

Experiences with Keyword driven GUI automation framework

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Topics

1. Introduction
2. Evaluation
3. Framework Architecture
4. Automation Project Life Cycle (APLC)
5. Metrics
6. Conclusions & Future work

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Introduction

- Products requiring test automation has overlapping functionalities
- Test automation handled in individual teams
- Single automation tool used by all teams
- Tool drawbacks
 - Higher training costs
 - Complexity of scripting language
 - Tight coupling to tool native language
 - Support for technologies (Ex. Java, HTML etc.,)
 - Support for non standard GUI controls
- Script drawbacks
 - High maintenance effort
 - Limited reusability across test configurations, locations, versions and products

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Evaluation

- Following key evaluation criteria used
 - Well defined structure / hierarchy for scripts reuse
 - Minimal training cost
 - Easy to learn & use
- Three automation tools evaluated
- No tools satisfied all our requirements
- Evaluation continued with frameworks instead of tools

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Evaluation - Results

- WRAFS satisfied all the evaluation criteria
- Key advantages of WRAFS
 - Design
 - Data driven concept
 - Modular
 - Re-usable
 - Extendable
 - Keyword Driven Approach (Learning curve too low)
 - Development & Deployment
 - Supports multiple platform
 - Debugging is easy
 - Ease of Script Maintenance
 - Additional features
 - Automatic Output File Generation
 - Automatic E-Mail Mechanism

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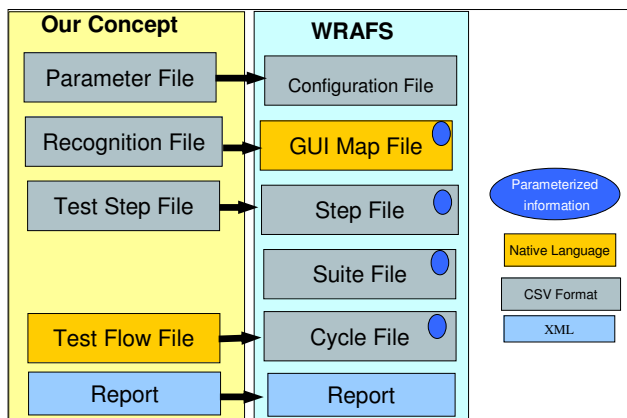
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Evaluation

The comparison of the criterias as defined by our 'concept' for the automation framework and features of WRAFS



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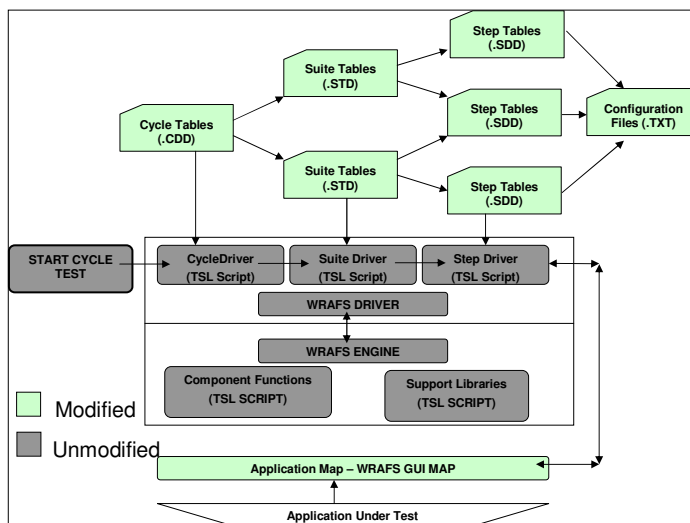
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Architecture



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Architecture

- WRAFS GUI Map
 - Contains details of identified objects
 - Created using Winrunner GUI Map Editor
- Test Tables
 - Cycle Table
 - Highest test level
 - Starting point of the test.
 - Call suite file(s)
 - Suite Table
 - Intermediate test level
 - Contains test steps
 - Calls step file(s)
 - Step Table
 - Lowest test level
 - Contains actions on objects
 - Optionally access test specific variables
- WRAFS Engine and Driver
 - Wrapper over Winrunner TSL functions
 - Facilitate execution of scripts using Winrunner

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APLC

After the selection of the tool, a well defined process was established for the following critical APPLC activities:

- **Documentation of Pre-conditions**
 - A defined state of the test bed is a must before running the automation test suite
 - If the state of the test bed is undefined, then the test script has to handle exceptions for missing administration and environment settings
- **Test case selection**
 - Avoid selection of test cases with high automation effort or involving manual verification steps
- **TC design**
 - Test script design guideline to ensure modularity and reusability
- **CM Strategy**
 - Following the standard development process all data, scripts and Precondition files will be stored in ClearCase.
- **Co-ordination across teams**
 - The Automation team takes an active role in ensuring maximum reusability of scripts among the development, Integration and System test teams during the test case selection, design and scripting phases

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APLC - Milestones

Development Milestones	Automation activities	Responsible Role	Explanation
Requirements frozen	General Automation Test - Strategy available	Automation Test coordinator	Preparation of the general Automation Strategy for the current project based on the new Requirements and Result of previous project
Analysis Complete	Test plan	Automation Test coordinator	Prepare the overall automation test plan for the project.
	Test requirement plan	Automation Test coordinator	Test requirements for automation (HW)
Design Complete	AT-spec	Functional test coordinator	All TCs identified, which are candidates for automation
Coding complete	AT scripts development	Automation test script developer	Automated script, data files, preconditions test suites developed
Module test complete	Test AT scripts	Automation test script developer	Test all developed test scripts
Bring up	AT scripts delivered	Functional test coordinator	Delivery of the developed scripts
Integration & system test	All test suites executed successfully	Functional test coordinator	Automated script, data files, preconditions test suites developed and tested
Release	Maintenance and development of new scripts based on change requests	Functional test coordinator	Automated script, data files, preconditions & test suites developed and tested (for new features)

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APLC – Roles & Responsibilities

Role	Skill	Responsibility
Automation test coordinator	Basic knowledge about automation & APLC	<ul style="list-style-type: none"> Provides “first” automation strategy, Global test strategy
Sub Project Leader	Knowledge about automation (principles, process etc.), applications and test cases	<ul style="list-style-type: none"> Ensure that the test scripts are carried over Effort estimation for automation activities
Functional test coordinator	<ul style="list-style-type: none"> Knowledge about automation (principles, process etc.), applications and test cases Write/convert TCs for automation Test script development Test script execution 	<ul style="list-style-type: none"> Driver for test strategy and AT-spec Ensure that the test scripts are carried over Execution of test suite
Feature coordinator	Knowledge about automation (principles, process etc.), applications and test cases	<ul style="list-style-type: none"> Contribution to Test Strategy and AT-spec Review of AT-spec
Tester	<ul style="list-style-type: none"> Knowledge about automation (principles, process etc.), applications and test cases Test script execution 	<ul style="list-style-type: none"> Contribution and review of AT-spec Execution of test suite
Test bed manager	Knowledge about the automation tool (installation and dependence from SW)	<ul style="list-style-type: none"> Installation of the tool Arrange Licenses for the automation Tool
Automation Tester/script developer	<ul style="list-style-type: none"> Knowledge about automation (principles, process etc.), applications and test cases Test script development Test script execution 	<ul style="list-style-type: none"> Preparation of AT-spec Convert test cases Automation of test cases & verification

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Metrics

S.No	Metric	Value
1	Effort required for training	1.5 to 2 days
2	Number of test cases automated by user	2 per day Development effort reduces as the developer gains experience
3	Number of test cases automated in all products	1. Product line – Switch Commander → 221 2. Product line – NetManager → 28* 3. Product line – @vantage Commander → 44
4	Number of test cases reused without any modifications across products	<ul style="list-style-type: none">• The 28 test cases for NetManager shown above, the automation scripts reused from the Switch Commander product line.• Additionally around 70 more test cases are identified which can be reused.• For these the change in configuration data is made and will be used in the next release of NetManager.
5	Number of test cases reused without any modifications across versions	All automated test cases whose functionality is unaltered in the new versions without any modifications.

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Conclusions

The new tool and the established process mentioned above helped us achieve the main goals:

- Data Script Separation
- Test bed independence
- Reusability of scripts across configurations, locations, versions and products
- Small learning curve

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Future Work

We are undertaking the following activities:

- Evaluation of LDTP which is a Keyword based automation framework on UNIX platforms.
- Creation of 'generic script templates' for direct use by script developers to automate their TCs
- Publish library APIs enhanced by us on SourceForge, so that they can be used by WRAFS community
- Collaboration with the WRAFS framework developers to develop a similar framework for QTP.

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