Optimizing Performance of Business-Critical Web Applications

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CA Wily
APPLICATION PERFORMANCE MANAGEMENT

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Executive Summary

Challenge

Increasing reliance on composite and Web-based applications to implement mission critical and revenue generating services has had significant implications for both IT staff and business managers. IT's primary responsibility and ongoing challenge is to provide a reliable, high-performance composite application environment that ensures the end user's ability to successfully conduct business transactions while enabling IT to meet Service Level Agreements (SLAs). Anything less than a superior end-user experience and high service quality can have immediate consequences such as lost online revenue and reduced customer satisfaction.

Opportunity

Real-time data that provides insight into the end-user's experience helps IT deliver reliable, efficient services that the business needs to increase revenue and acquire new customers. Insight into the complete end-to-end business processes enables proactive problem management and, when incidents do occur, helps IT quickly identify which customers are affected, the nature and severity of the problem, impact on business, which systems are affected, the likely cause and who to call for fast remediation.

Benefits

Implementing an Application Performance Management (APM) solution enables your IT team to deliver high-performance composite and Web-based services and assures business stakeholders that these applications are successfully executing customer transaction requests at the intended and agreed upon service levels. Real-time knowledge of the entire end-to-end user experience provides new insights that can significantly improve service delivery, increase customer loyalty, protect revenue and improve the overall online experience for the end user.

The Growth of Composite Applications

Adopting an effective application performance management strategy is a critical step in managing complex Web revenue and generating mission critical applications to deliver a high-quality end-user experience.

Like most enterprise IT organizations, your composite and Web application environment is growing in size and complexity at an increasingly rapid rate. Your environment may include a combination of legacy mainframe, distributed, Web services and emerging architectures. While these technologies can add significant value, they also add significant management complexity.

Increasing numbers of business transactions travel over diverse and interconnected infrastructures, networks, application servers, firewalls and virtualized systems via heterogeneous operating systems and distributed architectures. As customer demand increases, new technologies and new iterations of existing technologies need to be integrated into your environment, making your infrastructure increasingly vulnerable to failure and difficult to manage in production. In addition to managing complexity, rapidly rising demand for services and new technologies to meet service demands, you are being asked to:

- **EXCEED CUSTOMER EXPECTATIONS**: Online customers expect to be treated as your company's **only** customer — every time.
- **PROTECT REVENUE**: Because significant revenue is generated through Web applications, any downtime or performance issues compromise the bottom line.
- **ACCELERATE GROWTH**: Help the business support new capabilities, new channels and new sources of revenue.
- **CONTROL COSTS**: Leverage existing investments and ensure efficient delivery of IT services. Choose and implement solutions that provide a rapid return on initial investment and that provide long-term benefits.
- **OPTIMIZE**: Improve performance throughout the IT organization. Eliminate downtime and focus IT resources on projects that drive new revenue opportunities.

Leading global organizations are successfully leveraging composite applications and emerging architectures to provide essential business services via the Web. These applications perform a number of important business functions: revenue generation, supply chain management and the delivery of essential services to name just a few. But achieving business goals through the development and deployment of Web applications also has had unintended consequences.

As the first line to the customer experience, IT must be able to measure the end-user experience and also have visibility into the total end-to-end customer transaction as it traverses different infrastructure components. Additionally, they must bear the responsibility for managing Web application performance on a day-to-day basis. This means monitoring applications 24x7 in production, detecting and eliminating performance issues throughout an ever more complex application infrastructure and measuring compliance with internal and external service-level objectives that have been negotiated with business owners and third-party service providers.

In joining with IT in ensuring customer success, line of business managers need real-time visibility into customer experiences, the success or failures of critical business processes and the business impact of failed customer transactions. Only then will they have the critical data they need to prioritize incident response according to business criteria, to effectively manage customer service level objectives, to improve customer satisfaction and, in turn, to assure constant revenue streams.

Achieving these objectives requires a management solution that focuses on the customer and business process and is specifically designed for ensuring transition success — one that provides real-time insight into end-user experiences and deep end-to-end transaction visibility across the entire Web application architecture for both business and IT stakeholders.

