

White Paper

Increase  
Application  
Effectiveness

with XO® Application  
Performance Management

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# Increase Application Effectiveness with XO® Applications Performance Management

## Abstract

Current economic pressures for increased global competitiveness necessitate a closer alignment between IT operations and corporate business objectives – forcing IT to become more accountable in how it shows value. In this white paper, Fluke Networks, a leading provider of network and application performance management solutions, and XO Communications, a leading provider of telecommunications services for businesses, discuss how XO® Applications Performance Management – through its enhanced visibility into application behavior, ease of deployment, and versatility – is an attractive solution for many enterprise IT organizations seeking to increase application effectiveness and demonstrate value.

## Executive Summary

IT departments face many challenges in today's dynamic business environment. These range from security and compliance issues, to keeping up with often dramatic changes in technology, to the need to evolve processes and even culture in accordance with the increasing pressure for IT organizations to align themselves more effectively with the businesses they support.

However, if asked about thorny issues with clear organizational process implications, the majority of IT managers will point to networked applications. The reasons for this are manifold. For instance, new application technologies are becoming more and more distributed, modular, and geographically dispersed. And multi-directional interdependencies of data center and wide area networks now mirror the need for increased collaboration between network, application, and often service provider teams. At the same time, these applications are becoming one of the most critical IT factors in achieving business objectives – making the rewards for success all the richer, and the penalties for failure all the more severe.

According to research conducted by Enterprise Management Associates™ (EMA™),<sup>1</sup> there are four evolutionary phases that IT departments must go through to cope with these accelerating pressures for efficiency in the face of technological change.

- The first phase is purely reactive with the IT department engaged in seemingly unending “firefighting” with an exclusive focus on mean time to repair (MTTR).
- In phases two and three, IT operations shift progressively to a more proactive approach with an ever increasing emphasis on mean time between failure (MTBF), as the management of application and service performance comes into a sharper focus.

*“If asked about thorny issues with clear organizational process implications, the majority of IT managers will point to networked applications.”*

<sup>1</sup>The study was commissioned by Fluke Networks (formerly Visual Networks) and published in a white paper, June 2005.

*“The addition of a Voice over Internet Protocol (VoIP) module to XO Applications Performance Management demonstrates the growing acceptance of media convergence driving the present management marketplace.”*

- Phase four is, for the time being, an evolutionary target demanding higher levels of automation in network and systems management than are currently available, so that a largely self-healing infrastructure can enable IT to focus more proactively on the complexities of business alignment and service planning.

In lock step with the evolutionary pulse of the IT management market, the current release of XO Applications Performance Management focuses on market requirements to manage application performance over the network. This robust suite of tools provides live intelligence about the wide area network (WAN) – from the physical through application layers – to help IT managers make informed decisions vital to network performance.

The addition of a Voice over Internet Protocol (VoIP) module to XO Applications Performance Management demonstrates the growing acceptance of media convergence driving the present management marketplace. Moreover, the product’s modularity and overall effectiveness in isolating problems across different types of network transports and different application types demonstrates the functional extensibility and flexibility of the product architecture.

Users interviewed by EMA have verified the primary benefits of XO Applications Performance Management in terms of enhanced visibility into the IT infrastructure, ease of solution deployment, and collaborative strength for sharing analysis/information among internal IT operations team, as well as with service providers. These are consistent with EMA’s assessment based on product architecture and design – which demonstrated strengths in terms of:

- Ease of deployment
- Detailed application-to-network visibility
- Modular-extensible design
- Clarity of reporting

XO Applications Performance Management combines these traits with customer-reinforced values, promoting collaboration within IT and between IT and its contracted service providers. As the WAN and the data center necessarily converge, EMA believes that XO Applications Performance Management can provide a reliable and pragmatic catalyst in facilitating this change.

## **Background and Challenge**

### **Economic Pressures**

Macro-economic pressures for increased global competitiveness necessitate an ever closer alignment between IT operations and corporate business objectives. To increase revenue, enterprises must extend their geographical reach to expand their customer base for current products and services, while developing the new products and services often required to gain share in competitive and emerging markets.

And yet, investing in the development of new services may seem to compete directly for reduced corporate resources – forcing IT to become more accountable in how it shows value. This is true even as more and more business services are becoming IT-dependent, and as digitized business transactions and communication have become core competitive advantages in reaching global markets. To cope with these trends in the current economy, IT organizations must deliver high-quality services that are cost-aligned with finite corporate resources.

