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Delivering Real Solutions in High Tech

The Criticality of Interoperability

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Buyers of high technology infrastructure are increasingly demanding end-to-end solutions from their vendors. This makes it critical for vendors to have robust Solution Interoperability Testing Programs in place. In this article Booz Allen Hamilton addresses some of the key issues surrounding the non-technical aspects of designing an interoperability testing program for solutions:

- Scope of testing activities
- Program structure
- Testing infrastructure
- Program funding

In an earlier article titled "Customer Solutions: Building a Strategically Aligned Business Model," Booz Allen Hamilton discussed the trend toward customer solutions. This trend, we argued, was driven by an increasingly commoditized and transparent global environment, that made it harder and harder for companies to maintain their profit margins by selling traditional products and services.

Established industry players are confronting the reality that product-based differentiation is more costly and difficult to maintain than ever before, and the resulting product differences are increasingly less meaningful. Value has, in effect, migrated downstream from suppliers toward customers. Rather than continue to resist the inevitable, companies are looking for opportunities to develop higher margin "solutions" businesses.

Early on in this trend, innovative companies began bundling products with value-added services as a way to differentiate themselves, but solutions models have progressed towards offering wide ranges of solutions tailored to address specific end-customer problems.[1]

One of the key challenges of offering solutions in the high-tech equipment space is that Technology vendors increasingly have to place more emphasis on ensuring that all the elements in a solution are compatible. This requirement is primarily the result of two factors. First, as technologies, technology standards, and products with non-standard features proliferate, the potential product-base that a product has to be compatible with is growing. Second, in most cases vendors aggregate discrete products into solutions to meet their customers' needs. Additionally, buyers of high-tech equipment are requiring vendors to assume the responsibility for design, assembly, installation, and testing.

As a consequence, Solution Interoperability Testing (SIT) capabilities are becoming an increasingly important requirement for vendors of high technology products. These capabilities can ensure that multiple products when combined into a solution work together, and that the overall solution performs according to specified performance criteria. Multiple activities, or testing phases, are required to test the various aspects of interoperability. These activities can be combined under an integrated SIT program. A strong SIT program can help a technology vendor improve the competitiveness and quality of its offerings. Furthermore, a world-class interoperability program can offer the vendor additional benefits, such as:

- Reduced SIT costs
- Improved interoperability testing efficiency

[1] Source: "Customer Solutions: Building a Strategically Aligned Business Model" by Jeff Bennett, Deven Sharma, and Andrew Tipping (July 2001).

