

Metro Ethernet Business Case Drivers

Introduction

Data-intensive applications, new Internet business models, and population growth are all influencing the dramatic growth in demand for metropolitan bandwidth. Service providers have traditionally handled metropolitan data demand by providing last-mile services—from fiber facilities at customer locations to points of presence (POPs)—over T1 or E1 facilities. But these circuits provide limited bandwidth and prevent subscribers from easily adding bandwidth in small, flexible increments. Moreover, traditional circuits support either voice or data, not the integrated voice, video, and data that today's converged applications use.

Based on Ethernet, IP, and optical technologies, Metro Ethernet Access Services overcome the limitations of fixed-bandwidth facilities. They provide more bandwidth, the ability to provision bandwidth in flexible increments, and better support for converged voice, video, and data services.

Metro Ethernet Access Services promise attractive returns as well. Reduced equipment costs make these services more cost-effective than Frame Relay and ATM services. Service providers also can use existing infrastructures because Metro Ethernet Access Services can be provisioned

on Synchronous Optical Network/ Synchronous Digital Hierarchy (SONET/ SDH), wavelength-division multiplexing (WDM), native fiber, Resilient Packet Ring/ Dynamic Packet Transport (RPR/DPT) and can use multiple control planes, including Multiprotocol Label Switching (MPLS), Layer 2 Tunneling Protocol Version 3 (L2TPv3), IP, or IEEE 802.1q.

The revenue opportunity from Metro Ethernet Access Services is significant, and includes both connectivity and value-added services that are enhanced by metropolitan-area network (metro) Ethernet access, including IP VPN, network security, storage, hosting, voice-over-IP (VoIP) applications, content delivery, e-learning, service portals, tele-collaboration, and videoconferencing.

This case study identifies the business motives for Metro Ethernet Access Service and describes how they affect the service's business case. It explains how service providers can improve the overall business case through effective marketing and simplified network operations, and it highlights the ways that Cisco Systems® can help service providers launch and provision successful Metro Ethernet Access Service.



Business Case Summary

This business case examines the factors that affect the success of a Metro Ethernet Access Service in a large U.S. city. The study's assumptions are as follows:

- The service provider operates in a major U.S. metropolitan community.
- The service provider attracts 625 customers over 5 years.
- The service is a transparent LAN service and does not include Internet access.

Service speeds range from below 10 Mbps up to 1 Gbps. The service price includes both a port charge and a Committed Information Rate (CIR) that are consistent with existing market plans.

The results of this sample deployment scenario are captured in the following financial metrics:

- Net present value (NPV): US\$83.4 million
- Payback period (time required to recover the initial investment): 36 months
- Five-year internal rate of return (IRR): 60 percent
- Five-year operating margin (operating revenues less operating expenses): 43 percent

The NPV is the sum of cash flows discounted at the discount rate representing the economic worth of the service in today's dollars. The IRR is the discount rate that equates the present value of the future net cash flows from the service to the initial service investment. It is therefore the discount rate that equates the NPV of the service with zero.

These financial results reveal a business case that successfully meets important service provider investment criteria. However, a static presentation of results does not offer the necessary view into important business-case factors. Further, by engaging in a detailed analysis of critical components of the business case, this study can establish baseline requirements for building the successful business case and identify primary success and failure factors.

In building a business case for a specific service provider, and even a specific deployment within that service provider's service area, it is difficult to generalize about operational or architectural variables. The business case depends largely on the availability of fiber, the chosen architecture, customer density, and other factors. These factors, if significantly adverse, can dominate a business case and result in a business case, or worse, an actual deployment that fails to meet the service provider's financial objectives.

However, even with ideal conditions for deployment, there are still significant factors that are within control of the service provider that affect overall value, positively or negatively. Three important themes emerge as the major value propositions in the business case.

