Test Automation - Introduction

- Software Testing is an essential part of software development life cycle
- It reduces time to deliver the software product maintaining the highest standards of quality.
- Automation helps by speeding up the testing process and increasing the test coverage.
- Automation uses tools, strategies and artifacts that reduces the need of human intervention.
- Develops and execute test scripts, compare the actual and expected results and log test execution status.

Test Automation - Introduction

- Test Automation tries to increase test coverage
- Helps clients to run their business unimpacted and unharmed with no business losses because of continuous changes in business application.
- Tools – Quick Test Pro(QTP), Rational Functional Tester(RFT), Rational Robot, Selenium, Silk Test, Test Complete etc.,

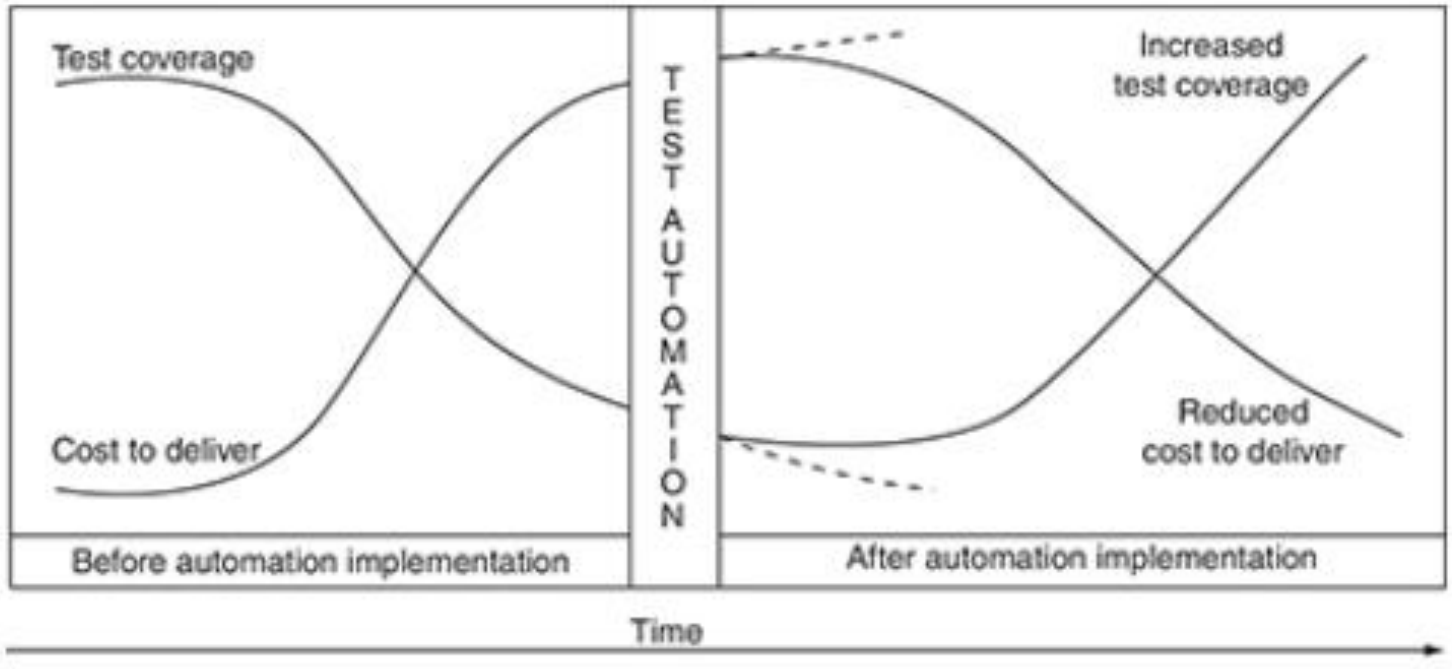
Test Automation - Objectives

- **Better:** Automated testing is more reliable than manual testing as tasks performed by manual testers are prone to human error. Test coverage can be improved using automation testing.

- **Faster :** Test execution speed of automation tools is higher than that of manual testers.

- **Cheaper:** Test Automation helps in testing large area of business application in minimum time that otherwise will require large number of manual testers, thereby increasing the testing cost.