Exhibit 1
Solution Interoperablity Testing Program Capability Matrix

Business Model Area	LEVEL 1 "Novice"	LEVEL 2 "Uncompetitive"	LEVEL 3 "Competitive"	LEVEL 4 "Current Best Practice"	LEVEL 5 "Future Best Practice"
Scope of Testing Activities	■ No company-wide agreed upon interoperability test process, methodology or guidelines ■ Only basic product development and demo SIT activities covered ■ Knowledge transfer is based on apprenticeship	■ No integrated process for testing activities – each solution owner defines process and test activities to cover ■ Testing focused on development and demo SIT activities ■ Knowledge communicated by conference calls, meetings and documentation	■ Clearly defines practices and process for testing within major product areas and life cycle stages ■ Testing covers most SIT activities ■ Knowledge transfer based web-based collaborative model in addition to formal classroom training and traditional mechanisms	■ Major life cycle stages have interop processes and hand-off criteria defined (but not integrated with each other) ■ SIT process includes all testing activities, including testing of suppliers but excluding "operations" testing ■ Short term staff participation in succeeding test phases to transfer knowledge – forward feeding of test resources (in addition to Level 3 methods)	■ Centrally defined, end-to-end process methodology ■ Interop testing covers all SIT activities (including "operations" testing) and suppliers/partner components ■ Knowledge transferred by forward feeding and backward feeding (in addition to Level 3 methods)
Program Structure	■ No formal, dedicated (permanent) interop teams – testing responsibility part of other function ■ Interop teams assembled on a case-by-case basis as needed ■ Roles and responsibilities decided through informal negotiations among stakeholders	■ Numerous test teams responsible for different aspects of testing across the organization ■ Dedicated interop teams "buried" deep within product unit R&D or engineering organization ■ Roles and responsibilities defined and understood within test team responsible for test activity – little knowledge of how activity fits with other activities/teams ■ Test teams responsible for all test steps (e.g. planning, execution, validation, etc.) within specific activity	■ Much of development test activities for similar product lines are centralized and staffed with dedicated, full-time generalists ■ Test units report to larger functions within business groups (e.g. R&D or engineering) ■ Test team assumes primary testing responsibility ■ Internal partners and SMEs some test execution assistance ■ External partner involvement limited	■ Small, permanent core interop team lead and coordinate interop testing projects, staffed with specialists from product units as needed – specialists released back to product unit upon completion of project ■ Core team reports to major product units ■ Test team responsible for strategy, planning and leading test activities across large parts of interop process and product areas within company (e.g. software) ■ Interop testing is leveraged as innovation opportunity with collaborative partner testing	■ Same staffing model as "Level 4" ■ Interop testing positioned as career path for test staff – Rotational program where employees can follow entire test process ■ Core team reports to corporate ■ Test team responsible for strategy and planning test activities across all parts of interop process and company areas ■ Extensive partner involvement throughout process, equally sharing responsibilities (Web-based collaboration)
Testing Infrastructure	■ No dedicated supporting lab infrastructure ■ Most testing dependent on engineering lab environments ■ No permanent demos – need to be built on a case-by-case basis ■ No use of 3rd party labs	■ Product lines maintain separate engineering labs for development testing ■ 1-2 pre-sales labs worldwide showcasing major solutions ■ Limited ability to demo customer-specific solutions ■ Very limited usage of 3rd party labs	■ In addition to Level 2 labs; 3rd party certification labs, professional services labs for some pre-sales and post-sales activities; solution development labs; regional demo labs in larger markets ■ Some ability to demo customer-specific solutions ■ Leverages 3rd party labs for outsourcing limited testing activities	■ In addition to Level 3 labs; dedicated solution development labs used across product units; integrated demo/proof-of-concept labs located in major markets and near target clients, focusing on customer-specific equipment trials ■ Heavy leveraging of 3rd party labs for testing not possible in-house and competitive testing	■ Functionally integrated regional and market-based demo, certification, and proof-of-concept labs set up as collaborative centers where customers are actively involved in process ■ Engineering labs are fluid – can be leveraged across full development ■ In addition to testing 3rd party labs are leveraged for innovation with partners
Program Funding	■ Virtually no sharing of test resources between stakeholders ■ No direct resource contributions to/from internal and external partners	■ Corporate culture does not encourage resource cooperation between product units ("each unit for itself") ■ Test units buy required resources from product units – voluntary partner contribution limited	■ Corporate culture encourages product units to voluntarily lend management and technical staff to other units – test team still funds majority of test activities ■ Partners lend or donate equipment and SMEs on a short-term basis	■ Interop testing seen as company-wide effort – contributions expected to be shared among stakeholders ■ In addition, each product house dedicates a small set of permanent FTEs to create a steering committee and test staff as needed ■ External partners contribute heavily (but not equally)	■ All stakeholders expected to contribute equally – costs of testing shared through collaborative budget ■ Partners have on-site, dedicated business and technical SMEs involved in all test activities

Source: Booz Allen Hamilton

- Higher service level guarantees
- Improved collaboration with partners
- Engine for innovation
- Branding through certification of third-party products

While the technical aspects of interoperability testing are fairly well known and are relatively consistent across vendors, the business aspects of setting up an SIT program for supporting this activity are often overlooked. These aspects can greatly influence the shape and results of interoperability testing activities.

SIT Capability Matrix

As part of a recent Booz Allen study on SIT, we established a capability matrix which we will reference throughout this article (see Exhibit 1, page 3). This matrix identifies the characteristics of a SIT program along several key dimensions and at various levels, ranging from "Novice" to "Future Best Practice."

While this matrix can serve as a high level guide for establishing a SIT program, it can also be used as a reference in evaluating a specific company's SIT capabilities. For example, if we evaluate SIT programs or activities from a benchmark group of high-tech companies we find that results vary significantly with more than half of the companies not operating at "Current Best Practice" levels (see Exhibit 2).

We will now focus on each of the key areas that need to be addressed when designing a SIT program.

