Automation Guide for SAP Regression Testing

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1. Introduction:

Regression testing is always being a key area during an implementation of ERP package (SAP R/3) across the world.

SAP R/3 offers great flexibility; hence tuned and adapted as per organization needs.

ERP package implementation will be generally multi year, multi phased, and multi location; hence the Regression testing is a critical area.

Key challenges here are frequency of regression testing cycle, huge number of critical business processes needs to be covered during regression and definitely cost involved in it.

This paper describes how Test Automation can address many challenges faced in SAP regression testing.

Focused approach towards Automation will help everybody to cope with different challenges faced during SAP testing.

2. Scenario:

Many organizations are going under SAP (R/3) implementation or upgrades, to implement their day to day business processes. SAP implementation will be planned in phase manner like go live at different geographical locations or go live with different functionalities or process areas. Usually after go live Changes; enhancements are planned in subsequent releases. Enhancements or additional functionalities are needed so as to cater requirement of Business Users.

Thorough testing is needed over a release of patch which enhanced the application.

This is to ensure a patch released has not caused additional defects. This definitely calls for quick regression testing by test team. Definitely huge team size is not a permanent solution for such kind of problem; instead team has to take towards automation of critical business processes.

3. Challenges faced during testing SAP:

- ❖ It is tailor made package so it becomes important to test all enhancements and modifications
- ❖ Each implementation is unique
- ❖ Implementations are geographically dispersed
- ❖ Interaction with different legacy systems and applications, it might not be standalone application in a system
- ❖ Huge business processes and areas which needs to be tested
- ❖ Different technologies involved like Java, web pages, terminal emulators
- ❖ Risk associated with testing delays affecting project schedule
- ❖ Risk of releasing inadequately tested system to users
- ❖ High Volume and variety of data needs to be tested

4. Why to Automate/Benefits:

- ❖ To cover maximum business process under Regression Testing roof
- ❖ Reduced manual effort during execution
- ❖ Regression testing cycle will be repeated many times during different phases of implementation of SAP/R3 package; like new roll outs, enhancements etc. this makes automation crucial
- ❖ Reduced cost as compared to manual testing
- ❖ Proper automation framework makes script maintainable
- ❖ Increases delivery confidence and minimizes risk of incomplete testing due to less time available
- ❖ Accuracy and productivity increases with automation
- ❖ Once automation suite is ready reduced dependency on functional or automation knowledge; minimum expertise required from both areas

5. Tool availability and comparison:

List of tools & respective vendors which supports SAP functional testing is as follows;

- ❖ Quick test professional – Mercury interactive
- ❖ Silk test – Segue software
- ❖ Rational robot - Rational
- ❖ QA Run - Compuware
- ❖ SAP- CATT – SAP in built tool

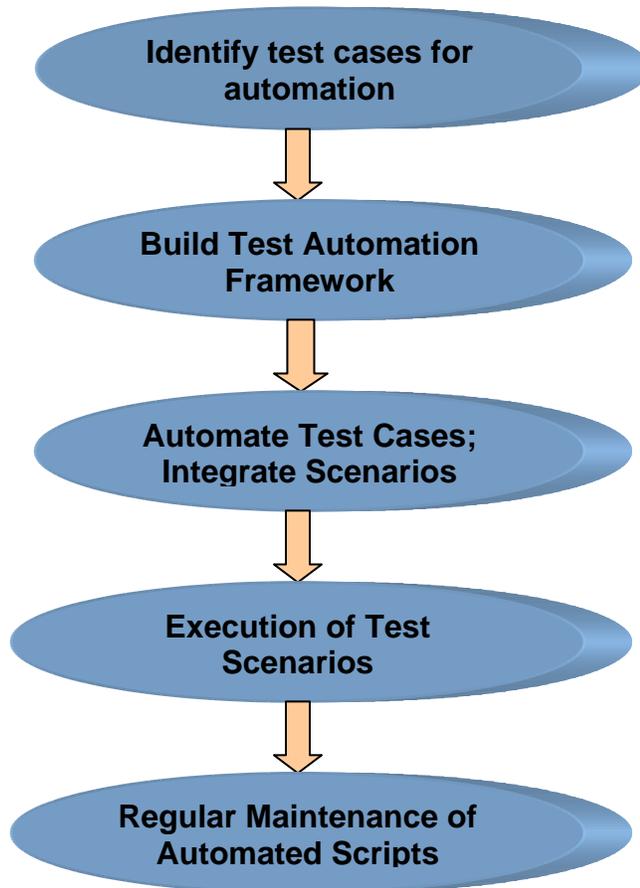As SAP CATT is in built tool in SAP package, need to do comparison before we select tool for automation.

