TEST SERVICE CENTRE

TSite

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based on the original white paper

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INTRODUCTION

Products and services are becoming increasingly more software intensive. Life cycles are shrinking and time-to-market is getting shorter all the time. This can place a lot of strain on available resources, and can lead to testing problems. In the conventional project based approach to testing, test processes are set up for the duration of the project only.

Due to temporary staffing, most of the knowledge and expertise gained over the course of a project is wasted and the painstakingly constructed test environment is simply dismantled upon completion. Not exactly an ideal situation in terms of cost management, time and quality.

PERMANENT TEST ORGANISATION

A test service centre (TSC, or TSite® as we, Sogeti, call it) avoids these drawbacks. A TSC is a permanent test organisation, ready to take on predetermined test assignments within a set timeframe and budget. Projects are carried out in accordance with a standard operational procedure within a reusable test environment.

TSC test processes are independent of specific assignments or projects. Similar to line organisations, there is a fixed base of experienced personnel that can service multiple clients or projects.

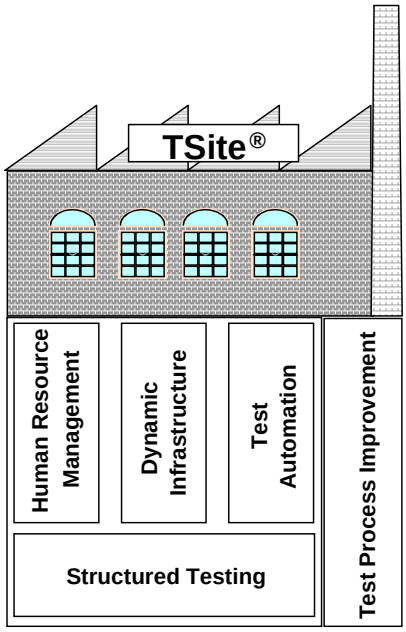
TSC advantages in a nutshell:

- Optimal usage of scarce expertise on structured testing, infrastructure and tools;
- Reliable test product quality;
- Brief start-up period;
- Continuous improvement of the test process embedded in the organisation;
- Consolidation and development of experience;
- Advance insight into costs and running time.

TEST SERVICE CENTRE ELEMENTS

For a general understanding, the definition of a TSC:

"a permanent test organisation which is equipped to deliver services and facilities to the owner, developer or tester of applications"



The TSC elements are:

- Structured test approach, the four 'cornerstones' of structured testing are test life cycle, test techniques, test infrastructure and organisation.
- Dynamic infrastructure, a reusable, multi-purpose and ready-to-use infrastructure.
- Test automation, is essential in order to be able to test cheaper, faster and better.
- Human resource management. A TSC has long-term interests. Experience and knowledge should be shared and applied in future projects for the improvement of a TSC.
- Test process improvement is embedded in a TSC and essential to reach the goals: cheaper, faster and better testing.

STRUCTURED TESTING

The basis for a TSC is a structured test approach. This means that the following four 'cornerstones' are well organised:

- In a test ***life cycle*** it is defined what activities have to be performed and when, who is responsible and what will be the result or product.
- Standard ***techniques*** are developed to support various activities in various phases. Examples are: techniques for determining test strategies, for specifying test cases (test design), for reports on quality or coverage, for test management techniques etc.
- The ***infrastructure*** is built in order to create a test environment for test execution. It consists of the hardware and software platform, the network, business applications and all associated databases and tables, tools etc.
- An ***organisation*** is defined, which includes an organisational structure, defined test functions for personnel, training, and many procedures and tools to support communication and secondary processes such as test management, change control, fault report management.

So far a TSC is not much different from any well-organised test project. What makes it different are the extra requirements on the test process:

- Reusability
  It is not just for one project, but it must be used again and again for many more releases to come.
- Flexibility and adaptability
  It is not just for this one system or application under test. It must be able to be used for testing other systems, with a minimum of extra effort.
- Ready to go
  In classical test projects preparation takes a lot of time and effort. A TSC enables us to start test execution as soon as possible.

