



A Comprehensive Cross-Platform Solution for E-Business Systems Management White Paper

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The prospects for new revenue sources, on demand Web-based customer services, doing business at lower internal costs, and increased profitability are all driving enterprise businesses to adopt Web-based transactions and services. These e-business benefits come at a cost, requiring complex environments and highly distributed computing that escalate pressures on IT management to ensure high performance and availability.

This paper examines e-business system complexity; explores the resulting management issues posed for IT organizations; and explains how NetIQ's performance and availability technologies offer the industry's leading solution for managing, diagnosing, and analyzing cross-platform distributed e-business environments.

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The Need for E-Business Systems Management

Increasingly, Internet-based distributed applications are running business-critical processes. Driven by new component-based delivery techniques for software, distributed object computing is quickly becoming the new standard for cost-effective, build-or-buy business applications. This new computing paradigm means that components can be distributed across a heterogeneous network while still allowing them to interoperate as a unified whole. Combined with the reach of the Internet, distributed component-based applications have given businesses a new opportunity to capitalize on their existing IT infrastructure. To realize this potential, IT organizations are investing heavily in e-business application development and deployment.

E-Business Drivers

E-business investments promise a quick, effective means of harnessing existing applications and data. IT organizations are using Internet-based applications to deliver new, more flexible and cost-effective internal business processing; provide online services and meet rising customer service demands; and automate transactions conducted with customers, partners, and vendors. The resulting applications provide core business operations that:

Increase the value of customer interaction. Today's competitive climate requires that companies continually improve service and leverage each customer touch point. E-business investments are paying off in lower costs and broader reach with Web-based self-service capabilities; on-demand services such as access to account information; and Web advertising and direct marketing.

Create new revenue sources. The Internet is a new sales channel, and in some industries it is fundamentally changing how business is done. Lower costs and broader reach are driving new revenues and profits through online e-catalogs; e-tailing via business-to-business and business-to-consumer e-commerce; and extranets and business exchanges used for procurement, supply chain management, and online auctions.

Reduce transaction times and cost. Efficiencies created by automating routine tasks mean productivity gains and higher margins. Businesses are Web-enabling repetitive processes such as credit or account-balance checks for use both internally and by partners, and are also automating vendor relationships such as supply and equipment purchasing.

The Stakes Are High

Far from a casual browser perusing your Web site, e-business represents critical business operations on the Internet, and creates a new level of IT management vulnerability. Once Web-based capabilities are launched, customers and partners expect the convenience and immediacy of on-demand services available 24/7. Consistent, fast response times become critical. Lack of availability or poor performance can frustrate potential customers; shake their confidence in the integrity of their transactions with your business; or worse. The repercussions could land your company in the news, or even impact the stock price.

It's no surprise that executives and line-of-business managers adopting e-business are putting increased pressure on IT management. IT problems with e-business systems can have a significant bottom-line impact, making service level agreements and early problem detection and correction even more critical. And now more than ever, IT management needs simple, clear exception reporting that illustrates how problems impact revenues and customer service.

The E-Business Challenge

The nature of e-business applications changes the systems management game. Web-based programs or component objects can access and manipulate data and processes remotely, and collaborate with other components or objects to produce a desired result. They can also spawn temporary objects that are required to complete the application workflow.

This shift to distributed, Internet-based applications engenders a new set of application performance and availability management requirements. The dynamic nature and polymorphism of these new applications means that management systems must be able to deal with a scale-out problem that is no longer predictable or geographically defined.

In this climate, IT managers are being challenged to manage high profile risks, while creating operational efficiency and reducing costs. To meet the challenge effectively, IT needs a new approach to systems management.

NetIQ: Experience for the Web-Enabled World

NetIQ knows systems management for the new e-business world. NetIQ developed the industry's leading solution for managing, diagnosing, and analyzing the performance and availability of Windows-based systems and applications. Very early on in the corporate deployment of these systems, NetIQ recognized the need to manage Internet-based applications such as e-mail, as well as their underlying systems and servers.

Today, NetIQ extends this knowledge to all the most popular Internet technologies and Web-enabling applications and servers, whether they run on Windows, or different vendor brands of UNIX or Linux.

