

ROI on Test Automation

A Simple Yet Powerful Approach

Calculating savings from testing automation frameworks



EXECUTIVE SUMMARY

Complexities of today's software require robust strategies for achieving enhanced speed of test execution at a lower cost. Test automation enables organizations to meet this objective and also yield a high return on investment. In this whitepaper, we present an overview of test automation and our approach for ROI calculation.



TABLE OF CONTENTS

Introduction	4
Test Automation Approach	4
ROI Methodology	4
• Benefits of Automation	4
• Costs of Automation	5
A Case in Point	5
• ROI for Standard Automation	5
• Automation Frameworks	5
Keane Automation Framework	5
• ROI using the Keane Automation Framework	5
Conclusion	6
APPENDIX – ROI Calculation	7
ABOUT KEANE	8

LIST OF TABLES

Table 1 Benefits Matrix	4
Table 2 Cost Matrix	5
Table 3 ROI Computation	7

TABLE OF FIGURES

Figure 1 ROI for Test Execution Frequencies	5
Figure 2 ROI for 18 Cycles/Year	6



Introduction

Test automation is the next logical step for organizations progressing towards establishing a mature quality assurance program. There are numerous alternatives when deciding to invest in test automation tools. Not only do the type of tools present options (test management tools versus test execution tools), but the platforms do as well (vendor supported versus open source). Making the correct investment is crucial success of initiatives; so don't underestimate the complexities.

Test Automation Approach

Success of automation lies in qualifying the environment for test automation. Many organizations prematurely invest in tools. Among the numerous different criteria that should be considered, it is important to determine the extent of technology and process maturity, as well as staff trained in the proposed toolset.

The success of test automation efforts is dependent on the following criteria:

Suitability of test automation

- Choice of the right automation tool for the testing requirement. Standard tool selection techniques are available to assist organizations in this effort.
- High stability of the applications considered for automation testing
- Availability of base-lined version of the application and test cases
- Availability of test cases that provide complete application coverage
- Support for future releases of the testing tool to adapt to technology changes
- Interoperability of the application with external systems

Forecasting test automation benefits

Organizations are often unable to realize desired benefits such as increased speed-to-market or improved cost benefits from their test automation strategies. They approach test automation from the

perspective of an improvement program that involves traditional investments in hardware, software, and staffing. However, the benefits of test automation can extend further, bringing innovations and efficiencies throughout the entire product development and testing lifecycle. When coupled with a ROI calculation approach, the automation strategy can be assessed quantitatively.

ROI Methodology

ROI can be calculated as Total benefit derived from automation / Total cost of automation. The benefits matrix below depicts the distribution of direct and indirect benefits across people, process, and technology drivers, which can be translated to customer benefits.

Benefits of Automation

Automated testing tools are capable of running continuously without any productivity loss or fatigue, with minimal or no manual intervention. This implies that organizations can plan testing activities beyond the traditional eight-hour work shift, reducing the elapsed duration for testing by as much as two-thirds of the time required for manual testing.

Test engineers can enhance application quality by focusing on value-added tasks and activities that test automation cannot address.

Test automation enables organizations to redeploy engineers for specialized tasks that cannot be accomplished through automation testing.

These tasks include interoperability testing involving external systems, testing for event driven processes in real time, intuitive testing, and more.

Costs of Automation

Fixed costs of automation include one-time investments to establish the automation environment. Recurring costs are incurred during the testing lifecycle. The below cost matrix depicts the distribution of fixed and recurring costs across people, process, and technology drivers.

A Case in Point

In this section, we illustrate savings in test execution time for automation.

