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Keane White Paper

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# An Ounce of Prevention

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## The Importance of Testing

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The National Institute of Standards & Technology (NIST) found that software errors cost the U.S. economy an aggregate of \$59.5 billion annually.

## EXECUTIVE SUMMARY

**Ineffective software testing practices are costing businesses dearly in lost revenues and poor brand image.**

Today's complex software applications require that testing be an essential, integrated part of software development, not an afterthought. As more businesses are taking advantage of outsourcing resources for QA activities, they find new challenges in vetting testing partners. This paper explores the latest challenges facing software organizations in assessing product quality, making testing a more strategic part of software development, and creating a new model for testing success.

### About Keane

Keane, an NTT DATA Company, is an IT services firm headquartered in the US with more than 12,500 professionals worldwide. For 45 years, Keane has been an Application Services specialist with distinguished project management credentials. Today, we offer a flagship suite of Application Services, as well as Infrastructure and Business Process Outsourcing solutions delivered through onsite, nearshore, and offshore resources.

Visit [www.keane.com](http://www.keane.com) to learn how our projects, managed services, and outsourcing engagements deliver value for a range of businesses and government agencies.

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## Abstract

deployments. Cuts in profits and earnings. A recent Associated Press article tied these business problems to the lack of effective software testing. The expanded complexity and distribution of today's systems brings a higher likelihood of far-reaching and serious errors – errors that tarnish reputations, cripple performance, and impact revenues.

Testing must be an integral part of the software development process, yet the realities of today's development cycles often relegate testing to the back burner, only occurring in the last days before product release.

Outsourcing offers a scalable means for obtaining resources, expertise, and automated tools that meet the cyclical demands of testing. Yet gaining full advantage of these benefits takes more than finding a service partner for testing. You must find the right partner – one that can lower your costs while driving sustainable improvements in quality, time-to-market, and change responsiveness.

This paper outlines the importance of testing, addresses its challenges, and proposes a model for success. It also discusses how to select the best testing partner for your organization, thereby maximizing the benefits of your testing efforts.

## The Importance of Testing

Long a critical component of the software development process, testing has grown in importance in recent years. We depend on correctly functioning software to operate our businesses, serve our customers, and support our partners. Testing is our safety net. It lowers business risk; protects us from outages, losses, and possible litigation; and helps ensure compliance with regulatory requirements.

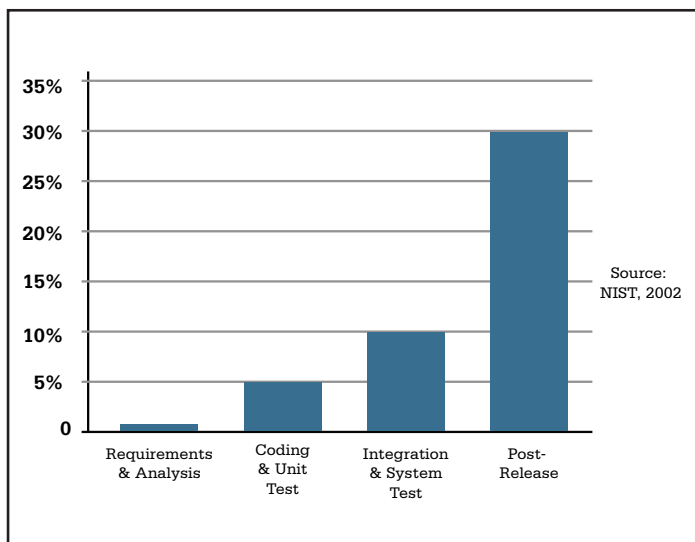
Each advance in the breadth and depth of computer usage only amplifies the need for thorough testing. The expanding complexity of today's systems brings a higher likelihood of introducing errors. Integration spreads their impact even wider, and direct connections to customers and partners compound their visibility and business costs. The National Institute of Standards and Technology (NIST) found that software bugs cost US businesses \$59.5 billion annually. Testing is crucial for reducing these impacts, yet the soaring cost, time, and effort required for adequate testing limits hinders these efforts.