### Pressure to Align IT with Business Operations

Despite numerous methodologies, deployment approaches, and technological advancements, ensuring the consistently high performance of networked applications remains an illusive art. If asked, IT managers, with few exceptions, will respond that distributed applications bring together many of the most challenging issues thwarting the successful alignment of IT and business operations. This is so, in part, because of the cultural divide that still exists between the *data center* (including application managers and developers), and the *network operations center* (NOC), on the one hand, and the need for IT to work more effectively with an often complex mix of WAN service providers in the delivery of applications (including VoIP), on the other hand. This problem is not eased by the fact that most vendors still typically design, package, and market products to one group or the other – visibly arming the “Hatfields” to point the finger at the “McCoys,” rather than encouraging collaboration.

### Pressure to Do Business Globally

Another factor raising the bar surrounding the management of “networked applications has to do with both changes in application design and economic pressures to do business more globally. As applications evolve to become more modular and distributed in nature, they are becoming a breed apart from traditional data-center-centric solutions. Already Web-based applications may have component sources distributed across broad geographical locations, and at minimum must meet end-user requirements for performance and quality of user experience across sometimes inconsistent and often geographically vast boundaries.

New technologies, such as VoIP and rich media, are going to add to these network-to-application interdependencies. In addition, the advent of Web Services and Service Oriented Architectures (SOAs) will transform application components into modular denizens of complex and overlapping network boundaries. To view the network as only raw plumbing in these instances is a fatal mistake.

### Future Requirements

The future of distributed application performance will not only require leveraging the network as an instrumented ocean to help diagnose and assess both its own performance and health vis-à-vis critical application services, but also directly informing on the health, performance, utilization, and optimization of those applications themselves. To meet this challenge, IT organizations should utilize networks and application management products that provide comprehensive visibility into the behavior of applications as they transverse the network. This is by no means a recent development. It is a part of IT organizational evolution to meet the dynamic requirements of business operations.

*“Despite numerous methodologies, deployment approaches, and technological advancements, ensuring the consistently high performance of networked applications remains an illusive art.”*

*“IT organizations move through four evolutionary phases in supporting enterprise business requirements.”*

## Evolution to Meet the Challenge

An EMA report entitled, “Next Generation IT Organizations: An Evolutionary Approach to On-Demand Computing,” outlines four evolutionary phases that IT organizations move through in supporting enterprise business requirements

### Phase One

This phase is characterized by a focus on mean time to repair in a “siloe” management environment, where reactive resolution of day-to-day crises is IT’s focus. The IT department as whole lacks the larger view of what the enterprise is trying to accomplish. Infrastructure management purchases are driven by crises rather than planned investments. For example, application management and network management would be thoroughly separate organizations with point management products, typically incapable of exchanging or correlating management data.

### Phase Two

The focus on MTTR continues with mean time between failures relegated primarily to historical service level management (SLM) reporting. Although proactive management becomes a conscious effort, there is still a lack of comprehensive intelligence sharing among the “siloe” groups. Troubleshooting and repair verification remain largely segregated by silos of discipline. However, there are more effective processes in place between application planning and network management to ensure that critical business applications get the bandwidth they need.

### Phase Three

The IT organization shifts to a more proactive focus on mean time between failure, with judicious investments in IT management products with superior analytic capabilities. The IT organization recognizes its role as an internal service provider acting from a business-centric posture. Attention to IT-to-business impact, rather than technology, is at the forefront of process, organization, and culture. This is in part enabled by collaborative activities with appropriate constituents both within IT and across the larger enterprise.

For example, service level agreements (SLAs) will address business-critical application behavior with an integrated view of both local area network (LAN) and WAN requirements to ensure availability, performance, and appropriate resource utilization. Tools for collaborative real-time application and network monitoring are used to promote common processes and dialog between the application performance and network management teams.

### Phase Four

This phase remains largely an evolutionary objective for IT, as it requires a predictive and self-healing management environment nimble enough to swiftly accommodate the rapidly changing dynamics of business operations. IT operations become closely aligned with business processes through integrated advanced analytics and automated intelligence. These analytics must be accurate in responding to observed, real-time business conditions. For example, a change in airline ticket reservations automatically causes an appropriate change in car rental reservations if such is indicated – without the need for human intervention.

The majority of IT organizations are in a transition to Phase Two. Nonetheless, a significant number of IT shops are in transition to Phase Three, and a few are even operating at this stage.