Infosys has used Quick test professional as automation tool based on following comparison and client needs.

5.1. Tools comparison (QTP Vs SAP CATT):

QTP	SAP-CATT
Recording is GUI based	Recording is GUI based
Third party application	It comes with SAP package
Forming scenarios and passing values between different steps is possible with QTP and easier	Values can not be exported outside the system, so script integration is difficult and not maintainable
It is object based recording	It is screen based recording
Flexibility in terms of re-recording from any step or enhancement in same script	This is not supported in this tool
More robust suite can be developed with help of error handling functions and recovery scenarios	This facility is not provided in this tool
Reusability of unique t codes is possible with QTP	This feature cant not be used much with this tool
In multi item transaction page down and scroll down can be recorded with QTP	Page down is not possible with this tool
Automated log on is possible with settings in QTP	Automated log on is not supported

Data driven testing can be used to its all capacities	Limited support to data driven testing
QTP supports many environments SAP and non SAP as well	It supports only SAP environment
It is used widely for integration/regression testing	It is used more for Unit testing
Better result reporting in QTP with all screen shots at each and every step even if it is failed or passed	This feature is not available in this tool

6. Test Automation Approach:

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┌─────────────────────────────────┐
│   Identify test cases for       │
│        automation               │
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┌─────────────────────────────────┐
│   Build Test Automation         │
│        Framework                │
└─────────────────────────────────┘
                │
                ▼
┌─────────────────────────────────┐
│   Automate Test Cases;          │
│   Integrate Scenarios           │
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                ▼
┌─────────────────────────────────┐
│   Execution of Test             │
│       Scenarios                 │
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│   Regular Maintenance of        │
│   Automated Scripts             │
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6.1.   Identification criteria for Automation:

ERP package is vast; catering to different needs of client in different process areas like Purchase, Sales, Finance and costing, HR, SRM, CRM and much more. Definitely it will have huge scope of business critical processes, which all fall into criteria of Regression testing suite.

Typically Infosys will take following approach to decide which Business cases will fall under Automation suite and which will not;

Following Business Test cases will fall into Automation test suite:

- ✓ Tests or business cases that need to be run for every release of application; critical business test cases
- ✓ Business test cases that use multiple data values for the same actions (data driven tests)
- ✓ Complex and time consuming business test cases
- ✓ Business test cases requiring a great deal of precision
- ✓ Business test cases involving many simple, repetitive tests
- ✓ Testing needed on multiple systems or Browsers
- ✓ And typically the business test cases in which automation and validation is possible with tool technology

Following Business test cases will not fall into Automation Test suite:

- ✗ Usability testing - "How easy is the Business process to use?"
- ✗ One-time testing
- ✗ Ad hoc/random testing - based on intuition and knowledge of application
- ✗ Back-end testing
- ✗ "ASAP" testing - "We need to test NOW!"

