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Testing Center of Excellence

The Power of Centralization and Standardization

Performance driven. Quality assured.

Traditional QA practices can no longer keep pace with business demands to quickly deliver applications and bring products to market faster.

Executive Summary

Your IT application landscape is going through tremendous changes. To stay successful and competitive, the business needs software systems that are efficient, reliable and capable of supporting complex composite business processes.

The business also demands speed and agility – being able to quickly deliver applications to support new technologies, run new functionality, bring products to market and take advantage of new opportunities. These demands are putting intense pressure on quality operations and processes.

Traditional project-level Quality Assurance (QA) practices can no longer provide the momentum and efficiency required to keep pace with these changes. Nor do they allow an IT organization to achieve full control of application quality, gain visibility into the state of quality across projects, or find ways to reduce operating costs and shorten time-to-market for the most mission-critical systems.

A Testing Center of Excellence (TCoE) delivers proven results by helping companies optimize application quality and performance, improve alignment between business and IT, increase QA efficiency and do more with their existing QA budgets, tools, environments and people.

A TCoE is a virtual command center that uses standardized testing methodology, best practices, automation, metrics and tools. It manages a flexible pool of available resources to ensure high levels of quality across applications – both before deployment and during production. It also provides visibility into the level of quality of any software system or project, helping IT management make deployment decisions based on business risk.

Implementing a successful TCoE requires thoughtful steps, which include assessment, planning, impact analysis, objective setting, tool selection and organizational adjustments. In our experience, a TCoE initiative can only succeed if it has strong executive sponsorship and support of the entire organization or an autonomous business unit. Yet, the benefits of having a fully functional TCoE can far outweigh the initial effort and risk, and measurable results can be obtained in a relatively short time.

This paper explores the steps required to establish a functional TCoE and provides practical recommendations for transitioning to a standards-based quality model.

Common Challenges with the Decentralized Testing Model

Are you seeing little - if any - measurable increase in application quality, despite making continuous investments in QA people, processes and tools? Are you discouraged by the lack of visibility into overall quality across software systems and projects and have to make deployment decisions based on incomplete information? Is your IT organization frequently at odds with the business because of conflicting priories and ever-changing demands?

Many IT leaders feel that their efforts to improve application quality are not fully paying off and that their existing QA processes are not able to keep up with the fast-paced and complex world of business demands. According to the 2011-2012 Capgemini, Sogeti and HP World Quality Report (http://www.capgemini.com/insights-and-resources/by-publication/world-quality-report-2011-2012/), many companies are struggling to determine the effectiveness of their QA efforts and calculate what value their QA teams deliver to the business per dollar/euro of investment.

A TCoE helps companies optimize application quality, and improve business and IT alignment.

Making a transition to the TCoE can help organizations address these and many other related issues:

- **Overwhelming demands for new technology and applications:** Your QA organization is not able to adapt to the frantic pace of change in technology and business priorities and deliver what the business needs fast enough
- **Inadequate application quality:** Defects and performance issues frequently go undetected until after the application is deployed into production, causing disruptions and negatively impacting the business
- **Higher than expected production costs and repeated delays in delivery schedules:** QA is unable to accurately estimate the time and resources required to release an application into production. Due to lack of cross-project visibility, the right resources are often not available to support critical applications, resulting in production holdups and delaying time-to-market
- **Losing the war for IT talent:** The already scarce IT resources are often held up performing repetitive manual testing activities. Not only is this practice inefficient, it can aggravate tensions between business and IT and create feelings of frustration among the IT staff. In an environment where companies compete for the most capable, dedicated employees, assigning people to tasks that do not leverage their core strengths or not offering a path for career growth can cause the company to lose the battle for the right talent
- **Lack of quality standards built into the development process:** Developers are not adopting "upstream" quality practices such as keeping adequate requirements documentation or performing unit testing. As a result, most quality issues are relegated to the QA phase, where it is more time-consuming and expensive to fix them.