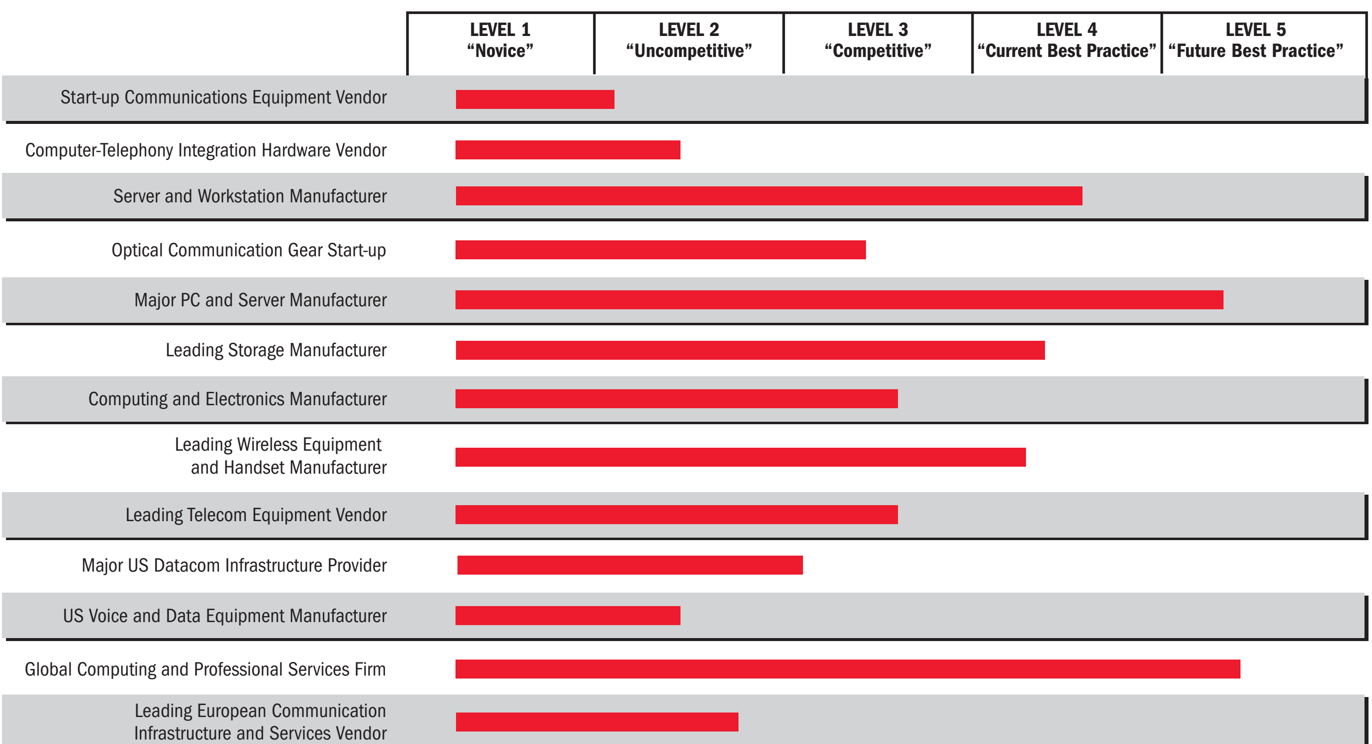
Scope Of Testing Activities

Testing activities can be aligned along a SIT process that follows the major stages of a solution life cycle:

- Product development
- Business development
- Pre-sales
- Post-sales

Exhibit 2

Solution Interoperability Testing Program Performance Comparison — Benchmark Group of High-Tech Companies



