

Observations from Finnish Testing Practices

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ESPA-seminaari Lappeenranta 17.1.2012



Some interesting facts

In US alone, 21.2 billion USD is annually lost to the direct consequences caused by insufficient testing. (Tassey 2002)

59.5 billion if considering also second-hand damages.

Testing is usually the most costly phase of software development. (Kit 1995)

Testing can be organized relatively efficiently with only 20% of the "optimal" resources (Huang et al. 2002).

Testing has a large influence on the profitability of the software product. (Huang et al. 2002)

Customer satisfaction, public image etc.

Where did this data come from?

12 organizations from the Finnish software industry

- Small to medium, national and international
- From 3-man test consultancies to software product developers to organization building embedded software for the hardware platform to public sector.

31 organization survey

10 organizations in the validation interviews

4 organizations in the development of a framework for selfassessment.

What is testing?



ISO/IEC 29119 Test Process



ISO/IEC 29119 Test Process



Overall, ISO/IEC 29119 processes



Key Figures on Testing (2009 survey)

	Max.	Min.	Median
Amount of employees in the company world- wide	350 000	4	315
Amount of developers and testers in the interviewed local organization.	600	0*	30
Amount of test automation cases from all test cases (%).	90	0	10 (26% av.)
Amount of projects which apply any agile approach (such as SCRUM) (%).	100	0	30
Amount of testing resources against self- defined optimum (has 2 needs 3 = 67%) (%).	100	10	75 (70% av.)
Amount of time from project dedicated solely to the testing activities (%).	70	0**	25 (27% av.)

* 0 = everyone on loan from 3rd party ** 0 = no dedicated time for testing

Key Figures on Testing



Key Figures on Testing



Testing phases are kept

Testing has enough time

We have identified the most important quality attributes.

We have prioritized the most important quality attributes.



On Test planning

	Design-based selection
ers: programmers and	Managers: test and project
	managers
wards agile methods	Leans towards plan-driven
	methods
	Sufficient
commonly	Applied rarely
most decisions done in	Large; most decisions are based
evel.	on company policies or
	customer requirements.
esting process	In the design process
e coverage may become	Test process may become
	laborous to manage
should be tested to	"What should be tested to
smallest losses if the	ensure that the product does
is faulty?"	what it is intended to do?"
	bers: programmers and bwards agile methods commonly most decisions done in level. esting process se coverage may become should be tested to smallest losses if the is faulty?"

How do organizations develop their test process?

Status quo is the preferred state.

Organization size does not matter for process improvement.

Process development is always a risk that costs money regardless of the results, and in many cases not considered productive work.

New concepts can be adopted, if they are reasonably close to the existing process or are at least comparable.

How do the organizations develop their test process?

Organizations do not tend to try out new ideas.

Sporadic development is done when the inconveniences overcome acceptable losses.

Even if the test process feedback is collected, it is often neglected if the process is "good enough".



How could organizations develop their test processes?

Test strategy, test policies and test plan exist in some state in every software organization.

All organizations had defined roles for test plan development.

Test documentation, as defined in the ISO/IEC 29119, is feasible to implement in any test organization.

In practice, the project level application of test processes is closer to the standard than in the organizational level.

Organizations DO NOT generally apply new ideas!

- Only one that would have, no questions asked, was test process consultancy, for which it was a main business area.
- ...And the other test consultancy did not.

Self-assessment framework

Combination of Test Improvement Model (TIM) (Ericson et al. 1997) maturity levels and ISO/IEC 29119 processes.

 \Box Division of activities in processes similar

- Design Objective was to have a assessment system, usable
 - \Box By a small group of people (2-5)
 - \Box In the local organization
 - \Box Without outside assistance
 - □ With a few discussions and meetings
 - □ Within one work day

Self-assessment framework in a nutshell

Level 4, Optimizing

• The organization has activities that aim to optimize the process; activities are done in a manner that is conceptually similar to the standard.

Level 3, Risk-lowering

• The organization has metrics or other methods to enable organization to do risk-lowering and preventative actions in process activities.

Level 2, Cost-effectiveness

• The organization tries to systematically promote cost-effectiveness or increase the efficiency of the process activities.

Level 1, Baseline

• The organization does have documented or at least generally agreed guidelines for these process activities, process is systematically done.

Level 0, Initial

• The organization does not have defined methods for this activity.

Processes

Organizational test process (OTP) develops and manages organizational test specifications, such as test policy and test strategy. It also is responsible for monitoring and controlling lower layers of the process.