All of these IT organizations face a growing pressure to manage the behavior of business-critical applications holistically. Most of these IT organizations are experiencing a network application integrity gap, as separate point products are used for application and network management. This only accentuates rather than minimizes finger pointing and organizational disharmony. As a result, IT operations lack a cohesive view of application behavior and IT professionals must perform in an environment that leads to inefficiencies in management.

XO Communications has responded to this situation with the XO Applications Performance Management tool. The software modules in XO Applications Performance Management provide in-depth application visibility with integrated coverage over the WAN, via new intelligent Analysis Service Elements (ASEs).

In short, XO Applications Performance Management fulfills the growing demand for both granular and holistic views into mission-critical applications and business processes. As a result, XO Applications Performance Management is proving itself to be a useful catalyst in establishing more effective collaborative processes across both the applications and network management teams within IT, and between IT and its contracted WAN service providers.

## **Benefits of XO® Applications Performance Management**

XO Applications Performance Management helps to bridge the network application integrity gap by integrating applications and network performance management into a single solution. By applying analytic software modules to enterprise application behavior data collected across WAN environments, XO Applications Performance Management delivers the following:

### **End-to-end Visibility of the IT Infrastructure**

By monitoring how applications perform across the WAN, XO Applications Performance Management determines application behavior and correlates influences across them.

### **Delineation of Usage by Specific Applications**

Due to the breadth of the solution's data collection and its capabilities for rapid pre-processing on a hardware level, XO Applications Performance can combine broad coverage with fairly granular data. It is not only capable of determining "top-talkers," for instance, but also can go further and determine specific protocol traffic flow distribution so that an IT manager can determine utilization by application and incorporate policies that often may help to improve the performance of distributed applications. This type of analysis can also help IT to optimize its network and other infrastructure investments.

### **Efficient Troubleshooting**

Through a fairly rigorous analysis of distributed application performance data, the guesswork of pinpointing, "Is it the network or the application?" can be reduced. Collaborative resolution can take place instead of engaging in finger

*"XO Applications Performance Management helps to bridge the network application integrity gap by integrating applications and network performance management into a single solution."*

pointing. As a result, the network operations center can successfully bridge the integrity gap by sharing XO Applications Performance Management reports with application performance teams as an accepted collaborative vehicle for resolving problems.

### Enhanced Application and Network Services Planning

The information obtained from monitoring applications and network infrastructure is stored in the XO Applications Performance Management database, which can provide engineers with accurate historical behavior profiles. These can be provide insights into better network resource planning for minimizing provisioning, without losing sight of service quality.

### Ease of Deployment and Adaptability

Technologies incorporated into XO Applications Performance Management automate much of the deployment process – without sacrificing the many options needed to customize functions for a wide variety of user environments.

These benefits and others should serve to make XO Applications Performance Management an appealing IT management product to both enterprise and service provider users seeking a versatile and relatively complete view of their networked applications infrastructure.

*“Technologies incorporated into XO Applications Performance Management automate much of the deployment process – without sacrificing the many options needed to customize functions for a wide variety of user environments.”*

## Product Description: XO Applications Performance Management

XO Applications Performance Management is architected to provide its users with the flexibility to accommodate specific user requirements. The solution also offers scalability, enabling its use from small businesses with IT organizations of four or fewer, to large enterprises and service provider environments. This is achieved by integrating special purpose hardware optimized for pre-processing raw data with a software-based analytic engine (see **Figure 1**). A Web-based user interface provides secure access to real-time and historical information. This architecture enables granular data collection, multi-level data interpretation, and secure access to information independent of user location.

### Data Collection

Although it is often taken for granted, efficient instrumentation of the IT infrastructure to collect useful management data at minimum cost and overhead is only becoming harder. This is due to a number of factors, including the geographical expansion of networks, and the proliferation of new and often complex, multi-tiered applications (see **Figure 2**).

XO Applications Performance Management provides users with a wide array of hardware elements to connect to user-specific network environments and collect the appropriate data. The hardware elements passively monitor real-time data flows and store them locally. This architectural strategy is aimed at combining granular data collection with minimal traffic overhead. Multiple types of data-collection hardware elements, each with a number of discrete models, are provided to users for deployment in their specific environments.