Note: Represents overall SIT program performance

Source: Booz Allen Hamilton

Exhibit 3
Typical Solution Interoperability Testing Process

Life Cycle Stage	PRODUCT DEVELOPMENT				BUSINESS DEVELOPMENT		PRE-SALES		POST-SALES		
Activity	Definitions	Design	Integration	Field Trial	3rd Party Testing	Partner Certification	Demonstration	Proof-of-Concept	Staging	Field Integration Testing	Operations
Definition	▪ "Specing" of solution	▪ Design and engineering of solution ▪ Vendor/ partner specification	▪ End-to-end engineering/ assembly, configuration of solution elements	▪ Small scale testing of solution in controlled, live environment	▪ Testing of aspects not possible in company labs (e.g., network load/stress testing, bakeoffs)	▪ Certification of "plug-in" partners	▪ Showcasing solution in "friendly" lab environment through test scenarios	▪ Test solution in customer specific/ specified environment	▪ Test actual (elements of) solution prior to deployment	▪ Testing of deployed solution ▪ Not necessarily done by vendor	▪ Technical customer support and debugging
Importance To SIT	▪ Conceptual stage – no physical solution available to test	▪ Integral part of solution design and engineering ▪ Verification of components/ partner products	▪ Verify ability of end-to-end solution to meet objectives (e.g. performance and stress testing)	▪ Confirm ability to deliver expected results in a "real world" environment	▪ Test areas of interop not possible in vendor labs ▪ Solution already tested for product introduction	▪ Expand range of third-party products certified to work with solution (which is not itself tested)	▪ No actual testing of solution — focus on demoing/ solution capabilities ▪ Important for sales effort	▪ Demonstrate ability of solution to work in customer defined configuration	▪ Verify integrity of solution components pre-deployed	▪ Ensure that solution works once deployed and handed over to customer	▪ While an important activity, it is normally considered outside scope of interop testing

Least critical element to process → Most critical element to process | Required Activity | "Optional" Activity

Source: Booz Allen Hamilton

The purpose of testing in the product development stage is to support the realization of a concept into a working, sellable technology solution. Activities include verifying that the solution design supports relevant standards and ensuring that suppliers adhere to interoperability requirements. Once a prototype has been developed, it is tested for system-level interoperability — integration testing. This activity tests, in a controlled lab environment, the compatibility of the various components that make up the solution and their joint ability to deliver against specified performance objectives. Before commercially launching a solution, the designers often want to test the solution in a "real-world" environment. A field test, or small-scale trial therefore often represents the last product development SIT activity.

During the business development stage the objective is to increase the overall marketability and attractiveness of the solution. SIT activities are a key element in this effort, as they help to expand the range of vendors, products, and environments with which the solution is compatible. When institutionalized this stage can form the basis of a partnership or channel program.

Once a specific customer opportunity has been identified, a series of tests is often used to demonstrate the value of the solution as part of the pre-sales activities. SIT activities in particular support this process through a series of "show and tell" tests. Sometimes customers are interested in the solution's ability to deliver against some specific requirements. In these cases the more general demo testing may not be sufficient and the vendor may commit to "proof of concept" testing.

Finally, during the post-sales stage, SIT activities ensure that the deployed solution works at the customer location. Testing activities are geared towards ensuring that the solution operates as expected once deployed in a live customer environment. The first step in this stage is to ready the solution for deployment (staging) and then ensuring that it works once installed.

The resulting end-to-end SIT process allows companies to ensure continuity of testing activities, facilitate transfer of knowledge (e.g., test results) between different groups involved in the solution life cycle, as well as ensuring overall SIT effectiveness by providing the general framework for testing. Additionally, the framework influences the consistency and quality of testing.

Booz Allen's definition of a SIT process extends beyond what is typically considered interoperability testing to include related activities across the solution life cycle. Exhibit 3 illustrates Booz Allen's view of the various SIT related activities.

Our analysis indicates that, while most companies perform some SIT related activities, a defined end-to-end SIT process covering all life cycle stages is not always in place. In the best case, companies have started to employ process frameworks that cover specific life cycle stages.

When it comes to designing an end-to-end interoperability testing process, vendors need to make the following choices:
- Scope of interoperability testing activities
- Formalization of test activities
- Provisions for transfer of knowledge

Each of these choices is discussed below.

Scope of Interoperability Testing Activities
In deciding on the scope of an SIT program vendors need to analyze two main factors:
- Strategic considerations
- Cost/benefit trade-off

Among the key strategic considerations are the vendor's value proposition for the solution and its go-to-market approach. In order to provide proof of certain elements of the value proposition, the vendor needs to incorporate certain testing activities into its program. For example, throughput rates can be certified, if the solution has been tested accordingly. If a vendor sells solutions directly to customers, the program will have to include pre- and post-sale testing activities whereas a vendor with an indirect selling model can concentrate more on product development related testing activities.

The scope of testing activities in the program should also be based on a cost/benefit analysis. The direct and indirect cost of performing specific testing activities has to be weighed against their impact on sales or margins. Vendors should only consider including the test activity as a part of an SIT program, if the benefits sufficiently outweigh the costs.

