*HURWITZ*GROUP

On Delivering Reliable Applications Faster

— **Compuware Corporation**

▶ **Hurwitz Report**

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Executive Summary

The Internet has forever changed the rules by which companies operate, and the catch phrase to describe this change is "e-Business." The worldwide, 'round-the-clock environment of the Web has leveled the playing field in several industries, creating opportunities for start-ups and established businesses alike.

To stay current and competitive, companies must refine their approach to doing business by incorporating the Web into their own business processes. e-Business success is not just about the technology; it is about understanding how a company uses the Internet to do business. That may mean creating and/or altering business processes, integrating old and new systems, or automating manual tasks.

It falls on the shoulders of corporate IT departments to figure out how to extend applications to support e-Business requirements. Application development teams often bear the brunt of the burden brought on by the onslaught of these initiatives. This situation marks a new era in application development.

Unlike the more predictable nature of client/server development, in the web era change is the only constant. New applications must link the old and the new, the large and the small, with internal applications and cyberspace services. Application development teams are responsible for launching higher quality applications to the market — sooner. Now more than ever, they must turn on a dime and respond to rapid requirement changes. Consequently, development strategies must be both responsive and reliable, enabling companies to do more in less time with fewer resources.

To achieve success in this new world, companies strive to build quality into the development process at every stage of the life cycle. Consistent yet flexible programming and testing practices are essential. Testing — early, often, and wisely with business requirements in mind — is the best insurance for achieving quality code. Analysis, design, development, and quality assurance teams need to collaborate effectively, making testing an integral part of the overall process, rather than a single step in the process. Testing that is easy and accessible, with results shared throughout the entire development team, will yield the best results.

Hurwitz Group believes that adroit CIOs, development managers, and developers understand the new set of rules and roles in which development teams operate — and that they look for tools that help them adapt to the unique rigors of software development in the web era. Fortunately, a small cadre of vendors has engineered products precisely to help developers and their managers produce high quality applications quickly.

Compuware understands the challenges facing development teams better than other vendors and has an Automated Software Quality strategy that enables companies to repeatedly deliver reliable applications faster. Its tools reveal actionable information earlier about the application and offer processes that enable development and testing to share information and work more effectively toward on-time delivery. Compuware offers this solution through DevPartner Studio and QACenter product offerings.

This white paper delves into the business and technical best practices for effective software development in the e-Business era. It also elucidates the basic features and benefits of Compuware's line-up of products for automated software quality.

Business Rules Are Changing

The Internet knows no holidays or international boundaries, creating a 24x7 channel for doing business worldwide. Customer loyalty becomes more elusive in this new market with the competition only a mouse-click away. The pressure to stay current and remain competitive in the virtual marketplace demands greater flexibility and the ability to adapt to change quickly and reliably. The Internet forces companies to rethink and retool business practices, whether to defend old turf or to take advantage of the Web as a new business channel. The factors driving this revolution include:

- ▶ Shorter time-to-market

- ▶ Resource constraints — the pressure to do more with less, particularly in terms of software engineering resources

- ▶ The playing field has leveled and become more crowded as new players constantly enter the game

- ▶ The Internet is not simply a new path to market, but an interactive channel between buyers and sellers

- ▶ Applications must keep pace with demand

To survive this changing business environment, savvy companies realize that they need to embrace technology as a competitive weapon. Success means leveraging IT as an extension of business, both strategically and tactically. It is not enough to build an application to solve a business problem; instead, it is necessary to create evolving application development practices to turn market flux into opportunity.

e-Business Application Development: Do More With Less

What is your primary challenge as a CIO, development manager, or developer in the e-Business era? Do more with less! Fortunately for those IT departments and software vendors who can adapt — and unfortunately for those who do not — e-Business affects software development quite dramatically. Hurwitz Group sees three primary conditions that contribute to the "do more with less" e-Business development mantra, including:

- ▶ **Not enough developers.** By spurring a demand for skilled application developers, the Internet has created a resource drain as companies struggle to retain current developers while looking to hire new ones. Even in the bear market conditions of early 2001, companies continue to try to cope with securing and retaining highly trained (or even moderately competent) development resources. Unfortunately there is no silver

bullet: IT departments must face the fact that they will be expected do more with fewer resources.

▶ **Breadth of development skills.** e-Business presents developers with new challenges not seen in client/server computing. In addition, the technological wheel will not stop turning, as evidenced by the on-rush of Web Services (SOAP, UDDI, XML, and WSDL) and the particular implementations in .NET with C# and Java. Developers need at least a grasp, if not command, of both old and new technologies, as well as the ability to tie them together when necessary. A well-rounded developer might need familiarity with web technologies, such as Java, application servers, various other web era mark-up and scripting languages, and the unique design and performance requirements of web-based applications. Yet the same developer might also need to know SQL, COBOL, Visual Basic, RPC, and C++. Finally, many developers must work with a long list of integration technologies, such as various messaging protocols and XML, plus data and object integration methods. The successful web developer, or the web development team en masse, possesses competence with a veritable laundry list of technologies, rather than a handful.

