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Erik van Veenendaal explains the results of Improve Quality Services'

latest survey on testing tools and how they are used

The quality of test tools has certainly matured during the past number of years. Their scope, diversity and level of application have increased. But how far have we come? What tools are used most and what is the level of satisfaction?

In order to find out, we at Improve Quality Services have carried out a survey in over 400 organisations world-wide ranging from IT companies with less than 200 employees to large multinationals. The results can be used to benchmark your current situation, and to identify areas where tools could be used beneficially. To make interpretation more meaningful, a distinction has been made between the market areas of technical applications (eg industry, embedded software and telecommunications) and information systems (eg banking, insurance and government).

This paper should also raise the interest of tool providers since it shows what testers are looking for and what tools still often end up as shelfware.

At a time when time-to-market is more critical than ever before, and applying the latest development methods and tools has shortened the time it takes to develop new systems, it is clearer than ever that testing is on the critical path of software development and that having an effective test process is necessary to ensure that

deadlines are met. In this situation tools are needed to provide the necessary support. After all we're living in an IT society and we're testing software. In recent years tools have grown to maturity and can, if implemented correctly, provide support in raising the efficiency, quality and control of the test process.

Implementation

Test tools may be classified according to the activities they support. The main support currently offered by test tools is intended for test management and test execution. In Table 1 data is shown regarding the implementation of the various tools – the percentage of companies actually using a certain tool type, either off-the-shelf or self-made. No less than 72% of the companies that participated in the survey indicated that they had at least one test tool.

The table shows immediately a general tendency in tool uptake; in the area of technical applications substantially more tools are available and applied than in the area of information systems. This is true for almost every type of tool. There seems to be a large uptake of test management tools. The implementation ratio of defect management tools is still unbelievably low compared to the number of offerings

available in the market. There are many defect management tools available, in all price ranges and for varying levels of maturity. To me it is disconcerting that around 50% of the test organisations are still doing defect manage-

	Control	Quality	Efficiency
Record and playback	*	*	**
Defect management	**	*	*
Coverage	**	**	*
Configuration management	***	*	
Static analysis	**	***	

Table 3: People's favourites

ment without a proper supporting tool and are still carrying out the process either manually or by means of an improvised spreadsheet. It should be noted that although configuration management is used in approximately 40% of the organisations surveyed, a much lower percentage uses it for configuration management of testware.

It seems 1 out of 5 organisations in the area of technical applications has a static analysis tool. The fact that this is much lower for information systems can be explained by the fact that few tools are available for 4G languages. The same reasoning probably also applies to the test coverage tooling. Although only a few tools exist for test design, over 10% of the organisations have a supporting tool available. Test design tools are available for use case testing, cause/effect graphing and component testing: the tool generates test cases from the code to achieve a certain level of code coverage. The only area where the uptake of tools is

	Technical applications	Information systems	Overall
Test management	45%	30%	35%
Defect management	59%	44%	51%
Configuration management	50%	25%	37%
Configuration management of testware	37%	10%	23%
Static analysis	22%	4%	12%
Test design	18%	13%	15%
Coverage	17%	2%	9%
Performance	35%	15%	25%
Record and playback	29%	30%	29%

Table 1: Test tools implementation ratio

	Control	Quality	Efficiency
Test management and control	5.8	5.1	5.4
Test preparation	5.4	5.7	5.5
Test execution	5.9	6.5	6.6

Table 2: Test tool satisfaction level

approximately the same is record (capture) and playback. Although it is often perceived as the most popular test tool, only one out of three organisations seems to have a record and play-back tool. This means that most scripted testing is still done manually and full regression testing is almost impossible.

User Satisfaction

Having a tool is one thing, but how satisfied are we regarding our test tools; do we perceive many or even any benefits? In the tool survey we inquired regarding the level of satisfaction, overall and then per type of tool. Overall 31% responded that they received many benefits, 67% stated that they received some benefits but expected more and only 2% didn't receive any benefits at all. This seems to be a reasonable score, and compared to earlier surveys an increase in perceived satisfaction level can be observed. Participants were also asked to rate their satisfaction level for individual tools on a scale of 1 to 10. Looking at the individual tools (Table 2 shows an overview by tools per phase) one can see that the results correspond to "some benefits but expected more score".