1. *Service-level agreement (SLA) enablement*—By offering increasingly granular levels of service, the service provider can capture additional revenue from customers. Also, the service provider can expand the addressable market by offering services that meet the stricter requirement of some customers.
2. *Marketing effectiveness*—By targeting more likely converts to metro Ethernet and communicating in vehicles that take advantage of partner contributions, the service provider can attract higher-quality customers more quickly, meet the needs of those customers explicitly, and retain them for a longer period.
3. *Network operations*—By simplifying network operations through capable platforms and robust OSSs, network management systems (NMSs), and element management systems (EMSs), the service provider can minimize the resources allocated to operating and managing the network and customers.

Focusing improvement efforts on these three areas results in greater value to the service provider.



Factors That Affect Business

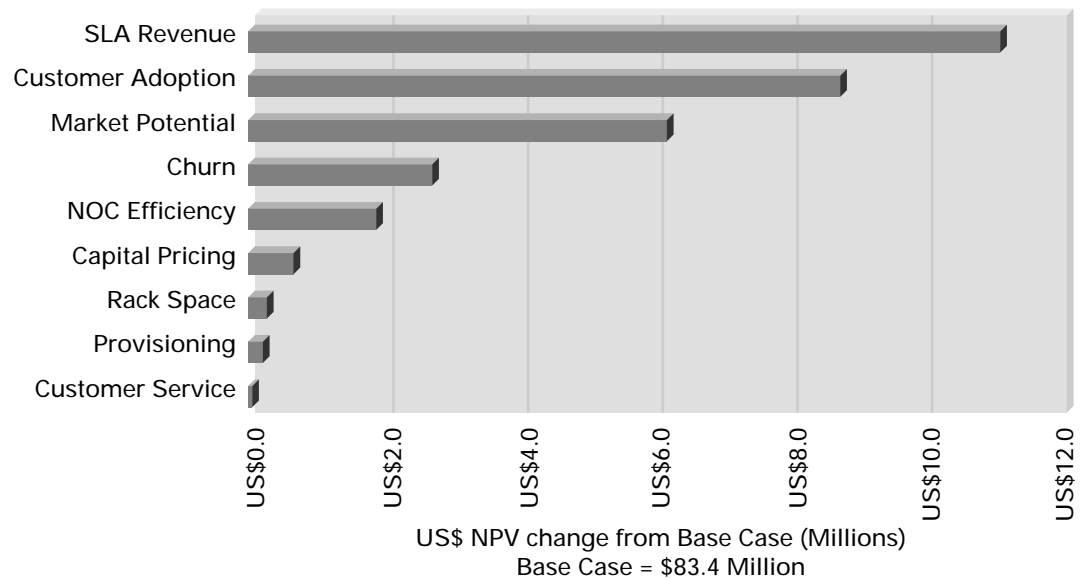
Understanding valuation requires a comparison of the underlying revenue, operating, and network variables. Only a small set of factors have a demonstrable effect on overall valuation. In the case of a Metro Ethernet Access Service these factors include:

1. SLA enablement
2. Marketing effectiveness (customer adoption rates, market potential, and customer turnover)
3. Network operations

It is worth noting that capital pricing is of minor value and ranks far lower in terms of magnitude than the five higher business variables.

Figure 1 summarizes the impact of changing these factors. Improving them by 10 percent demonstrates the magnitude of the improvement to the overall business case and the relative importance of each factor.

Figure 1
Metro Ethernet Access Sensitivity Analysis



SLA Revenues

Enabling SLA revenues improves NPV more than any other factor. By moving customers from basic to advanced service levels, service providers can collect greater revenues and improve the business case. In the sensitivity analysis, increasing revenues through SLAs by 10 percent raised the NPV by 13 percent.

Service providers offering Metro Ethernet Access Services can secure greater revenues from their respective clients in three ways. First, they can offer a variety of increasingly valuable and higher-priced SLAs. This approach requires differentiating service levels and pricing each to reflect the perceived value of the SLAs. Table 1 shows the most common features of SLAs.