- *Test management processes* (TMP) are the project-level management activities in the test process. TMP defines the test planning, test monitoring and control and test completion. They also are responsible for maintaining the test plans.
- *Test planning process* (TPP) is the process which is responsible for developing the test plan. Depending on the project phase, this may be project test plan, or test plan for a specific phase.
- *Test monitoring and control process* (TMCP) ensures that the testing is performed in line with test plan and organizational test documents. It also is responsible for identifying updates necessary for the test plan.
- *Test completion process* (TCP) is the process which includes activities, which are done when testing is completed. It ensures that useful test assets are made available for later use.
- *Static test processes* (STP) describes how static testing activities, such as test preparation, test result review or test follow-up are done. These activities are the "general" activities, which are done to all test cases in all test phases of the project.
- *Dynamic test processes* (DTP) describe how dynamic test activities such as test implementation, test execution, test environment set-up and test incident reporting are done in the organization. These activities are the "practical" activities, which vary between different types of testing.

Self-assessment framework

□Two results:

- □ General maturity and conformance with the standard model.
- □ Process improvement objectives to develop test process.
- □Here is an example of the self-assessment results from one case organization:





Self-assessment results in a nutshell

• Case profile:

OP	ТМР	ТРР	ТМСР	4	
-Test process defined as a "guideline", vague documentation on the topic.	-Management sets focus of upcoming test cases. -Test management can influence on release schedules.	-Test plan based on found issues in previous projects.	-Daily SCRUM meetings regarding current testing issues. -Case status evaluation at the organizational level. -Test focus keeps slipping.		
ТСР	STP	DTP		OP TMP TPP TMCP TCP STP DTP	
-Test completion reports used in development of test plans for next projects. -Effort to increase usage or error reports.	-Amount of test resources sufficient for tasks. -New test cases created according to focus areas defined by management.	-Tests follow test plan closely. -Large amounts of automation to ensure conformance. -Effort to increase amount of test resources like personnel.		Process development suggestions: •Activate organizational level management to address the test process needs in decision making •Define more clearly organization level policies and strategies.	

Self-assessment framework feedback

	Case A	Case B	Case C
Suitability of the framework	+; Generally the applied approach is feasible.	++; Practical approach on quickly and easily assessing the level of different testing tasks.	+; Levels are too universal, but model itself seems to cover everything needed.
Suitability of the assessment levels	 ; In large organization, the levels overlap, unnecessary processes for some organizations. 	+; Usable, although some processes do not need to be better than cost-effective.	-; Levels in general are OK but the definitions should be less ambiguous.
Accuracy of the profile	-; Profile should be more detailed.	+; Profile was accurate enough, although with some differences.	++; The profile represents the organization quite well.
Accuracy of the results	+; This type of feedback is always good for bringing out new ideas.	+; Results seemed usable.	++; Results same or similar to the internal discussions.
Framework development proposals	The assessment unit type and size should be clearly defined.	More definite descriptions for each framework level to reduce overlap.	Assessment needs practical examples and more metric measurements.
Best profiler	Outsider from third party, internal review is not accurate.	At least two manager-level employees; can be used internally.	Quality manager with handpicked group of people, usable internally.

In conclusion

Conclusions, Test policy and strategy

 The test policy along with the strategy are an operating plan to define the objectives, methods, and resources of testing within a organization.

The organizational documents are used in project level, where practical applications are made out of the objectives, methods and given resources.



Conclusions, Observations on Testing Practices

- Organizations do not develop their processes unless they really need to.
- Testing-focused standards and certificates are not widelyspread, even if the organizations do have generally positive attitude towards them.
- If feedback is collected, it may be completely ignored if the process is "good enough".
- Software criticality, development method or outsourcing do not affect to the perceived quality for a large degree.
- Test automation is a double-edged sword; if it works, it is a useful tool, but if it does not, it may become a costly misadventure.
 - Test automation should not be considered a "front-line testing tool", it is a quality assurance mechanism.

Conclusions, Observations on Testing Practices

- There are two stereotypical methods of designing a test plan: risk-based and design-based approaches.
- If testing can be reasonably effective with only 20% of the optimal resources, and the average for test resources is 75% (2009 survey), the problems nowadays are more likely caused by ineffective way of doing testing, not because of missing resources.
- Some form of test strategy, test policy and test plan exist in every organization that does testing.
 - Development can be considered to be the main source of quality, testing ensures that this "quality potential" becomes the reality.

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MASTO-publications related to the presentation

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