Managing .NET Web Services Infrastructures

A White Paper
Prepared for Compuware

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ENTERPRISE MANAGEMENT
ASSOCIATES

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Table of Contents

ENTERPRISE MANAGEMENT
A S S O C I A T E S

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Executive Summary

The pace of adoption of Web-based business applications is staggering. Consider that just over ten years ago, thin-client Web applications and the back-office infrastructure to support them did not exist. IT has come a long way in an incredibly short time!

Today, IT departments face major new challenges, and Web services is one of the most talked about and least understood. Web services are defined as back-office Web applications that participate in an architecture that allows them to be leveraged for more than just one application. In a sense, Web services are the logical extension of the object-oriented paradigm—re-use and extension of existing Web objects is the key concept. The key technology that is enabling Web services is XML, and every major Web services vendor supports XML.

Microsoft has led the charge toward Web services with its .NET architecture. .NET is an XML-based foundation that allows Web services to be easily created, maintained, and shared. A key Web services concept that is critical to IT planning is the fact that the Web services paradigm does not stop at the enterprise; they are intended to speed interactions between businesses (B2B), including all of the classic B2B scenarios—supply chain, service providers, etc.

Executives and IT management need to be proactive, anticipating the coming tornado that Web services and .NET has spawned. A systems management solution that can accommodate Web services should be in place before starting development of .NET applications, and must be in place prior to deployment of these applications. These applications are more dependent on the IT infrastructure than literally any other type of application, and proactive implementation of a systems management solution that is .NET-aware is a critical success factor.

This white paper discusses the challenges that IT faces in developing, deploying and managing .NET applications, top issues to consider when selecting a .NET management solution, and describes one vendor's offering that addresses these needs.

Introduction

Starting with the introduction of the Web in the early 1990s, the charge toward Web services has been unrelenting and accelerating. The notion that common business processes can be packaged, published, and re-used any number of ways, for internal and external purposes, is driving much of the research and development in the IT market today. Microsoft and Sun have led the charge with the .NET and Java 2 Enterprise Edition (J2EE) initiatives, and EMA is of the opinion that both standards will be major players in the future. Microsoft has shown great vision with its .NET framework, and EMA believes that .NET will continue to gain market share in the next few years. One of the primary advantages of .NET is that applications are considerably simpler to create and deploy than equivalent J2EE applications, resulting in much lower total cost to the enterprise.

Many enterprises are taking steps toward implementation of .NET applications, beginning with the development and deployment of simple internal applications and migration of existing code to .NET. The complexity of these applications will increase as enterprises become more comfortable with the technology, and the demands on IT will increase proportionally.

There are issues surrounding Web services deployments that IT must consider and plan for now. A key issue is management of these services, and failure to implement a management system that is capable of handling the .NET challenge can result in numerous risks to the business, including loss of competitiveness, customers, and employee productivity. The lack of management tools can result in re-engineering costs due to poorly designed applications.

There are many systems management vendors supporting .NET, but few support more than a limited portion of the architecture. A complete solution that encompasses all perspectives of .NET is required. This paper will describe the challenges of .NET application deployments, operational and management challenges, and one vendor's solution to the problem.

The Challenge of .NET Application Deployments

The biggest challenge to IT departments tasked with deploying distributed .NET applications is that the technology is new and maturing rapidly, and many organizations lack the technical knowledge and tools to manage the environment effectively. .NET applications are heavily dependent on the network and other IT services (such as database servers, authentication mechanisms, and the like), even more so than traditional client/server applications. Additionally, .NET applications may interact with other diverse .NET services located anywhere in the world. Indeed, one of the key concepts of .NET is that the architecture makes interaction with services located outside of the enterprise much easier. IT must begin the process of planning for .NET deployments by carefully planning these rollouts. Proper .NET infrastructures need to subscribe to the following key "best practice" considerations:

- Development and quality assurance standards;
- Application performance standards and baselines;
- Load testing and hardening of the IT infrastructure;
- Implementation of a .NET-aware systems management solution

Of particular concern to most IT managers is the last point; the vendor that provides the .NET systems management solution must be a seasoned veteran with deep expertise in all areas of application and network management, combined with being an acknowledged .NET expert. This is discussed in greater detail later in this document.

