

Reasonability of test automation

Some thoughts on test automation.



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Reasons

Situations, when we may need test automation.

Main reasons

- Regression testing – automatically repeat same tests.
- Faster – significantly improving time-to-market of the program.
- Better than humans – small details can be verified.
- ~~Pushed down by management.~~
- ~~“Everybody has test automation and we also need it”.~~ 😊

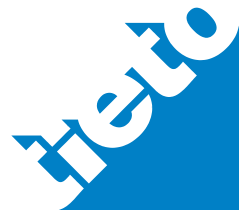
Estimations

Strategy for test automation to get estimations of planned costs.

Factors

Execution Scope Tools Users

- End users for test scripts.
- What are the use cases for them?
- Framework availability.
- Test tools.
- Stubs.
- Repeatable functionality in application.
- Scope of tests.
- Parallel versions
- Regularity of executions.
- Environment for executions



Strategy



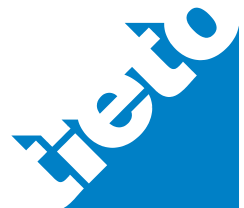
Remember factors.

- Define scope
 - Prioritize test cases and functionalities.
 - Remember 20/80 principle!
 - 80% of test cases can be automated within 20% of time.
- Define entry and exit criteria for test automation.
- Define prerequisites.
- Describe approach – architecture for test scripts.
 - Framework.
 - Reusability.
 - Parameterisation.
 - Data-driven approach.



Prerequisites

- ✓ Required tools are available.
- ✓ Necessary HW is available.
- ✓ There are skilled specialists available for script development.
- ✓ Support from lead developers is required.
- ✓ Testable application.



Estimations



Remember factors.

- + Strategy preparation
- + Script development
- + Documenting
- + Testing of scripts
- + Trainings (received and provided)
- + Test cases definition
- + Execution and validation
- + Test scripts and test data maintenance
- + Environment maintenance
- + Administration (project management, meetings, review, etc.)
- + Risks

Total required m/d.

The background of the slide is a high-angle aerial photograph of three skydivers in freefall. They are positioned in the upper left quadrant, with their bodies spread out in various orientations. Below them, the landscape is a complex mosaic of green, brown, and tan fields, separated by thin lines of roads or fences. In the bottom right corner, a small town or village is visible, with a cluster of buildings and trees. The overall lighting is bright, suggesting a clear day.

Decision

What aspects should be analysed
before taking a decision?

External defects



Is “Zero defects” policy in place?



How crucial (reputation, financial and other losses) are the defects from production?

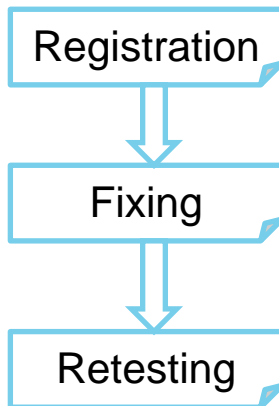


Is the number and categorization of defects limited within some agreements between customer and developers?

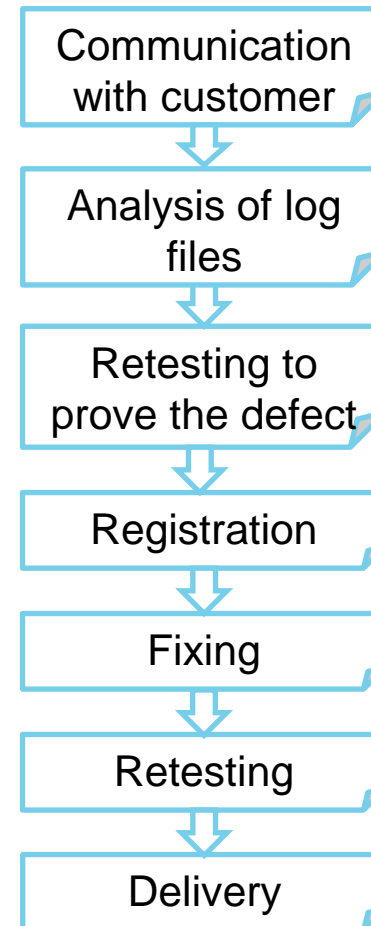


Cost of defect

“Cost of internal defect” vs “Cost of external defect”



Cost of external defects is about x10 more than internal.