6.2. Test Automation Framework:
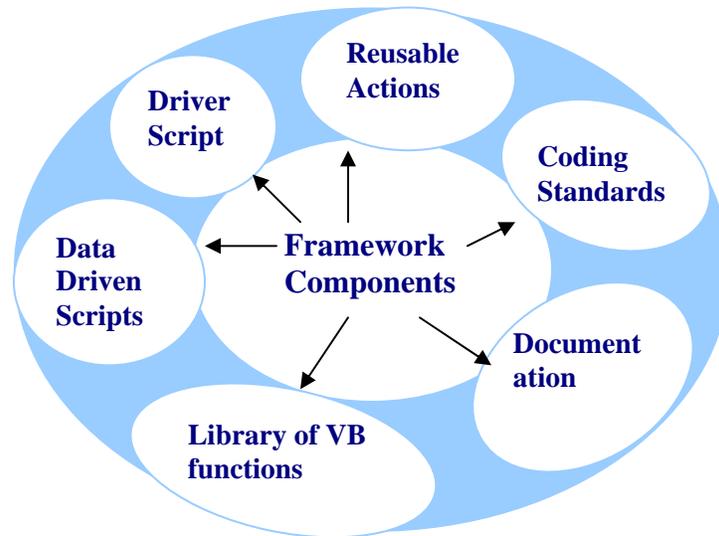
Reusable Actions:

Before starting automation all business process are analyzed to check which all transaction codes are repeatedly used. The result of this analysis is list of unique transaction codes. These unique transactions are scripted as reusable actions and placed under reusable folder. Now these scripts can be used multiple other scripts to form end to end scenario.

E.g. In Sap Customer creation or sales order creation are very basic steps in Sales module, the reusable scripts of these transactions give us ability to design different end to end scenarios.

Driver Script:

Driver Scripts calls Reusable script from Reusable library. This is meant for actual execution of test condition from a scenario. Driver script parameters decide the behavior of reusable script.

Data Driven Scripts:

In SAP, same script needs to be run for different set of data depending on plant, company code etc. This gives rise to need of Data driven approach. This approach helps us to reduce hard coding of data in a script and instead data will be stored in Data table which can be exported to excel sheet. Also, Data can be imported to datable via excel sheet. Parameterization works to store data in data table instead of a script

Library of VB functions:

Library of VB functions is developed which can be used across different clients, thus it provides reusability. Mainly these functions are written for better error handling and robustness of the script. These are written for taking care of some logic as well like moving to next line in data table for new plant code so that correct data per plant will be picked up.

Coding Standards:

Coding standard document is written and maintained for better quality, readability, maintainability of a script.
Different standards are followed for use of Variable name, data table excel name, Sheet name, input variables, output variables, function name, reusable action name, calling action name etc.
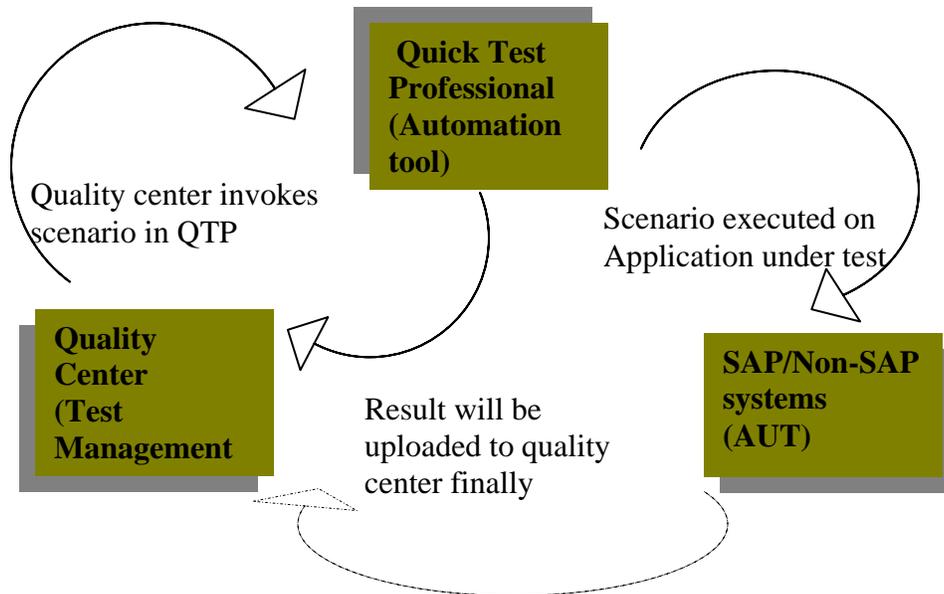
Documentation:

Documentation is key factor so as to take care of team changes or handing over it to some other team. Documents are written for all technical scripts giving all details like logic, flow of script, all technical details and test data requirement and some important points to be noted. These documents will help some other person to execute the right script in right way.

