

ROI of test automation: benefit and cost

by Dorothy Graham

A successful automation strategy requires continuous, realistic assessment of the return on investment



Dorothy Graham explains a way to measure benefit of automated test execution and points out a common hidden cost

A lot of testers are struggling with automated execution. What we want from it is obvious, but how to quantify that is less well understood. Wrong

estimates, insufficient resourcing and nasty surprises cause failure and loss. A successful strategy needs realistic and accurate assessment of the benefit and the time and effort needed to realize it not only before and just after an automation initiative but continually, in order to maintain benefit and protect the investment.

Considering execution time alone can be very misleading. A set of tests that takes a tester hours to perform might be completed in minutes by a test execution tool. But other tasks before, during and after execution may well take a lot longer with the tool than without (figure 1).

Cost of automation: incident analysis

Measurement of return on investment in automation must take account of many costs. Some are obvious: evaluation and implementation effort, licensing, infrastructure, support and training, additional test design and especially maintenance effort and disruption caused by the need to change both development and testing practices for compatibility with how a tool works.

Hidden costs also often arise. Many are dependent on the characteristics of the specific organization and situation, making them unpredictable. One that is often neglected is the additional effort to report and analyse the cause when an execution tool reports failure of an automated test.

A tester performing manual test execution builds up knowledge and awareness of the test item and the objectives of the test performed. When he or she raises an incident, the

context is already known. That makes the difficult and vital task of reporting the incident easier to do well, and that makes reproducing and addressing the incident more efficient.

Automated test execution, especially used in conjunction with the automated test design featured in many toolsets, usually indicate test failure quite opaquely – for example by displaying a red symbol with a code line or test step number. Investigation is required to discover the source of the incident: the test item, the environment, the tests or the tool itself. If it appears to be the test item, in order to report the incident effectively, the context needs to be gathered: what happened, what was done to make it happen, and why it was considered incorrect. This often involves interpreting the test – designed for machine and not human readability – and executing it, in part or whole, manually. That is often difficult to do accurately, so that the incident is not reproduced, necessitating more analysis and repetition. All this is time consuming and represents significant cost to be taken into account.

Benefit of automated execution: equivalent manual test effort

Test automation has significant benefits: it can make it possible to test more exhaustively, ie to execute the tests more times with more variation in input and environment and achieving greater coverage of the test item than would be practical manually. One way to measure that benefit is to consider the equivalent manual test effort (EMTE) – the time that would be taken to execute the tests without automation. EMTE is easy to estimate by timing manual execution of one instance of each test and

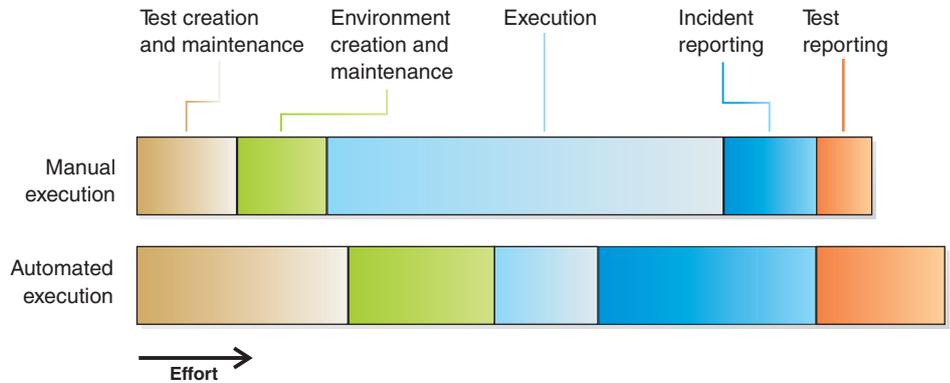


Figure 1: automation and overall test effort: gains and losses

extrapolating: the estimate may be made more accurate by adding time representing the needs and working patterns of humans as opposed to machines. Some test organizations include an EMTE figure in each test specification and set up a system to add it to a cumulative total every time that test is executed automatically. Subtracting the actual time spent from that total provides a meaningful measure of effort saved by automation.

EMTE is a simple but useful measure of benefit but it could be misused: repeated unnecessary execution of tests whose defect-finding potential has been exhausted would produce an impressive but meaningless figure.

Successful automation efforts measure return on investment by using measures of benefit such as EMTE, and by counting all automation costs, including incident reporting time ■

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