Formalization of Test Activities
Having decided what testing activities to cover in an SIT program, vendors have a choice on how to formalize the process. Formalization of the process includes definition, communication, and implementation of the testing approach, or process framework. Formalization is primarily manifested through a written and formally communicated methodology that guides the interoperability testing program. It does not, however, address how the process is enforced (discussed under "Program Structure," page 7).

Formalizing the methodology is important as it can help everyone within a program understand each other's roles and improve the efficiency and quality of testing. As a common methodology and process is used throughout the company, testing activities become more consistent across test teams and projects, lowering undesired variance in testing methodologies and approaches. Furthermore, a written and communicated methodology will help underscore the importance of interoperability testing.

The level of formality of a SIT program can vary widely from less formal to highly formalized. In the case of less formal programs, interoperability testing largely emerges as a natural part of a solution's engineering and product management activities. On a case by case basis the managers responsible for elements of the solution life cycle determine the need and scope of interoperability testing. This approach leads to differing test methodologies and inconsistent results across the organization. Furthermore, it is often difficult to determine when and to whom to hand off testing.

On the other extreme of the spectrum are highly formalized programs. In these programs the overall testing methodology is centrally defined and consistently employed across all projects and business units. This ensures that everyone involved in the interoperability testing activity understands their role and how their specific test activities fit in with preceding and succeeding activities, and trigger points for hand offs. Furthermore, well defined criteria determine what and when it is time for a team to hand off to the next test group. Therefore, a more formalized interoperability testing process may improve the chances of operating a successful SIT program and developing a successful solution.

Provisions for Transfer of Knowledge

A key objective of the testing process is to ensure that learnings and results are transferred properly between teams involved in the different testing stages.

Many mechanisms exist for sharing knowledge between stakeholders, e.g. written documentation, web-based collaborative systems, or simple conference calls. However it is important to clarify that none of these mechanisms is by itself sufficient to create a best-in-class program.

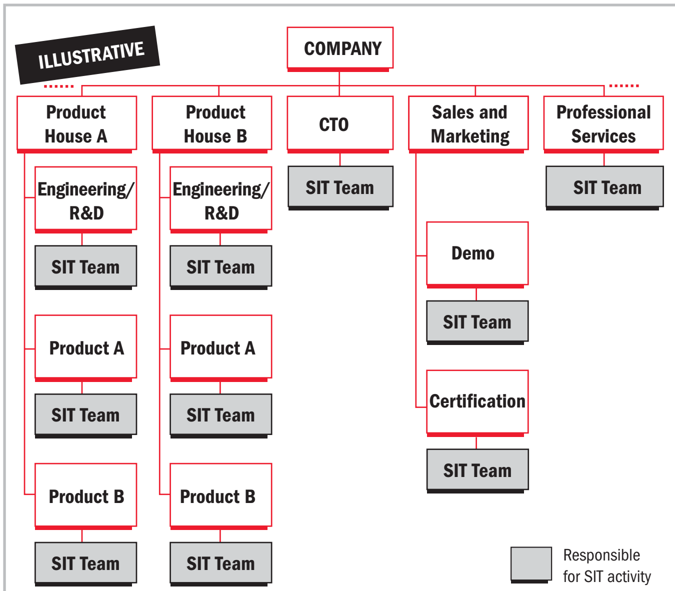
From our experience, an overlap of the testing stages, where team members participate in other teams' activities, has the highest impact on facilitating knowledge transfer. Through personal interaction testers benefit from understanding, how their activities fit in with preceding, and succeeding activities. In its simplest form, this can be achieved through "forward feeding" test resources, where test members assist teams responsible for subsequent test activities. A more advanced approach is to a apply a "forward and backward feeding" mechanism, where team members from succeeding test activities also participate in the activities prior to the phase they are responsible for (see Exhibit 1, page 3 – Scope of Testing Activities).

Program Structure

Another important aspect of a SIT program is the structure of the program used to support testing activities. This program design dimension includes the number of discrete SIT teams, their reporting hierarchy, and the distribution of responsibilities among groups involved in the program.[2]

The organizational model chosen by a vendor can significantly impact efficiency, knowledge transfer, consistency, and the cost of interoperability testing. Ultimately, vendors need to choose the structure that allows them to best achieve their particular objectives.