Test coverage: Before and after test automation implementation



Test Automation – Key Factors

1. **Committed management**
2. **Budgeted cost**
3. **Process**
4. **Dedicated resources**
5. **Realistic expectations**

Committed management

- **Management need to see test automation as necessary and critical**
- **Project plans and test plans are to be designed based on automation**
- **Management and automation team should be completely committed**
- **Test automation priority is to be assigned and targets need to be set.**

Factors	Description
Plan approval	• Necessary steps to be taken to make the stakeholders, management, and the customer understand the importance of this one-time investment • Scheduled time-plan approval
Commitment on priority	• Commitment from the management on the priority assigned to this activity

Budgeted Process

- **Project budget estimates are to be planned based on test automation.**
- **Project budget sheet includes**

1. **Automation tool cost**
2. **Hardware and software cost**
3. **Resource cost**
4. **Training cost**
5. **Test Automation and implementation cost**
6. **Maintenance cost**

Budgeted Process

Factors	Description
Dedicated budget	Dedicated budget to be allocated, which includes test tool cost, software and hardware costs, implementation cost, development cost, deployment cost, maintenance cost, resource cost, and training cost

Process

- Standardized process is one of key to successful execution of an automation project.
- Processes are to be defined for each stage of test automation life cycle.
- Quality control procedures are to be defined to check and control the quality of test automation project and its deliverables.
- Test automation metrics are to be defined to measure the quality, effectiveness and profitability of the automation project.

Process

Factors	Description
Well-defined standard testing process	• Quality control procedures • Test design and execution standards • No *ad-hoc* testing • Define the tests • Define the test coverage and traceability matrix • Define test criteria at each stage
Well-defined standard test automation process	• Automation standards and guidelines • Scripting standards and guidelines • Well-defined standard test automation architecture and framework • Automation coverage and traceability matrix • Automation documents, training documents, and user manuals

Dedicated Resources

- Skilled automation resources are to be allocated to test automation team
- Use of manual testers as automation developers is to be avoided.
- Automation consultants are to be used to do automation project effort and cost estimation.
- Automation architects are to be assigned the task of feasibility analysis and framework design.
- Automation developers are to be used for test script development.

Dedicated Resources

Factors	Description
Dedicated resources	A dedicated well-qualified test automation team is needed for effective test automation. Nondedicated team with lesser experience on test automation can lead to: • *Ad-hoc* automation • Focus on wrong area of application • Least maintainable and reusable code • Frequent failures of test scripts • Failure to execute regression runs • Huge maintenance cost • No information exchange between automation team members

Realistic Expectations

- Management and test automation project team should have realistic achievable expectations
- Map table has to be created which maps management and testing expectations to the automation deliverables.
- Expectations that can not be met need to be filtered at this stage.

Realistic Expectations

Factors	Description
Expectations	• Achieving 100% automation is an unreachable goal • All business scenarios/test cases cannot be automated • Initial cost of investment and implementation cost is high • No immediate payback from investment • Benefits from test automation are achieved only after several cycles of test execution • Ramp up time will be required for tool selection and framework creation • No single automation tool supports all applications and GUI objects • Record/playback technique of automation hardly yields positive results • Testers cannot write effective test scripts. The availability of specialized resources (test automation consultant, test automation architect, and test automation developer) is must

What to Automate

Business context analysis –

- Analysis to identify business scenarios that are available and complete.
- It implies business scenarios on which change request is not expected.

Prioritization analysis –

- Analysis to define priority of automation of the identified business scenarios.

What to Automate

Facilitation analysis –

- Analysis to identify business scenarios whose all test cases have been written and test case review is done.
- If any gap is found, gap analysis is done to identify gaps.
- If the gap can be closed, then it is evaluated for gap closure.
- Business scenarios that are found incomplete or non automatable are ignored for automation.

What to Automate

Business Critical analysis –

- Analysis of business scenarios as per their exposure to business criticality

Completeness analysis-

- Completeness analysis is done to identify business scenarios that are ready for automation.