## The Challenge of Testing

Always a burden for IT organizations, the mounting demands of testing strain development resources, budgets, and schedules. Software developers typically are not testing experts and avoid testing whenever possible. Testing today's highly complex and integrated software is a distinct competency that requires trained specialists, automated tools, and a readiness to respond to the cyclical resource demands

of release-driven development efforts. Yet, the high costs of testing coupled with budget cutbacks have limited the testing capacity of many IT organizations. Compounding the issue is the fact that developers traditionally have taken a tactical approach to testing – focused on defect detection at the end of the development process. However, as Figure 1 shows, inadequate testing in the early stages of development leaves defects that are increasingly expensive to fix later in the lifecycle.

**Figure 1:** Relative Cost of Defect Correction



## How Outsourced Testing Can Help

Outsourcing is one approach for reducing the resource and cost constraints of testing. It offers a scalable means for obtaining qualified onshore and offshore resources to supplement internal testing capabilities. It also reduces the need to train and maintain the broad inventory of internal testing skills required to handle diverse applications and technologies. According to Forrester Research, “Outsourced testing is on the verge of a major boom. Quality is expensive for organizations to invest in, and outsourced testing is making inroads in several discrete areas of testing.” (Outsource Testing for Quality Gains, Not Just Cost Savings, July 13, 2004)

In many instances, testing is well suited for the mechanized processes found in offshore facilities. With these processes, backed by test management and automation tools and metrics, companies can realize higher productivity and better results than they could achieve internally. Using lower-cost offshore resources also delivers more output and greater coverage for the same budget expenditure, while providing an independent “fresh set of eyes” for the systems being tested.

In addition, time zone differences between developers and testers work to the advantage of project schedules. Testers can begin when the developers complete their day and provide results by the following morning. However, while the benefits of outsourced testing are substantial, gaining full advantage from them takes more than simply finding an offshore services partner.

## Critical Factors for Selecting a Testing Partner

The demand for outsourced testing is causing a proliferation of onshore and offshore testing service offerings. While these offerings share superficial similarities, they differ significantly in the business value they deliver. Gaining high-leverage, long-term business improvement takes more than a provider with a pool of available testing resources. No matter the partner, they will only bring marginal benefit if those resources are devoted to high-cost, late-cycle error identification. To gain sustainable improvements in quality, time-to-market, and change responsiveness,

consider the eight characteristics of a high-value testing partner:

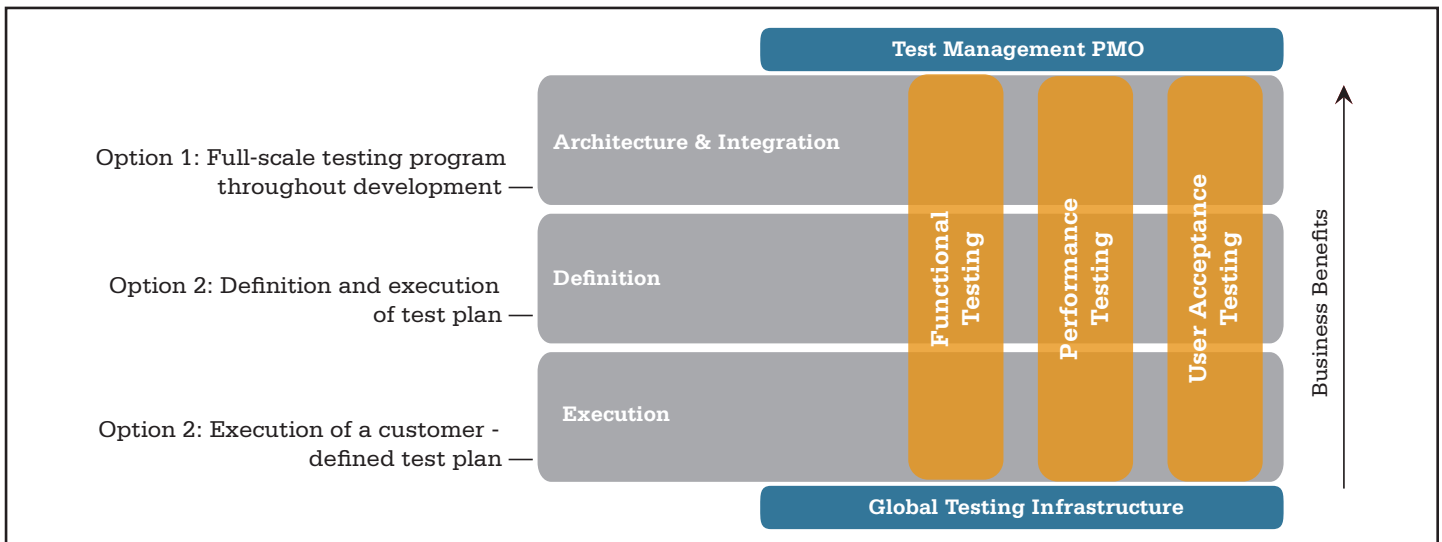
### Business Orientation to Testing.

Although testing is a technical function, its end result should be a positive impact on business performance. The ideal partner must understand the context and strategic importance of software features and allocate resources accordingly. Risk-based testing approaches ensure that testing initiatives target areas of the greatest business importance. As a result, development teams gain speed and reduce costs by focusing on the highest value activities.

### Vision of Improvement Beyond Finding Defects

Finding defects provides one level of benefit, but preventing those defects in the first place results in the

Figure 2 : Keane's Testing Service



highest quality at the lowest cost. A high-value testing partner uses the knowledge gained during testing to improve development processes and prevent similar defects from being introduced in the future. An emphasis on requirements definition and validation of specifications by test engineers can improve an organization's ability to clearly define requirements.

### **Production Experience**

Real-world experience in supporting production applications is essential for understanding where and why to apply testing to prevent defects from impacting service and business performance.

### **Willingness to Commit to Results**

A trusted partner is willing to be held accountable for its performance through metrics and service level agreements. This commitment extends to the quality of its results, the productivity of its teams, and its ability to leverage knowledge gained during testing to continually improve development processes.

### **Project Management**

A properly executed testing program involves considerable coordination and communication to keep business objectives in sight while ensuring the flawless execution of countless details. A prospective partner's project management expertise is as important as its technical testing knowledge for guaranteeing the success of its delivered services.

### **Strong Testing Methodology**

The use of a testing methodology is easy to claim, but hard to prove. Ensure that a prospective testing partner's methodology is available for examination, follows industry standards and best practices, and is actually put to use on its projects.

### **Solid Testing Practice**

To effectively deliver its services, a testing partner must have the training, experience, resources, and global delivery capabilities to apply its testing methodology to any tool or infrastructure environment.

### **Broad Range of Delivery Options Every testing effort is different.**

The ideal partner offers flexible delivery options that can be tailored to the management, resource, and execution needs of an individual engagement.

## **Keane's Testing Service**

Keane's Testing Service helps IT organizations achieve their testing objectives and business goals flexibly and cost effectively. Keane is able to leverage its expertise and global capabilities to gain greater efficiencies, make high-value process improvements, and commit to service level performance.

Keane provides a range of service options – from full-scale architecture and integration to project definition and execution. The company tailors the scope and level of its responsibilities by client and business need, enabling clients to “mix and match” options to create customized solutions.

### **Option 1: Architecture and Integration**

To help clients maximize the benefits of testing, Keane assumes responsibility for one or more testing functions that can be shared across a department or an entire company. At this level, Keane implements its lifecycle approach, ensuring that testing begins at the start of the development process and becomes an integral activity as development progresses.