Table 1 SLA Features

SLA Differentiation
• Packet delivery rate
• Latency
• Availability
• Jitter
• Mean Time To Repair (MTTR)

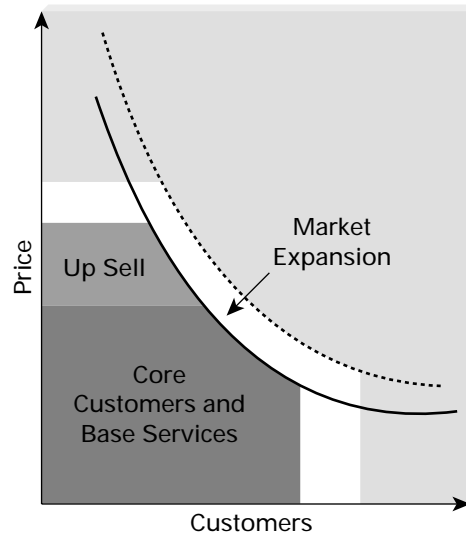
Secondly, service providers can deliver different *classes of service* that correspond to a variety of Committed Information Rates (CIRs). For instance, a service provider could offer three classes of service—bronze, silver, and gold—each offering higher performance than the previous class. An end user might put voice traffic on a gold class of service, backup traffic on a silver class, and basic noncritical data on a bronze class. By varying characteristics such as prioritization, latency, jitter, and packet loss, service providers can differentiate the service classes and price them accordingly.

Third, service providers can offer *dynamic bandwidth allocation* or bandwidth on demand for applications such as video broadcasts or data backups. Consider an enterprise that wants to broadcast a CEO's speech to different sites in real time. To accommodate the broadcast, the customer needs to increase its network bandwidth from 100 Mbps to 200 Mbps. The service provider would make the additional 100 Mbps available and charge for the increased bandwidth for the broadcast's duration. Perhaps another customer backs up data at certain times of the day, a process that demands additional bandwidth for only brief periods. Again, the service provider would make the extra bandwidth available strictly for the duration of the backups and thereby generate extra revenue.

Enabling SLAs permits the service provider to create layers of differentiated services. Value is increased by capturing more revenue per customer as well as expanding the addressable market given strict SLA requirements among certain customer segments. In the context of a demand curve, the service provider may capture a greater area under the curve as well as potentially shift the demand function to the right. These actions have a significant and positive impact on service valuation (Figure 2).



Figure 2
Illustration of Demand Curve



The Importance of OSSs, NMSs, and EMSs

Successfully differentiating services in these ways—by SLAs, class of service (CoS), or dynamic bandwidth allocation—requires excellent OSSs, NMSs, and EMSs. Service providers must be able to deliver different levels or classes of service and monitor these differences to meet service targets. In other words, gold-level customers must receive gold-level service and so forth.

Service providers also need to produce performance reports that address a wide variety of questions. For instance, was the service down during the month? For how long? Are the service-level commitments being met? How often did these commitments fall short? Even more complex, service providers need to bill for service and credit for any failures covered in the SLAs.

Ideally, service providers would operate highly automated OSSs, NMSs, and EMSs to monitor, measure, report on, and bill for SLA guarantees. Without such systems, they must conduct workarounds, manually managing at least parts of their SLAs. This constraint increases costs and reduces margins.

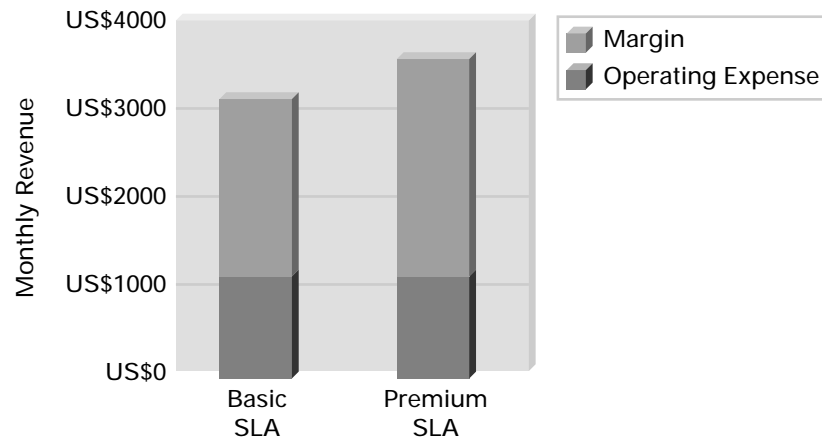
Financial Benefits of Upgrading SLAs

Assume that a customer has a 100-Mbps Metro Ethernet Access Service with a 55-percent CIR. When subscribing to a basic-level SLA, the customer generates average revenue of US\$3165 a month. By moving the customer to a premium SLA service, the customer generates revenue of US\$3640 a month, a 15-percent increase. At the same time, the service provider's monthly costs rise from US\$1172 to only US\$1201, a 2.4-percent difference attributable solely to sales commission increase. The net margin consequently rises by US\$446 a month, increasing from 63 percent to 67 percent of revenue.



