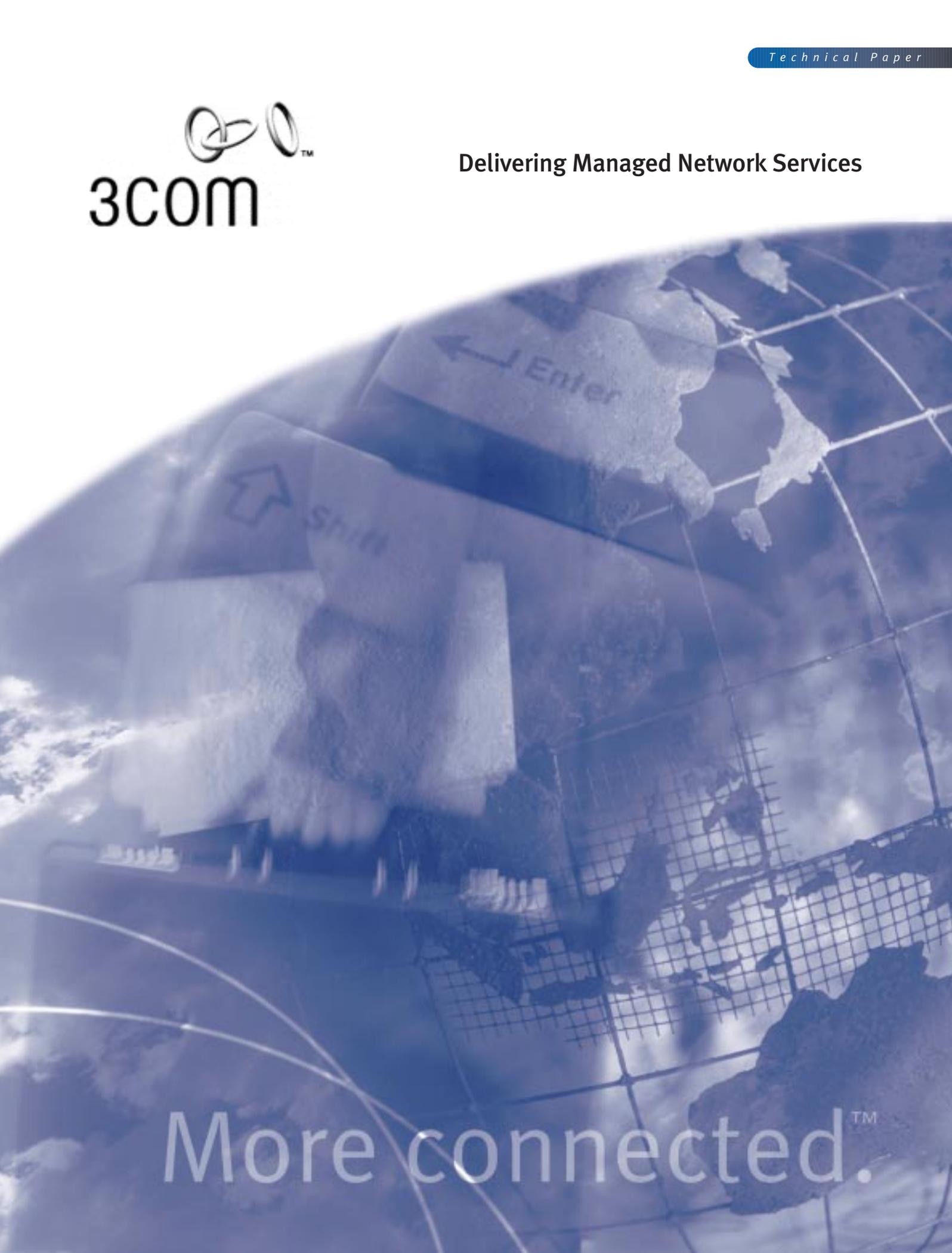




Delivering Managed Network Services

The background of the entire page is a blue-tinted image. It features a globe with a grid of latitude and longitude lines. Overlaid on the globe is a close-up, semi-transparent image of a computer keyboard. The keys for "Shift" and "Enter" are clearly visible. The overall aesthetic is professional and tech-oriented.