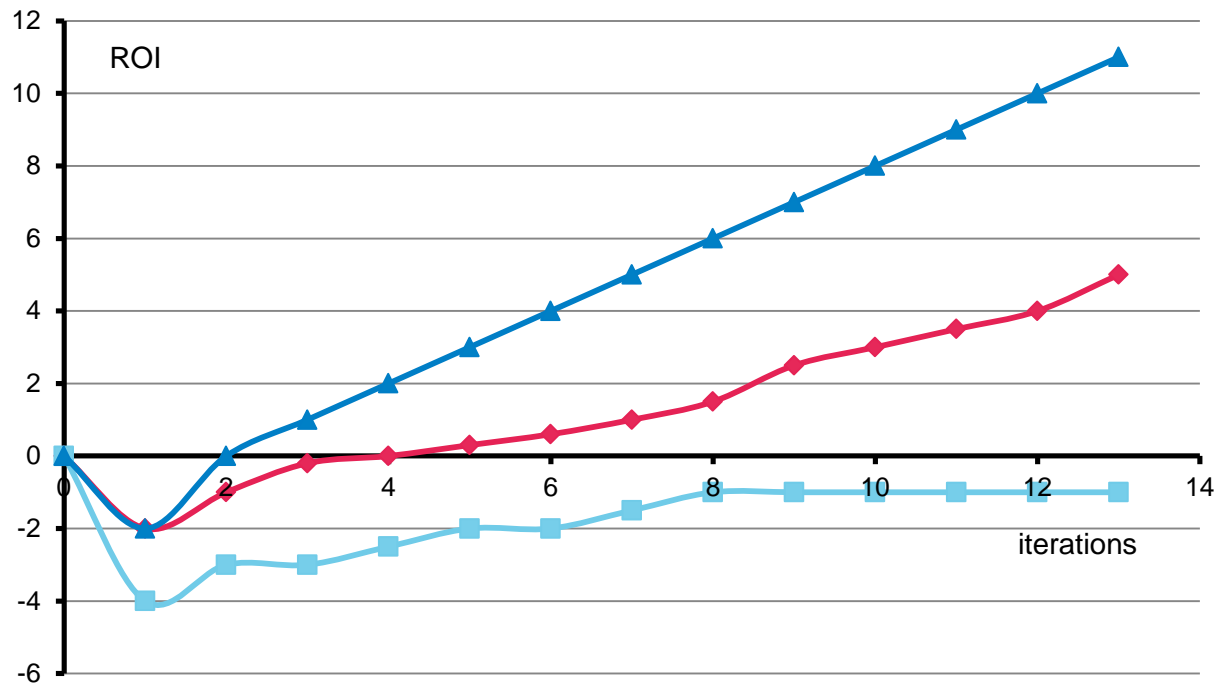
Return Of Investments

$$\text{ROI} = \frac{\text{benefit}}{\text{investment}} = \frac{\text{gain} - \text{costs}}{\text{investment}}$$

- *Gain* is the price of manual test case execution.
 - *Gain = manual execution + env. maintenance*
- *Costs* is the total price for test automation (incl. investment).
 - *Costs = investment + test development + test execution + maintenance*
- *Investment* is the price to be ready for test development.
 - *Investment = licenses + HW costs (tools) + initial deployment + configuration + trainings*



Return Of Investments (examples)