▶ **Complex architectural and design goals.** Before the e-Business explosion, companies developed with a relatively simple set of foundation technologies in mind — perhaps an operating system and a database. Client/server applications were developed for a known set of end-users, and for predefined network and hardware configuration. e-Business demands that common parameters such as the total number of concurrent users, server and client platforms, and performance conditions be thrown out. For e-Business computing, the number of concurrent users is often unknown and often changing. Designs need to consider multiple platforms — both server and client side — in terms of core processing and integration. Furthermore, reliability becomes tantamount when your users are also your customers. Some are buyers, some are partners, but none are under your corporate jurisdiction. As more and more of the business moves to the Internet, application failure equates directly to lost business.

Hurwitz Group would like to report that we've discovered a magical solution to quell the "do more with less" challenges of today's software development. Unfortunately, we cannot: The only way to do more with less is to improve the application development process.

Improving the application development process means implementing effective project management and tracking practices, implementing consistent development methodologies, as well as integrating quality assurance and testing throughout the application development life cycle. Success cannot depend on informal email exchange, or chance conversations around the water cooler, especially in an era when face-to-face interactions among team members are increasingly rare. Effective communication among all team members, including development, QA, and testing personnel, should be considered a vital component of the development process.

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Doing It Right: Development Best Practices Vis-à-vis Testing

Best practices involve putting processes into place that are flexible enough to handle change, but rigid enough to ensure consistent coding and testing practices throughout the life cycle. Any changes in development must be reflected in commensurate changes in testing; neither side of the process can function adequately in isolation. The effective management of change within the development cycle therefore becomes an essential underpinning for the entire process. Workflow must be designed with change in mind. From the beginning, tools and procedures must be configured in a way that allows for the smooth — and repeatable — management of change, whether those changes appear early in the cycle or, as happens most often in the real programming world, at the last minute.

To build quality into the life cycle, it is necessary to:

- ▶ Link business objectives with test plans
- ▶ Identify and control change
- ▶ Automate the testing process
- ▶ Measure the effectiveness of testing
- ▶ Conduct early and iterative testing
- ▶ Manage the application life cycle
- ▶ Facilitate communication across all team members

Quality from the start means a quality product at the end of the life cycle. Hurwitz Group believes that assuring quality demands a consistent, proactive approach that anticipates performance problems, rather than merely reacting to them after the fact. Some of the details

of the development best-practice to consider, especially in terms of software quality, include:

▶ **Link business objectives with test plans.** The task of capturing and communicating business needs and translating those into application code is fundamental to the success of any project. In reality, requirements begin as assumptions, assumptions that must be tested to ensure the correct end result in a business context. Does the billing system pull the correct shipping address information out of the customer database? Or will a shipment meant to go to Dayton, Ohio end up in Des Moines, Iowa? A way to avoid this is to create an automated process that links requirements data and test scripts. Test results could then be compared against business needs to ensure that business objectives have been satisfied. This approach creates a direct cause and effect relationship between business objectives and test plans.

▶ **Identify and control change.** It is impossible to anticipate all the necessary functionality for building an application at the beginning of the life cycle. Therefore, it is wise to implement a method for capturing and managing the constant flow-of-change requirements that go on throughout the course of development. Once the change process is in place it acts as the information source for prioritizing assignments and allocating resources accordingly. Unfortunately, some development team members resist participating in invasive change control procedures. The trick, therefore, is to use tools that capture business, functional, and other testing requirements in a straightforward fashion.

▶ **Automate the testing process.** The best way to ensure consistent testing throughout the life cycle is to automate the testing process. Automation facilitates a complete set of testing, dramatically reduces the time required to test, and supports iterative testing. Although testing lacks the glamour of coding, it is the lynchpin in the success or failure of the development process. The benefits of automation keep testing in sync with ever-changing requirements and ensure the delivery of quality applications.

▶ **Measure the effectiveness of testing.** Code coverage analysis allows developers to automatically locate untested code and measure testing effectiveness for multilanguage applications, components, and web pages, even across multiple tiers and computers. Merging multiple test-coverage runs reduces overall testing time by reducing redundant testing while ensuring optimal code coverage rates. Code coverage data helps developers save testing time and improve code reliability by measuring and tracking test execution during development. Armed with this information, a developer can make better decisions about where future testing efforts should focus to optimize application code coverage.