  This issue becomes even more critical when teams move to an Agile delivery methodology with its tight schedules and high quality demands. Developers and testers need to work in tandem to assure quality during Sprint cycles or risk missing application delivery milestones
- **Each project team is "reinventing the wheel":** For every project, testers have to determine how to engage with the development team, gain access to application requirements and provide quality metrics. All automation efforts are siloed, with no shared components, scripts or plans. All efforts that were put into setting up QA cycles for a project are wasted when it comes to an end
- **Teams want to share and reuse, but have no tools for it:** Even if different QA teams want to share common practices and testing assets, the only tools available to them are spreadsheets and Word documents, making collaboration and reuse cumbersome and ineffective
- **The most experienced QA staff are assigned to forward-looking projects:** While the most skilled QA engineers are working on web services, SOA, mobile and other cutting-edge applications, the legacy "keeping the lights on" projects are being supported by less experienced teams. Without sharing best practices, this scenario can increase the cost of quality and lead to production problems, negatively impacting your business' core applications
- **Lack of Continuous Improvement:** Without consistent processes, it's next to impossible for organizations to perform regular assessments and identify opportunities for improvement.

Many IT organizations recognize that improving their quality processes and moving towards a standards-based approach will help them in the long-term, yet they are hesitant to take the initial steps. The Capgemini, Sogeti and HP market experience proves that transitioning to a Testing Center of Excellence is typically not a complicated process and that the right approach and tools can quickly bring positive ROI and tangible improvements.

Testing CoE Implementation Considerations

When the 2011-2012 World Quality Report survey participants were asked whether they have already implemented a Testing Center of Excellence, only four percent indicated that their companies have a fully operational TCoE, and an additional six percent said that they have started the effort of establishing a TCoE within the past two years. If the benefits of moving towards a centralized and industrialized approach to testing are indisputable, why haven't more companies implemented this approach?

In discussing this with clients, we recognize that part of the reason behind the companies' apprehension to make the transition is undoubtedly the normal resistance to change. The need to make a considerable organizational shift, reassign and retrain resources, potentially eliminate certain positions and take application quality control away from the lines of business (LOB) can indeed be unsettling.

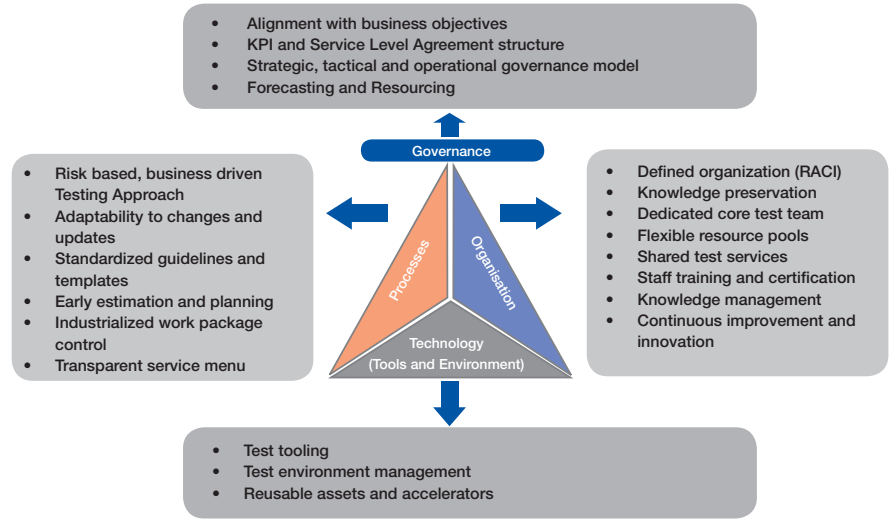
Yet an even bigger factor behind the reluctance to implement new methods is the fact that most organizations simply lack the resources, expertise and experience to address such an important transformation entirely on their own.

Many outsourced options are available for companies who are willing to make the move toward the TCoE. A trusted third-party service provider can offer their resources and knowledge of test process assessment and improvement based on proven methodology and hardened quality frameworks.