Challenges in Managing .NET Environments

Like traditional distributed applications, .NET applications rely on the underlying IT infrastructure to perform optimally. .NET applications are essentially a distributed application on steroids; traditional client/server applications depend on a database server and possibly a middle-tier application server, whereas .NET applications not only rely upon these resources, but many other .NET-specific services that are all relying upon many layers of technology. .NET depends on new technology that is used in an entirely new way, and traditional testing, hardening, and management tools may or may not cover all of the application's touch-points in an organization (not to mention those that may be outside of the organization). All of these issues make .NET applications much more dependent on the performance of the IT infrastructure than virtually any other type of application.

.NET Application Design Issues

There are a number of key .NET application design issues that must be considered:

- Verification of .NET transaction performance prior to deployment on a production network by calculating baseline performance metrics, analyzing application performance under load, and tuning application performance.
- Design of optimal .NET architectures, including server placement

Managing .NET Web Services Infrastructures

.NET Systems Management Issues

Key .NET systems management issues to consider include:

- Network Monitoring and Planning
  - How .NET applications affect network utilization, and how the network affects .NET application performance
  - Impact on .NET applications by network outages or bottlenecks, and identification of weak links in the network
  - Sizing the WAN for .NET deployments, and planning for application growth
- Application Monitoring
  - Measurement of end-user QoE in complex .NET environments
  - Determination of the source of .NET application performance bottlenecks
  - Verification of performance and availability of third-party .NET service providers, particularly those that have provided SLAs
  - Identification, management, and monitoring of .NET users
  - Obtaining .NET visibility across all tiers of the IT infrastructure

Key .NET Systems Management Requirements

IT organizations should insist on the following key features in a .NET management solution:

- Vendor must have deep .NET management expertise and be acknowledged as such by Microsoft. Vendor should be able to train IT support personnel on .NET management best practices
- Supports management of legacy systems and new .NET applications
- Integrates with existing management tools
- Provides views into actual end-user QoE
- Bridges the communications gap between developers and operations, as well as IT management silos
- Supplies enterprise-class features such as scalability and redundancy
- Easy to implement, providing rapid time-to-value and an easily quantifiable ROI
- All modules in the system should share a common look-and-feel

At present, few management vendors support .NET, and even fewer satisfy all of the requirements mentioned above. One vendor, Compuware, has invested heavily in the .NET arena since its introduction and has leveraged the expertise and maturity of its Vantage product line in support of .NET applications; an overview is provided in the following section.

Compuware Vantage

Compuware has been in the systems management business since the 1980's and has steadily added to its portfolio since that time. Compuware's Vantage systems management suite includes products that manage virtually every aspect of the IT infrastructure. All components of the suite work together, sharing data and leveraging a common user interface. The result is a fully integrated suite of enterprise-class products that help to optimize the performance and availability of .NET and legacy applications by identifying, troubleshooting, and correcting problems; managing service levels; and planning for future growth.

The Vantage suite is comprised of Application Expert, ApplicationVantage, NetworkVantage, ServerVantage, ClientVantage, and Predictor. Each product is examined in detail on the following pages.

Application Expert

Application Expert is one of Compuware's flagship enterprise management products. It is one of the few products that successfully combines visualization at the network level with application layer knowledge. This combination allows IT personnel to predict response times of traditional and .NET applications on the network infrastructure. An optional WAN Provisioning Module (WPM) adds knowledge of WAN technologies to the base Application Expert functionality, allowing IT to determine the impact of applications on the WAN. A key technology is the ability to capture XML and SOAP messages as they flow across the network (filtering on .NET-specific traffic), and tie this information in with WAN metrics.

Once these metrics are obtained and correlated, conclusions may be drawn that may cause changes to the overall architecture of the .NET application. Examples of this include moving servers, moving services from one server to another, and tuning of application code to reduce exposure to network latency.