Drivers	Direct Benefits	Indirect Benefits
People	Savings in staffing costs due to efficient redeployment of workforce	Motivated workforce, increased customer satisfaction
Process	Savings in testing lifecycle costs due to reduced execution time	Enhanced process efficiency, innovations
Technology	Improved productivity due to additional test cycles within a given schedule	Lower application lifecycle costs resulting from improved product quality

Table 1 Benefits Matrix



Benefits

We assume a sample size of 500 test cases per test cycle. Benefit of automation for each test cycle is given by:

$$TS = TM - TA$$

Where,

TS = Time saved due to test automation

calculations for the following frequencies of execution:

- 18 test cycles/ year
- 30 test cycles/ year
- 50 test cycles/ year

As evident from the graph above, ROI for test automation increases with increasing

Automation Frameworks

Software organizations with an independent testing practice can enhance the benefits of automation further through the use of automation frameworks. Automation Frameworks can provide reusable code bases which support the deployment of the testing tool into the engagement.

In the following section, we detail the salient features of our automation framework, illustrating ROI enhancements over standard test automation approaches.

Keane Automation Framework

At Keane, we enhance the testing process by using the Keane Automation Framework (KAF) features to facilitate additional reductions in development and maintenance efforts in the following ways:

- Application and platform agnostic to facilitate independent support across (web application, desktop, mobile, etc., etc.)
- Multi-platform support (Windows, Java, etc.) –so that scripts can be ported across platforms with minor changes

Drivers	One Time Costs	Recurring Costs
People	<ul style="list-style-type: none"> • Cost of training staff on automation tools • Staffing costs for automation script development 	Staffing costs for automation script maintenance
Process	<ul style="list-style-type: none"> • Costs for establishing new processes (workflow, configuration management, process management, etc.) 	Not Applicable
Technology	<ul style="list-style-type: none"> • Cost of hardware and software • Licenses for automation 	Cost of maintaining hardware and automation software

Table 2 Cost Matrix

TM = Time taken for manual testing

TA = Time taken for automated testing

Cost of Automation

Cost of automation is given by:

$$CA = CHS + CDM + CT$$

Where,

CA = Cost of automation

CHS = Cost of hardware and software (this can be apportioned over many testing engagements)

CDM = Cost of developing and maintaining automation script

CT = Cost of training staff on automation tools (this can be apportioned over many testing engagements)

ROI for Standard Automation

The following graph illustrates ROI for standard automation approaches for a sample size of 500 test cases, executed over periods ranging from one year to five years. The graph depicts ROI

test cycle frequency. In addition, test execution yields positive ROI earlier in the testing program as the frequency of test cycles increases.

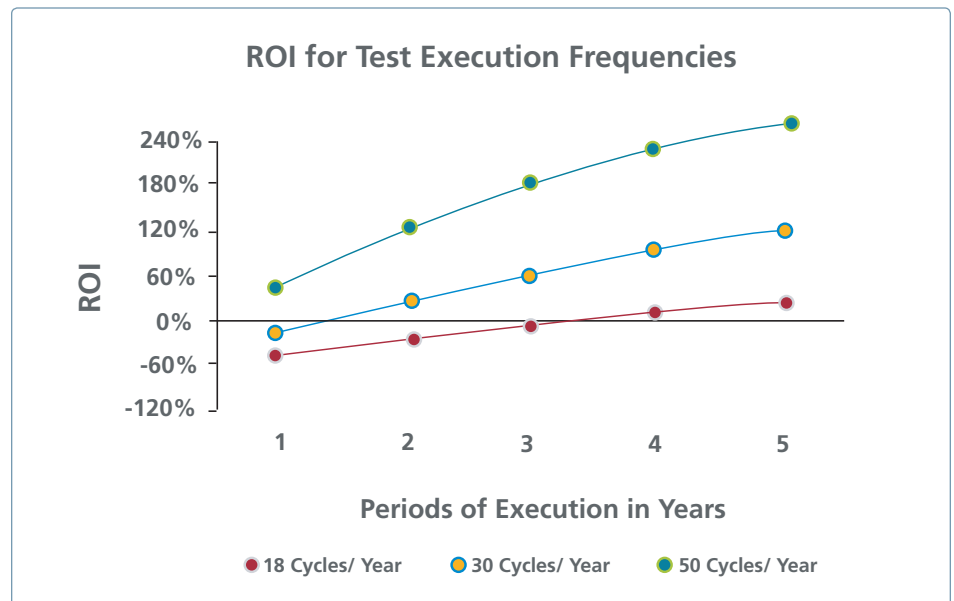


Figure 1 ROI for Test Execution Frequencies



- Agile structure to support for hybrid testing approach. Supported by the ability to combine data-driven, keyword driven, and modular approaches in automation design
- Support for standard components so that wrappers can be added to support third-party components
- Minimal training requirements for framework usage