Automatability analysis-

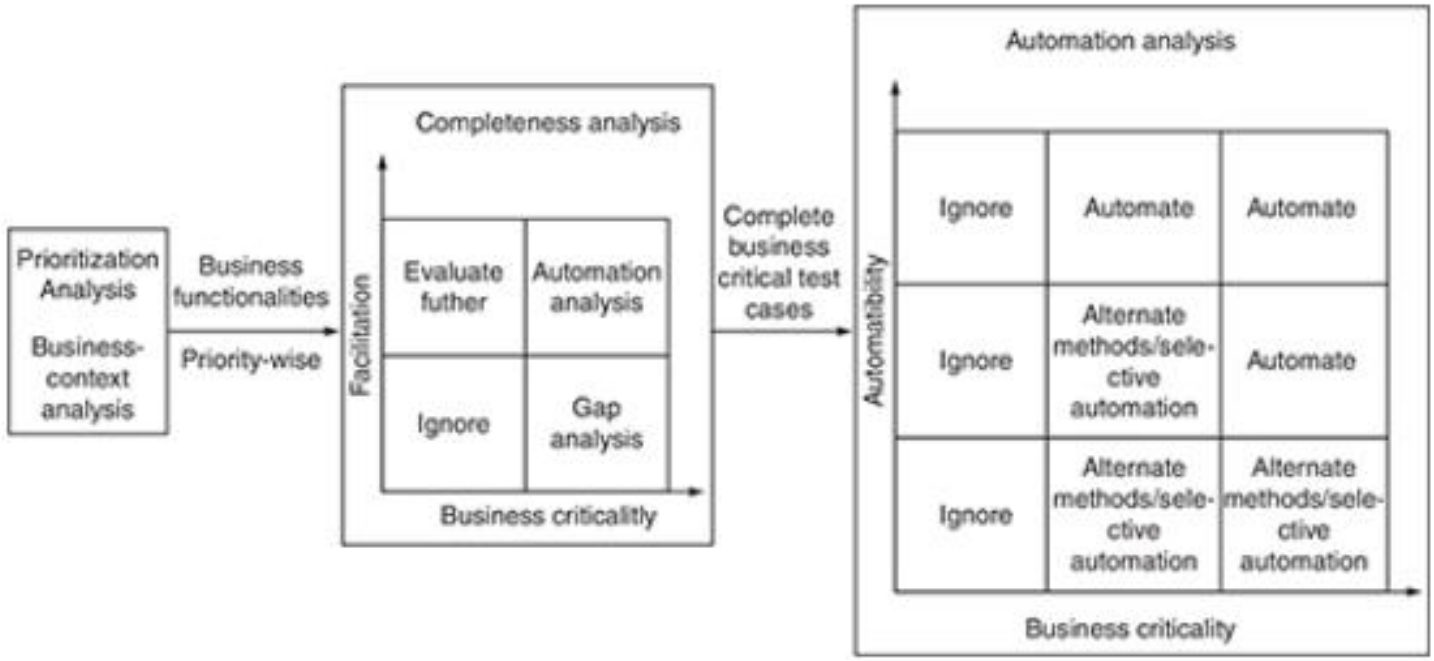
- Analysis to identify business scenarios/test cases that can be automated.
- If complete automation is not feasible, attempt should be made to partially automate.

Few parameters on which decision to automate a test case

1. Business criticality: Test scenarios critical to business. Ex: once failure result in huge monetary loss
2. Repeatability:Test scenario that need to be executed again and again. Regression test scenarios

- Reuability : Test scenario that needs to be executed over a wide range of input data variations. Ex: testing the login screen with different set of input data.
- Robust: Test scenarios that are prone to human errors. Ex: comparing data of two excel files.
- Execution time: Test scenarios that are time consuming. Ex: transferring funds from the same account more than 100 times.

Identifying business scenarios for automation



What not to Automate

- Parameters based on the decision to reject a scenario for automation:

Negative return on investment (ROI): Test scenarios whose automated ROI is negative as compared to manual testing. Ex: Test scenarios that are executed once in a while.

No baseline: Test scenarios for which accurate input data or expected output is not known. Ex: format of PDF reports.

- GUI testing: Test scenarios that test the look, feel, color etc., of GUI.
- Baseline complexity: Complex test scenarios that involve multiple steps unrelated to each other. Ex: GUI test scenarios that interact with disintegrated independent system.
- Automation complexity: Test scenarios that involve GUI objects that cannot be recognized by the automation tool and output cannot be retrieved accurately.

BENEFITS OF TEST AUTOMATION

- Reliable: Tests perform the same operations each time they are executed, thereby eliminating human error.
- Reusable: Same tests could be used to test on different environment settings.
- Repeatable: Same tests could be executed repeatedly
- Fast : Test automation tools execute tests at much faster pace than that of human users

- Comprehensive: Test suit can be made that tests every feature.
- Cost reduction : Tests can run in unattended mode 24/7 thereby reducing the human effort and cost.
- Programmable: Complex business scenarios can be automated to pull out the hidden information.

SWOT ANALYSIS