

Requirements Management 101

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Requirements Management 101

The following is an excerpt from the book [Practitioner's Guide to Requirements Management, Part I: Requirements Planning](#), written by the authors.

Overview

Requirements management, like project management, is a discipline comprised of inputs and outputs, tools, and techniques, processes and activities, but just for business analysis activities. Requirements management includes the planning, monitoring, analyzing, communicating, and managing of those requirements. Get a quick introduction or refresher on this important topic.

Just as planning is a key component of project management, it is also a key component of requirements management. The key output from requirements planning is a requirements management plan, which on large projects can be a formal set of documents with many subsidiary plans, such as a business analysis communication plan, business analysis risk plan, estimates for the business analysis work effort, and many more. On smaller efforts the requirements management plan can be an informal roadmap. In either case, it is subsidiary to the overall project management plan. *Figure 2.1* shows the Requirements Management Plan in relation to part of the overall project plan.

Requirements Management
The discipline of planning, monitoring, analyzing, communicating, and managing requirements.

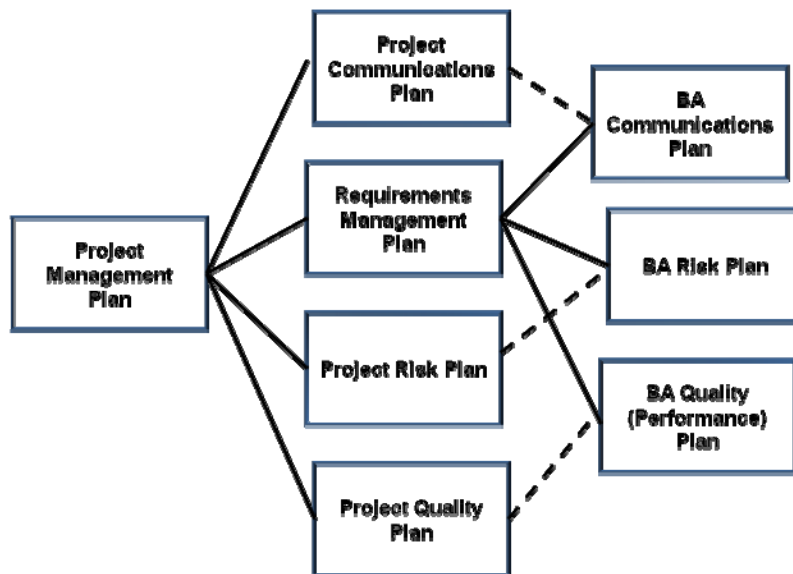


Table 1 Requirements Management Plan in Relation to the Project Plan

What makes a Good Requirement?

In order for a requirement to be worth managing, it must be useful. To be useful, a requirement has to be understood by all key stakeholders. Sponsors and business subject matter experts need to know that the

ultimate solution will solve their problem and meet their objectives. Developers need to understand how to design and build the product. The testing staff needs to be able to find and remove any defects the product may have. Change managers (Human Resources staff, consultants, project managers) need to understand how the end product will affect the organization. If a requirement is not clear, some or all of the components that comprise the product could be defective.

It has been said that a good requirement is SMART. That is, it is specific, measurable, attainable/achievable, reliable/realistic, and testable/traceable/time constrained. There are other characteristics listed in the BABOK® (Business Analysis Body of Knowledge) Guide. We have another mnemonic to help you remember the essence of what a good requirement is. We use the analogy of a mermaid, the mythological being who, according to some legends, lured humans underwater. For the sake of our analogy we say that a mermaid wants “to tease under the seas.” So how is a mermaid like a good requirement? “To tease” refers to two requirements characteristics starting with the letter “T.” Under the “seas” refers to the requirement characteristics that begin with the letter ‘C.’ There are seven of these characteristics in all that comprise a good requirement. The “Ts” and “Cs” look something like this:

The mermaid’s goal:

“To tease under the seas”



Figure 2 Characteristics of a Good Requirement

A description of each of these characteristics follows.

Clear

Clear means that there is no ambiguity about the requirement. A clear requirement is interpreted the same by any two people who are not confused by the wording of a requirement. A clear requirement is unambiguous when it is not open to multiple interpretations. Ambiguous or nonspecific requirements are difficult to manage because vague requirements allow for designs that do not match the customer’s expectations. The product may match the design exactly, but if the requirements were not specific enough, it will not satisfy the customer. Requirements using units of measure or specific words have reduced ambiguity. So, “less than five seconds” is preferable over “fast,” for example.