A partnership with an organization with TCoE capabilities can help to address the key test process challenges and quickly implement the following improvement steps:

- Benchmark the test maturity of an organization against industry standards, and develop quality blueprints and actionable transition plans
- Prioritize goals and quick wins based on value to help build ownership and motivation
- Implement structured, business-driven test management approach, including flexible and agile testing techniques
- Apply industry best practices, methodologies and knowledge of automated tools, frameworks and accelerators

Key Elements of a Testing Center of Excellence



By standardizing on industry-leading testing solutions, a TCoE can realize significant savings.

- Set up and maintain the hardware, software and testing services infrastructure including test environments and tools
- Evaluate existing resources and create a plan for additional staff and skill sets
- Train testing teams and mentor the entire organization to apply process and organizational changes
- Measure the impact on test maturity after transformation using business-relevant parameters – such as cost and productivity
- Quantify the success of the TCoE against metrics, and promote TCoE advantages internally
- Improve QA processes through continuous innovation, short evaluation cycles and provide realistic 'how to' recommendations for every phase of the transition.

Assessing an Organization's Readiness for the Testing Center of Excellence

Like any new endeavor, a TCoE transition begins with an assessment of the current QA processes, development practices and overall organizational culture dynamics and maturity levels. Naturally, no two organizations have the same requirements, resources or starting points for building a TCoE.

Therefore each assessment must be tailored to the needs of a specific organization, taking into account its industry, business goals, established processes and software development methods. The assessment can help identify the key challenges in any test organization and analyze its readiness to begin the TCoE conversion process.

Cultural Maturity: For an organization that has not adopted any best practices in other aspects of the business, a TCoE can be the first step towards implementing structure, control and measurement standards. On the other hand, an organization that has demonstrated an ability to adopt and manage standards such as CMMi, ITIL and/or has established a shared services infrastructure in other areas is likely to be more culturally receptive toward a quality standardization project.

Existing Quality Process Assessment: An IT organization that views quality as an integral part of the Application Lifecycle Management (ALM) will be more responsive to stricter requirements for prioritization, planning and measurement as part of the TCoE. In contrast, a company that treats application testing as a one-time, project-based activity is going to have to implement additional standardization and governance steps on their way to establishing a TCoE.

Skill Set Availability: Having enough core skills in the QA organization will help make the transition to the TCoE easier. Some of the existing resources can be developed into the core team subject-matter experts (SMEs) to help with building and maintaining key aspects of application and process knowledge.

However, even without the available expertise, an organization can still embark on a test centralization initiative. The aim of a TCoE is to use all available in-house capabilities and knowledge, and augment it when necessary with additional personnel training and development, as well as outside product and process expertise.

Stakeholder Commitment: The level of organizational support and executive sponsorship can determine how quickly a TCoE can deliver real results. If the entire organization – or business unit – is not committed to making the transition, it will be much harder to establish strong quality processes, governance and metrics.

A TCoE can drive real and concrete improvements in application quality, performance and security within the first 3-6 months of transformation effort.

Test Tools and Environment: One of the primary goals of a TCoE is to reduce piecemeal tools and incompatible platforms used among various project teams. By standardizing on industry-leading testing solutions, a TCoE can realize significant savings, improve application quality and facilitate consistency and repeatability at the same time. A test automation team can become its own "center" within the TCoE, taking charge of establishing standards and processes for automation, setting automation goals and analyzing the results.

Key Performance Indicators: An ultimate goal of the assessment phase is to align the specific IT goals with the core company's business objectives. With an understanding of how these goals impact each other, IT management can begin to identify a set of key performance indicators (KPIs) that measure the accomplishment of these business goals.

KPIs can include metrics such as the number of application defects in production and their impact on the business, defect closure rates or requirements coverage. Such indicators can help justify the investment in the TCoE and measure its success once it's operational.

Defining the TCoE Transformation Roadmap

The road to a fully operational TCoE does not need to be a lengthy process. In our experience, an organization can expect to complete the initial transformation phase in the first 3-6 months, followed by stabilization and optimization efforts spanning an additional 6 to 12 months.

With the right approach, in less than six months, your company can begin to see real and concrete improvements in application quality, performance and security. Moreover, in less than a year and a half, you can expect to realize even greater cost and quality benefits as a result of improved process efficiencies and an introduction of a new, optimized operating model for the entire QA organization.