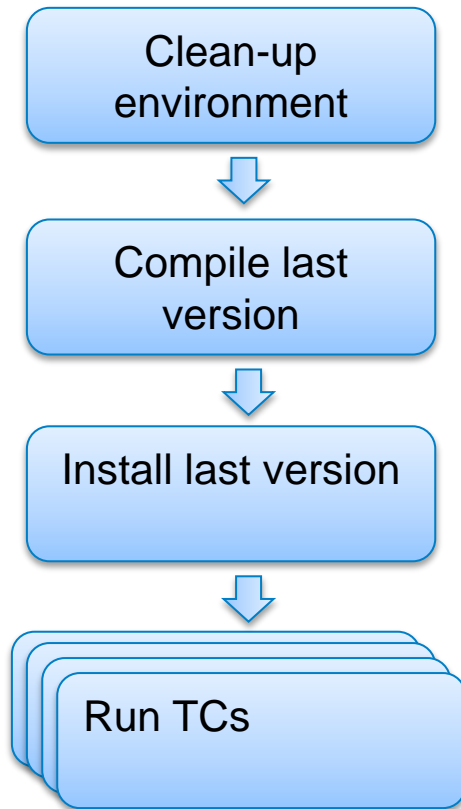




Practices

Several practical approaches that could be recommended for others.

Build-deploy-test



Why Clean-up is the first one not the last one??

Keyword-driven testing

Test_Case_Set	Step_Type	Application	Step_Description	Step_Keyword	Step_Parameters	ws_smoke_customer_person	ws_smoke_customer_organization
SET 1	Business					person	organization
	Technical	BO	Clean old customer data	clean_data_file		X	X
	Business	BO	New customer - all tags	process_xml	INPUT_XML:newCustomer_allTags.xml, SAVE_INPUT_TAGS:name surname, SAVE_OUTPUT_TAGS:partyId, CHECK_PRESENCE_ONLY_TAGS:partyId	nationalId:11837, surname:Larsen	
	Business	BO	Find customer by nationalId	process_xml	INPUT_XML:findParties.xml, SAVE_INPUT_TAGS:., SAVE_OUTPUT_TAGS:., CHECK_PRESENCE_ONLY_TAGS:partyId	nationalId:11837	
	Business	BO	Add party note	process_xml	INPUT_XML:addPartyNote.xml, SAVE_INPUT_TAGS:., SAVE_OUTPUT_TAGS:., CHECK_PRESENCE_ONLY_TAGS:	partyId:%partyId%, noteType:CALL-RECEIVED, noteText:Card is not working.	
	Business	BO	Update customer's surname and nationalId	process_xml	INPUT_XML:updateCustomer_allTags.xml, SAVE_INPUT_TAGS:., SAVE_OUTPUT_TAGS:., CHECK_PRESENCE_ONLY_TAGS:	partyId:%partyId%, nationalId:11835, surname:NewSurname	
	Business	BO	Get customer with updated surname and nationalId	process_xml	INPUT_XML:getCustomer.xml, SAVE_INPUT_TAGS:., SAVE_OUTPUT_TAGS:., CHECK_PRESENCE_ONLY_TAGS:partyId	partyId:%partyId%	
	Business	BO	New account and base card	process_xml	INPUT_XML:newAccountAndCard_allTags.xml, SAVE_INPUT_TAGS:nameOnCard creditLimit, SAVE_OUTPUT_TAGS:accountAgreementId accountNumber cardAgreementId cardId, CHECK_PRESENCE_ONLY_TAGS:accountAgreementId accountNumber cardAgreementId cardId	accountOwnerPartyId:%partyId%, cardholderPartyId:%partyId%, creditLimit:100.00, nameOnCard:Base%next%	
	Business	BO	Issuing data synchronization (cards are sent to front office)	run_process	PROCESS_NAME:IssSyncStart, WAIT_ACT:9020, PROCESS_TIMEOUT:60		
					INPUT_XML:getAgreement.xml, SAVE_INPUT_TAGS:., SAVE_OUTPUT_TAGS:., CHECK_PRESENCE_ONLY_TAGS:partyId accountOwnerPartyId cardholderPartyId cardNumber cardServiceAgreementId accountAgreementId account		