On a scale of 1 to 10 no really high scores can be observed, although the highest level of satisfaction is clearly in the area of test execution tools with benefits in the area of better and more effective testing (quality) and more efficient testing (less effort). As to be expected tools in the area of test management and control have the highest satisfaction score in the area of control. Overall this is only an average score for satisfaction and a challenge for the upcoming years.

People's favourites

Perhaps one of most interesting questions asked by the survey is 'which tools do people indicate as their favourites?'. This of course could be seen as a top five recommendation list. Use the practical experiences from your collegues, rather than taking advice from a tool vendor. The list of people's favourite tools is corrected for the number of implemention occurences and also shows the area and level of benefit that testers can receive, ranging from one star (some benefits) to three stars (great many benefits).

Record and playback is still the tool with the highest potential. Table 3 shows that allthough record and playback is often mentioned as a tool that improves testing efficiency, it is also indicated that these tools provide more control to the test processes and allow for more effective testing. It surprised me that three tools that relate more to developers (coverage, configuration management and static analysis) are on the list. One may also notice that a lot of benefits are in the area of control and quality and that test tools are certainly not only for improving efficiency.

Shelfware

There are many organisations that have successfully chosen and purchased test tools, but many organisations have not achieved any benefit from their investment because their tools have ended up not being used, ie on the shelf or "shelfware". This is not only a problem for test tools, but also a common problem for many types of tools. During the survey the respondents were asked whether they had any shelfware, and if so what tools had become shelfware. No less than 26% of the organisations claimed to have some sort of shelfware. Although this is still a high number, the percentage is substantially lower that reported in earlier surveys by Dorothy Graham; 50% in 1995, 45% in 1997 and 40% in 1998 (Fewster and Graham, 1999).

Figure 1 shows the type of tools that end up as shelfware. Record and playback (42%) is by far the winner. In general one can say the test tools that require a substantial implementation process are mentioned here. It seems not every organisation is yet aware of the fact that there is a lot more to implementation than buying a tool. A thorough selection and implementation process is a critical success factor for beneficial test tool support (Veenendaal, 2002). It is interesting to see that record and playback is both number one on the "people's favourite" list and number one on the shelfware list. Apparently it is either implemented correctly and thoroughly and as a result has great benefits or it does not receive the required amount of resources and as a result becomes shelfware.

More tools?

Finally it was asked whether people would like more tools. This of course is an especially interesting question for tool suppliers, since it indicates what people are looking for. No less that 75% stated that they would like more tools. The three tools that were mentioned most are record and playback, test management and code coverage.

For record and playback and code coverage there seems to be a logical explanation. They both still today have limitations regarding hardware and software platforms and programming language.
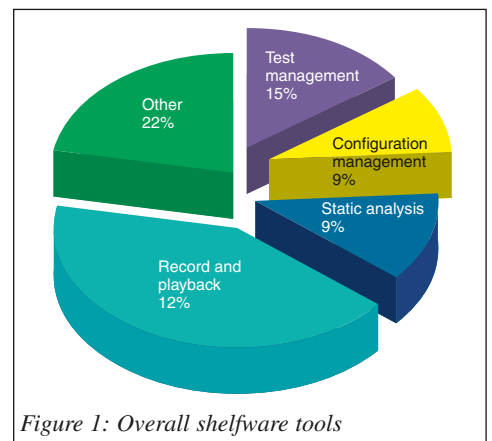

Figure 1: Overall shelfware tools

Many organisations in the area of information systems are looking for coverage tools that support 4GLs and not for tools that support "just" C, C++ and Java. In the area of technical applications the usage of a standard (non-intrusive) record and playback tools is still limited due to various hardware and software constraints. Perhaps an interesting challenge for the tool suppliers!

References

Fewster, M. and D. Graham (1999), *Automating Software Testing: Effective use of test execution tools,* Addison-Wesley, ISBN 0-201-33140-3

Veenendaal, E. van (2002), *The Testing Practitioner,* UTN Publishing, ISBN 90-72194-65-9