By persuading this customer to move from a basic SLA to a premium SLA, the service provider increases its revenue. By automating the move, the service provider incurs no incremental costs other than a marginally higher sales commission. All other costs remain static: the service provider uses the same circuit and supports that circuit the same way. Figure 3 shows the margin and revenue gains from automatically upgrading this customer to a premium SLA.

Figure 3
Revenue and Margin Increase from SLA Upgrade



Marketing Effectiveness

The marketing effectiveness of the service provider helps enable SLAs. But marketing effectiveness also includes three significant value enhancers:

1. *Customer adoption*—The rate at which customers sign up for services
2. *Market potential*—The overall number of customers who will ultimately adopt the services
3. *Churn*—The rate at which existing customers cancel services

Well-coordinated marketing efforts, using the expertise of channels and other partners, can result in accelerated adoption, higher-quality customers (lower turnover), and higher overall penetration. The result is more customers adopting services more quickly. Together, these factors add tremendous value to the business case. The fixed expenses of upfront network implementation, systems integrations, and other setup costs can be recovered more quickly; minimum efficient scale, or the point at which fixed operating costs and capital expenditures can be spread over a number of subscribers, can be achieved faster, thus improving overall margins; and existing capital can support more revenue, improving capital efficiency.

Customer Adoption Rate

By effectively targeting those customers who are ready to buy, the service provider can achieve higher success rates on promotional programs and accelerate adoption of the services. Activities leading to higher effectiveness can include comarketing with partners, improving direct-marketing campaigns, or opening additional sales channels.



Alternatively, customers become more inclined to adopt a service if they are exposed to positive referrals, or personal recommendations. By holding customer advisory sessions or generating multiple case-study references, service providers improve the image of their services and are more likely to sell them. Again, partnerships and channels can prove to be excellent resources.

Improving customer adoption rates has the highest impact of the three components of marketing efficiency, improving NPV by 11 percent for a 10-percent improvement in adoption rate.

Expanding Market Potential

Expanding market potential is similar in concept to increasing market penetration. There are certainly multiple means to increase penetration with varying degrees of effectiveness. Increasing channel scope is one way. Through partnership with companies with an alternative avenue into the enterprise, the service provider can present its services from a different perspective.

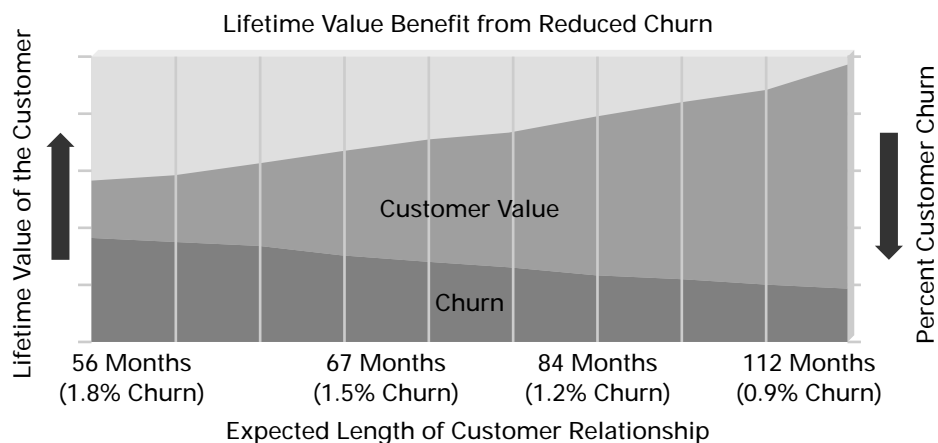
Another way is to provide appropriate service bundles that appeal to specific customer segments. As an example, bundling an IP voice service with metro Ethernet access that has differentiated CoS for data and voice could appeal to customers with distributed employees who need to communicate with the corporate headquarters.

