasting, videoconferencing</li> <li>• IP telephony</li> </ul>
	Enhance business-critical infrastructure	<ul style="list-style-type: none"> <li>• Storage and offsite disaster recovery</li> <li>• Data center connectivity</li> </ul>
<b>Small to medium-sized business</b>	Increase Internet-access speeds and bandwidth	<ul style="list-style-type: none"> <li>• Access on demand</li> <li>• High-speed bandwidth</li> </ul>

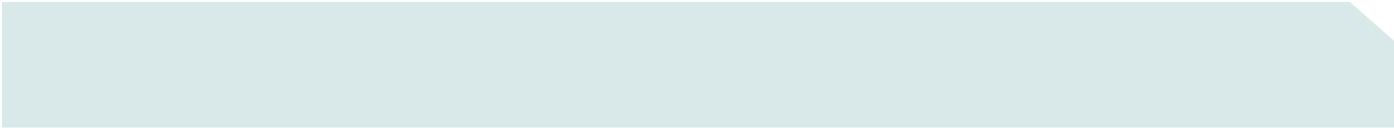
Please see the customer case-study references for more examples in real-life customer scenarios.

### WHY CISCO

Cisco Systems® is the leader in enterprise networking and service providers have recognized that Cisco® Metro Ethernet Access Services and technologies offer them a competitive advantage. An increasing number of service providers are offering managed Metro Ethernet access services to business customers based on Cisco solutions that include routing, switching, and optical technologies. Cisco platforms for Metro Ethernet access services have been proven and validated by optical, IP, and Ethernet customers.

Service providers with the Cisco Powered Network designation supply reliable, industry-leading, out-tasked services that help enable advanced applications based on Cisco end-to-end network equipment and technology. These service providers offer the following benefits:

- Compliance with stringent requirements and standards
- Confidence that vendors are using industry-standard technology
- Optimized deployment of network security services in a timely manner
- Lower infrastructure investment



More than 500 of the most successful service providers around the world are members of the Cisco Powered Network Program. Situated in more than 56 countries, these program members offer a wide range of services—over networks built with Cisco products and solutions—for small and large businesses alike.

Service providers with the Cisco Powered Network designation are committed to using end-to-end Cisco equipment in their networks and meet high standards of operational excellence and customer service and support.

## **FOR MORE INFORMATION**

To learn more about Cisco solutions for metropolitan networking, please see the managed services e-tour at <http://www.cisco.com/go/managedservices>.

Also look there for Cisco overviews on other managed services including:

- Security services
- VPN services
- Business Voice services

## **OTHER RESOURCES**

[http://www.cisco.com/offer/powernow/tree.taf-asset\\_idk99461.htm?sid=118527\\_979](http://www.cisco.com/offer/powernow/tree.taf-asset_idk99461.htm?sid=118527_979)

[http://www.cisco.com/en/US/netsol/ns341/ns121/ns389/networking\\_solutions\\_solution.html](http://www.cisco.com/en/US/netsol/ns341/ns121/ns389/networking_solutions_solution.html)

### **White Papers**

[http://www.cisco.com/en/US/netsol/ns341/ns121/ns389/ns308/networking\\_solutions\\_white\\_papers\\_list.html](http://www.cisco.com/en/US/netsol/ns341/ns121/ns389/ns308/networking_solutions_white_papers_list.html)

Metro Ethernet Access Services Business Overview for Service Providers:

[http://www.cisco.com/en/US/netsol/ns341/ns396/ns223/networking\\_solutions\\_white\\_paper09186a0080215adc.shtml](http://www.cisco.com/en/US/netsol/ns341/ns396/ns223/networking_solutions_white_paper09186a0080215adc.shtml)

### **Customer Success Stories**

[http://www.cisco.com/en/US/netsol/ns341/ns121/ns389/ns308/networking\\_solutions\\_customer\\_success\\_stories\\_list.html](http://www.cisco.com/en/US/netsol/ns341/ns121/ns389/ns308/networking_solutions_customer_success_stories_list.html)

### **Outsourcing Guide (Cisco Powered Network Program)**

[http://www.cisco.com/warp/public/779/servpro/cpn/benefits/Cisco\\_Outsourcing\\_Guide.pdf](http://www.cisco.com/warp/public/779/servpro/cpn/benefits/Cisco_Outsourcing_Guide.pdf)

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