Exhibit 4
Distributed Model



Definition
- Testing is only one of many activities teams are responsible for
- No single end-to-end ownership for SIT testing

Advantages
- Involvement of appropriate SMEs in testing activities facilitated
- Ease of implementation

Disadvantages
- High Cost
- Unclear roles and responsibilities
- Poor transfer of knowledge
- Inconsistent testing and lack of continuity

Source: Booz Allen Hamilton

There are three fundamental models for organizing a SIT program:
- Distributed model
- Centralized model
- Center of excellence model

Each organizational model is detailed below.

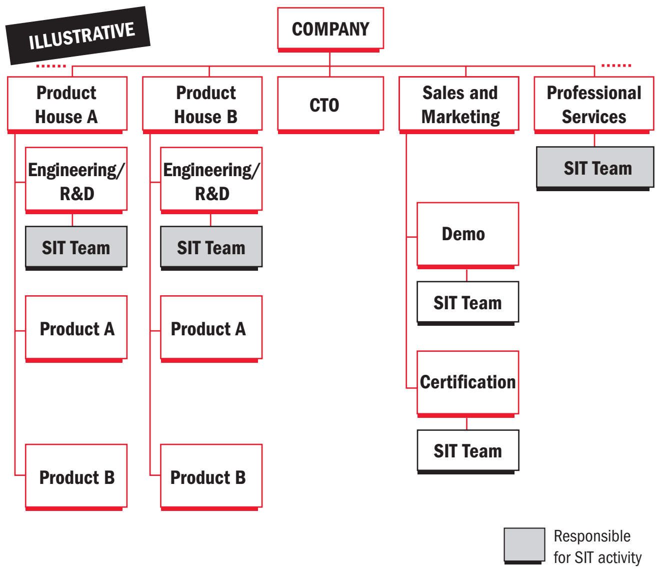
Distributed Model

In the distributed model responsibility for different SIT activities is distributed among many teams (see Exhibit 4). Testing in this model is simply one element of the team's activities supporting a life cycle stage.

The distributed model can be effective because testing activities are performed by individuals who are most familiar with specific elements of the solution and have the necessary functional or technical subject matter expertise.

[2] Each activity involves tasks, such as leading and coordinating (e.g., project management of test program, resource allocation etc.), planning (e.g., defining objectives, writing tests, validating results, etc.), and execution (e.g., conducting tests, recording, and documenting results, etc.).

Exhibit 5
Centralized Model (Within Product House)



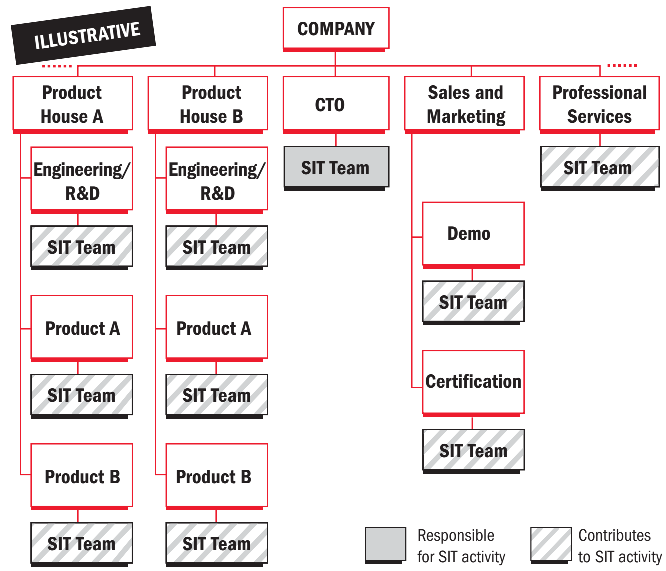
Definition
- Single, dedicated unit responsible for testing activities associated with either a solution or a particular life cycle stage

Advantages
- Strong ability to facilitate transfer of knowledge
- High consistency of SIT testing across the process
- Reduced dependency on other product houses

Disadvantages
- Inefficient duplication of capabilities and resources across the organization
- High cost of fielding large, permanent unit

Source: Booz Allen Hamilton

Exhibit 6
Center of Excellence Model (Company-wide)



Definition
- Small, permanent core team responsible for leading end-to-end SIT testing
- Product houses lend test resources as required to execute tests

Advantages
- Ensures involvement of SMEs in test activities
- High cost effectiveness
- Effective transfer of knowledge

Disadvantages
- Difficult to execute on – requires full cooperation from product houses
- Requires clear definition of roles & responsibilities

Source: Booz Allen Hamilton

However, several challenges exist with this model. With many different parties involved, establishing clear roles and responsibilities, avoiding duplication of effort, and managing hand offs can lead to inefficiencies and higher costs.