A TCoE transformation roadmap includes the following key elements:

- **Scope and timeline:** Define the major activities, milestones and timelines for each of the implementation stages: setup, transition stabilization and operation
- **Goals:** Establish goals for each stage in the key areas including test automation, test processes, test environment and governance
- **Integration:** Determine how the TCoE interfaces with projects, management, service providers and other existing quality initiatives
- **Staff and training:** Assess skill availability and determine the need for resource reassignment, training, additional hiring and augmentation
- **Core teams:** Establish core teams of SMEs around the areas of automation, governance, asset management and other essential parts of the testing process
- **Infrastructure and tools:** Estimate the cost and resource requirement for buying and maintaining the new testing infrastructure and test management and automation platform
- **Communication:** Promote the TCoE through internal communications and discussions to ensure that the entire organization is on-board with the TCoE concept
- **Governance:** Define strategic KPIs and integrate the TCoE into the overall IT governance structure. The TCoE KPIs should be aligned with the key CIO objectives – such as cost efficiency, software quality level, time-to-market, flexibility and agility. The governance process also helps ensure continuous evaluation and improvement for test processes, tools and standards.

As a result of the assessment and planning effort, you should be able to estimate what organizational changes are required for the transformation to the TCoE,

approximate the essential hardware, software, skills and outside services investment and set high-level milestones and timelines.

The TCoE Evolution: From Sharing Processes to Service Utility

One of the key advantages of the TCoE is that it can initially be built on a small scale, with minimal upfront investment, and without disrupting the current project delivery schedules and commitments. As the organization begins to see improvements and tangible results, it can scale up the TCoE capacity, resources, responsibilities and services.

The other good news is that despite being called a "center" of excellence, it's not absolutely necessary for an organization to change its structure and physically centralize its QA operations. While there may be an advantage in co-locating the development, product and testing teams, in many cases a "virtual" TCoE may be the best solution.

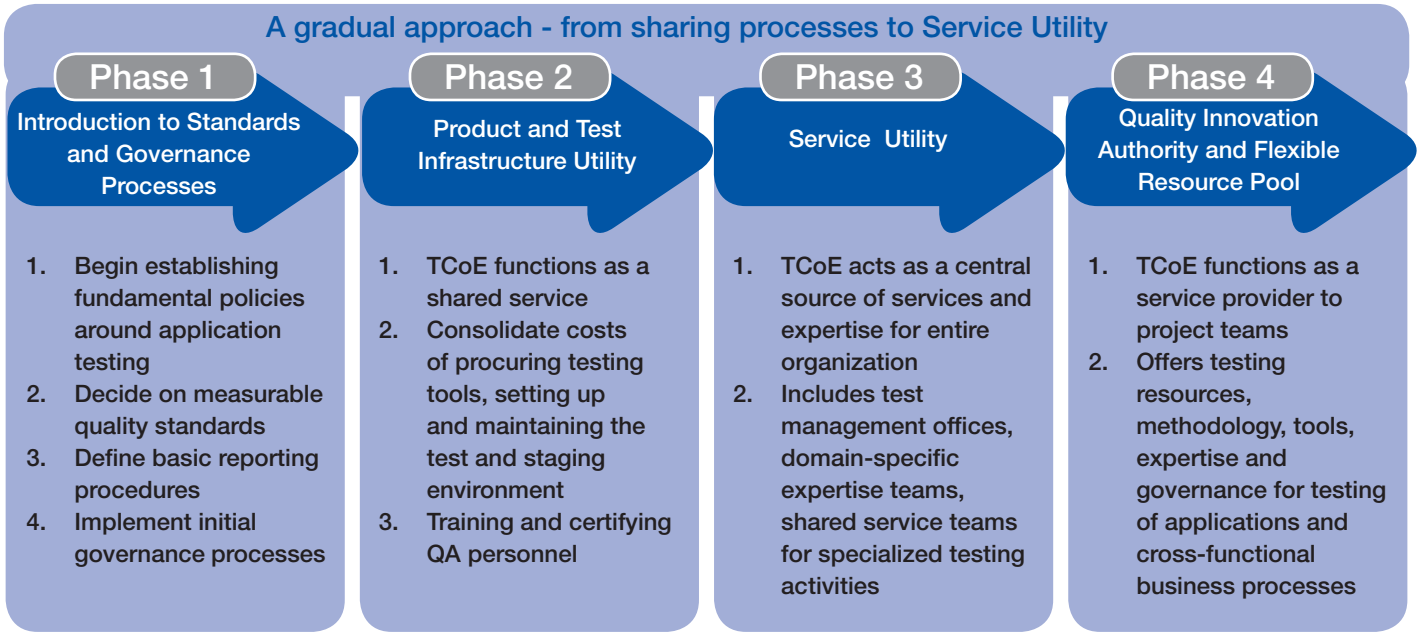
The main concept of a TCoE is the establishment and sharing of best practices and reusability of tools and resources – not the mandatory relocation of the entire operation under one roof.