The New IT Management Dilemma

Historically, systems and the applications they ran were predictable, and the management challenge was different. First-generation computing environments were monolithic and the prevalent business operating systems of the day were IBM's MVS and DOS/VSE. System costs were based on MIPS – the key metric was CPU utilization. Application code required careful optimization, and capacity planning was critical to budget planning.

Distributed systems were introduced as second-generation hardware was adopted, and distributed processing power meant that application processing could be physically separated into presentation, business logic, and data management layers. The presentation layer was moved to the desktop, and core processing and data were spread across the network, but typically each executed on a single system.

Leading enterprise ERP and CRM software products are built this way. Their functions are understood, and they are tuned to run in a fixed environment, with a defined number of users at any given time.

E-Business Environments Are Dynamic

The advent of distributed object computing means that applications are now being logically broken apart at the transaction level. Object-oriented computing breaks transactions into multiple steps that can run on multiple processors across a heterogeneous network. Adoption of XML and related Internet standards means that data formats are more flexible, and can be stored, accessed, and processed by many applications across the network.

Browsers, which are becoming the ubiquitous user interface, add yet another variable. This presentation layer creates the potential for much broader access to transactions and data, both inside the enterprise and across the firewall.

In this environment, processing requirements vary based on where the objects are executing. They may run either on a desktop or on a server, and IT is responsible for delivering adequate and consistent service levels regardless. Web-based transactions mean volumes can vary, creating unpredictable system usage and making it difficult to balance loads and manage capacity. IT organizations today must deal with a scaling problem that is no longer predictable.

E-Business Environments Are Complex

IT managers must take into account huge numbers of application components that can't be managed by hand. Supported by interdependent data servers, application servers, and middleware, these components can be based on Java or .NET, or both, and can run across a mix of platforms including different versions of Windows and different brands of UNIX or Linux.

A relatively simple Web site will involve an operating system, a Web server such as Microsoft IIS or Apache, and a data store such as Microsoft SQL Server or Oracle RDBMS. Typical Web-enabled applications involve these types of servers as well as Web application servers such as BEA's WebLogic Server or IBM's WebSphere, and may also involve middleware that handles message queuing and brokers transaction requests.

For these e-business environments, monitoring system load and CPU utilization isn't enough. Managing these environments effectively means that IT staff needs the ability to manage, diagnose, and analyze systems and servers, as well as application components and their connection points. IT operations staff needs insight into the application servers—to know, for example, if an Enterprise JavaBeans container on WebLogic Server is overflowing. Technical experts need powerful visualization capabilities to correlate system information and illustrate behavior across the layers comprising the technology infrastructure.

The old rules of system predictability no longer apply. The management practices and tools that IT teams use must be able to cope with this new level of change and complexity.

The Limitations of Traditional Systems Management

Web-enabled applications and the e-business environments that drive them turn traditional systems management upside down. They also change the dynamic between development and operations tasks.

Many enterprise IT organizations today have significant application integration projects underway. These projects preserve investment in existing systems while extending their processing capabilities, exposing application code as Web services, and facilitating data exchange with XML. This approach creates extensibility for key business processes, but it blurs the line between controlled production systems and test environments. As application modularity increases, the ability to test every combination and permutation becomes impossible. Applications no longer transition cleanly from development to production, nor do production environments remain constant.

Operations teams must be equipped to identify and isolate unanticipated application problems as well as systems issues. High-level systems experts need integrated diagnostic capabilities to evaluate and resolve the behavior of distributed transactions—down to pinpointing which specific Java application bean has failed. In this transitory and dynamic environment, traditional systems management frameworks and point solutions fall short.

Mainframe-Adapted Tools

Management frameworks evolved in the monolithic, homogeneous computing environments characteristic of mainframe computers. Based largely on proprietary code and techniques, these systems have long implementation timelines. They typically require experienced systems personnel to customize their deployment and use, and ultimately do not provide effective visibility into distributed, multi-tier architectures. As a result, they often end up as shelfware. These framework solutions are not equipped or designed to manage a world where dynamic binding of processing occurs, and when or where processes will run is an unknown.