DYNAMIC INFRASTRUCTURE

In a TSC we need a ready-to-use infrastructure, that has enough flexibility to be used for different systems.

- All business applications that interact with each other are installed and configured on the same infrastructure. Different configuration settings, including user authorisation files and shared tables, are saved to enable separate testing of individual business applications as well as integration between selected applications. Each test has its own initial settings saved (such as specific database contents) and is automated as much as possible.
- Test tools are installed and configured in such a way, that different tests can make use of them without messing up each other's results. In order to achieve this many things can be arranged or created: standard directory structures defining where to look for test input and where to store the output, reusable scripts for the performance of standard activities, such as logging in on a remote server or collecting certain types of test output, etc.
- A TSC maintains standards and templates for all test deliverables, such as test strategies, test plans, test specifications, error reports. No time is wasted on inventing new ways to carry out old things.
- When a TSC is requested to test a completely new and different application, most components can be used immediately. Procedures, templates, fault report, database, probably do not need to be adapted. Tools can be employed very quickly, because configuration settings and structures are ready and people are already experienced in using them correctly and efficiently. Under adverse circumstances, however, it may occur that a hardware platform must be changed heavily or a complete new one must be installed.

TEST AUTOMATION

Automation is essential in order to be able to test cheaper, faster and better. Many tools are available to assist in various testing tasks, such as test project management, test specification, test execution, coverage measurement, problem management etc. In a TSC the test process is progressively automated as part of a test process improvement programme.

Of all testing tasks, test execution is the one that often gets top priority to be automated, because it is on the critical path of IT projects. It is not surprising then that test execution tools attract much attention. A large range of record and playback tools are available, with increasingly attractive (graphical) user interfaces and exciting technological possibilities. Unfortunately, these expensive tools often end up as shelfware. The reason for this usually is that organisations have too high expectations of the tool, and that they underestimate the knowledge and skills required using them properly.

For a long time, organisations required that test tools should be extremely user friendly, so that end users should be able to work with them. This suggested that end users should be able to automate tests. The result was often poor. The first step to successful test automation is to recognise that it takes an automation project to achieve it. It requires automation skills and automation techniques. The technique of 'data driven testing' is becoming widely recognised as a good approach for creating maintainable test suites, the (record & playback) test tool providing the development environment.

HUMAN RESOURCE MANAGEMENT

A TSC has long-term interests. It does not exploit people to successfully finish this one project on time, but it keeps in mind that it wants to stay in business for a longer period of time. Its staff should be encouraged to stay and improve their skills. Experience and knowledge should be preserved and shared, and applied in future projects for the improvement of the performance of a TSC.

A TSC has specialists for test tools used, in order to ensure maximum advantage of each tool.

TSC personnel is trained in all working procedures and techniques, such as developing test strategies, participating in problem management meetings, producing reports. This causes them to be able to start very quickly with a new test job.

TEST PROCESS IMPROVEMENT

A TSC is a dedicated test organisation that performs tests not just for one project but for many different projects, different systems and different customers. It may be an independent organisation by itself or an independent part of the IT department of a larger organisation. It focuses on the test *process* to improve its efficiency and quality. The goals of a TSC are cheaper, faster, and better testing.

With this it is able to sell its test services at competitive prices. Such an organisation we find under different names, including test factory, test plant, test competence centre.

A TSC is useful especially in situations in which reusability is feasible, or infrastructure or expertise is scarce. These include:

- Maintenance testing;
- Large scale projects such as Solvancy II and IPv6;
- Special IT environments, such as Internet or Object Orientation;
- As part of a 'software factory'.

HOW TO DO YOUR DECISION MAKING RIGHT

Changing from a project-based approach to a permanent test organisation has consequences for costs, lead-time and quality of the following aspects.