The impact of improvement in this factor is also significant, increasing NPV by 7 percent for a 10-percent increase in customer potential.

Reducing Customer Churn

If service providers can keep their customers longer—and hence reduce customer turnover—they can also improve the business case. By reducing churn by 10 percent (from 1.8 percent per month to 1.5 percent per month), the average length of the customer relationship increases from 56 months to 67 months (Figure 4). This translates into more revenue and a higher return on initial acquisition costs. Also, with fewer customers cancelling the service, and the same number adopting the service, the overall market penetration will improve.

Figure 4
Lifetime Value of the Customer





By delivering to higher-quality customers who are subscribing to the services that meet their needs best, service providers can reduce churn. Also, by creating bundles that better address customer needs and are more deeply embedded in the customer's operations, the service provider can decrease the likelihood of the customer switching service providers.

As shown in these examples, the three factors that collectively comprise marketing effectiveness are interdependent to a large degree. Efforts to improve one factor will likely have a positive impact on the other factors as well.

Finally, Cisco® can be of value on all three fronts. Whether through its Cisco Powered Network Program, its alliances, or its joint promotion initiatives, Cisco can help service providers uncover high-quality prospects, increase customer-adoption rates, and reduce customer turnover—keys to long-term success.

Increasing Network Operational Efficiency

The sensitivity analysis revealed that increasing network operational efficiency is actually more important than decreasing the cost of the underlying capital. The cost associated with managing the network over five years can be higher than the capital cost of the platform being managed. Therefore, it is critical to focus attention on improving network operational efficiency.

Several factors affect the effort and expense of operating a network. For example, the more customers there are, the greater the effort to support those customers. The size of a network also influences its operation: the more platforms, the more complex the network. And managing a complex network requires more resources than a simple network does. Similarly, the more SLA options, classes of service, or bandwidth options, the higher the network operational expense. Services that easily and transparently layer upon one another are simpler to manage than those that require manual intervention.

Cisco can help improve network operational efficiency in two ways. First, it can assist service providers to set up their OSSs, NMSs, and EMSs to simplify network operations. This capability equips service providers to add new customers cost-effectively and to introduce new platforms with minimal impact on network complexity.

Second, Cisco can help service providers to maximize port-density ratios. The more ports there are on a given platform, for instance a Cisco 7600 Series Router, the fewer platforms there are in the network. And the fewer the platforms, the easier the network is to manage. Therefore, by optimally allocating ports among their platforms, service providers can reduce costs. These considerations are addressed in more detail shortly.

Upgrading Auto Provisioning

In an ideal world, a Metro Ethernet Access Service customer would be able to go online and independently change its service, for instance, ordering higher-megabit ports with higher CIRs. Known as autoprovisioning, this capability requires no service provider involvement at all. More realistically, however, a customer would need to call its service provider and ask for the change. The service provider would then instantly fulfill the order by updating its database. This latter approach is known as semi-autoprovisioning.

Either way, service providers avoid manually upgrading the circuits. An advantage of Ethernet over traditional systems, this convenience offers two primary benefits. First, it avoids the cost of the customer visit (also known as a “truck roll”) and the end-office upgrade, which together can be as high as US\$1000. And second, service providers earn revenue from the upgraded service immediately. Compare this situation to the traditional scenario where service upgrades can take from two to four weeks or longer. In such cases, service providers stand to forgo up to \$1500 in revenue that they could have earned with an auto or semi-autoprovisioning system.



Improving Network Management

As their networks and customer bases expand, service providers should focus on improving network management efficiency. Why is it important to manage networks efficiently? The savings can be substantial.

