Survey on Quality Requirements

In the following survey you will be asked to estimate the relevance of several quality requirements. At each step you will be presented with:

- a quality concern: an interest which pertains to the system's development, its operation or any other aspects that are critical or otherwise important to one or more stakeholders.
- some examples of quality requirements related to the specified quality concern.
- questions related to the quality concern.

The evaluation is subjective and should be based on your personal professional experience. Before expressing your evaluation, please make sure you carefully read and understand the examples given for each quality concern. All information obtained from this study will be kept anonymous.

Motivation
The architecture of a software system is the result of a number of design decisions that aim at satisfying a given set of quality requirements, such as ease of evolution, good run-time performance, and rapid build times. Architecture is rarely explicit in code and alignment between intended and actual architecture is often very difficult to validate and requires consistent human effort.
There have been several attempts to address this problem (e.g. component dependencies: JDepend, Sotograph, Structure 101; performance: JMeter) but there are still many aspects that remain ignored.
Our goal is to develop new ways for expressing and validating quality requirements.
We envision a set of tools that help identifying implementation solutions that break specified architectural requirements. This questionnaire will help us to identify the most relevant and commonly specified aspects of an architecture. This will provide a solid starting point for our research project.

Thanks for your collaboration.

Andrea Caracciolo
caracciolo (at) iam.unibe.ch
quality concern

**Naming conventions**

examples of requirement related to this concern
- Component Interfaces end with the suffix '_CI'.
- Java bean classes end with the suffix 'Bean'.
- File names must conform to the following pattern: [DATE]_[SOME-ID].txt

questions (REQUIRED)

a. **FAMILIARITY**
   Have you ever seen this kind of requirement in a project ?
   - [ ] Yes
   - [ ] No

b. **IMPACT ON PROJECT SUCCESS**
   How important was it to satisfy this kind of requirement ?
   - [ ] 1 No impact on the project
   - [ ] 2 Low impact
   - [ ] 3 Moderate impact
   - [ ] 4 High impact
   - [ ] 5 Critical to project success

questions (OPTIONAL)

c. **FORMALISM**
   How was the requirement specified ?
   - [ ] natural language
   - [ ] semi-formal notation:
   - [ ] common formal notation:
   - [ ] tool-specific notation:
   - [ ] other:

   d. **VERIFICATION**
   How was the requirement validated during development ?
   - [ ] no verification
   - [ ] code review
   - [ ] blackbox test
   - [ ] whitebox test
   - [ ] testing tool:
   - [ ] other:

e. **COMMENT**
   Do you want to share any comment or personal example for this kind of requirement ?

[Next] [Back]
quality concern

**Availability**

examples of requirement related to this concern

- The system must be reachable 99% of the times from 6h00 to 20h00.

questions (REQUIRED)

a. **FAMILIARITY**
   Have you ever seen this kind of requirement in a project?

   - Yes
   - No

b. **IMPACT ON PROJECT SUCCESS**
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questions (OPTIONAL)

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   - other:

e. **COMMENT**
   Do you want to share any comment or personal example for this kind of requirement?

   

Back   Next
quality concern

**Response-time**

examples of requirement related to this concern
- The system is time-critical and has to answer each request within 10 ms.
- The rendering operation has to be completed in less than 4 ms.

questions (REQUIRED)

a. FAMILIARITY
Have you ever seen this kind of requirement in a project?

- [ ] Yes
- [ ] No

b. IMPACT ON PROJECT SUCCESS
How important was it to satisfy this kind of requirement?

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questions (OPTIONAL)

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e. COMMENT
Do you want to share any comment or personal example for this kind of requirement?


quality concern

**Throughput**

eamples of requirement related to this concern

- The system must be able to execute a certain task 10'000 times per hour.

questions (REQUIRED)

**a. FAMILIARITY**
Have you ever seen this kind of requirement in a project?

- [ ] Yes
- [x] No

**b. IMPACT ON PROJECT SUCCESS**
How important was it to satisfy this kind of requirement?

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- [ ] other: ______________________

**e. COMMENT**
Do you want to share any comment or personal example for this kind of requirement?

______________________________
quality concern

Recoverability

effects of requirement related to this concern

- The system has to be operational again within 1h after a crash.

questions (REQUIRED)

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- Yes
- No

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- other:

e. COMMENT
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-space for comment-

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quality concern

**Dependencies**

examples of requirement related to this concern

- Component A cannot invoke method X of component B
- Service A can only interact with service B
- Maven artifact A is not allowed to depend on any other artifact.

questions (REQUIRED)

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e. **COMMENT**
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-
# Quality Concern

**Signature**

Examples of requirement related to this concern:

- The web service must have the following parameters: Amount (xsd:double), Currency (xsd:string).
- The interface of the component must provide the following methods: push(Message), pull():Result.