More connected.™

Delivering Managed Network Services

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Acronyms and Abbreviations

ABR

area border router

ADSL

asymmetric digital subscriber line

ATM

Asynchronous Transfer Mode

CBR

constant bit rate

CIR

committed information rate

CPE

customer premises equipment

CSU

channel service unit

DSU

data service unit

FDDI

Fiber Distributed Data Interface

FRAD

Frame Relay access device

FXO

Foreign Exchange Office

FXS

Foreign Exchange Service

HSSI

High-Speed Serial Interface

ILEC

independent local exchange carrier

IMA

Inverse Multiplexing over ATM

IP

Internet Protocol

ISDN

Integrated Services Digital Network

Delivering Managed Network Services

Every business organization today needs an IT infrastructure that can extend globally to all prospective customers, employees, suppliers, and partners, and that can enable innovative and efficient business processes. But few organizations have the internal resources to ensure the stable operation of such an E-Business-ready network infrastructure.

This situation creates a tremendous opportunity for service providers to offer value-added managed network services (MNS), including voice/data integration services, virtual private network (VPN) services, business-to-business extranets, guaranteed service levels, and application outsourcing. Analysts estimate that the market for such services is as much as \$26 billion per year.

This paper describes the economic forces driving the market for managed network services and discusses the issues a service provider needs to consider in order to ensure profitable delivery of such services. It outlines the mutual benefits of strong partnerships between service providers and network equipment vendors. Finally, it describes 3Com Corporation's architectural approach to an infrastructure that enables incremental, profitable deployment of managed network services.

Making IT Networks E-Business-Ready

Almost every IT manager in the world is working hard to manage the issues associated with two underlying trends in networking:

- Every business organization needs an IT infrastructure that is E-Business-ready, meaning that it extends globally to all prospective customers, employees, suppliers, and partners, and that it enables new, innovative, and efficient business processes.
- Few organizations can hire, train, and retain enough internal talent to ensure the operation of a stable, technologically current, highly available, high-performance IT infrastructure. Also, technology, product, and WAN service life cycles are becoming shorter, making it more important and more difficult to stay current.

The intersection of these two trends has resulted in a rapidly growing opportunity for network integration services. Businesses are realizing that they need to allocate more resources to building an E-Business-ready operational model—but that they may not be able to build it with their own staff.

The Yankee Group has estimated that the worldwide market for such services, exclusive of equipment and transport, was \$13.6 billion in 1996 and will grow to be \$25.9 billion by the year 2000. Contrast that to the expected market for the equipment and transport services managed by such services in 2000 (\$15.0 billion and \$6.0 billion respectively), and it is evident why equipment vendors, service providers, and systems integrators are all eyeing service dollars as a prime target for revenue growth.

Many industry analysts view this market opportunity as falling naturally to the service provider industry. Customers tend to evaluate their networks by starting from the WAN and working their way into the enterprise, a practice that is increasingly prevalent as Internet-driven applications come to dictate IT thinking. Service providers have the strongest presence and expertise in the WAN, giving them an inherent competitive edge and enabling them to differentiate themselves on voice/data integration, IP/VPN-based services, and a host of digital economy-based solutions.

Equipment vendor professional services organizations, on the other hand, are seen as being too strongly oriented toward the vendor's specific product set. And most third-party systems integrators have to partner with a service provider to ensure end-to-end performance and security, so it seems logical to the customer to work directly with a service provider that can meet all their needs. Service providers thus have a great opportunity to elevate their value proposition beyond basic transport by providing managed network services.

What Are Managed Network Services?

Managed network services describe a wide array of services in which the service provider

takes responsibility for more than just the transport function. Some examples¹ include:

- “Technology labeled” WAN services (such as Frame Relay and ATM), where the access device (router, FRAD, or multiplexer) is installed and managed by the service provider
- Internet-oriented services, where the level of service is controlled by a service provider; this could include service provider VPNs with reliability, performance, and/or security guarantees
- Managed enterprise networks, where the service provider takes responsibility not only for the WAN and WAN access devices, but also for some set of functions deeper into the premise network, such as the campus backbone, building LANs, servers, and/or desktops
- Consolidated access services
- Application and E-Commerce outsourcing (service bureaus)

The Market Opportunity for Managed Network Services

Table 1 shows Yankee Group estimates of the global market for network integration services. The revenue opportunity associated with various forms of service is greater than the money spent on equipment and WAN transport combined. Additionally, end users typically spend \$3000 to \$4000 per desktop per year on projects, operations, and support. That’s an astounding \$300 billion per year, and the Yankee Group estimates that roughly ten per cent of this end-user expenditure is available for conversion to managed network services. For service providers, this represents a huge revenue potential in end-to-end services.

Factors Determining Profitability

A number of factors determine the potential profitability of managed network services. These include the customer’s motivation to outsource network services, the customer’s

¹ “Out-tasking” is expressly excluded from this definition of MNS. Some examples of out-tasking include hiring a third party to run the internal operations of a data center, contracting for UNIX administrators or router administrators on a full-time basis, or turning over the management of the entire IT function to a third party. Out-tasking, which is primarily a Human Resources strategy, deals with a different sort of customer need than MNS, which is oriented toward maintaining a competitive edge in the digital economy.