▶ **Test early and iteratively.** Test early, test often, and test wisely are the mantras for building reliable applications. An effective testing regimen begins at the earliest stages of application development, pinpointing potential problems and their causes, saving time and money by identifying key issues early on in the development cycle. Applications that are thoroughly tested through all stages of the development process ensure that problems are caught early on and corrective action can be taken while having the least cost and time impact. The end result is applications that meet target goals and expectations.

▶ **Manage the application life cycle.** Without good reporting and management frameworks, application development projects can quickly spiral out of control. Project managers need a clear picture of where the project stands at all times in the context of achieving underlying business goals. The more information project managers have in-hand, the better they can prioritize problem resolution while minimizing impact on project schedules.

▶ **Facilitate communication across all team members.** It is not enough to just collect testing information; the true value comes from sharing those results from defect detection to problem resolution across the team. The development and testing process needs to integrate into the project workflow, so that defect tracking and corrections become part of the project plan. The earlier defects are caught and identified, the easier it is to eliminate redundant errors. Keeping everyone in the loop requires that all team members have up-to-date information on defects and their status at all times.

Compuware Solutions for Automated Software Quality

Compuware provides a comprehensive solution set for enterprise e-Business development. Its automated software quality approach uniquely addresses each of the best practices that Hurwitz Group articulates. Its solution provides an integrated development and test automation tool set that consistently delivers reliable applications on time. Compuware's DevPartner Studio and QACenter automate routine and time-consuming development and testing tasks, as well as coordinate workflow and communication across the project team and its management. Its automated software quality solution provides:

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and **QACenter**
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- ▶ Development tools to quickly detect and isolate programming problems and performance issues

- ▶ Industry-leading testing tools to improve application quality

- ▶ Integrated requirements, project tracking, and communication tools to provide the insight and analysis needed to optimize project decisions and meet business requirements

DevPartner

DevPartner Studio Enterprise Edition is a suite of tightly integrated debugging, tuning, testing, and management tools for software development teams using Microsoft Visual C++, Microsoft Visual Basic, Java, ASP, or HTML. It combines powerful error detection, performance profiling, code coverage, requirements management, automated testing, and deployment tools with integrated project tracking, defect management, and workflow automation.

DevPartner makes a real contribution to meeting performance parameters and successfully completing a development project — regardless of the coding tools and languages, and regardless of analysis and design methodologies.

QACenter

QACenter is a suite of automated software quality products for enterprise and e-Business applications. It provides a comprehensive solution for IT organizations concerned with assuring quality and performance, while keeping pace with faster development cycles.

QACenter E-Business Edition offers integrated products that address every major task a QA team confronts in any e-Business testing project. It provides powerful test automation and test management tools, as well as requirements management, automated defect identification, and tracking and comprehensive web site analysis.

Compuware Solutions for Automated Software Quality meet e-Business challenges by helping developers build reliable, high-performance applications quickly. By combining integrated error detection and sophisticated, flexible testing and deployment tools with comprehensive project tracking, task management, and workflow automation, Compuware gives developers and managers more control over their projects, allowing on-time delivery while improving productivity and application quality.

Conclusion

Hurwitz Group believes application development practices must be revamped to fit into the new Internet-based business paradigm. The nature of e-Business makes it imperative that solutions be developed rapidly and bug-free. This can only be accomplished through close ties between development and quality assurance.

Traditional testing products do not play well in the architecturally complex, resource constrained situation brought on by the Web. Organizational barriers between development and QA teams must come down and be replaced with a true team process that encompasses all players. The process must manage workflow and enable coordination between development, testing, and quality assurance without creating bottlenecks. It must be flexible enough to handle requirement changes on the fly without stalling the process.

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e-Business leaves no room for error, and does not tolerate tardiness. Approaching testing right from the beginning saves money by catching errors early, and it saves time by facilitating the entire development process. The demand for a combination of automated software quality tools for developers, coupled with a process methodology that weds testing, quality assurance, and development efforts, has become palpable among leading development teams.

Hurwitz Group tracks a wide variety of e-Business products and practices. Compuware's complete suite of development, testing, and quality assurance tools enables companies to meet the challenge of building e-Business solutions. The company's best-practices approach provides comprehensive, innovative, and reliable solutions that meet and anticipate the needs of developers in today's web-driven environment.

About Hurwitz Group

Hurwitz Group, an analyst, research, and consulting firm, is a recognized leader in identifying
and articulating the business value of technology. Known for its real-world experience, consultative
style, and pragmatic approach, Hurwitz Group provides strategic guidance to its clients by
delivering analysis, market research, custom content, and consulting services. Clients include
Global 2000, software, services, systems, and investment companies.