### Option 2: Definition and Execution

For clients that need to enhance applications in response to changing business or industry requirements, Keane takes responsibility for creating and executing the test plan – reducing business risks and instituting efficiencies over time.

### Option 3: Execution and Support

For clients with a defined test plan, Keane will execute that plan, providing services such as independent validation of third-party development, performance testing of a new software package, or user acceptance testing of a new application – reducing cycle times and increasing time-to-market.

### Keane's Testing Service comprises three service disciplines:

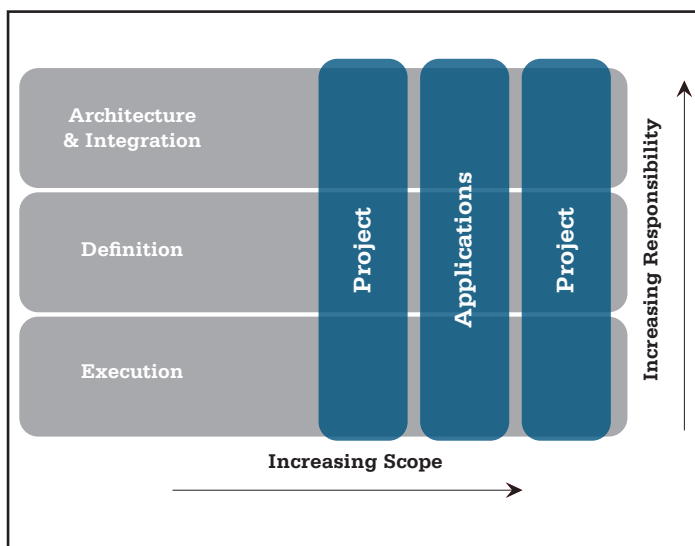
- » **Functional Testing.** Covers unit, integration, and system testing to verify that software

functionality addresses documented requirements (individual functions, the interaction of different components and interfaces, and the overall end-user experience). It also includes regression testing of completed functionality.

- » **Performance Testing.** Confirms that delivered software meets performance goals such as variable loads, response, and turnaround times.
- » **User Acceptance Testing (UAT).** Assists IT organizations in orchestrating effective end-user validation and acceptance programs. UAT verifies software integrity and performance against expected use, intended use, and important business functions.

## Implementing Keane's Testing Service

Figure 3 : Keane's Testing Service Implementation Options



Keane typically engages in three different levels of testing implementation. Keane can assume wider responsibility as clients' comfort with outsourced testing grows.

**Project approach:** Keane delivers a defined testing project such as independent validation of third-party development or performance testing of a new software package.

**Applications approach:** Keane takes responsibility for handling ongoing testing requirements for one or more production applications, capitalizing on its ability to institute efficiencies over time.

**Shared service approach:** Keane takes over full responsibility for one or more testing functions that

can be shared across a department or an entire company.

At the baseline level, Keane provides resources and guidance to execute an existing plan for a project, but has no responsibility for development process improvement. As scope and responsibility grow, Keane is able to leverage its expertise and global capabilities to gain greater efficiencies, make high-value process improvements, and commit to service level performance.

The testing process is split into distinct levels or phases, ensuring that testing is integrated into the software development lifecycle. As a result, the company is able to focus on quality and defect prevention while reducing development time and costs by up to 40% cost savings.