Table 1. Demand for Network Integration Services (in billions)²

	1996	1997	1998	1999	2000
Pre-implementation ³	\$5.3	\$6.2	\$7.1	\$8.2	\$9.3
Implementation/integration ⁴	\$4.5	\$5.2	\$6.0	\$6.8	\$7.7
Operations ⁵	\$3.8	\$4.8	\$6.0	\$7.4	\$8.9
Total integration and outsourcing	\$13.6	\$16.2	\$19.1	\$22.5	\$25.9
Related equipment	\$8.7	\$10.0	\$11.5	\$13.2	\$15.0
Related transport	\$2.8	\$3.4	\$4.2	\$5.0	\$6.0

² The Yankee Group, “Network Integration Services,” December 31, 1997.

³ Includes planning, architecture, design, hardware/software selection, and other business-oriented and technical consulting services.

⁴ Includes procurement, installation, provisioning, and testing.

⁵ Includes remote and on-site monitoring, performance tuning, fault management, configuration management, security management, accounting and billing, vendor management, carrier management, help desk, maintenance, and moves/adds/changes.

Acronyms and Abbreviations

ISP
Internet service provider

IT
information technology

IXC
inter-exchange carrier

MNS
managed network services

NOC
network operating center

PBX
private branch exchange

POP
point-of-presence

PTT
Postal Telephone and Telegraph

PVC
permanent virtual circuit

QoS
Quality of Service

RMA
return material authorization

SONET
Synchronous Optical Network

SVC
switched virtual circuit

TDM
time division multiplexing

UNI
User-Network Interface

VAR
value-added retailer

VoIP
Voice over Internet Protocol

VPN
virtual private network

WAN
wide area network

willingness to pay, and the cost of delivering the services. Each of these issues is discussed in the sections that follow.

Outsourcing Criteria

Several recent customer studies have determined that customers are influenced to outsource their network services primarily because outsourcing provides the following benefits:

- Addresses lack of in-house skills, especially as related to security, new technologies, and voice/data integration
- Allows focus on core business tasks
- Provides for 24 x 7 coverage
- Enables rapid growth
- Provides access to rapidly changing skill sets
- Expands scope from regional to global
- Enables conversion of capital costs to a consistent monthly expense item

Conversely, reasons prospects might not choose to outsource include the following:

- Lack of control
- Lack of quality
- Higher cost
- Lack of accountability and responsibility

To develop a successful managed network services business, service providers must convince customers that they can bring more expertise to bear than the customer could without external help, that the overall cost is roughly equivalent to trying to do it all internally, and that the service provider is willing to share in the risk and accountability associated with system performance.

It is clear that these arguments are being made successfully today: more than 50 percent of the companies surveyed are currently making significant use of network integrators (Yankee Group). But only about half of those surveyed report that they are satisfied with the network integrator. So an opportunity for differentiation and capture of market share still exists.

Willingness to Pay

Customer willingness to pay is based on an assessment of two key factors:

- The degree to which the service allows them to shed internal costs and headaches

- The degree to which the service enables a quantifiable, competitive business advantage

In general, willingness to pay is determined by the degree of service penetration into the customer environment and the level of service provided within the penetrated sector.

Traditionally, service providers have been effective at providing basic transport, a commodity service with low margins as illustrated in Figure 1. Some offer device management services for WAN access equipment (such as managed router services or managed FRAD services), allowing them to move vertically on the level-of-service axis. Continuing on that vector to provide systems-level and business-level services related to WAN transport and access devices can increase profits further. But the customer willingness to pay increases dramatically if the service provider can couple those higher levels of service with deeper penetration into the customer's environment, solving more of their problems and allowing them to shed more internal costs. This requires moving horizontally, as shown in Figure 1, into areas that are now often served by systems integration and consulting companies.

Service Delivery Cost

While cost isn't generally identified as one of the primary reasons for outsourcing, one of the advantages a service provider can offer a customer is to integrate the cost of equipment, logistics, maintenance, upgrades, and operations into a flat monthly charge. The customer is able to remove the capital equipment component from their ledger and replace it with a regular monthly expense.

To profit from such business, a service provider must have a cost base for delivering services that is significantly lower than a prospective customer's own costs. This requires leverage—reliable, standardized products that can be provisioned quickly for a wide variety of services and service levels; common management tools that trained personnel can use to configure, troubleshoot, and proactively manage multiple services; the ability to monitor and tune service levels to make sure that service is neither under- nor over-delivered;

and access to local presence for low-cost installation and logistics.