**Questions (REQUIRED)**

**a. Familiarity**
Have you ever seen this kind of requirement in a project?

- [ ] Yes
- [ ] No

**b. Impact on Project Success**
How important was it to satisfy this kind of requirement?

- [ ] 1 No impact on the project
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**Questions (OPTIONAL)**

**c. Formalism**
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**d. Verification**
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- [ ] other:

**e. Comment**
Do you want to share any comment or personal example for this kind of requirement?

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**Back**

**Next**

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http://scg.unibe.ch/survey/survey.php?id=11112&q=7
quality concern

**File location**

tool-specific notation:

questions (REQUIRED)

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quality concern

**Data structure**

examples of requirement related to this concern
- Dependencies must be specified in the configuration file in the following way: `<dependency>
  <groupId>...</groupId>
</dependency>`
- The database schema must conform to a specified ER diagram

questions (REQUIRED)

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questions (OPTIONAL)

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e. **COMMENT**
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quality concern

**Meta-annotation**

examples of requirement related to this concern

- Attributes of type `DateTime` must be annotated with `@CustomDate(format = "d-m-Y")`.
- Data transfer object classes must be annotated with `@DTO`.

questions (REQUIRED)

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e. **COMMENT**
Do you want to share any comment or personal example for this kind of requirement?

[Input field for comment]

[Buttons]

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quality concern

**Communication**

examples of requirement related to this concern
- Communication must be synchronous; protocol used must be HTTPS
- Data is exchanged between layers using DTOs.

questions (REQUIRED)

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questions (OPTIONAL)

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**e. COMMENT**
Do you want to share any comment or personal example for this kind of requirement?

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quality concern

**Data integrity**

examples of requirement related to this concern
- Instance values of datatype IBAN must start with an ISO 3166-1 country code.
- Attributes with annotation @date must conform to the following pattern: dd-mm-yyyy.

questions (REQUIRED)

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quality concern

**Data retention policy**

elements of requirement related to this concern
- Logs can only be deleted after 10 weeks.
- Only the last 4 digits of a credit card number can be stored.

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quality concern

Accessibility

examples of requirement related to this concern

- The web front-end must be accessible to color blind users.

questions (REQUIRED)

a. FAMILIARITY
Have you ever seen this kind of requirement in a project?

- Yes
- No

b. IMPACT ON PROJECT SUCCESS
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Next
**Visual design**

examples of requirement related to this concern

- The web front-end must comply to the standard corporate design guidelines.

questions (REQUIRED)

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quality concern

Event handling

extamples of requirement related to this concern

- Exceptions of type MyException must be handled within the layer where they were generated.
- Each file download must be logged in downloads.log.

questions (REQUIRED)

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   - Yes
   - No

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http://scg.unibe.ch/survey/survey.php?id=11112&q=16
quality concern

**Authorization**

topics of requirement related to this concern

- Access to the service is restricted to users having role A or being part of group B.

questions (REQUIRED)

a. **FAMILIARITY**
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   - Yes
   - No

b. **IMPACT ON PROJECT SUCCESS**
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quality concern

**Authentication**

examples of requirement related to this concern

- The user has to confirm his identity using the single sign-on service of the company.

questions (REQUIRED)

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   - Yes
   - No

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Next
### Code quality

Examples of requirement related to this concern:
- Code-coverage for unit tests must be > 85%.
- Average length of javadoc comments for non-accessor methods must be more than 10 words.

#### Questions (REQUIRED)

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quality concern

**Software infrastructure**

examples of requirement related to this concern

- All servers must run RedHat 1.23, Tomcat 1.23, Oracle 1.23.
- Components communicate with each other using CORBA

questions (REQUIRED)

a. FAMILIARITY
Have you ever seen this kind of requirement in a project?

- Yes
- No

b. IMPACT ON PROJECT SUCCESS
How important was it to satisfy this kind of requirement?

- 1: No impact on the project
- 2: Low impact
- 3: Moderate impact
- 4: High impact
- 5: Critical to project success

questions (OPTIONAL)

c. FORMALISM
How was the requirement specified?

- natural language
- semi-formal notation:
- ad-hoc formal notation
- common formal notation:
- tool-specific notation:
- other:

d. VERIFICATION
How was the requirement validated during development?

- no verification
- code review
- blackbox test
- whitebox test
- testing tool:
- other:

e. COMMENT
Do you want to share any comment or personal example for this kind of requirement?

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Next
quality concern

**Software update**

tool-specific notation:

common formal notation:

other:

natural language

semi-formal notation:

ad-hoc formal notation

no verification

code review

blackbox test

whitebox test

testing tool:

other:

FAMILIARITY
Have you ever seen this kind of requirement in a project?

- Yes
- No

IMPACT ON PROJECT SUCCESS
How important was it to satisfy this kind of requirement?

- 1: No impact on the project
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- no verification
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- testing tool:
- other:

COMMENT
Do you want to share any comment or personal example for this kind of requirement?

Step 21 / 22

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quality concern

**Hardware infrastructure**

examples of requirement related to this concern
- Server must have 48GB RAM, 2 x 2.6GHz Intel Xeon processor, 1TB hard disk.

questions (REQUIRED)

<table>
<thead>
<tr>
<th>a. FAMILIARITY</th>
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questions (OPTIONAL)

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Profile & Feedback (optional)

- Email: 

☑ I want to receive updates about major research results

- Role in the company: 

- IT domain: 

- Usually adopted Technology stack: 

- Additional constraints (did we forget to mention any?): 

- Notes (personal comments, clarifications, ...): 

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