6.3. Automate Test Cases and Build scenarios:
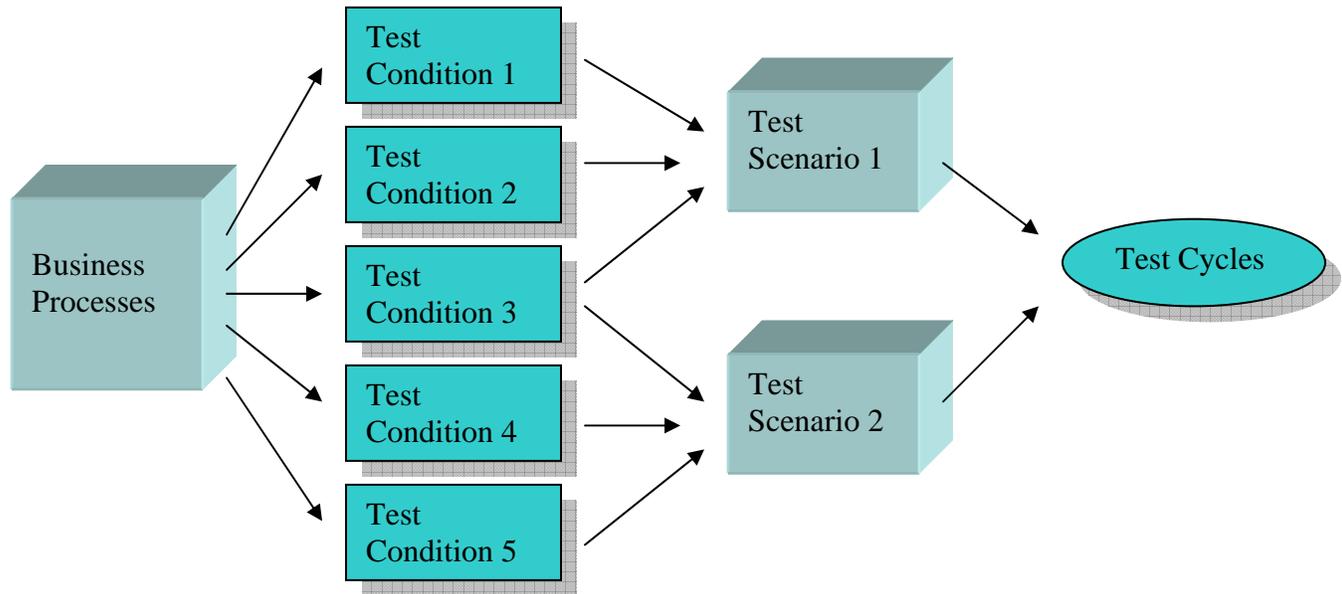
- ❖ Test script automation is drive by functional requirement
- ❖ Business process and functionality is evaluated for automation purpose
- ❖ Business process can be drill down to different unique transactions carried out in SAP
- ❖ Build a reusable library of all these transactions
- ❖ These reusable transactions can be used now in different scenarios as required
- ❖ Test scenarios will be executed during different testing cycles during different phases like roll out, enhancements etc.
- ❖ This approach gives a confidence of covering all functionality and business processes