Most service providers understand the procurement costs associated with various types of WAN access equipment found at the customer premises. Most service providers also have at least some infrastructure for installing and maintaining such equipment, and understand the costs related to that aspect of operation. However, the costs associated with providing a higher level of service for these

components—fault management, proactive management, configuration, software updates, service level monitoring, and service level assurance—are often not as well understood. Yet managing this aspect of cost can be the difference between profit and loss for delivering managed network services.

Managed network services delivery usually requires the creation of a network operations center (NOC), where a core set of tools can be used that enable a relatively small number of

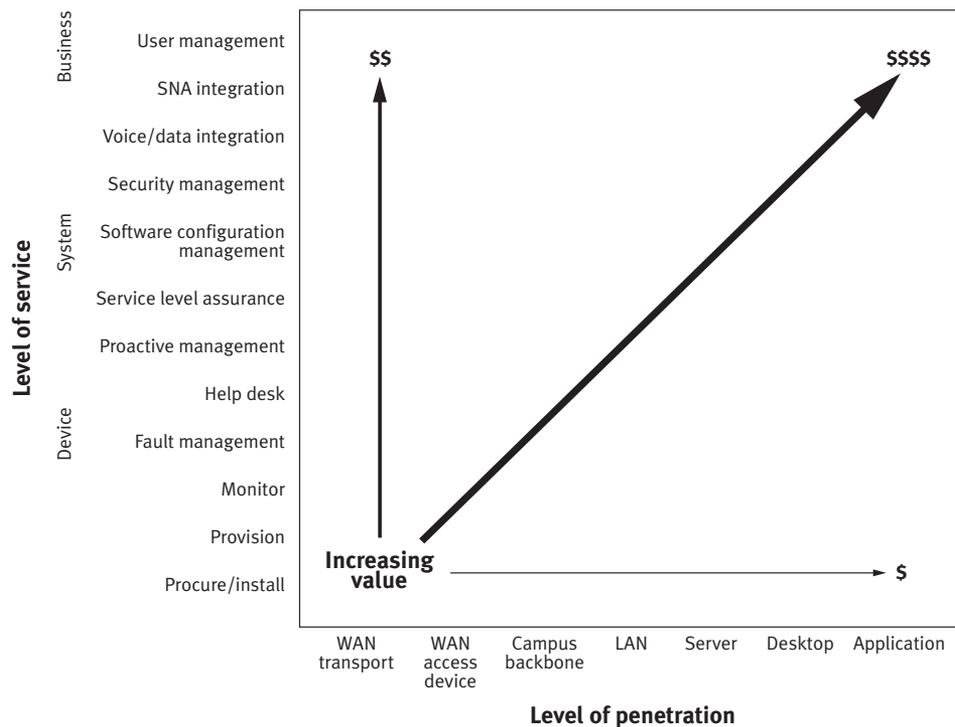


Figure 1. Willingness to Pay vs. Service Level and Penetration⁶

⁶ WAN transport includes leased lines, Frame Relay, SMDS, dial-up, SONET, ISDN, xDSL, ATM, Switched 56, and other core WAN services.

WAN access devices include routers, CSU/DSUs, FRADs, ATM service muxes, TDM muxes, modem pools, etc. Campus backbone and LAN components consist of ATM switches, backbone routers, Layer 2/Layer 3 switches, hubs, FDDI concentrators, 10/100/1000 Ethernet components, Token Ring, etc. The backbone is usually shared by multiple organizations, while individual LANs can be used by a single division or organization.

Server functions include the server hardware and the operating system, including the network operating system components and related protocols. This level of penetration might also encompass other shared devices such as gateways, firewalls, printer servers, fax servers, etc.

Desktop functions include the desktop hardware and operating environment, including the network operating system client components and related protocol software.

Application includes both the server and client functions that deliver the application to the end user. This encompasses e-mail, messaging, calendaring, Internet/intranet access, office automation, word processing, spreadsheets, business reporting, enterprise resource management, and other E-Business functions.

Table 2. NOC Cost Efficiency Analysis⁷

	Typical NOC	NOC Using “Best Practices”
Devices per Tier 1 engineer	150–250	500–750
Devices per Tier 2 engineer	500–1000	Infinite (tier not needed)
Tier 3 engineer	1 per 8 Tier 1/2	1 per 6 Tier 1/2
Annual loaded salary cost for NOC serving 5,000 devices	\$6.0 million	\$1.4 million

⁷ From an unpublished Research Report by Acuitive, Inc., based on a survey of a number of service provider NOCs supporting various forms of MNS. Number of engineers depends on the services offered. These numbers assume basic monitoring, fault management, configuration management, and software version control for WAN access routers, FRADs, and T-muxes.