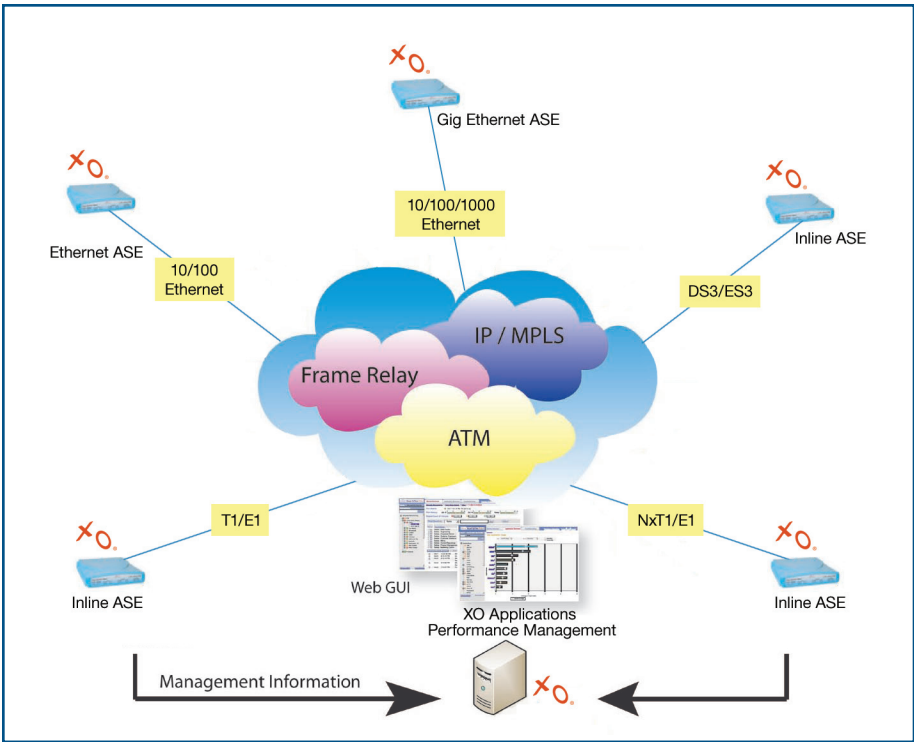


Figure 1: Architectural Components of XO Applications Performance Management

*“XO Applications Performance Management provides users with a wide array of hardware elements to connect to user-specific network environments and collect the appropriate data.”*

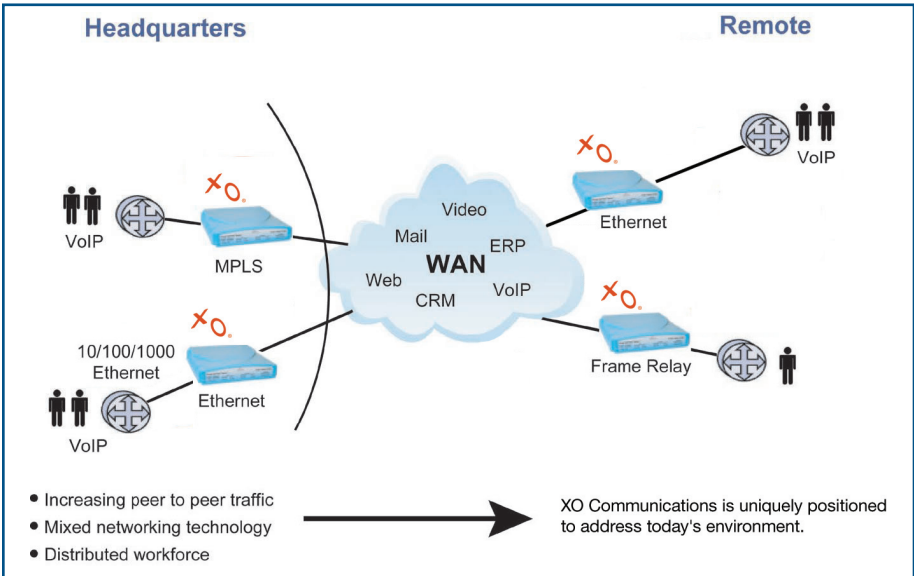


Figure 2: Data Instrumentation in Current Environment

These hardware data collection elements are as follows:

- **Analysis Service Element (ASE)** – The ASE family of data collection elements are designed to monitor and manage application performance across the WAN. There are different speeds, feeds, and interfaces for different network requirements. The intelligent devices passively monitor performance and store the information locally.