Consider that on average service providers employ 1 technician for every 750 to 1250 customers. And they also typically hire 1 technician for every 20 platforms (such as Cisco 7600 Series) in the metro core network. Further, the service provider requires four additional technicians just to provide 24-hour monitoring. With involvement from Cisco, a technician who manages 20 platforms today may well be able to improve their efficiency, managing additional platforms. Cisco offers potential efficiency gains from a variety of sources: improved network testing; advanced OSS, NMS, and EMS support; and involvement in the Cisco Powered Network program.

Such efficiency improvements can translate into big savings. For instance, managing a core network platform costs roughly \$2500 a month. This figure assumes that the fully loaded technician labor rate is approximately US\$10,000 a month, including salaries, benefits, training, computer equipment, and office space. But offering 24-hour service requires increasing the US\$10,000 monthly expense by a factor of five. For US\$50,000 a month, service providers can operate three shifts a day and cover weekends and holidays.

The magnitude of this expense underscores the value of managing networks efficiently. If technicians can administer more platforms, the network-management cost per platform will fall and service provider margins will rise.

Increasing Port Density

Service providers can also reduce network-management expenses by increasing port density, and Cisco can be of value here as well. Increasing port density per platform enables service providers to operate fewer platforms and hence lower their network management expenses.

Service providers can also save money by using ports more efficiently and reducing the number of ports that they need. In short, increasing port density enables service providers to improve technician productivity. By helping service providers design their networks to maximize port density, Cisco can optimize equipment configurations and eliminate inefficiencies that can negatively affect profitability.

Cisco Partner Program

Cisco network-design services are one example of the expertise and resources that service providers can use to deliver successful Metro Ethernet Access Services. Cisco offers industry-leading technology and solutions, vast internetworking expertise, and the ability to identify and influence business demand for service provider offerings—enabling service providers to launch new services, boost revenues, and keep ahead of their competitors.

The Cisco Powered Network Program is the primary vehicle for Cisco strategic service provider customers. By offering access to Cisco resources, the Cisco Powered Network Program equips service providers to market their offerings more effectively.

In fact, Cisco can help service providers in a host of valuable ways: testing solutions to determine if they work in the service provider's environment, quantifying market opportunities, segmenting markets, customizing marketing plans, positioning services, developing value propositions, generating leads, orchestrating direct marketing campaigns, conducting sales training, hosting service provider events and symposiums, fostering channel partnerships, and more.

All of these services and initiatives enable service providers to deploy services and bring customers online more quickly. By improving marketing effectiveness, Cisco allows service providers to capture new markets, reduce customer turnover, and accelerate service adoption. The outcome is higher net present values, bigger margins, and improved capital efficiency.

Why Cisco

The leader in networking solutions, Cisco offers a complete end-to-end solution that equips service providers to deploy profitable Metro Ethernet Access Services. Cisco offers service providers the following advantages:

- *Market leadership in enterprise converged networking*—More enterprises have built their IP infrastructures with Cisco equipment than with any other vendor's products. Service providers that work with Cisco can therefore quickly connect with customers. This capability accelerates service demand, which increases network utilization, reduces cost per user, and generates faster ROI.
- *Standards leadership*—For more than a decade, Cisco has played an important role in developing innovative Ethernet, Layer 2, and IP MPLS features. And Cisco continues to lead support for Metro Ethernet standardization in the IEEE, ITU, IETF, and Metro Ethernet Forum, as well as in the MPLS and Frame Relay Alliance and the ATM Forum.
- *Technology leadership*—Cisco has unsurpassed deployment experience: The company now serves more than 100 MPLS customers, 1000 optical customers, and countless IP customers. Cisco will invest US\$10 billion over the next five years to continue to bring innovation to the service provider market.
- *Support services*—Cisco Support Services help services providers move to multiservice packet networks. The services address device-, network-, and application-level challenges. Service providers that select Cisco Metro Ethernet solutions gain access to the industry's largest team of networking experts. These experts work with service providers to plan, design, and implement projects and to support operations and optimize networks.
- *Proven solution*—Cisco has validated the capability and performance of its Metro Ethernet Access Services with multiple service provider partners—not just in the lab.

For additional information about how Cisco can assist your organization to launch profitable Metro Ethernet Access Services and generate a quick return on your investment, please call your Cisco account representative today.



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