The terms Tier 1, Tier 2, and Tier 3 engineer refer to the roles different engineers perform in NOC operations. Tier 3 engineers are usually the high-level experts to whom the toughest problems are referred. Tier 1 engineers usually operate the help desk. These definitions are not universal.

experts to efficiently perform remote monitoring and management. A key factor in the profit equation for a managed network service is the NOC’s operational efficiency: how many customers and services each NOC engineer can simultaneously support. The more the tools and related training can be utilized across multiple customers, products, and services, the more cost efficient the NOC operation. This is partly due to reduced software acquisition and maintenance costs, but even more to the ability to assign NOC personnel to tasks across customers and services as needed, rather than having narrowly trained specialist groups.

Achieving an efficient NOC depends on five factors:

- The degree to which the equipment being managed lends itself to efficient remote management and to commonality of management across different products and services. This is key; if the equipment does not lend itself to efficient remote management, no amount of NOC applications and personnel training will provide efficient operation.
- The degree to which the tool set supports efficient, leveraged remote deployment of value-added services such as software distribution, proactive management, capacity planning, accounting/billing, etc.
- The degree to which training on tools for one product and service leverages using the

same or similar tools for other products and services.

- The efficiency of the processes, methods, and procedures used by NOC personnel for problem identification, escalation, and resolution.
- The degree of proactive management exerted by the NOC to predict or prevent problems.

Acuitive Inc., a private IT consulting firm, has performed research on NOC operations (Table 2) that shows the difference in annual costs between a midsized NOC using “best practices” and a typical NOC that hasn’t applied these practices in the areas of managed device selection, management applications selections, and NOC methods and procedures.

The difference in operations cost between using best practices and not using them can be very large. Unless the five factors identified above are handled effectively, it is very difficult to deliver sustainable, profitable managed network services. Providing a set of products and related applications that enable efficient NOC operation is an integral part of 3Com’s managed network services strategy.

Partnering to Deliver the “Whole Product”

One of the biggest obstacles to delivering managed network services can be on-site operations such as installation, hardware replacement or upgrade, and on-site troubleshooting when remote tools can’t resolve problems.

Some service providers, such as ILECs, PTTs, and IXCs, have some infrastructure for these processes, but others, such as many ISPs, do not. Even those with some infrastructure may not have complete geographical coverage or skill sets. Augmentation via VAR and/or regional or metro systems integrators can be either useful or absolutely necessary in this area.

In addition, the cost and time-to-revenue of providing value-added services beyond the WAN access device can be very high for service providers, many of whom don't have a critical mass of core competency in LAN, server, and application technologies to leverage. The desire to be a "one-stop shop" has driven many large service providers to enhance their skill sets by allying themselves with large systems integrators such as EDS or even acquiring systems integrators to build the capability internally (as evidenced by Sprint's acquisition of Paragnet).

Lastly, many service providers have found strategic relationships with equipment vendors to be essential. There are many factors that make these relationships useful to both parties:

- Equipment vendors can work closely with the service providers to create unique technologies that enable a differentiated service offering.
- Equipment vendors can work with service providers to ensure that instrumentation is available to be leveraged by NOC applications, increasing the efficiency of the NOC.
- NOC operations can be integrated with the vendor's own customer care functions to ensure rapid diagnosis and resolution of problems by the people most expert to handle each problem. The end customer doesn't even have to be aware of such relationships. All they see is quality service from the service provider.
- Vendor professional services, often oriented toward a deep understanding of the vendor's own equipment and its application, can be used to augment service provider services. This allows the service provider to offer a complete set of consulting services to their customer prospects. In these days of rapid technological change and confusion, customers often view such consulting services

as the most compelling aspect of the interaction with the service provider. Thus, performing consulting well not only increases the revenue opportunity, but also helps ensure customer retention.

- The equipment vendor's internal mechanisms and channel relationships for logistics—installation, sparing, RMA, etc.—can be leveraged by the service provider so that they don't have to replicate all those functions.
- Equipment vendors can refer business to the service providers when they see that one of their enterprise customers would benefit from a managed network service to augment the enterprise network and/or application.

Most managed network services providers will have relationships in one or all of the areas identified above. Their success is often strongly correlated to the strength of these relationships and the effectiveness with which the service provider manages them.