SECTION 2

Yesterday's Management Tools Are Not Enough

Organizations deploying complex, next-generation composite applications have discovered that the tools, skills and processes they have used to manage applications for years suddenly seem completely ineffective for managing business-critical processes.

Next-generation applications are inherently complex and difficult to manage. They are comprised of many interconnected, heterogeneous parts — Web servers, Java and .NET applications, application servers, packaged applications such as Siebel, Oracle and SAP as well as back-end systems such as IBM MQ, CICS, Tuxedo and various databases. Compounding this complexity are initiatives around business process and integration technologies and quality initiatives like ITIL® and Six Sigma.

This degree of complexity is the new norm and yesterday's tools cannot provide the transaction visibility or management power to optimize these new environments. When organizations deploy composite applications, they are inevitably confronted by a variety of new management challenges.

- **LACK OF PERFORMANCE VISIBILITY**: J2EE and .NET application platforms provide little information about the performance of the applications running with the environment. Flying blind, many support and operations managers learn of application problems by a phone call from the call center or a user in the field. The angry phone call triggers a hunt for the problem, which can last for many long, frustrating hours or even days.
- **LACK OF VISIBILITY INTO CUSTOMER EXPERIENCE**: Web-based applications provide tremendous cost savings by moving critical business functions to the Web, but they "automate" customer relationships. The result is that the application provider and relationship owner lose the critical visibility they once had into the level of customer satisfaction, and IT has no way of knowing how many customer transactions succeeded or failed.
- **APPLICATION VOLATILITY**: Often the reason an enterprise has decided to implement its next generation of applications using J2EE and .NET is the ability to rapidly change an application to adapt to new business needs. Consequently, this leads to a very high level of volatility. Many organizations report that their applications change as often as daily or weekly, which puts additional stress on management methodologies.
- **INADEQUACY OF TESTING**: Studies have shown that when issues arise, enterprises have identified code problems as the source of application problems less than 20% of the time. Testing alone will not insure high performance and can rarely duplicate real-time environments, real user behavior or real transaction data.
- **TIME PRESSURE**: Online applications by their nature are time sensitive. End users expect your application to be always available and instantly responsive. When it is not available, IT is under considerable pressure from business management to bring it back online immediately. For some organizations, the transition to a high availability state can be very stressful.

Most organizations respond to these challenges by falling back on the tried and true, well-established management tools and practices they have employed for years. The average large enterprise IT organization uses 50 different point management tools from as many as 20 different vendors. With so much already invested in tools and training, IT senior managers often feel that they have the means to control these new applications. But what they are beginning to understand — sometimes at great additional cost to the organization as measured by downtime and the resulting business impact — is that any attempt to manage the performance and availability of their new applications without tools specifically designed for these complex environments is not an effective approach.

Consider the tools your IT teams use to manage the complex networks, applications, systems and infrastructure at your organization. There are specialized tools for managing databases, networks, CICS sessions, security, server provisioning, MQ messaging and so on. The problem is that each of these tools was designed to perform a specific set of monitoring functions for a specific IT silo — by definition these tools are non-integrated and therefore offer limited (if any) assistance to IT leaders with responsibility to ensure the performance of the transactions across the overall composite application and customer experience.

There are so many stakeholders involved within your organization that are associated with your complex environment that the "blame game" often gets played out when a problem occurs. Each of your stakeholders generally has a specialty tool that provides enough data about their piece of the infrastructure with which the application interacts. Many times, those tools show that the problem is not associated with their particular component of the infrastructure. This creates a very inefficient process for quickly diagnosing the issue and usually prevents your IT organization from focusing on key projects and initiatives that can be driving new revenue for your business.