Point Solutions

At the other end of the spectrum are point solutions, designed to provide diagnostics for specific layers of a multi-tier application environment. Their view is too limited to provide insight into the distributed connection points and components that make up e-business systems. Reliance on point solutions means purchasing and using a broad array of tools. Each requires a separate learning curve that impacts every new member of the IT team. Each stores data in different formats, making unified application of service level metrics a huge effort. Ultimately, these tools limit operations and systems management personnel to consulting discrete silos of information.

The limitations in frameworks and point solutions derive in large part from the systems environments for which they were originally designed. UNIX systems, prevalent in many e-business environments, pose additional challenges.

The UNIX Systems Management Challenge

Management solutions for UNIX are largely home-grown. Over time, engineers and systems administrators have developed custom tools to manage UNIX workstations and servers, commonly using shell programs or scripts. Today, systems management scripts are typically written in Perl, a scripting language developed for this purpose. While Perl has grown in popularity, Bourne, Bash, Korn, and C shell scripts are also in use today. In an effort to automate routine tasks, UNIX administrators use the cron UNIX service to run scripts at a specified time. Although cron starts each job, the scripts lack central control and run without integration or interaction with one another.

Individual or small numbers of servers can be managed effectively using these standalone scripts. However, enterprise-class IT organizations can use more than 20 servers for a portal implementation, and often deploy and manage upward of 800 UNIX servers. As applications become interdependent and the numbers of servers grow, using custom, standalone scripts becomes more difficult and less effective.

In the typical enterprise IT department, custom UNIX solutions based on these standard services have evolved into vast, complex script libraries intended to perform routine system tasks as well as capture specialized diagnostics. Written by system administrators, database administrators, application developers, and system operators, scripts are rarely written to any standard and lack an overarching structure.

This lack of consistent, centralized systems management means that new staff face a steep learning curve to simply handle routine operations. Critical knowledge of these homegrown environments can easily be lost when a key member of the technical team transitions to a new role or leaves. And when IT is called on to provide service level and management reports, collecting and correlating information can be impossible.

This lack of standards and consistency creates acute problems when IT staff needs to manage, analyze, and diagnose the transaction components and connection points of dynamic, highly distributed e-business applications.

What IT Management Needs

The new demands that e-business systems place on IT have increased the pressure on IT management – already under the gun to provide more operational efficiency with fewer resources. IT managers need a cost-effective, resource efficient solution designed for e-business. A solution that:

- Supports existing operations practices
- Retains the knowledge of core experts
- Enables a single pane of glass for managing across all systems
- Empowers highly skilled personnel, and supports less experienced staff
- Provides consistent, repeatable service level and exception reporting
- Enforces policy management across servers and applications
- Collects information regardless of UNIX variety
- Instruments any combination of Windows, UNIX, and Linux environments
- Captures information from Web servers, application servers, middleware, and other application component software
- Presents powerful visualization capabilities that correlate relevant system and application information
- Retains knowledge long after the originator has left the organization

With business operations at stake, possibly the most important capability is managing response time – from the end user perspective. Individual components can appear operational and still put customer retention at risk if response time is inadequate. A comprehensive e-business systems management solution needs to provide an accurate measure of user experience with actual response times.

Response time, combined with a consistent set of metrics that are applicable regardless of underlying systems and software, will provide IT management and their operations teams with a holistic view of their e-business environments.

NetIQ: The E-Business Systems Management Solution

To stay ahead of the demands e-business applications place on operations, IT managers need to leverage the most valuable people within their organizations – power users. Power users are the senior engineers, architects, and system administrators responsible for critical applications and process definition. By equipping power users with power tools, these senior staff members can quickly respond to deployment issues and resolve complex problems. They can offload routine tasks to operations personnel and optimize service delivery by standardizing processes.

NetIQ provides performance and availability tools for your power users. Intelligent agents are at the core of these solutions. These agents are designed to support your current operations, regardless of what console management system is in use.

Many e-business environments rely on mixed Windows and UNIX environments, and support legacy application integration. NetIQ performance and availability agent technology is designed for these integrated architectures, and can interface with Microsoft Operations Manager (MOM); with other NetIQ performance and availability products; and through connector agents to provide seamless integration with existing frameworks. NetIQ agents provide new diagnostic and reporting depth to these existing management systems by capturing metrics designed to correlate events across application and system layers.