In addition, requirements need to be not only specific, but easily understood by all stakeholders. Use of a glossary is helpful, because it reduces ambiguity. Sometimes different interpretations are caused by different meanings for the same words.

Developing a glossary that defines terms can bring to light and clarify many of these hidden misunderstandings. As new stakeholders become involved over the life of the project, a glossary can prevent misinterpretations and increase productivity.



Acronyms that are used but never defined can also make requirements hard to understand, especially by stakeholders less familiar with a particular area of the business. It is very helpful to include an acronym reference list with the glossary, so that those who need to read only a section of the requirements don't have to search the entire document to find the first reference to any acronyms they encounter.

Concise

Requirements that are to the point are more easily understood and less open to misinterpretation than long sentences and paragraphs. Requirements documents are sometimes written in dense paragraph form, thinking that density equates to completeness. It doesn't. Densely written requirements cannot be tested. It is also harder for designers to transform requirements into a workable solution when they are not concise.

Some tips for keeping requirements concise include:

- Keep sentences simple in relationship to number of words and grammatical structure. User stories, for example, are an example of concise requirements.
- Organize and group requirements into a hierarchical list, with high-level requirements broken down into sub-requirements as they are uncovered.
- Remove redundant requirements or clarify requirements that seem similar but are really unique.
- Use graphical models, diagrams, and prototypes where appropriate.



Consistent

A consistent requirement is one that does not conflict with any others. For example, if a requirement states that banking customers can receive three free paper bank statements for each owner each quarter, then we cannot have another requirement stating that customers will be charged a fee for duplicate paper statements. In addition, words need to be consistent throughout the requirements document. Again, user stories have a consistent format, as do requirements lists using the convention of “the system shall...”

Confirmed (verified for correctness and validated against objectives)

A confirmed requirement is one that:

- Is approved by appropriate stakeholders. Requirements that are not documented and read cannot be validated by the stakeholders because the meaning is subject to change through time and verbal “re-telling.” Unambiguous and concise requirements also help reduce confusion and misunderstanding so that it becomes easier for stakeholders to read and determine that requirements are valid.
- Is approved by the sponsor. Before actual signoff, the sponsor or sponsor delegate reviews and confirms the requirement.
- Is aligned with the business problem it helps solve as well as the project objectives to validate the requirements.

- Is approved by the project control board, or the body that has been set up to handle changes. As new requirements surface, they are not valid until approved following an agreed-upon authorization process.
- Describes what is needed rather than how the need will be satisfied.

Complete Requirements

To be complete, a requirement must:

- **Have attributes** or facts about it. These would include important information such as a unique number to easily reference it in other project and product documents, a textual description, the priority of each requirement, who requested each requirement, the source, the rationale, and the current status of each requirement, to name a few.
- **Produce no further questions** from the stakeholders. In other words, sponsors, domain experts, technical staff, testing personnel, etc. should all be able to read the requirements without having any additional questions.
- **Be documented**, to avoid “the amnesia syndrome,” which occurs when stakeholders approve requirements in a meeting, and then conveniently forget that they approved them. Documentation provides a reminder of which requirements have been approved.

Traceable

Requirements traceability is a structured way to keep track of requirements. It has been defined as “the ability to describe and follow the life of a requirement, in both a forward and backward direction, i.e., from its origins, through its development and specification, to its subsequent deployment and use, and through periods of ongoing refinement and iteration in any of these phases¹.”

Before explaining in more detail, let’s look at how requirements link at various levels. Below is a table which shows requirements linkage.

Requirement Level	Linkages
High-level requirements	Business problem
	Business objectives
	Project objectives
	Detailed requirements
Detailed requirements	Higher-level requirements
	Lower-level requirements
	Design
	Development
	Test scenarios, cases, scripts
	Acceptance test criteria
	Deployment plan

Requirements Traceability

The ability to track a requirement through the development life cycle. This includes backward to the business need and forward through development.

¹ IEEE Standards Software Engineering, IEEE Standard Glossary of Software Engineering Terminology, IEEE Std. 610-1990, The Institute of Electrical and Electronics Engineers, 1999, ISBN 0-7381-1559-2, CMMISM for Systems Engineering/Software Engineering, Version 1.02 (CMMISW/SW, V 1.02); CMMI Staged Representation, CMU/SEI-2000-TR-018, ESC-TR-2000-018; Continuous Representation, CMU/SEI-2000-TR-019, ESC-TR-2000-019; Product Development Team; Software Engineering Institute; November 2000

	Verification plan
	WBS task
	Resource plan
Changes	All of the above

Figure 1 Examples of Requirements Linkages

As the above table shows, requirements are traced back to their source, to themselves as detailed requirements are discovered, and throughout the project. Tracing requirements back to their source is sometimes called backwards or upwards traceability and involves linking requirements to the identified business problem, business objectives, and project objectives. *Figure 4* illustrates the concept of backwards traceability.