Traditional legacy point product management tools, when used for managing today's applications, suffer from three critical flaws:

- **THEY ARE NOT DESIGNED FOR COLLABORATION**: J2EE and .NET applications touch many different components of the infrastructure including security, portal and integration technologies in addition to legacy mainframe and transaction messaging platforms. Composite applications require collaboration. IT teams responsible for individual technologies can only achieve optimal application performance by working in concert to identify and eliminate performance problems.
- **THEY ARE DESIGNED TO SEE ONLY A SINGLE POINT ON THE TRANSACTION CHAIN**: Point management tools typically serve a series of stovepipe IT disciplines such as database performance, network element performance or administration, etc. These tools are not designed to provide a comprehensive view for transactions across composite applications (i.e. an end-to-end transaction view, a business process view, a service level view, etc.).
- **THEY ARE LARGELY INCOMPATIBLE WITH EACH OTHER**: Attempting to solve performance issues using a disparate array of tools from multiple vendors creates frustration and does not allow IT to act quickly or effectively.

In short, enterprises will almost certainly fail to meet the challenges of managing today's complex applications and associated customer experience by relying solely on point solutions that may provide a deep but very narrow view on one aspect of the environment. Organizations require an entirely new performance management strategy designed specifically to reverse the unintended consequences of disintermediation, to better ensure an optimum end-user experience and to meet business objectives successfully.

SECTION 3

Growing Complexity Demands a New Approach

An APM solution enables IT teams to deliver competitive, high performance composite and Web applications and assure business stakeholders that these applications are successfully completing customer transaction requests at the intended and agreed on service levels with a high degree of reliability. It is the right approach for organizations that recognize the critical impact today's applications have on business processes and that understand the need for a solution that ensures the highest levels of end-user experience.

An effective APM solution needs to look at the entire end-to-end transaction infrastructure from many perspectives:

- **COMPONENT VIEW**: Because of their complexity and composite nature, Web and other composite applications must be managed from the inside. That is, the management technology must be able to monitor the performance of individual components and how they interact with one another at the deepest possible levels. Why? Because transaction integrity is dependent upon the flawless interaction of hundreds of components and back end systems. Only by knowing the performance at the deepest level can you be certain the higher levels — the business process, the shopping cart, entire transaction flows — are working.
- **BUSINESS PROCESS VIEW**: The ability of end users to successfully initiate and complete transactions is the ultimate measure of success for all applications. It is essential that businesses understand the end-user experience so they don't get blindsided by unintended complaints. Organizations need to instantly be alerted if end-users are experiencing transaction failures regardless of the availability of the applications they are trying to use.
- **END-USER/CUSTOMER VIEW**: To manage composite applications, it is critical to be able to monitor and trace real transactions from the browser (end user) to the back end systems where data is located. But to be truly effective, this end-to-end visibility must be internal — from the application's point of view — so that problems can be accurately and quickly identified. Siloed systems management tools will fail to share this data as transactions traverse the information supply chain.
- **CROSS-TECHNOLOGY VIEW**: Whether your application platform is heterogeneous or provided by a single vendor or contractor, it's essential that the management solution provide real-time visibility across the entire stack — server, OS, JVM, portal server, integration middleware, application server, application code, database — in a single tool, regardless of operating system or deployment platform.
- **IT TO BUSINESS VIEW**: Organizations that deploy business-critical Web applications must ensure effective communication between IT groups and line of business managers — especially when it comes to the performance of these applications. The management solution needs to provide a shared mechanism for measuring application availability, performance trends and customer success.
- **OPERATIONS TO SUPPORT VIEW**: Most organizations recognize that they have critical skills gaps between operations, where applications are monitored, and support, where performance enhancement and problem remediation skills are concentrated. The successful management tool will bridge this gap by providing 24x7 monitoring capability in operations and deep granular visibility for support organizations in the same tool.
- **HISTORICAL VIEW**: It's not enough to measure application performance and customer experience as a function of daily operations. Capacity planners, architects, infrastructure managers and business managers all have a need to review the historical performance of applications and their environments. The ability to record and play back transaction performance data is critical to better planning, budgeting and application design.
- **DEVELOPMENT TO QA TO PRODUCTION VIEW**: By using a single management tool for monitoring performance, diagnosing bottlenecks and communicating with each other, the teams involved in building, testing and deploying the application can better ensure application integrity and resilience throughout the application lifecycle.