Centralized Model

In the centralized model a dedicated, permanent group assumes end-to-end responsibility for all SIT activities associated either with a particular solution or across solutions for a particular life cycle stage (see Exhibit 5). This group permanently provides staff and relevant functional capabilities for all SIT activities. For a given company, several centralized SIT teams can co-exist in different product houses.

As test staff is consolidated under one group in this model, the ability to transfer knowledge efficiently and enforce the SIT process is greatly improved. However, some duplication of efforts across the organization still remains given that these teams tend to be housed within engineering organizations, the ability of the test team is often limited to engineering related SIT activities.

Center of Excellence Model

The center of excellence model is based on having a small, permanent dedicated core team that is responsible for assembling and coordinating temporary teams for the purpose of performing specific SIT activities (see Exhibit 6).

The resulting "centers of excellence" are comprised of subject matter experts as well as generalists. Upon completion of the testing activity, the specialists are released back to their original functions.

This model emerges as the most effective and efficient one, for two primary reasons. The small, but permanent core team can ensure an end-to-end view of the SIT process. The temporary nature of the overall SIT team allows for a focused approach and results in a better use of existing resources.

However, this model may be the most challenging to implement and execute against. The center of excellence model requires on-going cooperation and commitment from numerous senior stakeholders across the company and potentially from external partners. Secondly, the core team needs to have a broad range of capabilities, e.g. lead the testing, provide technical expertise, and successfully link back to the business units. Lastly, to ensure the organizational support required to make this model successful, the core group should report to a senior company executive, such as the CTO.

Clearly formalizing and institutionalizing the roles and responsibilities of each team is a major element of success for the three models described above. Today, there is a great variance in how companies distribute and communicate the roles and responsibilities across organizations; in less advanced programs roles and responsibilities are defined as the need emerges during the testing process, whereas world-class companies have very clearly defined the functional roles and responsibilities of each stakeholder (see Exhibit 1, page 3 – Program Structure).

Testing Infrastructure

Laboratory infrastructure is another critical dimension to a SIT program as test labs serve as the primary environments for conducting testing. To establish an effective SIT environment, vendors need to carefully decide what testing activities the labs need to support, the number of labs and locations, and whether to build or outsource the labs. The scope of covered activities and the number of labs will significantly drive capital expenditures, operating costs and the complexity of the overall SIT program.

At a high level vendor labs support two main activities — internal or market-facing. Internal labs (e.g., engineering and R&D labs) are mainly used during the product development stage and only open to company personnel and strategic partners. Market-facing labs (e.g., demo and partner certification labs) support the business development, pre- and post-sale stages, and are used as a sales and marketing platform or as a collaborative technical environment open to third parties.

The number of market facing SIT labs and their locations should also allow vendors to closely interact and collaborate with their customers and partners. As a rule of thumb, one demonstration lab and one professional services lab per major market or region may be sufficient, dependent on the nature of the solution. The number of internal labs should be minimized and leveraged for as many SIT activities as possible. Consolidating internal SIT environments with related non-SIT functions is also advisable as costs can be reduced and knowledge transfer between involved parties improved (see Exhibit 1, page 3 – Testing Infrastructure).

In evaluating the decision on whether to build their own test labs, vendors should examine the strategic importance of the chosen testing activities and in-house capabilities vs. capabilities available through third parties. This analysis should be further complemented by a cost/benefit assessment.

While most vendors predominantly use in-house and partner labs, independent third-party labs can also be leveraged for complementary testing. These labs are normally operated by independent institutions (e.g. George Mason University, New Hampshire University) and offer test environments that individual vendors are not able to replicate. These environments may include very costly high-performance interoperability stress testing equipment (e.g., 200 Gbps traffic generators for stress testing). They may also include products from multiple vendors (e.g., servers, optical gun, etc.). In this way, a vendor can gain access to a multi-vendor lab environment, by simply agreeing to contribute its own equipment to the lab.