NetIQ Technology: Designed for E-Business

These agents use the latest technologies, including Java and C++, and support Internet-based standards such as XML for data communication and distributed processing. The agents dynamically capture and manage metrics for reporting and diagnostic purposes, including historical baselines, thresholds, and service management. This adaptable agent technology provides:

- **Unified and centralized management**

Regardless of the management system or the console interface, centralized management is only possible if a common model captures and normalizes data. NetIQ smart agent technology captures meaningful information for correlation and comparison from throughout the multi-tiered e-business application environment. With NetIQ agent technology, management reports and service level tracking are simple and comprehensive.

- **Detailed diagnostics**

Just as cars today require computer chips to monitor engine components, while car repair involves the application of plug-in computers for additional diagnostics, IT operations must be prepared to monitor both standard metrics and, when needed, collect deep diagnostics. NetIQ agents are designed to perform routine threshold checks and integrate with operations consoles for event notification and action. The strength of the agents lies in the depth of information they capture from inter-related application components. This information can pinpoint more sophisticated problems for diagnosis by technology experts.

- **Broad operations support**

Technology experts and operations technicians need different types of tools to do their jobs, yet they also need to share information. NetIQ agent technology supports both types of tools, and enables them to interoperate.

Many organizations use Microsoft Operations Manager (MOM) for self-managing, policy-based event management. For these organizations, NetIQ provides Extended Management Pack (XMP) Modules. NetIQ XMP Modules extend MOM to cover UNIX and Linux systems. NetIQ agent technology complements and extends Microsoft Operations Manager by supplying advanced monitoring and analysis capabilities for non-Microsoft environments. XMP connectors can also convey centralized MOM alert information to external frameworks.

- **Dynamic policy management**

Using a lightweight, unobtrusive design, a single base agent resides on each server. The agent is directed by managed objects (MOs) to monitor specific application servers, middleware, data servers, and other components. Managed objects operate as dynamic plug-ins to the agent, providing server- and application-specific policies. By centralizing scheduling and communications in the agent, policies administered by MOs can be set and changed immediately, without changes to the agent itself and without any impact on servers. Change is simple—select from a list and deploy from a central console.

- **A single source for cross-platform management metrics**

NetIQ agents are operating system agnostic. Data capture and evaluation is directed using Knowledge Scripts, which are archived in a centralized console. Far from being proprietary, these scripts utilize Perl for UNIX, and Visual Basic (VB) or Visual Basic for Applications (VBA) for Windows. Despite the differences in programming language, UNIX and Windows Knowledge Scripts work identically. NetIQ supplies a large number of UNIX and Windows Knowledge Scripts out-of-the-box. Import capabilities protect and retain the investment in the huge libraries of Perl scripts already prevalent in most UNIX environments.

- **Efficiency and flexibility—the best of both worlds**

Traditional agent technology tends to be processing efficient, but highly inflexible. Set once to monitor specific events and thresholds, any change requires reinstallation of the agent, risking service interruptions. In contrast, free-agent scripts are very flexible, but highly inefficient. They must be written for every eventuality by experienced personnel, and maintained carefully so they are not lost or inadvertently changed. Processing overhead can become a substantial drag on system resources.

In contrast, NetIQ utilizes a single agent per server with associated plug-in managed objects to direct policy administration, and Knowledge Scripts to dynamically control and change specific policies. A centralized management environment securely maintains Knowledge Scripts and ensures changes are tested before they are deployed. This solution provides the best of both worlds, delivering both efficient and flexible management capabilities.

- **Response time from the end-user perspective**

NetIQ provides powerful agent technology to monitor an organization's Web site for high availability and performance, from the client perspective. Designed to run from a client system, this agent technology provides Web transaction monitoring; services monitoring; and performs a set of individual functional checks. The agent can also record and replay transactions to emulate user behavior. It helps manage the integrity of a Web site through link checking, and monitors the performance of individual page elements and file protocol services. By monitoring the complete Web experience, IT can be sure that key Web sites are fully available and fully functional.

- **Powerful data visualization**

With comprehensive yet simple reporting and analysis capabilities, NetIQ provides a new vantage point on e-business applications. Individualized chart consoles enable power users to visually correlate several metrics that together will help them diagnose application and system behavior in highly distributed environments. Drag and drop features provide experts the tools, for example, to correlate context switches per second to percentages of CPU utilization, memory utilization, network I/O rates, or disk I/O rates. Working with graphical information, seasoned IT staff can pinpoint bottlenecks or errant application components faster and more effectively.