The growing complexity of today's heterogeneous Web and composite applications, coupled with their increasing importance to the business, increases the number of stakeholders involved in managing them. Application support personnel must work with back-end system administrators, third-party service providers, as well as development and QA personnel to ensure applications are successfully deployed and maintained. Line of business managers want visibility into performance and hold operations managers accountable with measurable service level agreements. With so many stakeholders, you've got to ensure everyone shares a common understanding of the impact of application performance on business success.

In a perfect world, each of these stakeholders would have the right information when they need it, allowing them to prioritize problem resolution based on business factors and to quickly restore business operations before SLAs are compromised. Until now, achieving this goal has proven to be a challenge. Line of business managers, system administrators, architects and operations personnel each have a distinct viewpoint of the business, the Web applications that support the business and their operating environments. The fact that each person has different skill sets, focuses on different matters in their day-to-day jobs and measures success differently only makes the problem worse. Each has their own tools for measuring and managing information systems and business success factors. This may appear to work when everything is running well, but this strategy flounders when complex problems emerge. Each stakeholder lacks the ability to communicate using a common language.

SECTION 4

Transactions Provide a Common Language

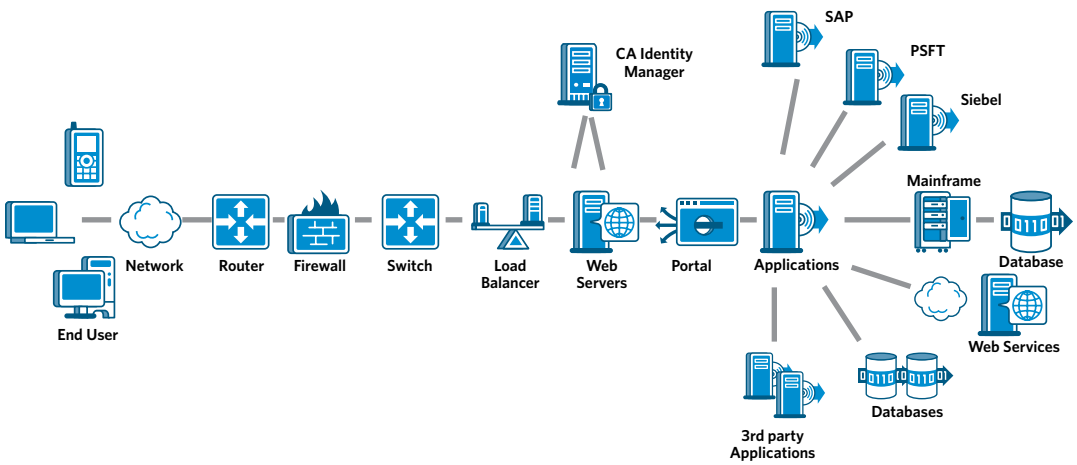
Place Order or *Pay Bill* are business transactions that should be meaningful to every stakeholder in the enterprise. Each person must understand their role as it relates to ensuring a successful *Place Order* or *Pay Bill* transaction. The DBA needs to keep the database up for the purpose of supporting a specific transaction. Application support must know how to route issues to those specialists supporting specific transactions and must know how important that transaction is to the business. Likewise, developers should know that the applications they create and the transactions that flow through them are critical to the business. Operations managers need to know what quality of service those transactions need to meet and why. And finally, business managers need to know that customer satisfaction and revenue streams depend on successful Web application transactions and that they must work with IT to monitor and measure transaction success.

The best way to solve the communication problem is by monitoring business transactions end-to-end — tracing the link between end-user requests and the back-end systems that fulfill the request and then making critical information about the transaction available to every stakeholder. Then, when a performance issue arises, operations teams can detect incidents before SLAs are compromised and business managers can immediately understand the business and customer impact of the incident and prioritize resolution appropriately. Application support can quickly isolate the problem to its cause, back-end system administrators can immediately determine if their systems are impacting application performance and developers can determine whether code errors are involved. Deep transaction visibility therefore helps every stakeholder work collaboratively, using a common language, to achieve the same objectives — superior service delivery, high rates of customer satisfaction and revenue assurance.

