Definition and Guidelines for Requirements Traceability

I. Definition and Benefits

A requirement is *traceable** if the following information is documented and available: the source of the requirement; why the requirement exists (rationale); what requirements are related to it; and how the requirement is met in the system design, implementation, and user documentation. Because requirements must be verified, traceability to test is required.

Benefits of maintaining requirements traceability include better customer satisfaction and lower system development costs (by avoiding effort on nonrequired capabilities, by reducing rework, and by making testing more efficient). Experience has shown that investment in good requirements management practices is always cost-effective.

II. Guidelines for Requirements Traceability

A. Record requirements' sources and rationale.

A requirement's source can be a stakeholder need, an organizational quality standard, a specification, a statement of work, technical documentation, incident reports, or other requirements. The rationale of a requirement summarizes the reasons why that requirement has been specified.

B. Use checklists for requirements analysis.

Checklist-based analysis incorporates our experience to check systematically each requirement to speed the analysis process. It reduces the chance of errors. It avoids rediscovering problems we have already encountered.

C. Prioritize requirements.

Assigning priorities helps stakeholders decide on the core requirements for the system. Priorities help focus negotiation meetings and help resolve disputes between stakeholders. This also helps designers to decide on the system architecture and helps to resolve design conflicts.

D. Provide standard templates for describing requirements.
E. Uniquely identify each requirement.
F. Define traceability policies.

   Traceability policies define the information that should be maintained; the techniques to maintain it; and a description of how to handle and document exceptions.
G. Maintain a traceability manual.
H. Classify requirements using a multidimensional approach.
I. Use a data dictionary (a computer-maintained list of names with information about them).
J. Document the links between stakeholder requirements and the system. Linking the requirements to a system model increases the traceability of the system. When user requirements change, it is easier to assess the impact and estimate the costs of the proposed changes. Also, the development of a system model often reveals requirements problems.
K. Use a requirements tool/database to manage requirements and to maintain traceability.

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*The ANSI/IEEE Standard 830-1984 definition of requirements traceability is "A software requirements specification is traceable if (i) the origin of each of its requirements is clear and if (ii) it facilitates the referencing of each requirement in future development or enhancement documentation."