Program Funding

Vendors can take various approaches to ensure appropriate funds and resources (e.g., staff, equipment) are available to perform the required SIT activities.

The allocation of responsibility to provide program funding is an important indicator of the degree of commitment and collaboration among parties involved in the testing program.

The question of program funding extends to partners as well. Resource contributions typically vary based on the nature of the relationship between the partners. Strategic partners typically contribute a range of equipment and expertise to interoperability testing activities, sometimes free of charge. For more loosely structured partnerships, the partners' contributions are more limited and may, for instance, only involve discounts for purchased equipment to be used in the solution.

Best-in-breed companies adopt a more collaborative approach, where testing is seen as a company wide effort…

In general, responsibilities for program funding can be allocated in the following ways:

- Independent approach
- Collaborative approach
- Platform approach

Each of the three approaches is discussed below.

Independent Approach

The team responsible for certain test activities within a company, typically also assumes primary responsibility for funding these activities and ensuring the appropriate resources are available. For example, if the interoperability testing team reports into the engineering function of a business unit, the engineering unit provides funding and staff for testing. Under this approach, organizations benefiting from testing often share at least a portion of the required funding (e.g., corporate marketing shares funding responsibility for demonstration lab activities).

Within the context of a partnership, a technology solution vendor can also pursue an independent approach (i.e. exclusively assuming responsibility for providing virtually all testing resources). The independent approach is mostly adopted by very large vendors, whose strategy does not favor including third-party elements in their solutions. As a result there is very little interaction with external partners in this model, resulting in few opportunities for cooperation, especially in the area of innovation. A key disadvantage of this approach is that the unit or company responsible for testing has to independently finance all resource requirements.

Collaborative Approach

Best-in-breed companies adopt a more collaborative approach, where testing is seen as a company wide effort or across all partners, and therefore different stakeholders equally share the responsibility for program funding (see Exhibit 1, page 3 – Program Funding).

While many companies today aspire to this model, interestingly it is mainly start-ups and younger high-tech companies who employ this approach.

A collaborative model is generally better suited for solutions comprising of elements from multiple units within a company or from multiple vendors. This model allows the vendor to leverage interoperability testing as a platform for innovation rather than simply a debugging mechanism. However, this approach can only be successful with a clear commitment towards common objectives and close collaboration across product units or partners.

Platform Approach

Under the platform approach a vendor requires the partner to contribute the majority of the variable costs required for the testing (e.g., staff and equipment). The solution vendor primarily provides the fixed costs (e.g., test environment).

The platform approach is often employed by vendors that have either significant market power or where the vendor solution is a platform (e.g. a server platform) upon which many other vendors can add elements (e.g. software programs). In some cases the partners may even have to pay a fee to participate in the test program. Therefore, the platform approach often forms the basis of a third-party partnership program. As a result, the platform approach is normally only employed for a limited set of SIT activities, such as for third-party certification programs, which may focus extending the value of the solution.

Many larger high technology vendors with existing partners actually use a combination of the various approaches, such as funding certain test activities independently, share funding with a few strategic partners, and launch testing programs for a broader audience to participate.

Conclusion

This article identified some of the key questions facing vendors designing SIT programs, described viable approaches, and highlighted some of the pros and cons for each.

Designing a SIT program is a complex task. As a starting point, a vendor needs to clearly understand and articulate the objectives of the testing program to maximize its effectiveness. Once the objectives have been defined the vendor needs to make several decisions in terms of the scope of testing activities, program structure, testing infrastructure, and program funding. Clearly, for each of these decisions several choices exist and each choice should be carefully evaluated based on its efficiency, effectiveness, and cost-benefit trade-off.

At the beginning of this article, we discussed how vendors are increasingly moving towards offering a broad range of solutions in order to provide customers with differentiated value. One of the most important elements of delivering a solution is to ensure that it actually works. Consequently, a well designed SIT program will provide vendors with the necessary capabilities to ensure they can fully deliver against their value proposition.

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Booz Allen has extensive experience in communications, media, and technology industries. Particular examples in the high technology hardware and software solutions area include business planning and roll-out, setting up solution business units, solution development and testing, and partnering approaches. The findings of this article are based on a recent benchmarking study conducted by Booz Allen covering technology companies from multiple high-tech industries.

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20020037/4/02 PRINTED IN USA