“Our Test Automation Framework enables a reduction in script development and maintenance efforts, accentuating the benefits of test automation”

The following graph depicts ROI for a frequency of 18 test cycles per year.

Automation using the KAF yields much higher ROI than that obtained through standard automation techniques.

Conclusion

Test automation provides significant benefits in terms of savings in execution cycle time. The savings can result from enhancements to the speed of test case execution as well as the ability to carry out testing operations beyond regular work shifts. The use of frameworks can further increase the savings by reducing the development and maintenance effort for automation scripts.

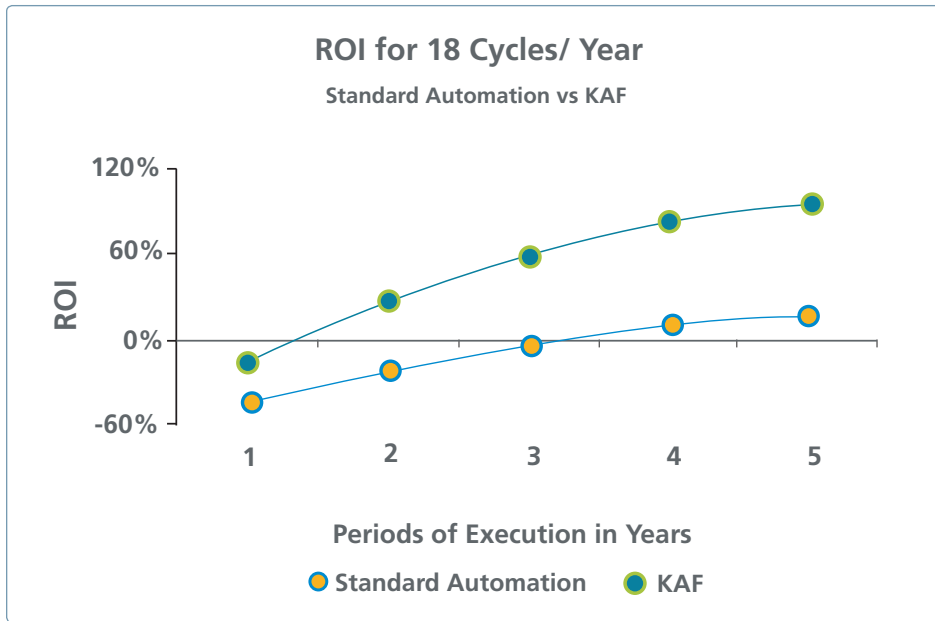


Figure 2 ROI for 18 Cycles/Year

ROI using the Keane Automation Framework

KAF can bring about reduction in automation test script development by as much as 43%.

The graph compares the results of execution using standard automation techniques compared with those using the KAF.



Appendix – ROI Calculation

ROI of executing 18 test cycles/ year using standard automation techniques

Elements	One Year Period	Two Year Period	Three Year Period	Four Year Period	Five Year Period
Total number of test cycles	18	36	54	72	90
Total effort saved in a year due to automation (person days)	843.75	1687.5	2531.25	3375	4218.75
Total cost savings due to automation	\$ 168,750	\$ 337,500	\$ 506,250	\$ 675,000	\$ 843,750
Costs of automation					
Development effort for automation in person days	875	875	875	875	875
Average maintenance effort for automation test scripts	525	1050	1575	2100	2625
Total effort spent during automation period	1400	1925	2450	2975	3500
Total cost of automation	\$ 280,000	\$ 385,000	\$ 490,000	\$ 595,000	\$ 700,000
Total cost of hardware/ software – one time cost	\$ 40,000	\$ 40,000	\$ 40,000	\$ 40,000	\$ 40,000
Net savings	\$ (151,250)	\$ (87,500)	\$ (23,750)	\$ 40,000	\$ 103,750
ROI	-47 %	-21 %	-04 %	06 %	14 %