*“XO Applications Performance Management provides a flexible software package designed to enable users to deploy additional functionality expeditiously to meet new and changing management requirements.”*

- **WAN Deployment Options** – The core strength of XO Applications Performance Management has historically been in WAN performance management. The ASE family includes devices for frame relay, Ethernet, IP VPNS, dedicated circuits, and MPLS-based private networking. The devices can be deployed as an in-line passive probe with speeds ranging from T1 to DS3. The WAN deployment model places the ASE on the network side of the router.

### Data Storage and Interpretation

The XO Applications Performance Management server interacts with multiple analysis service elements to ensure efficient data transfer to a central repository where analytic software modules interpret repository data. The data transfer process was designed for minimal network overhead. The ASE’s preprocessing reduces the amount of management traffic when compared to typical polling solutions that can burden the network.

The central data repository enables XO Applications Performance Management to interpret end-to-end application behavior by combining information from various data collection points across the network. IT users can access the XO Applications Performance Management toolsets via a Web-based interface to proactively monitor network and application performance.

### Software Modules

XO Applications Performance Management provides a flexible software package designed to enable users to deploy additional functionality expeditiously to meet new and changing management requirements. This modularity also gives users the ability to adopt functionality to fit their specific environment today – with the flexibility of adding new modules as network and application requirements change.

XO Applications Performance Management has the following modules:

- **AppSummary** – This module enables IT users to auto-discover networked applications and display current levels of infrastructure utilization, as indicated in **Figure 3**.

From this summary view, the user can “drill-down” to each server hosting specific applications to obtain metrics, such as “server connect” and “server response time.” In addition, the auto-discovery function serves as a policy enforcer or security monitoring service, since rogue applications running on the infrastructure will be displayed in conjunction with the appropriate user constituency.

The AppSummary module enables the users to monitor the state of application behavior over the broad infrastructure “at a glance.” Alarms for new applications, both authorized and rogue, can quickly identify when an application appears on the network. The summary view also supports longer-term product planning for infrastructure optimization and other long-range planning activities.

- **AppFlows** – The AppFlows module enables users to monitor application flows between specific entities across the network, whether they are client/server, peer-to-peer, or server/server flows.



Figure 3: XO Applications Performance Management AppSummary

In addition, this module allows users to group infrastructure devices and components according to the networked applications they support. This gives the IT users views of the relationships among network and system devices and their interconnections as they impact business application services.

Furthermore, the user can interrogate a specific server’s distribution of services and “drill-down” to specific metrics – such as server delays, or utilization of specific applications. The module empowers users by providing them with views of various vantage points necessary to help with proactive problem identification and diagnosis.

- **Traffic Capture** – This module provides users with packet capture and analysis capabilities for the various segments of the networked infrastructure. The information from these packet decodes is displayed in simple English formats. XO Applications Performance Management provides a pre- and post-capture filtering capability to focus on the aspects of consequence for diagnostic and planning activities. Following XO Applications Performance Management’s design point, it enables users to monitor traffic behavior throughout the entire infrastructure – with minimum investment into capital equipment.
- **Back in Time** – This module provides a graphical, historical view of the performance of distributed applications over the past two weeks. The user interface contains a slider to select any portion of time or data, or glide through the historical data display. This is especially useful in diagnosing intermittently occurring failures that statistically constitute the majority of performance problems across IT infrastructures.

In addition, the Back in Time module contains a feature called “Burst Analyzer” used to help ensure sufficient bandwidth for

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mission-critical applications, and a capability called “SLA Service Advisor” that provides “up-to-the-minute” analysis of metrics, such as throughput, delivery ratio, or round-trip delay, to monitor internally and externally provided services.

- **Class of Service** – As convergence is becoming more and more of a reality through the adoption of MPLS, VoIP, and other technologies, the need to prioritize traffic flow across the infrastructure is becoming a necessity. This is all the more true as the adoption of such new technologies means that synchronous and asynchronous applications compete for the bandwidth. The Class of Service module (see Figure 4) enables users to monitor traffic flow based on IP service classes to ensure that the IT infrastructure settings are correctly aligned with application delivery policy. The module can detect applications running in violation of policies and interfering with the appropriate traffic.

