Nonfunctional Requirements

- Performance Requirements
- Safety Requirements
- Security Requirements
- Software Quality Attributes

template

Performance Requirements

- State specific performance requirements for various system operations. Explain their rationale to guide the developers in making appropriate design choices. For instance, stringent database response time demands might lead the designers to mirror the database in multiple geographical locations or to denormalize relational database tables for faster query responses.

- Quantify the performance requirements as specifically as possible—for example, "95 percent of catalog database queries shall be completed within 3 seconds on a single-user 1.1-GHz Intel Pentium 4 PC running Microsoft Windows XP with at least 60 percent of the system resources free."

Safety Requirements

- In this section, specify those requirements that are concerned with possible loss, damage, or harm that could result from the use of the product.

- Define any safeguards or actions that must be taken, as well as potentially dangerous actions that must be prevented. Identify any safety certifications, policies, or regulations to which the product must conform. Examples of safety requirements are

- **Ex:** The system shall terminate any operation within **1** second if the measured tank pressure exceeds 95 percent of the specified maximum pressure.

Security Requirements

- Specify any requirements regarding security, integrity, or privacy issues that affect access to the product, use of the product, and protection of data that the product uses or creates

- **Ex:** Every user must change his initially assigned login password immediately after his first successful login. The initial password may never be reused.

Software Quality Attributes

- State any additional product quality characteristics that will be important to either customers or developers.

- These characteristics should be specific, quantitative, and verifiable. Indicate the relative priorities of various attributes.
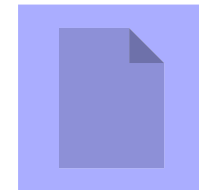
Appendices

- Appendix A: <u>Glossary</u>
- Appendix B: Analysis Models
- Appendix C: Issues List

Ambiguous Terms to Avoid in Requirements Specifications

acceptable, adequate	Define what constitutes acceptability and how the system can judge this.
as much as practicable	Don't leave it up to the developers to determine what's practicable. Make it a TBD and set a date to find out.
at least, at a minimum, not more than, not to exceed	Specify the minimum and maximum acceptable values.
between	Define whether the end points are included in the range.
depends on	Describe the nature of the dependency. Does another system provide input to this system, must other software be installed before your software can run, or does your system rely on another one to perform some calculations or services?

efficient	Define how efficiently the system uses resources, how quickly it performs specific operations, or how easy it is for people to use.
fast, rapid	Specify the minimum acceptable speed at which the system performs some action.
flexible	Describe the ways in which the system must change in response to changing conditions or business needs.
improved, better, faster, superior	Quantify how much better or faster constitutes adequate improvement in a specific functional area.
including, including but not limited to, and so on, etc., such as	The list of items should include all possibilities. Otherwise, it can't be used for design or testing.
maximize, minimize, optimize	State the maximum and minimum acceptable values of some parameter.

Example 1

- *The Background Task Manager shall provide status messages at regular intervals not less than every 60 seconds."*

After

1. The Background Task Manager (BTM) shall display status messages in a designated area of the user interface.

1.1 The messages shall be updated every 60 plus or minus 10 seconds after background task processing begins.

1.2 The messages shall remain visible continuously.

1.3 Whenever communication with the background task process is possible, the BTM shall display the percent completed of the background task.

1.4 The BTM shall display a "Done" message when the background task is completed.

1.5 The BTM shall display a message if the background task has stalled.

Example 2

- The XML Editor shall switch between displaying and hiding nonprinting characters instantaneously

After

- The user shall be able to toggle between displaying and hiding all XML tags in the document being edited with the activation of a specific triggering mechanism. The display shall change in 0.1 second or less.

Example 3

- The XML parser shall produce a markup error report that allows quick resolution of errors when used by XML novices.

After

1. After the XML Parser has completely parsed a file, it shall produce an error report that contains the line number and text of any XML errors found in the parsed file and a description of each error found.

2. If no parsing errors are found, the parser shall not produce an error report.

Example 4

- The editor shall not offer search and replace options that could have disastrous results

After

- 1. The editor shall require the user to confirm global text changes, deletions, and insertions that could result in data loss.

- 2. The application shall provide a multilevel undo capability limited only by the system resources available to the application.

Example 5

- *Charge numbers should be validated on line against the master corporate charge number list, if possible.*

After

- At the time the requester enters a charge number, the system shall validate the charge number against the master corporate charge number list. If the charge number is not found on the list, the system shall display an error message and shall not accept the order.

Example 6

- The device tester shall allow the user to easily connect additional components, including a pulse generator, a voltmeter, a capacitance meter, and custom probe cards

After

1. The tester shall incorporate a USB port to allow the user to connect any measurement device that has a USB connection.

2. The USB port shall be installed on the front panel to permit a trained operator to connect a measurement device in 15 seconds or less.

Requirement Attributes

List of events / use cases that need this requirement

The type from the template

Requirement #: **Unique id**   Requirement Type: Event/use case #:

Description: **A one sentence statement of the intention of the requirement**

Rationale: **A justification of the requirement**

Source: **Who raised this requirement?**

Fit Criterion: **A measurement of the requirement such that it is possible to test if the solution matches the original requirement**

Customer Satisfaction: Customer Dissatisfaction:

Dependencies: **A list of other requirements that have**   Conflicts: Other requirements that cannot be implemented if this one is
some dependency on this one

Supporting Materials: ———— **Pointer to documents that illustrate and explain this requirement**

History: **Creation, changes, deletions, etc.**

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Degree of stakeholder happiness if this requirement is successfully implemented.
Scale from 1 = uninterested to 5 = extremely pleased.

Measure of stakeholder unhappiness if this requirement is not part of the final product.
Scale from 1 = hardly matters to 5 = extremely displeased.