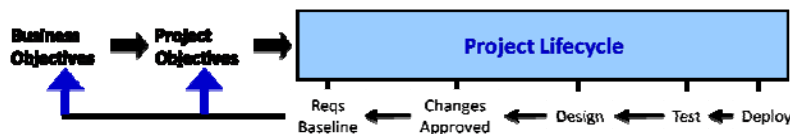


Figure 2 Backwards Traceability

Tracing requirements throughout the project is called forwards allocation or forwards traceability and involves documenting the linkage between the requirements and other requirements, and requirements to the design, development, testing, and deployment work products. *Figure 5* illustrates the concept of forwards traceability.

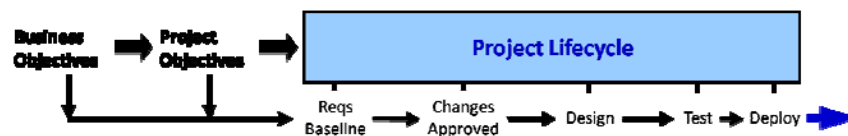


Table 3 Forwards Traceability

Requirements traceability aids requirements management in ensuring that each requirement:



- *Adds value.* Tracing requirements to their source can help teams easily determine which requirements are relevant to solving the business need for which the project has been undertaken. Each requirement is traced back to business strategy, vision, and objectives to help keep the project doing all the right things and only the right things.
- *Belongs in the approved scope.* Since requirements and subsequent work products can be traced to their source and to higher-level requirements, it is easier to see which requirements belong to the project and which do not belong. Those that cannot be traced do not belong in the project. Scope management is one of the biggest project challenges, so traceability is a useful tool in controlling scope.
- *Is actually delivered at the end of the project or project phase.* Tracing the approved requirement as they are developed, tested, and implemented helps point out where they have or have not been included in the final product. Once the right requirements have been identified and agreed upon, it is important to ensure that all the pieces needed to satisfy those requirements are designed, built, tested, and delivered.

Traceability also aids in determining impacts and interrelationships, so that:

- The cost of each requirement and requested changes can be more easily estimated.
- Testing coverage can be planned.
- Risks can be more easily identified, and a risk response plan developed.

In sum, traceability has many benefits, such as making requirements easier to manage, easier to read, and more concise. Although there are many techniques for creating structure from chaos, traceability provides one of the most effective way to organize large amounts of disparate pieces of information.

Traceability Tip
Use traceability to help ensure that each requirement is linked with project deliverables, project objectives, business problems, and business objectives, thereby preventing rogue requirements from sneaking into the project.

Testable

Once traced, requirements can be more easily tested. “Testability” is the ability to prove that results meet the originally stated requirement. In order to test a requirement, it needs to be written clearly and specifically, and it needs to be attainable, or reasonable. For example, clients cannot expect the same transaction time they would get in a business intelligence application that they would get in an operational system, because such times are not attainable in most business situations.

A requirement should not be considered complete until it is deemed testable. Once a requirement is deemed testable, it then needs to be tested. All testing documentation, from test plan/test design to test script, needs to reference and test every requirement associated with that document, ensuring that the requirements are substantiated as being met throughout its development.

Figure 6 shows a summary of characteristics for good requirements.

Requirements Characteristic	Description
Clear	No ambiguity about the requirement. Not open to multiple interpretations. Using units of measure or specific words helps reduce ambiguity.
Concise	Brief, and to the point. Well-organized. Use models when possible.
Consistent	Does not conflict with any others. Consistent format, whether in text or models.
Confirmed	Approved by appropriate stakeholders, including the sponsor. Aligned with business need. Describes what is needed rather than how the need will be satisfied.
Complete	Produce no further questions from the stakeholders. Are documented. Have attributes or facts about it.
Traceable	Requirements link backwards to business need, and forward through design, build, test, and deployment.
Testable	Ability to prove that results meet the originally stated requirement.

Figure 4 Characteristics of Good Requirements

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For more information on this topic:

- See our course called [Planning and Managing Requirements](#).
- Read our article “**Seven Success Factors for Requirements Planning**” and other articles on requirements management at <http://www.watermarklearning.com/articles.php>.

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