*“The Class of Service module enables users to monitor traffic flow based on IP service classes to ensure that the IT infrastructure settings are correctly aligned with application delivery policy.”*

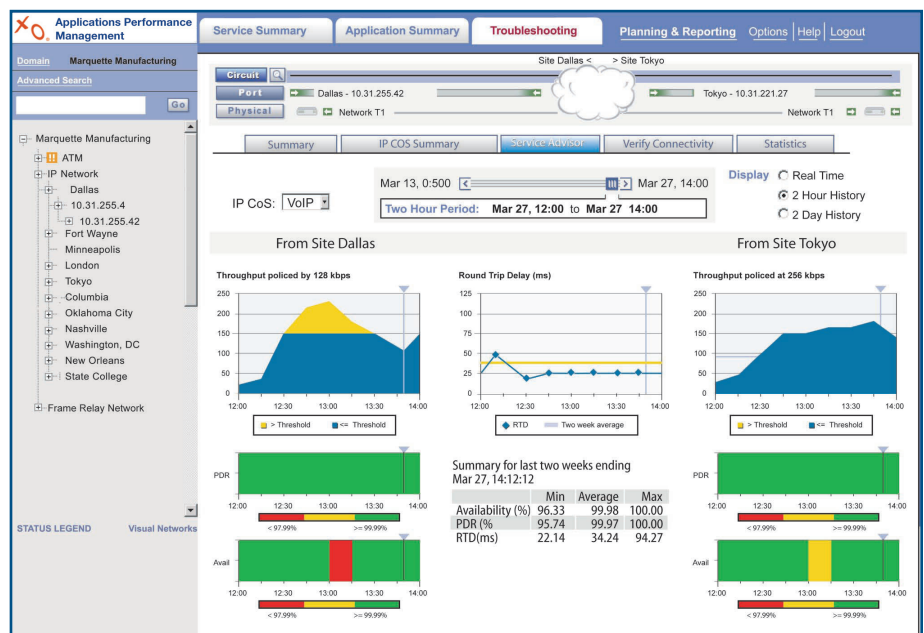


Figure 4: Up-to-the-Minute Service Level Measurements

- **VoIP MRI** – The VoIP Management, Reporting and Integrity (MRI) module enables both pre-deployment assessments of the infrastructure and the subsequent monitoring of the VoIP performance after deployment. Compatible with the ITU standard for VoIP monitoring and performance, this module monitors and measures protocol activity – such as Session Initiation Protocol (SIP), H323, or Realtime Transport Protocol (RTP) – and analyzes the performance of voice packets across the infrastructure. Among the monitored parameters are: (1) an end-to-end IP circuit jitter based on daily average jitter measurements for all types of IP traffic, (2) round trip delay (RTD), and (3) packet delivery ratio (PDR) that can be user-selected according to period of time. Enterprises can assess if their networks are ready for VoIP and manage VoIP performance after deployment within a single system.

## Conclusion

In today's challenging economic environment, IT directors must find ways to improve total cost of ownership through more efficient use of existing infrastructure – and expand opportunities to analyze and predict performance of applications used every day across the enterprise.

XO Communications now has the industry's most comprehensive applications performance management capabilities integrated with its MPLS-based networking solutions. XO Applications Performance Management provides end-to-end visibility of the XO Wide Area Network – in real-time – to help resolve issues whenever necessary.

Through its enhanced visibility into application behavior, as well as through its ease of deployment and versatility, XO Applications Performance Management is an attractive solution for many enterprise IT organizations seeking to improve their ability to analyze and predict applications performance.

## About XO Communications

XO Communications, a subsidiary of XO Holdings, Inc. (OTCBB: XOHO), is a leading nationwide provider of advanced communications services and solutions for businesses, enterprises, government, carriers and service providers. Its customers include more than half of the Fortune 500, in addition to leading cable companies, carriers, content providers and mobile network operators. Utilizing its unique combination of high-capacity nationwide and metro networks and broadband wireless capabilities, XO offers customers a broad range of managed voice, data and IP services with proven performance, scalability and value in more than 75 metropolitan markets across the United States.

The XO® Applications Performance Management tool, when added to your XO® MPLS IP-VPN or XO® IP Flex with VPN service, displays live intelligence about your Wide Area Network – from the physical through applications layers. This robust tool can help you make informed decisions vital to the performance of your network (such as bandwidth requirement and class of service settings), thus ensuring a quality experience for your end-users. XO has the industry's most comprehensive applications performance management capabilities embedded in our MPLS IP-VPN managed service offerings. To find out how we can meet your specific networking requirements, visit [www.xo.com](http://www.xo.com) or call 1.866.266.9696.

*“XO Communications now has the industry's most comprehensive applications performance management capabilities integrated with its MPLS-based networking solutions.”*

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