Typical Service Roll-Out Strategy

Because of the cost and competency factors involved, service providers typically expand their revenue opportunity in five phases. Figure 2 on page 8 illustrates the level of service and level of penetration into the enterprise network for each phase.

- **Phase 1:** Managed WAN access service (e.g., managed router service). In this first phase, service providers sell transport service by folding router, router procurement, router installation, and ongoing router management into a bundled cost. Most service providers provide this option today, not necessarily to add margin, but just to keep their WAN services competitive. Offerings are generally available for private routed, Frame Relay, IP, and ATM networks. Often, by leveraging a build-out of the internal network to the WAN edge, service providers offer the ability to integrate voice, data, and video access in a manner that allows flexible allocation of resources among those services.
- **Phase 2:** Value-added WAN services. In this phase, the service provider offers a range of value-added functions in addition to transport services. These offerings can include fault management, proactive management,

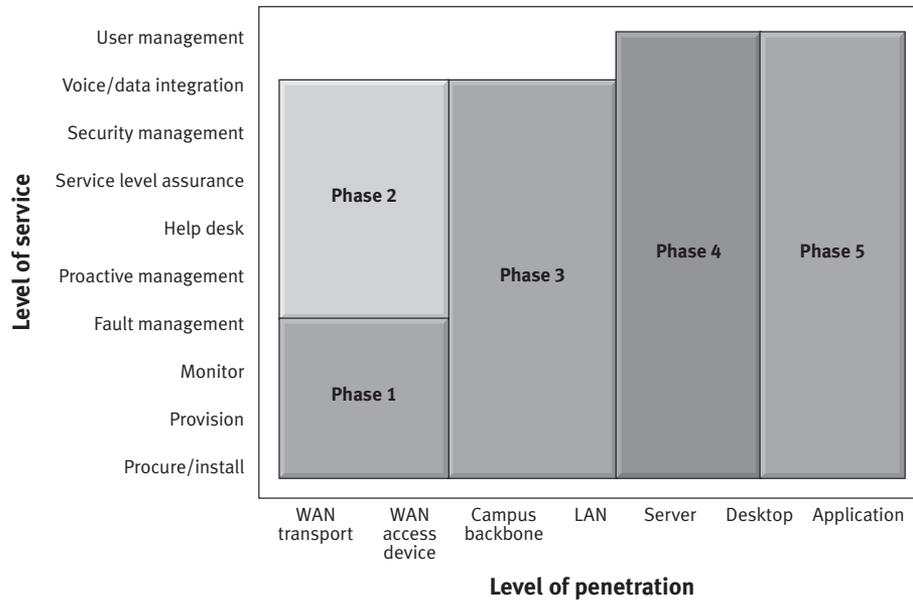


Figure 2. Service Levels and Network Penetration for Managed Network Services Roll-Out

help desk, regional/global maintenance and logistics, protocol tuning, configuration management, software updates, year 2000 remediation, security management, usage reporting, accounting, and billing.

- **Phase 3:** LAN penetration. This phase adds support for managed network services and value-added functions past the WAN demarcation point and into the LAN environment, but not including the server, desktop, and application.
- **Phase 4:** Server management. This phase adds installation, configuration, and ongoing management of enterprise servers.
- **Phase 5:** Application management. The final phase of the rollout includes support for managed network services and value-added functions to the server, desktop, and application.

3Com Corporation: A Partner in Delivering Profitable Managed Network Services

3Com Corporation is the industry leader in providing the products that control the access points into private and public networks. 3Com is actively involved in building the infrastructure of such networks, and keenly aware of the forces driving the market opportunity for network integration and managed network ser-

VICES: customers want to reduce the effort they spend on planning and operating networked applications in order to focus on using those applications to drive their business. 3Com is committed to ensuring that there is a vibrant community delivering network integration and managed network services so that new and innovative technologies have an effective path to broad end-user deployment.

3Com's goal is to provide the right level of product and service support to enable service providers to profit from managed network services. The company's strategy is designed to enable service providers to cost-effectively execute a phased roll-out of managed network services at the pace they determine is strategically appropriate for them. To accomplish this, 3Com has tapped into its extensive enterprise and carrier product lines, integrated with unified management tools and professional services, to achieve the following goals:

- Provide lowest cost-of-ownership point-of-presence (POP) and WAN CPE products that put service providers in a position to profitably differentiate either on bundled service price or on feature/functionality.
- Within a single, cohesive set of product platforms, provide the industry's widest array of WAN technologies, from analog

dial access through ISDN and ADSL, cable modems, fractional T1, inverse multiplexing, Frame Relay, ATM, VoIP, and SONET, all with a rich feature set that enables value-added services such as integrated voice/data, VPNs, authentication, encryption, billing, capacity planning, and efficient remote management.