- Dedicated personnel opposed to temporary personnel;
- Well managed and maintained test environment opposed to a temporary test environment;
- Ready-made test organisation opposed to a test project set up for the duration of the project;
- A generic standard way of working opposed to project standards;
- Reusable testware opposed to temporary testware

But first of all, you need to know the criteria, which will help you to decide that a TSC is *the* solution in your situation. Examples of these criteria are: the number or size of infrastructures/platforms, the number of test projects, the number of test personnel, the use of tooling, the size of the test projects, the size of the testdata, the amount of testware, the lead time and training. All these aspects will influence your decisionmaking.

HOW TO SELECT THE SPECIFIC SERVICES A TSC SHOULD PROVIDE

Service area matrix

Activities / TSite elements	*support*	*control*	*maintenance*	*R&D*	*execution*
Test automation					
Dynamic infrastructure					
Structured testing					
Test process improvement					

A TSC consists of the elements: structured testing, dynamic infrastructure, test automation, human resource management and test process improvement.

If a matrix is drawn with the service areas (grouped by the elements test automation, dynamic infrastructure, structured testing and process improvement) at one axis and the services a TSC offers (as a subdivision of support, control, maintenance, r&d and test execution) at the other axis, it is possible to fill in the matrix and to indicate which services should be provided by a given TSC with regard to given service areas. And, also important, which services will not be provided by a given TSC. Once the services are selected, one can implement these services in a TSC one by one.

The consequences for human resource management can be deduced from the completed matrix.

SCOPE AND POLICY

Essentially a TSC is a line organisation rather than a project organisation. Line management in a TSC must ensure that all resources (people and machines) are used efficiently. Test contracts must be acquired in an active way. All employees should realise that a TSC must be competitive. It should not be obligatory to use a TSC for test activities; IT projects can also organise tests themselves. However, they should not want to do this since a TSC can do it faster, better and cheaper.

One TSC works most efficiently for one type of organisation (banking, insurance, government, etc.). The support of more organisations costs more in terms of application platform and required business knowledge. The scope may also be one of the platforms (e.g. a TSC for mainframe applications only), test levels (e.g. functional acceptance testing), quality characteristics (e.g. usability testing), subject matter (e.g. billing, savings accounts, branch applications).

Although a TSC is an independent organisation, close communication with other parties (system development, users) is essential to know where to focus test attention and how to operate certain system functions.

RESULTS OF AN IMPLEMENTED TEST SERVICE CENTRE

Some results of a recent TSC implementation for a large financial institution in the Netherlands are:

General

- Generic standard way of working;
- Reusable testware;
- Ready-to-use infrastructure;
- 90% decrease of minor disturbances in production;
- 80% of the test techniques is supported by tools;
- Close communication between users, developers and system management.

Test automation

- >80% of the test execution automated;
- Return on investment after 5-10 re-tests;
- >50% decrease of the overall lead time due to test automation;
- >80% decrease of the test execution lead time due to test automation.

CONCLUSIONS

In general it can be concluded that the most successful TSC's exist where test expertise, infrastructure or resources (or a combination of them) are scarce. If not already present, a TSC can be used to implement a structured test approach. Management support and commitment are vital.

The scope of a TSC may be small at the start but should not stay too small later.

Care should be taken that test knowledge and expertise is shared in a TSC although testers may work on different projects. At the same time it is wise to invest in knowledge of the subject matter of business applications under test.

However hectic testing may be, the completion phase of the testing life cycle should not be omitted. On a larger scale a TSC should be aware of the threats of 'going concern'.

As yet there is evidence to be able to give a positive answer to the question of whether testing in a TSC is faster and cheaper. It should be noted, however, that to some extent the gains on one side (dedicated testing, reusability, ready-to-use) also imply losses on the other (more difficult communication with other parties, working according to fixed agreements). Quality of testing definitely becomes more constant and predictable in a TSC environment.