Each organization faces its own unique challenges and has a particular set of quality requirements and objectives. As a result, each company may select a different path to a TCoE – choosing and often combining one or more of the following four phases:

Phase One: Introduction to Standards and Governance Processes

For companies that don't have any formal testing practices, the first phase offers an opportunity to begin establishing some fundamental policies around application testing. This is also the time to decide on measurable quality standards and define basic reporting procedures. At this phase, a TCoE doesn't actually perform any application testing, but rather works with distributed line of business testing teams on defining and implementing initial governance processes.

The TCoE Evolution



Establishing a TCoE is a phased approach. As the organization sees improvements and tangible results, it can scale up capacity and resources.

In order to successfully embed centralized testing best practices into the organization's governance structure, a TCoE needs to secure executive support on both strategic and tactical levels, as well as agree on the set of KPIs that are directly aligned with the following key IT management objectives:

- Control and reduction of IT costs
- Higher application quality
- Faster time-to-market
- Optimizing the maturity of IT processes.

A set of strategic TCoE KPIs can then be derived from these objectives, including common measurements such as:

- Test cost reduction
- Test quality measured as a percent of defect leakage
- Average duration of test phase
- Percentage of test automation.

These targets and KPIs should be closely monitored, evaluated and revised on a regular basis. With standardized measurement and reporting in place, an organization can begin documenting the costs of specific quality, performance or security problems, making it easier to quantify the ongoing investment in the TCoE evolution.

Phase Two: Product and Test Infrastructure Utility
When testing is performed at a project level, each individual QA team finds itself developing or purchasing its own set of test management and automation tools and setting up a separate test environment. Naturally, a QA team that's close to the business has a good understanding of the quality needs and can select the best tools for the job.

However not only does this practice generate a large number of incompatible solutions, it prevents teams from sharing testing assets such as requirements, test components and scripts between applications – breeding redundancy, rework and wasting already scarce IT resources. Standardizing on a set of tools can be an important step toward a testing CoE – especially if the tools can be integrated into centralized governance processes developed in the previous stage.

A Product and Test Infrastructure organization can function as a shared service. This model can significantly reduce IT expenses by consolidating the cost of procuring testing tools, setting up and maintaining the test and staging environment, and training and certifying QA personnel.

Standardizing on testing tools, methods and techniques can also help relieve the strain on QA personnel – making it easier to switch resources from project to project without having to re-learn new products and routines. At this phase, an organization can also begin to realize tangible benefits from test automation – as scripts and components are developed, maintained and reused throughout the application lifecycle and between different IT systems.

Phase Three: Service Utility
At this level, a TCoE acts as a central source of services and expertise for the entire organization. A Service Utility TCoE includes test management offices, domain-specific expertise teams, shared service teams for specialized testing activities – such as performance and security testing and test environment management services.

A Service Utility model is particularly helpful to organizations that are testing complex business processes that span multiple applications and infrastructure components. While the LOB teams may retain some level of control over application-specific testing, the experts within a centralized TCoE group perform QA of integrated business processes.

The Service Utility can help improve application quality by working with different groups or units within the company and promoting the adoption of quality and governance processes beyond QA. It can also help the LOB teams develop new skills around testing of new technologies—such as Rich Internet Applications (RIA) frameworks, mobile, and Service Oriented Architecture (SOA) and Representational state transfer (REST) composite applications.