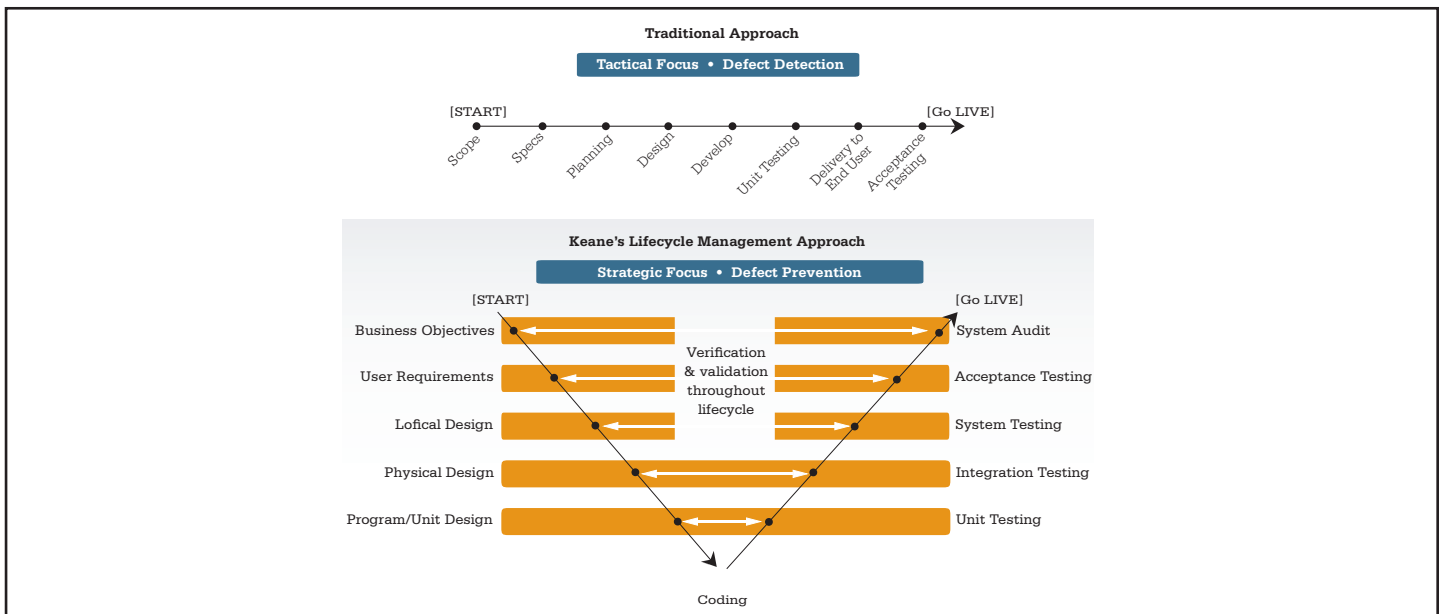
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**Figure 4 :** Keane's Lifecycle Management Approach vs. Traditional Approach



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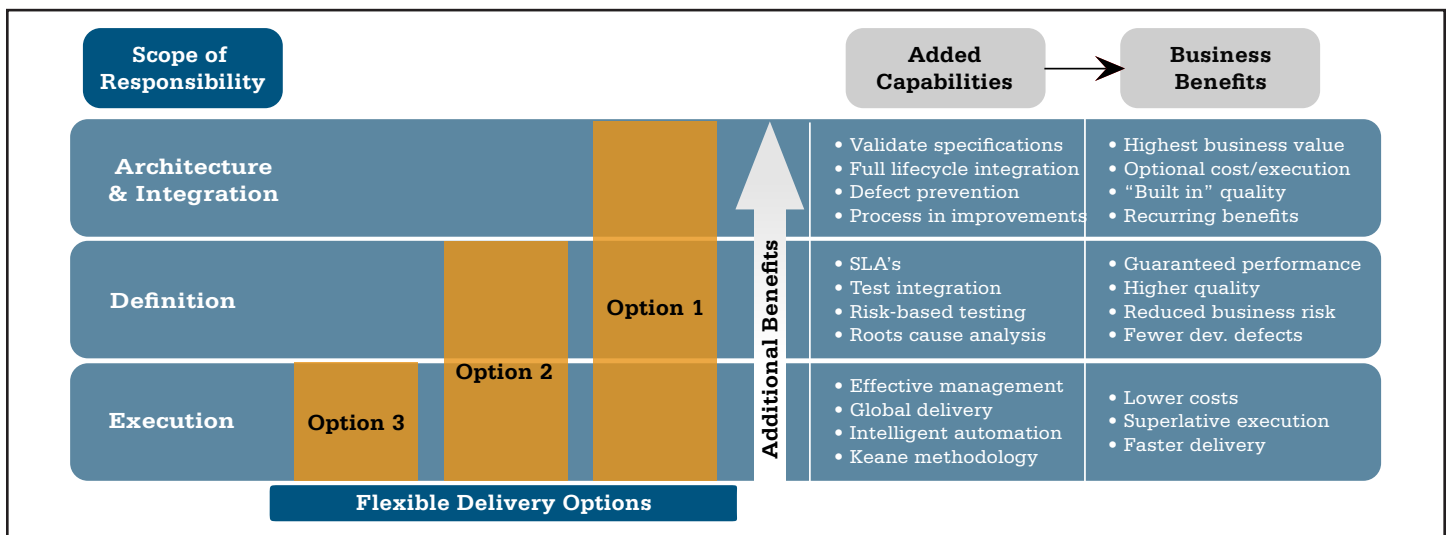
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## Benefits of Keane's Outsourced Testing