Data-driven testing

Test_Case_Set	Step_Type	Application	Step_Description	Step_Keyword	Step_Parameters	ws_smoke_customer_person	ws_smoke_customer_organization
SET 1	Business					person	organization
	Technical	BO	Clean old customer data	clean_data file		X	X
	Business	BO	New customer - all tags	process.xml	INPUT_XML: newCustomer_allTags.xml, SAVE_INPUT_TAGS: name surname, SAVE_OUTPUT_TAGS: partyId, CHECK_PRESENCE_ONLY_TAGS: partyId	nationalId:11837, surname:Larsen	
	Business	BO	Find customer by nationalId	process.xml	INPUT_XML: findParties.xml, SAVE_INPUT_TAGS: , SAVE_OUTPUT_TAGS: , CHECK_PRESENCE_ONLY_TAGS: partyId	nationalId:11837	
	Business	BO	Add party note	process.xml	INPUT_XML: addPartyNote.xml, SAVE_INPUT_TAGS: , SAVE_OUTPUT_TAGS: , CHECK_PRESENCE_ONLY_TAGS:	partyId:%partyId%, noteType:CALL-RECEIVED, noteText:Card is not working.	
	Business	BO	Update customer's surname and nationalId	process.xml	INPUT_XML: updateCustomer_allTags.xml, SAVE_INPUT_TAGS: , SAVE_OUTPUT_TAGS: , CHECK_PRESENCE_ONLY_TAGS:	partyId:%partyId%, nationalId:11835, surname:NewSurname	
	Business	BO	Get customer with updated surname and nationalId	process.xml	INPUT_XML: getCustomer.xml, SAVE_INPUT_TAGS: , SAVE_OUTPUT_TAGS: , CHECK_PRESENCE_ONLY_TAGS: partyId	partyId:%partyId%	
	Business	BO	New account and base card	process.xml	INPUT_XML: newAccountAndCard_allTags.xml, SAVE_INPUT_TAGS: nameOnCard creditLimit, SAVE_OUTPUT_TAGS: accountAgreementId accountNumber cardAgreementId cardId, CHECK_PRESENCE_ONLY_TAGS: accountAgreementId accountNumber cardAgreementId cardId	accountOwnerPartyId:%partyId%, cardholderPartyId:%partyId%, creditLimit:100.00, nameOnCard:Base%next%	
	Business	BO	Issuing data synchronization (cards are sent to front office)	run_process	PROCESS_NAME: IssSyncStart, WAIT_ACT: 9020, PROCESS_TIMEOUT: 60		
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Simplification

- Simple reduces errors.
- Simple is more effective.
- Simple is easy to understand, support and reuse.



simple is
beautiful.

Examples of small independent test scripts with purpose:

- To compile.
- To install.
- To run Shell command.
- To extract data.
- To change business date.



Dedicated persons

Different dedicated roles:

- test script developers;
- functional testers for test data definition;
- environment manager;

**One can do his best within dedicated role.
Goalkeeper can not be good forwarder!!**

Automated test data preparation

- Usually requires huge resources.
- Sometimes can be automated. Data could be taken from:
 - Production log files.
 - Production database tables.
 - Certification logs.
 - Can be generated using special scripts. This is a bit risky!



Self documented test data

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	Business	BO	New account and base card	process.xml	INPUT_XML: newAccountAndCard_allTags.xml, SAVE_INPUT_TAGS: nameOnCard creditLimit, SAVE_OUTPUT_TAGS: accountAgreementId accountNumber cardAgreementId cardId, CHECK_PRESENCE_ONLY_TAGS: accountAgreementId accountNumber cardAgreementId cardId	accountOwnerPartyId:%partyId%, cardholderPartyId:%partyId%, creditLimit:100.00, nameOnCard:Base%next%	
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Bad examples – “rakes”

- x **Test data** definition in test scripts.
- x Complicated **test data** definition.
- x **Parameters** definition in test scripts.
- x De-support of used **tools**.
- x **Multiplatform** support.
- x Each good **tester** can be test automation specialist.
- x Regular execution on **several platforms** requires almost xN more maintenance.
- x **Bad communication** significantly decreases efficiency.





Evaluation and evolution

Scope, spend time and defect analysis.