In this phase, IT management can expect to gain visibility into application quality across projects and over time, and use this information to make application decisions based on quality and risk. Service Utility expertise can also be outsourced to a third-party provider both locally and off-shore.

Phase Four: Quality Innovation Authority and Flexible Resource Pool
Arriving at the top rung of the ladder of the maturity scale means that your organization has made quality a priority and your organizational structure and processes are now focused on operational excellence. A fully centralized – or virtually centralized – Testing Center of Excellence functions as a service provider to project teams throughout the organization by offering testing resources, methodology, tools, expertise and governance for testing of all types of applications and cross-functional business processes.

Importantly, a Quality Authority TCoE can help an organization shift the focus from testing as a separate activity at the end of the application lifecycle to a continuous and cross-functional approach to quality and incorporate it into every phase of the cycle.

It can therefore help develop new quality practices, introduce quality gates, create new solutions and accelerators for testing and drive continuous innovation in application delivery practices. Ongoing reviews and process improvement also become common practice in this phase, as the TCoE matures and evolves.

This model can be implemented in-house, or run and staffed using an outsourced service provider. At this stage, the governance processes implemented by the TCoE transcend organizational boundaries: an entire organization implements application lifecycle management, and all project metrics are pooled to gain visibility into the overall quality of the company's software systems.

Automating the TCoE Processes and Operations

There are two distinct types of automation solutions designed to support a Testing Center of Excellence: automated application lifecycle management platforms and the automation solutions for the actual functional, performance and security tests.

Automated application lifecycle management is a solution that helps you manage the application lifecycle from requirements through readiness for delivery - preferably from a single software platform with a unified repository, consistent user experience, integration with heterogeneous development platforms, and customizable dashboard, planning, tracking and reporting.

Automated quality or test management (often a component of application lifecycle management platforms) enables your organization to codify and follow

best practices, centralize the planning activities, and keep track of resource allocation and provisioning, as well as measure and track quality across projects. Quality dashboards and reporting across the application lifecycle supports TCoE governance objectives by helping analyze data about milestones defined by the TCoE.

However – as we discussed earlier – not every organization is going to be ready to completely centralize and automate the management of requirements, functional, performance and security testing from the start. Therefore, it is essential that an application lifecycle management or quality management platform offers various configurations that share a common underlying architecture. If a test team is ready to implement process improvements only on a functional or performance testing side, they can do so - and expand the platform later without have to "rip and replace".

As companies mature and move up the TCoE evolution ladder, they begin to see the opportunities for automating the tests themselves: replacing manual functional and regression test procedures with reusable, component-based testing scripts. The test automation solutions can offer substantial cost savings and quality improvements by simplifying test design, encouraging reusability and streamlining maintenance for a wide variety of modern applications.

The Business Benefits of a Testing Center of Excellence

Working with clients who have made the transition to the TCoE, we find they are able to report positive shifts in quality and many constructive changes in their organizational culture. The most notable results achieved by the Capgemini and Sogeti and HP TCoE clients include:

Increased agility: When a quality team can manage and scale their quality resources, they can better respond to the new business challenges and allocate their efforts toward highest priority projects

Faster time-to-market: Projects that used to be delayed due to lack of available resources and the right skill set are now released on time, helping companies stay competitive and respond better to new business opportunities. On average, we have achieved reduced test times of 30% or more, as well as test automation levels of 50-70%

Cost efficiency: Centralizing testing tools and resources can eliminate redundancy and lead to tremendous savings in resource utilization, as well as software procurement, setup and maintenance costs. Typical resource cost reduction is around 35% over a 3-year time frame

Better quality: The TCoE model delivers better application software, reduced risk of failure and a better customer experience. We find that after implementing a TCoE an organization's test maturity level improves to "Efficient" in all areas as measured by our TPI® model (TMMi level 5) and the percentage of defect leakage of high severity defects is less than 2%

Tighter alignment: The TCoE helps keep the quality effort aligned tightly with business needs by defining and measuring KPIs

Career advancement: The model creates a compelling new career opportunity for IT professionals, leading to more job satisfaction among QA personnel and helping the organization recruit and retain top talent

Culture of quality: The transition from project-based testing to standardized

quality processes and toolsets helps the organization focus on quality issues and speeds the evolution to a culture of quality.