- Provide management tools for POP and CPE products that easily extend to encompass the management of campus LAN, local LAN, server, and desktop functions. Once these tools are in place and NOC personnel are trained, the incremental cost of extending service penetration is small.
- Maintain channel relationships that service provider partners can tap into to enhance their ability to install CPE products and provide replacement and maintenance logistics.
- Offer professional services that augment the service providers' delivery systems to add critical mass or to temporarily fill capability gaps, removing roadblocks to service delivery and hastening time to revenue.

3Com Architectural Principles

To build manageable and scalable service networks, the core infrastructure is generally built with Layer 1 devices (SONET) and Layer 2 devices (ATM and Frame Relay switches), and a few strategically placed Layer 3 devices (routers). These devices provide high performance at a reasonable cost and can be provisioned statically so that changes to the core infrastructure are generally not required for each new subscriber or as each new service is rolled out.

The responsibility for customer- and service-specific provisioning, grooming, bandwidth management, security policy enforcement, service level management, address management, protocol translation, and other value-added capabilities is generally pushed to the edge of the network (Figure 3). The advantages of this approach are that the overhead of supporting value-added services is spread among a large number of devices in the network, and these devices have direct access to the customer premises links and are in a

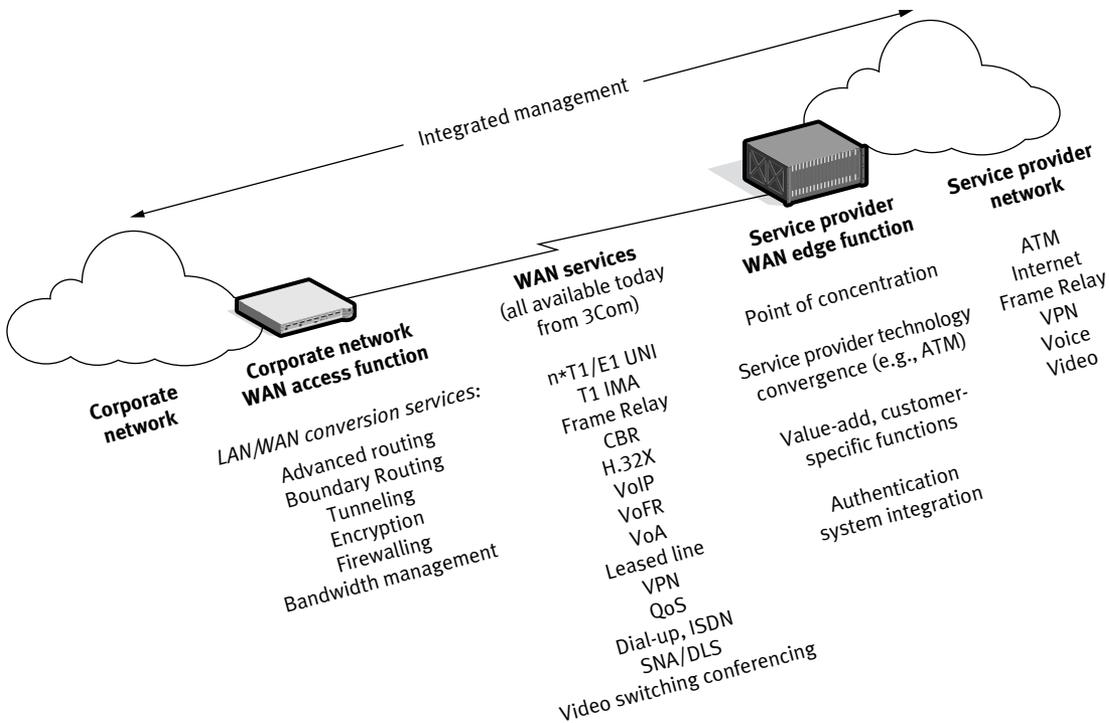


Figure 3. 3Com Architecture for Managed Network Services

good position to implement specific customer requirements.

Such a distribution of functionality enables a high degree of plug-and-play network growth, which in turn results in lower delivery costs for managed network services. A high level of compatibility at the critical network access points enables connectivity to reach new levels of penetration, growth, and efficiency. The value of any network is directly correlated to the number of customers and applications riding on it.

3Com will continue to deliver industry-leading service provider edge products that, along with complementary service infrastructure and customer premises products, enable flexible and differentiated service definitions, rapid service deployment, nonstop operation, and low cost of service delivery.