3 dimensions

Scope

- Coverage according to manual test cases
- Coverage according to requirements
- Branch, statement and other code coverage

Spend time

- Real vs Original estimations
- Maintenance hours

Defects

- Manual vs Automated
- Internal vs External
- Analysis of External defects

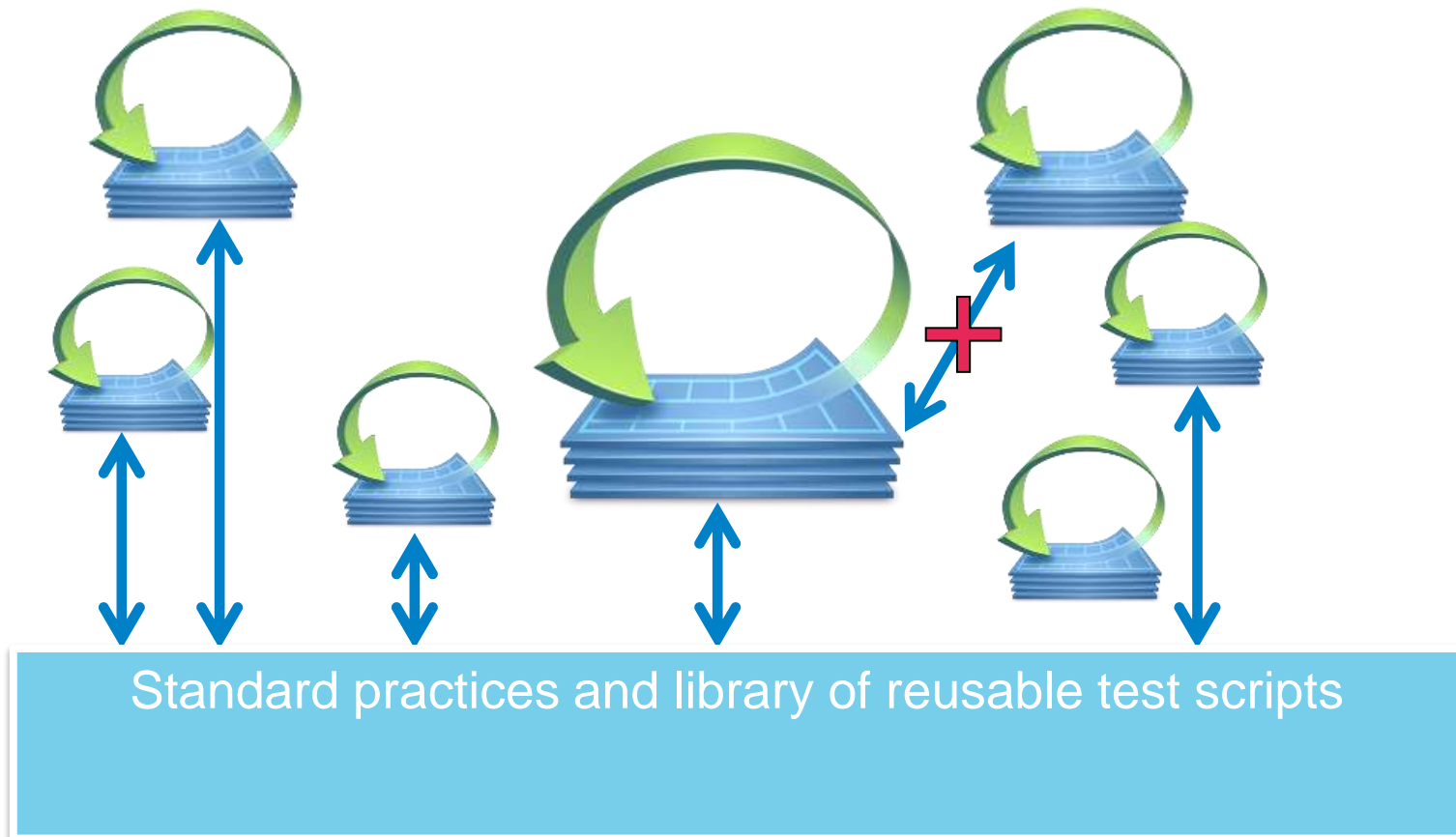


Automated testing similar to sappers



(c) Randall Rice, Rice Consulting Services, Inc, USA

Evolution of complex test automation



Conclusion

Methods, tools, stuff, SUT.

Conclusion

- With test execution on multiple configurations and versions is quite easy to prove necessity of test automation (positive ROI).
- There are good tools, frameworks, but to get reasonable test automation we still need:
 - Applied approaches.
 - Additional tools and stubs.
 - Specialists.
 - Application itself (testability).





**Knowledge.
Passion.
Results.**

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