NetIQ agent technology enables IT management to provide consistent service level and exception reporting. The agents provide a common set of metrics to establish baselines and set thresholds, and are easily modified to capture deep, detailed diagnostics. Portable, powerful, flexible, and adaptable—NetIQ agents are technology for the e-business world.

NetIQ: Deployment at Web Speed

Deploying NetIQ agent technology is fast, efficient, and straightforward. NetIQ supports Microsoft Systems Management Server (SMS) installation for Windows systems. In UNIX and Linux environments, NetIQ supports popular third party software distribution tools. Installation takes minutes and can either use an interactive process or be accomplished in an automated, unattended mode. NetIQ components for data collection, management, and agent administration typically take less than a day to install. NetIQ delivers comprehensive, out-of-the-box functionality across all leading servers, applications, and Web-based systems, enabling fast implementation. Once installed, agents identify software present on the server through an auto-discovery process.

The result? Complex enterprise NetIQ deployments are accomplished in days and weeks, not months and years. Once installed, NetIQ technology adapts to standard operations practices and can be used quickly, without a steep learning curve.

NetIQ UNIX Systems Management

NetIQ UNIX agent technology provides structure and consistency for UNIX environments, with features for both operations personnel and technical experts. NetIQ extends the same structure, consistency, and features to mixed Windows, UNIX, and Linux environments, enabling operational efficiencies across any combination of Windows, IBM AIX, HP-UX, Sun Microsystems Solaris, and Red Hat Linux.

For UNIX, NetIQ combines the flexibility of Perl scripts with the advantages of agent capabilities. A single NetIQ agent links with the kernel libraries on a specific processor, providing highly efficient monitoring and measurement. The agent gathers information and manages thresholds as directed by Knowledge Scripts. Knowledge Scripts utilize Perl and conform to standards that ensure they can be used and understood by all your key staff. NetIQ protects your substantial investments in existing Perl scripts with automated import capabilities.

This unique combination of scripting and agents means policies can be applied quickly and effectively to groups of servers. Updates can also be made and tested without impacting production systems. Once tested, changes can take effect immediately, dynamically modifying data capture. Operations staff benefits from consistent policy management, and technical experts gain fast, efficient problem diagnosis. Both staff and management benefit from a single source for reporting and service metrics.

NetIQ UNIX agents act independently of the console or management system in use. They provide warm start capabilities—if the managed client is rebooted, monitoring continues when the system comes back online. Even if the management server is down or cannot be accessed via the network, event detection and data collection can continue.

NetIQ UNIX solutions deliver consolidated management reporting and oversight with consistent information; they provide technical experts the flexibility they need; and they offer marked operational efficiencies.

NetIQ Solutions: Modular Management for E-Business

NetIQ solutions offer insight into each layer of multi-tiered e-business environments. By employing a common data collection model, NetIQ ensures that data can be compared and correlated to produce a unified view of critical e-business systems and functions including:

End-User Response Time. Response time is the acid test for availability and performance. NetIQ agents measure actual response times and detect bottlenecks in Web sites, providing information for IT staff to determine which pages are slow, which Web server is having a performance problem, and what components in a page or the Web infrastructure are causing a bottleneck. NetIQ provides a Web Recorder to capture and play back transactions for response time evaluation, ensuring the entire site (network connection, Web server, CGI scripts, J2EE servers, .NET databases, etc.) is functioning. The agent uses synthetic transactions to test services such as FTP, SMTP, and POP3, and performs functional checks to verify links and monitor performance of individual page elements.

Underlying Systems. Regardless of platform, all underlying systems share common performance and availability concerns: system resource usage – processor, memory, disk I/O and network I/O; disk storage capacity; and ensuring the system is reachable. NetIQ agents monitor these resources for event notification, and capture metrics for diagnostics, load balancing, capacity planning, and service reporting. These metrics often indicate problems elsewhere in the application infrastructure, and can reveal the source of problems when correlated with other application and server component measurements.

