A Quality Assurance Strategy Tradeoff Analysis Method (QATAM)

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Motivation

- In common industry practice a wide range of different software engineering approaches and QA activities exist.

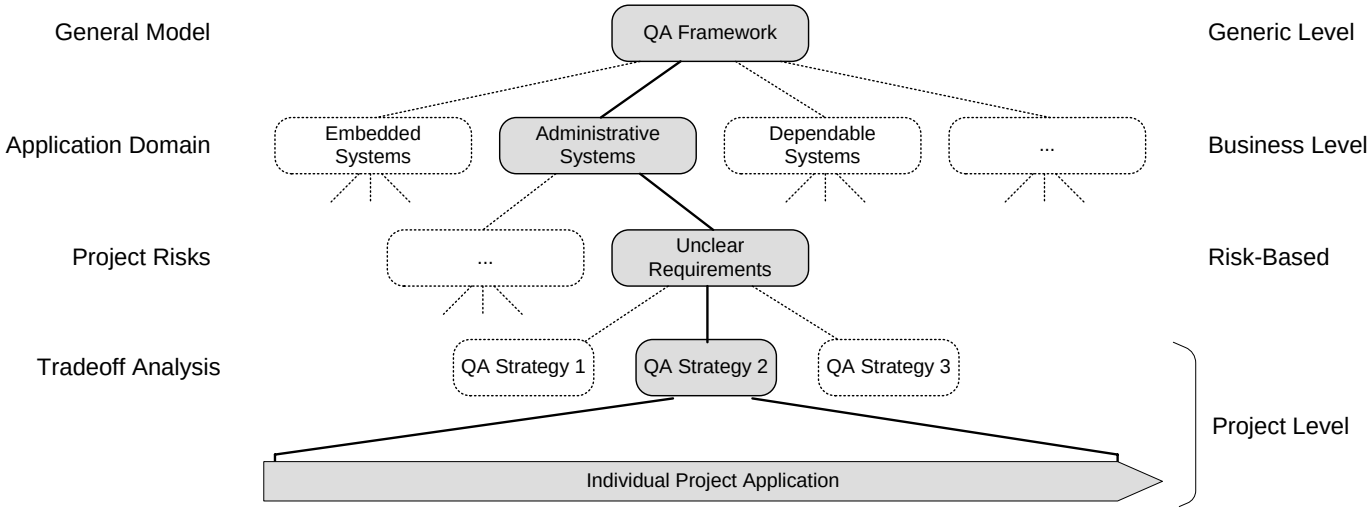
- Need for selecting suitable methods
  - Depending on the project environment (e.g., application domain, risks)
  - Based on sound empirical evidence or the experience of stakeholders.
  - Selected methods (e.g., QA strategies) must be agreed to each other along the development process.
  - Quality attributes must be measurable.

- Decision makers need to assess and compare the overall effects of QA method combinations and the tradeoffs between involved QA activities based on project risks.

→ Need for an analysis technique to assess different QA strategies (QA processes) and to identify tradeoffs of individual methods.

What is QATAM ?

- Quality Assurance Tradeoff Analysis Method (QATAM) focuses on the analysis of an agreed set of QA approaches in a SE project regarding project risk and tradeoffs.
- QATAM is a vehicle to support Quality Assurance Planning activities



- QATAM is based on SEI's ATAM (architecture tradeoff analysis methods) which assesses different architecture variants against the product requirements ("product variants").
- QATAM supports decision makers in selecting QA strategies ("process variants").

Example Application

- Adaptation of ATAM steps.
- 9 Steps of QATAM

0. Planning & information exchange
1. Scenario brainstorming:
   - definition of win conditions
   - measures for success criteria
   - exit criteria.
2. Initial selection of candidate bundles of QA activities
3. Scenario coverage checking
4. Prioritization and grouping of scenarios
5. Mapping and evaluation of QA strategies regarding prioritized scenarios.
6. Sensitivity point analysis: comparison of different QA approaches
7. Trade-off determination and
8. Summary of promising QA bundles and definition of an action plan

Candidate SE / QA methods

Possible Risks	Software Processes: Agile SE Processes	Software Processes: Traditional SE Processes	Analytical QA activities: Reviews	Analytical QA activities: Inspection	Analytical QA activities: Testing	Constructive SE activities: Pair Programming	Constructive SE activities: Test-Driven Development
Unclear requirements	++	-	n/a	n/a	n/a	++	+
Number of defects found during a review	n/a	n/a	+	++	+	++	+
New Team Members	-	+	+	++	-	++	+

Cut from a Risk-QA method candidate matrix.

Benefits of QATAM & Future Work

Expected Contributions of QATAM

- Repeatable Scenario–based evaluation of capabilities of bundles of QA activities.
- Use of best-available empirical evidence (local experience and/or from research literature) for QA method selection → decision support (sensitivity-point analysis, Trade-off determination)
- Immediate application in industry setting (e.g., Inspection planning framework).
- Further QATAM enables the identification of gaps in empirical evidence. (e.g. no or limited experience of an inspection technique in a specific context).

Future work

- Refine and evaluate QATAM process model in software products in industry context.
- Pilot Study with an industry partner.