6.4. Execution of Test scenarios:

```
                           Quick Test
                           Professional
                           (Automation
                           tool)

  Quality center invokes
  scenario in QTP                           Scenario executed on
                                            Application under test

  Quality
  Center                                    SAP/Non-SAP
  (Test                 Result will be      systems
  Management            uploaded to quality (AUT)
                        center finally
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- ❖ Quality center is a test management tool which is used with QTP for execution of test scenarios
- ❖ Quality center opens a test condition in a QTP tool and which is run in turn on a application under test like SAP or may be non SAP application
- ❖ Quality center enables us to form a integrated scenario out of different test scripts in Test Lab tab of it
- ❖ QTP enables to capture all results and finally upload it to quality center
- ❖ Result can be analyzed on basis of step by step execution and screen shot captured at each step

6.5. Maintenance of Automation suite:

Once automation suite is developed, test scripts need to be looked and validated so as to keep scripts inline with business requirements and make them run successfully for any technical changes.

Infosys follows a process and relook into script in following scenarios;

- ❖ SAP GUI has changed, some changes on screen
- ❖ Business functionality has changed
- ❖ Enhancements to a transactions which is automated
- ❖ New functionality added
- ❖ Changes in functionality or GUI of non SAP system, for which automation has done
- ❖ SAP upgrade is going to happen
- ❖ SAP hot packs implemented
- ❖ Scripts need to be reworked if its failing due to some technical issues in every cycle
- ❖ Use of proper framework and reusability will make script maintainable with less effort
- ❖ Modular approach for script writing and data management will make life easier

7. Points to Remember!

- ❖ Tool selection is always important as tool need to take care of SAP and non SAP systems
- ❖ Try to use of modular, scalable, simple framework with key factor of reusability
- ❖ Make script very generalize so that it can be used in different scenarios
- ❖ For execution cycle, master data needs to be find out every time from environment, please check correctness of data
- ❖ Do smoke test with some of basic transactions; so as to confirm environment is up and running
- ❖ Same with interfaces, check interfaces are up and running before going ahead with all execution
- ❖ Make sure environment is loaded with latest changes
- ❖ Make sure access to all required SAP transactions is there
- ❖ For smooth execution check all QTP and Quality Center settings

❖ Check test cases are proper and updated and are in line with business requirement

❖ Data flow between different systems is always problem and need to sync up for that

8. Case Study:

8.1. Client and Business need:

Client is convenient Food and Beverages Company listed on the New York Stock Exchange, Amsterdam, Chicago and Swiss stock exchanges.

The Client is implementing SAP 4.7 Enterprise Version to support their Financial, Purchasing, Planning & Manufacturing process. It is closely integrated with other legacy systems. SAP implementation is for simplifying and synchronizing many business processes.

Requirement was reinforce test strategy for such a critical and huge implementation, SAP domain expertise and test execution with less time and more coverage. Multiple permutations to be checked by regression at module, sub module level calling for reusability, data driven approach.

8.2. Infosys Solution:

Infosys assessed their different lines of business processes, interfaces, middle ware and test environments. Study was carried out to understand the adequacy of test case documentation System appreciation documents, Business process flows, validations critical to business, integration of modules in and around SAP. Test strategy is designed to provide them some leading practices like test automation.
First Test automation POC has been carried out and depending on results and cost benefit analysis; whole automation suite has been created.

8.3. Challenges:

- ❖ Environment set up and connectivity
- ❖ Business requirement changes; lot many minor releases
- ❖ Multiple interfaces with other legacy system which will make data flow back and forth making integration difficult
- ❖ Frequent Integration failures across middleware(Tibco, Xi) , Source(SAP) and Target(Legacy) systems
- ❖ No uniform methodology and standards for Testing due to multi-vendor, multi-package scenario
- ❖ Stringent deadlines

8.4. Benefits:

- ❖ Automation scripts for data creation
- ❖ Reduced testing time by 40% as compared to manual testing
- ❖ Multi-purpose scripts used for Security, Interface, Regression and Functional testing
- ❖ Infosys framework gave reduced rework and high maintainability
- ❖ Multi-purpose scripts used for Security, Interface, Regression and Functional testing
- ❖ ROI achieved in the 1st year of automation implementation
- ❖ Offshore Testing added a huge value by carrying out QA activities, regression testing during the sustenance and releases.
- ❖ For modules which went Live - The team accomplished 80% automation execution coverage
- ❖ Regression cycle time now has shrunk which earlier was 2 weeks to 4 days using available Mercury Tools and innovative scripting techniques.
- ❖ The client was able to achieve cost savings in automation as well as accelerated release for the on ongoing implementation project

9. Conclusion:

Automation plays key role to make SAP implementation successful.

Testing is always huge area during SAP implementation which either involve huge cost and if neglected huge risk.

If we go ahead with automation with proper tool and framework, cost and risk is going to be reduced for each SAP implementation.

It has significant benefits if properly planned, validated, and maintained.