As Figure 4 shows, the traditional testing approach is fundamentally flawed. Testing needs to begin at the very start of the development process and become an integral activity as development progresses. Unfortunately the limitations of internal resources usually prevent this from happening—making the ultimate error resolution far more expensive than necessary. As Figure 5 shows, Keane's flexible offerings provide added capabilities and benefits at every level of implementation. These benefits increase as Keane assumes greater responsibility for testing.

**Figure 5 :** Keane's Testing Service: Capabilities and Benefits



Keane's Testing Service provides highly skilled testing resources, a solid methodology, and global delivery capabilities to lower costs and speed time-to-market. By taking charge of test definition as well as execution, Keane is able to guarantee its performance to defined objectives to lower business risk, improve processes to raise quality, and reduce development defects. Integrating Keane's testing approach throughout the development lifecycle provides the highest business value by ensuring adherence to business requirements, reducing the total cost of application ownership by preventing defects from occurring in the first place, and accelerating the delivery of strategic business functionality.

IT benefits from outsourced testing by leveraging resources as needed and gaining access to best practices, assistance in test automation, and the ability to offload undesirable testing work. Keane's willingness to accept accountability for its results allows clients to concentrate on other core competencies. In addition, Keane's attention to detail and superlative execution improves clients' reputation for high-quality, on-time delivery. Through root cause analysis and continuous improvement of development and maintenance processes, testing becomes a means for reducing production break/fix cycles, thereby freeing resources and funds for strategic initiatives.

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## Why Partner with Keane for Testing?

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A compelling combination of experience, approach, and expertise makes Keane a unique partner for testing:

**Quality approach** – Keane's Testing Service is built on a foundation of 40 years of software development experience and adherence to rigorous CMMI standards. The company doesn't just find defects; it prevents them from happening – resulting in the highest quality at the lowest cost.

**Business focus** – Keane's risk-based testing approach ensures that testing efforts target the areas of greatest business importance.

**Commitment to results** – Keane commits to quality results and demonstrates its performance through metrics and service level agreements.

**Project management expertise** – Clients and industry analysts recognize Keane for its project management prowess. The company's project management office ensures excellence, accountability, and effective communication throughout the engagement.

**Flexible delivery options** – Keane's Testing Service can be tailored to the management, resource, and execution needs of any client.

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**“If there are no formal testing practices in place, there is substantial potential for releasing defects that can expose a company to rework, poor customer satisfaction, and possible legal action.”**

*- Margo Visitacion,  
Principal Analyst Forrester Research, Inc.,  
Quality Assurance Versus Quality Control  
December 22, 2004*

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### Application and Infrastructure Solutions

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