

Requirements Quality & Reuse

(by The REUSE Company)



In most projects, **rework** is one of the most consuming tasks. Implementing software reuse and quality assessment tools to requirements represents a way to reduce rework cost.

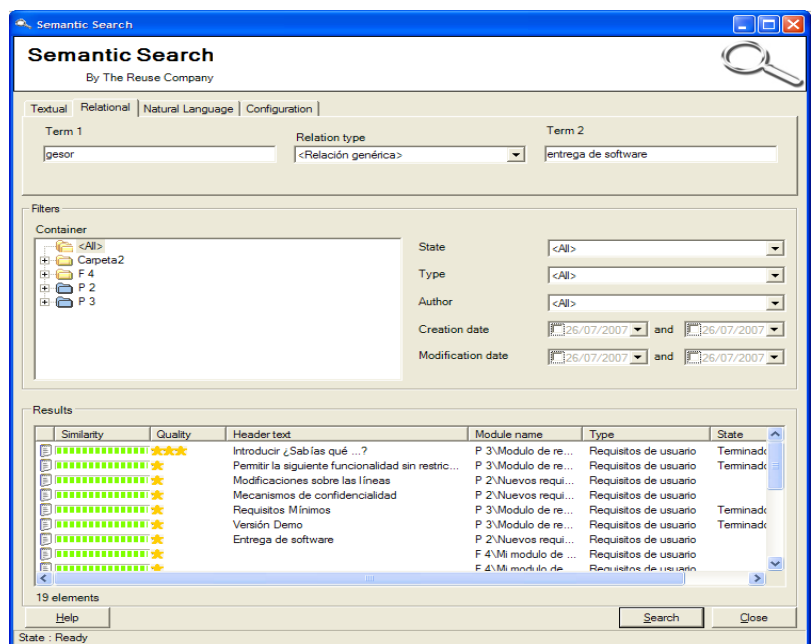
Apply reuse and early quality assessment to requirements specifications for drastically reducing rework load.

Requirements Reuse

According to Barry Boehm's lessons, there are three main things we can do to enhance the efficiency of our projects: work more rapidly, in a more clever way, or either work less. We can clearly see that software reuse is the answer to the last statement, even though it could be the answer for all of them.

Now, thinking about reuse, why not reusing the most valuable assets in our organizations?: **requirements**.

If we follow, in a parallel way, those best practices stated in CMMI related to Requirements Management (REQM) such as tracking changes to requirements, and tracing requirements with other life-cycle assets, the value of requirements reuse is even higher. Boehm estimates a cost reduction of about 47%.



Black box reuse, as well as COTS (*Components Off-The-Shelf*) reuse, is, according to Boehm, a very interesting reuse strategy. Nevertheless, both of them are mainly applied to source code and executable components. On the other hand, applying **Requirements reuse** can provide straightforward benefits in **productivity** through improvements in costs, time and quality. In order to provide requirements reuse, the following techniques are available:

- **Semantic treatment of requirements:** Advanced PLN technology allows representing requirements with a high level semantic precision. A retrieval model allows to search similar requirements by content, within a common repository where all the requirements are indexed. If you accomplish **post-mortem analysis** (debriefing) and **traceability** with other assets in the life-cycle, it can be possible for you to reuse not only the requirements attributes, descriptions and relationships with other requirements, but also tests.
- **Requirements patterns:** several studies state that at least 10% of the new requirements in a new project have been somehow designed in previous projects. What is the value of this 10%? If you pack these requirements, together with their risks, tests, designs, code... into a requirement pattern, the pattern repository can easily become into the most valuable asset for your organization. Patterns can be involved in your new projects with a couple of mouse clicks.
- **Parameterized requirements:** represent an added-value tool for our patterns. They allow us to store requirements with parameters allowing your analyst to state a value for every variable when the reused requirement is being instantiated.

Requirements Quality Analyzer

The requirement can be considered one of the most valuable assets within our organization. Not only describes constraints and compulsory statements, but also our business models and rules. An error during its capture, elicitation or management could represent a serious problem with unpleasant consequences. One of the most common techniques to avoid this risk is the clear definition of the desirable features of a requirement.

- **Complete:** describes the whole customers situation
- **Consistent:** without internal conflicts between requirements
- **Correct:** describes accurately and exactly the customer's situation and need.
- **Modifiable:** Documented in a structured and accessible manner.
- **Verifiable:** it must be very simple to determine the success/failure property for every requirement.
- **Traceable:** with whatever number of artifacts used in the life cycle
- **Not ambiguous:** The requirement should only be understood in only one way.

However, could these features be measured in an objective way? Is it possible to automate the measurements? The Reuse Company offers its technology to achieve this goal, enabling the systematic qualification of requirements by measuring:

- **Over specifications Detection:** including design terms, pseudo code etc, in the body of the requirement
- **Speculative sentences:** i.e. usually, generally, typically...
- **Conditional concepts location:** i.e. perhaps, probably...
- **Imperative verbs usage vs. Conditional Verbs usage**
- **Too many negations in the text**
- **Ambiguous terms:** 'enough', 'sufficient', 'sure', 'usable'...
- **Existence or absence of domain terms** (based on conceptual maps)
- **Existence or absence of domain verbs:** (based on conceptual maps)
- **Multiple needs within a particular requirement**
- **Not complete sentences:** 'later on', 'in the future'...
- **Requirement size**
- **Text Legibility**
- **Number of dependencies:** between every requirement and other Project actives
- **Volatility:** Number of versions generated after the acknowledge of a requirement
- **One unique verb by requirement:** acknowledging a single need within a requirement.
- **Reduction of acronyms and technical terms**
- **Over usage of hierarchical levels**

Those indicators clearly affect the desirable features of every requirements specification. Their correct and automatic measurement will produce a framework for **measuring and improving the quality** of the organization's projects.

The Reuse Company's Quality tool will allow you to measure the quality of a particular requirement or a group of them. This will also allow you to early detect low quality requirements, indicating ways and tips for re-writing them. Therefore, the cost of **rework** will be dramatically reduced.

The quality management information can be sampled at a project level, or at an engineer level, offering tips for **process improvement**.