ApplicationVantage

ApplicationVantage can quickly provide detailed bottleneck analyses on production .NET applications, tying in the underlying IT components that interact with them. The product captures application transactions from client and server perspectives, allowing rapid bottleneck identification. SOAP and XML support provide .NET-specific transaction captures, and metrics gathered enable application developers to determine which SOAP requests are taking the most time to complete and make informed, strategic design decisions to improve application performance on the production network. This "two-sided capture" technology is a key advantage.

NetworkVantage

NetworkVantage provides enterprise-wide network monitoring, identifying all applications that use the network, including .NET-specific traffic. The product captures SOAP application packets and identifies .NET traffic by content or end-point destinations. Custom SOAP definitions can be added to the system to further refine the degree of granularity of the analyses, and as Microsoft and other vendors further refine their .NET applications, Compuware will continue to refine NetworkVantage SOAP message definitions to obtain even more information about the application. This information, combined with network data, allows easy identification of .NET routing problems.

NetworkVantage has a number of features that apply to .NET as well as traditional applications. This includes the ability to track and trend traffic to and from key locations and/or applications, enabling breakdown of network traffic to top clients and servers, identifying users that are abusing the network, discovering rogue IP addresses accessing the network, and allowing IT to tune WAN link usage.

ServerVantage

ServerVantage provides insight into critical .NET servers and server processes that are necessary to keep .NET applications up and running. Templates ship with the product that contain pre-defined thresholds and monitoring criteria for standard .NET server processes, enabling quick implementations based on Microsoft guidelines. This is a key dimension of the monitoring puzzle, as .NET applications are very dependent on underlying server processes in order to perform correctly.

ClientVantage

ClientVantage is an end-user quality of experience monitoring tool that enables IT managers and business users to quickly monitor the overall performance of a business application.

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When performance degradations are detected, the product provides performance information that allows administrators to troubleshoot the problem from a number of different perspectives. For example, the product provides insight into client resource utilization as well as a complete first tier transaction trace. ClientVantage is useful for monitoring external application performance such as applications supplied by a service provider. The product also provides the ability to proactively predict performance degradation before an actual outage occurs.

Predictor

Predictor allows modeling of the .NET application infrastructure, estimating the performance of specific links based on increasing and/or varying quantities of traffic. This enables proactive planning decisions regarding link and bandwidth upgrades before failures occur. With the dependence of .NET applications on network links, Predictor is a key component in ensuring application performance.

The Combination

When the sum of all of the Compuware Vantage components is taken, the result is a complete monitoring architecture that does a good job of monitoring classic IT resources while providing support for next-generation .NET applications.

EMA's Perspective

Compuware is one of the few vendors to invest in tackling the many thorny issues surrounding management of .NET applications from a holistic point-of-view. EMA believes that Compuware's Vantage product suite is a significant offering in this area, providing visibility into .NET applications from virtually every layer in the IT infrastructure including network, server, and applications perspectives. Recent Compuware announcements relating to further integration of these products are a positive sign that Compuware is committed to this vision for the long-term.

While there will no doubt be competitive offerings in this area, Compuware's excellent twenty-year track record of delivering enterprise-class management solutions should continue to give it a competitive edge. Combine Vantage's .NET management capabilities with the fact that Vantage manages "classic" enterprise IT infrastructures (including distributed applications, servers, and LAN/WAN), and IT has a powerful systems management solution to leverage for existing and future IT challenges, whether they be .NET, client/server, J2EE, or simply planning for future growth.

If Compuware can successfully integrate existing Vantage capabilities with support for J2EE environments, the company could find itself with few competitors that can offer the same functionality for both major Web services plays. Strong integration between all of the products in the Vantage line, coupled with event correlation and root-cause analysis capabilities, would significantly strengthen the product line's market appeal.

EMA believes that IT personnel and business executives that are losing sleep over these issues should seriously consider Compuware's solutions as a strategic present and future investment.

About Enterprise Management Associates, Inc.

Enterprise Management Associates, Inc. is the fastest growing analyst firm focused on the management software and services market. EMA brings strategic insights to both vendors and IT professionals seeking to leverage areas of growth across e-business, network, systems and application management. Enterprise Management's vision and insights draw from its ongoing research and the perspectives of an experienced team with diverse, real-world backgrounds in the IT, service provider, ISV and publishing communities.