ROI for executing 18 test cycles/ year using Keane automation framework

Elements	One Year Period	Two Year Period	Three Year Period	Four Year Period	Five Year Period
Total number of test cycles	18	36	54	72	90
Total effort saved in a year due to automation (person days)	843.75	1687.5	2531.25	3375	4218.75
Total cost savings due to automation	\$ 168,750	\$ 337,500	\$ 506,250	\$ 675,000	\$ 843,750
Costs of automation					
Development effort for automation in person days	500	500	500	500	500
Average maintenance effort for automation test scripts	300	600	900	1200	1500
Total effort spent during automation period	800	1100	1400	1700	2000
Total cost of automation	\$ 160,000	\$ 220,000	\$ 280,000	\$ 340,000	\$ 400,000
Total cost of hardware/ software – one time cost	\$ 40,000	\$ 40,000	\$ 40,000	\$ 40,000	\$ 40,000
Net savings	\$ (31,250)	\$ 77,500	\$ 186,250	\$ 295,000	\$ 403,750
ROI	-16 %	30 %	58 %	78 %	92 %

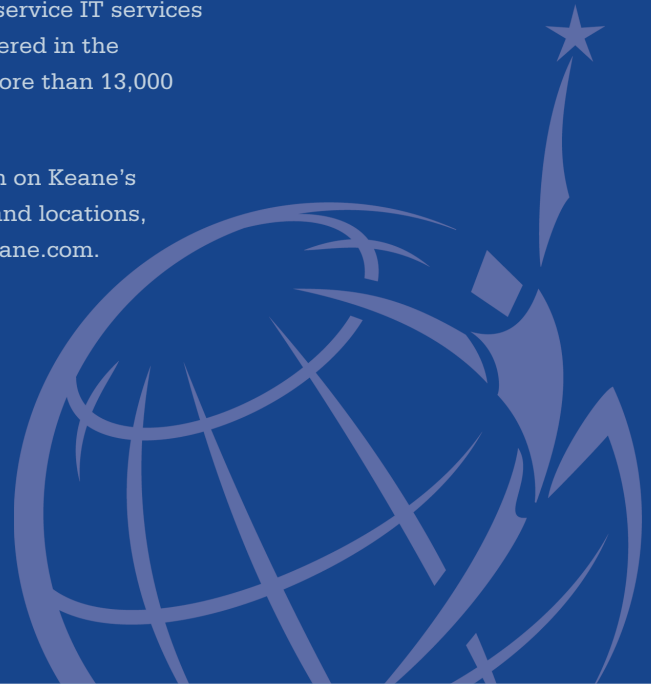


About Keane

Keane partners with businesses and government agencies to *optimize* IT investments by delivering exceptional operation, maintenance, and evolution of mission-critical systems and business processes. Keane helps clients realize the greatest value from their IT investments by leveraging an insider's hands-on understanding of the nuances and subtleties of their applications, processes and infrastructure making the recommendations we give more actionable, the work we do more pragmatic, and the results realized more measurable.

In business since 1965, Keane is an agile, mid-sized, full service IT services firm with headquarters in the United States and more than 13,000 employees globally.

For more information on Keane's services, solutions, and locations, please visit www.keane.com.



Keane

Corporate Headquarters
88 Kearny Street, Suite 1650
San Francisco, CA 94108

For more information about Keane's services, contact us at:

877.88.KEANE
info@keane.com
keane.com