Conclusion

Despite the relatively small number of existing Testing Centers of Excellence, the trend toward quality centralization is obvious: nearly two-thirds of the 2011-2012 World Quality Report respondents from medium-sized and large companies from a broad range of sectors and geographies have indicated that they are interested in exploring the concept of a TCoE and are planning to adopt a more industrialized approach to application quality.

As more companies embark on the journey towards centralizing their software quality efforts, Capgemini and Sogeti and HP will continue to provide targeted services and software solutions to make the transition faster, easier and more efficient for our clients. Together, we can help your QA organization achieve operational excellence and help you deliver business results.

Capgemini Group and HP: Technology and Service Experts to Help with Your TCoE Transition

By partnering with the Capgemini Group and HP, you benefit from the experience of expert technology and consulting companies:

Capgemini and Sogeti have supported clients in setting up and running Testing Centers of Excellence for many years, often as an evolution towards a fully managed testing service. We have developed a tried and tested roadmap for taking clients at their own pace, from assessing readiness and TCoE design, through to implementation of best practices, training and automation.

In the process of transitioning to the TCoE, we help clients optimize their overall application quality and performance, standardize their testing methodology, best practices, automation, metrics and tools, industrialize their testing effort and develop a flexible pool of motivated and trained resources. This cost-efficient model means better visibility of the quality of an application where deployment decisions are based on a more accurate assessment of business risk.

HP has been delivering a complete set of Application Software Quality solutions addressing all aspects of software quality—functionality, performance and security--for over a decade. Today, it offers a unique integrated software platform, HP ALM, for application lifecycle management across the widest array of heterogeneous environments and modern application architectures.

With HP ALM, Testing Centers of Excellence have the comprehensive software environment needed to establish best practices across their software development methodology of choice, share assets and vital information, drive collaboration across teams and provide the traceability and insight needed to increase velocity and deliver innovation faster.

Offered as software or Software as a Service (SaaS), HP's proven solutions -- HP ALM, HP Quality Center and HP Performance Center, which are all built on common platform architecture – are used by more Testing Centers of Excellence than any other solution available today[1] .

HP and the Capgemini Group can work together with you to make the most of your technology investments and help you succeed in your TCoE implementation.

[1] IDC Application Software Quality Market Share, 2011

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About Capgemini and Sogeti

With around 120,000 people in 40 countries, The Capgemini Group is one of the world's foremost providers of consulting, technology and outsourcing services. The Group reported 2011 global revenues of EUR 9.7 billion. Together with its clients, Capgemini creates and delivers business and technology solutions that fit their needs and drive the results they want. A deeply multicultural organization, Capgemini has developed its own way of working, the Collaborative Business Experience™, and draws on Rightshore®, its worldwide delivery model. Sogeti, its wholly-owned subsidiary, is a leading provider of local professional services, bringing together more than 20,000 professionals in 15 countries and is present in over 100 locations in Europe, the US and India.

Together, Capgemini and Sogeti have developed innovative, business-driven quality assurance (QA) and testing services, combining best-in-breed testing methodologies (TMap® and TPI®) and the global delivery model, Rightshore®, to help organizations achieve their testing and QA goals. Capgemini and Sogeti have created one of the largest dedicated testing practices in the world, with over 9,500 test professionals and a further 14,500 application specialists, notably through a common center of excellence with testing specialists developed in India.

For more information, please visit:
www.capgemini.com/testing
www.sogeti.com/testing

About HP

HP is the world's largest technology company serving more than one billion customers, with people working in 170 countries. The company's background in quality assurance, combined with market-leading software tools and deep testing expertise, enables HP to deliver solutions for all aspects of application quality management.

www.hp.com

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For more information about how Capgemini and Sogeti's Testing Services can help organizations achieve their testing and QA goals, using a Testing Center of Excellence with HP, please contact your local Capgemini/Sogeti testing representative or our Global Testing Services Sales Team, or HP:

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