END-TO-END TRANSACTION VISIBILITY IS CRITICAL TO APM SUCCESS

FIGURE A

Effective APM requires end-to-end transaction visibility from the end-user to back-end systems.



Implementing an effective APM strategy allows you to:

- Monitor customer transactions end-to-end
- Manage today's complex and heterogeneous application environments from legacy mainframe to distributed to Web services to emerging architectures
- Identify specific customers or groups of customers affected by downtime
- Measure customer transaction success/failure rates
- End finger pointing and endless bridge calls
- Maintain superior application performance and availability
- Predict emerging problems and implement repairs before they affect customers
- Diagnose application problems in minutes
- Share critical performance data throughout the enterprise
- Speed application deployment and reduce TCO
- Record data needed to comply with governance demands
- Measure the cost of downtime in money and in terms of customer impact
- Map service dependencies to better understand the environment

Organizations that have implemented an APM solution have realized the following business benefits:

- Reduced downtime and increased throughput for revenue generating applications
- Improved service quality, reduced costs and optimized IT resources
- Rapid Return on Investment (ROI) and accelerated time to market for new services

SECTION 5

Does Your Organization Manage the End-User Experience?

Considerations for IT

- Can you monitor all transactions in real time, 24x7?
- Can you set proactive alerts that notify you of out-of-bounds performance conditions before customer SLAs are compromised?
- Can you integrate customer experience monitoring with application infrastructure monitoring?
- Can you use a single solution for both monitoring and deep-dive diagnosis and problem resolution at any stage in the transaction lifecycle?
- Can the IT team collaborate on problem solving across IT silos using a single set of performance data to identify where problems are and who is responsible for addressing them?

Considerations for Line-of-Business

- Is your first indication of application failure a call from an unsatisfied customer?
- Are you able to monitor business processes and measure the business impact of failed transactions?
- Can you measure performance against SLAs and quality initiatives such as Six Sigma?

If you answered *no* to any of the above, your current management solution is not providing sufficient protection from the potential loss of significant revenue due to application failure or customer alienation caused by failed transactions.

Conclusion

To assure critical revenue and optimal performance, organizations today need a Web APM solution that can monitor 100% of user transactions, provide unique data on the business impact of failed transactions and deliver essential data for resolving problems quickly. With such a solution in place, everyone in the organization — line of business managers, application administrators, system architects, DBAs, IT application owners and business managers — can work together to ensure customer satisfaction, SLA compliance and business success. These complementary views need to be integrated in a single solution that enables each stakeholder to leverage the same set of data to rapidly and assuredly determine the location and cause of performance problems.

In addition to core application management capabilities, organizations today also need the ability to measure how well their customers are being served by their applications. This requires new capabilities for measuring and analyzing the performance and quality of end-user transactions such as login, buy, GL, update, etc. Only by gaining insight into the customer experience will IT teams have all the information necessary to maintain the highest levels of overall application performance and customer satisfaction.

About CA Wily

CA, one of the world's largest information technology (IT) management software companies, unifies and simplifies complex IT management across the enterprise for greater business results. Our vision, tools and expertise help customers manage risk, improve service, manage costs and align their IT investments with their business needs.

With more than 1200 customers worldwide, CA Wily is the market-leading provider of Application Performance Management solutions. The CA Wily APM solution manages the performance and availability of critical Web applications and the end user experience, enabling organizations to measure the business value of each user's online experience, proactively identify and prioritize problems based on business impact and triage and resolve problems across complex and heterogeneous application environments before they affect users, customers and business. CA Wily's comprehensive management approach allows enterprises to rapidly detect and diagnose application slowdowns and failures and better assess the impact of application performance on business success. This means better customer service, more stable revenue streams and higher IT productivity.