Service Definition and Deployment Flexibility

3Com provides the widest possible array of interface options, both on the campus side of networks and on the network (WAN) side. Leveraging a small set of core products, service providers can support a wide variety of service topologies by choosing the right combination of network interface modules to connect LANs to a wide variety of WAN speeds and protocols, all in support of emerging IP-based solutions. Interfaces supported by 3Com products include the following:

- T1/E1 and fractional T1/E1
- ATM UNI—T1/E1, DS-3, and OC-3c/STS-1
- Inverse Multiplexing over ATM (IMA)
- PBX, FXO/FXS, and E&M voice interfaces
- ISDN
- Analog dial-up
- 56K and Switched 56K
- ASDL
- Cable modem
- HSSI, V.35
- Ethernet and Fast Ethernet

Over this infrastructure, a wide range of software-defined network services can be configured, enabling customized customer service definitions and rapid service deployment. Service options include the following:

- Integrated voice/data/video
- Frame Relay service access (PVC, SVC, CIR)
- ATM service access (including T1 and IMA, CBR and ABR)
- Edge routing, Boundary Routing, multi-protocol routing
- VoIP
- Tunneling and encryption
- Authentication services
- Dynamic bandwidth allocation to take advantage of “quiet times” over voice connections
- Prioritization, bandwidth management, and QoS
- Site-to-site VPNs, mobile user VPNs

These network services enable a virtually unlimited range of applications, including distance learning, high-speed Internet access, distributed enterprise applications, cross-site database synchronization, video conferencing, low-cost long-distance voice, and telecommuter “virtual desktop” access.

Efficient Operations Costs

Operations cost efficiency is gained by having a small number of core products that can be deployed to support a wide range of access technologies and service-enabling functions. 3Com's products are inherently cost effective, with the lowest cost in the industry.

The small set of products with common interface cards and hot-swap capability minimizes sparing costs, mean-time-to-repair, time-to-install, and training costs. Equally important, the instrumentation in these products enables deployment of a rich set of NOC tools to monitor and manage them and execute value-added managed system services across products and services. This results in very efficient NOC operation.

Penetrating the LAN

The 3Com product line extends smoothly to support those service providers that want to extend their managed network service offerings beyond the WAN access point and into the LAN to the server, the desktop, and possibly the application. Various 3Com products can be deployed to build campus backbones,

departmental LANs, and desktop/server connectivity. The same management environment that manages the WAN edge-oriented products can be extended to provide management of these enterprise components.

3Com as a Business Partner

3Com's strategic synergy with its service provider partners yields three key benefits:

- 3Com can act as a broker between its extensive channel partners and service providers, to help them build the relationships they need to support on-site operations and logistics.
- 3Com can align its internal customer support and professional service processes along the lines of the service provider's to provide efficient problem escalation or out-of-hours front-line support.
- 3Com can act as a lead-generation engine, referencing its enterprise customers who are looking for WAN and managed network services solutions.

These efforts can help 3Com service provider partners effectively fill gaps that might otherwise delay time-to-revenue for new services.

Conclusion

The trend toward network integration services is real and sustaining. Enterprise customers are finding that they cannot keep up with the pace of innovation in networking technology, yet they fall behind competitively if they don't. An excellent opportunity exists for service providers to profit from this trend by offering managed network services. This strat-

egy allows service providers to bundle traditional transport services with various levels of network integration services to gain margin and market share.

To take advantage of this opportunity, service providers can leverage their core service offerings, but they must also rapidly become proficient in some areas that may be new to them, such as LAN equipment and application management. To quickly gain a reputation for delivering quality service in these nontraditional areas, a service provider will have to leverage key partnerships.

Why choose 3Com as a strategic partner in delivering managed network services?

3Com's technologies and products enable differentiated services, rapid deployment, and efficient NOC operation. And 3Com will support its service provider partners by helping them create partnerships to meet logistics needs, by using its professional services and customer support to augment theirs, and by providing leads from its extensive interactions with enterprise customers.

3Com views its future success as being strongly influenced by the success of managed network services. These services can become a pathway for the efficient introduction of new, innovative technologies into network environments. For this reason, 3Com is firmly committed to helping service providers launch and grow profitable managed network services. Working closely with 3Com, managed network services providers can move decisively to penetrate what the Yankee Group calls a \$20 billion to \$30 billion market for managed network services. ◻



About 3Com Corporation

With more than 200 million customers worldwide, 3Com Corporation connects more people in more ways to information than any other networking company. 3Com delivers innovative information access products and network system solutions to large, medium, and small enterprises; carriers and network service providers; PC OEMs; and consumers. **3Com—More connected.™**

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