Web Servers. These presentation engines manage Web pages and frames, and are distinct from an underlying Web application server that manages business logic. Often part of a Web product suite, NetIQ solutions can instrument a broad range of Web servers including Microsoft IIS, Apache, IBM HTTP Server, and Sun ONE Web Server (formerly iPlanet Web Server). NetIQ agents track, verify, and can automate corrective actions for key resources that impact how Web pages perform, including connection queues, file cache, and DNS cache.

J2EE Application Servers. Java-based Web application servers provide application functionality and access to back-end enterprise systems. NetIQ manages application servers such as BEA WebLogic Server, Sun ONE Application Server, and IBM WebSphere Application Server using a range of techniques including JMX. The NetIQ agents monitor both system resources and the behavior of components including servlets and JSP Pages, as well as Enterprise JavaBeans and the containers in which they execute. This combination enables your technology experts to isolate and pinpoint problems in application components as well as system resources.

Directory Servers. Designed to ease system administration with centralized information, directory servers operate behind the scenes as critical infrastructure components. Web sites, portals, and application servers often rely on uninterrupted access to directory servers. When these repositories for permissions, access rights, and user verification are unavailable, downtime can impact production applications across the board. NetIQ agents capture metrics to diagnose problems ranging from disk corruption and lost tree structures to replication failures that can be difficult to discern, and yet have far reaching consequences. NetIQ metrics provide technical experts deep diagnostics and visualization capabilities to identify application impact.

E-mail. Messaging middleware forms the backbone of enterprise applications today. E-mail is an extremely high profile application – when Exchange or Domino is down, business grinds to a halt. NetIQ agents can track, verify, and correct key e-mail resource usage issues, and they can track and manage resources used for Exchange conferencing features, and to interface BlackBerry wireless devices to Exchange.

The agents can restart Exchange and Domino servers, observe e-mail traffic volumes both between mail servers and to one or more Internet domains, and identify the heaviest users. Optionally, response time can be tracked using synthetic transactions. Agents also track Exchange mailbox sizes and public folder use; monitor Domino white space and replication time; and track connectivity and activity for mailboxes serviced by the BlackBerry server.

NetIQ agent technology can alleviate problems before they happen, by identifying when mail is flowing slowly, replication is not happening as scheduled, and mailboxes are filling up; and also by observing queue behavior for variances from the norm. NetIQ helps IT staff preempt e-mail problems before they occur.

Messaging. Generalized messaging handling systems are another critical enterprise resource. NetIQ instruments Microsoft Message Queue (MSMQ), IBM's MQSeries, Microsoft BizTalk Server, and Application Server services such as Java Message Service (JMS). Agents track connectivity, queue size, volume, network connections, and error replies. These metrics typically flag events that are symptomatic of application or network problems, and provide IT operations an early warning.

Networks. Hardware vendors offer a wide variety of device management alternatives and NetIQ agents are designed with this in mind. The agents capture relevant device diagnostics using industry standard SNMP information when it makes sense as a component of application behavior.

NetIQ agents also provide network response time metrics that can be cross-referenced to application behavior. Using an out-of-the-box library of scripts to generate synthetic transactions, network availability and response time can be tracked and captured.

Databases. E-business applications escalate data usage to new levels. Volatile processing volumes can impact memory and space usage, locking resources and database connection pools. By correlating metrics from application server components with database utilization, IT staff can evaluate usage spikes and make changes based on trends.

Portals. The term has come to mean managed information sharing via an Intranet, extranet, or Web site. Systems underlying portals can include J2EE servers, Web servers, application servers, directory servers, databases, and other combinations. NetIQ agent technology equips IT organizations to handle a wide variety of portal infrastructures.

With NetIQ, operations staff and technical experts gain a shared, consistent view of their e-business environments, across a broad spectrum of systems and applications. This shared management capability allows level-one staff to more quickly identify problems and affords the specialist an in-depth view of specific environmental components.

NetIQ Knows E-Business Systems Management

Component-based design techniques for software are changing systems management. As IT moves from cost center to revenue and profit center, pressure mounts on IT management to ensure availability, reliability, and performance for e-business applications.

NetIQ makes managing environments comprised of distributed systems and highly dynamic transaction processing a reality. NetIQ solutions are modular, flexible, and adaptable to support the integrated view IT management needs of their critical e-business environments. Today, businesses that depend on Web-enabled applications depend on NetIQ.