Requirement Metrics—Value Added

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Actions in the requirements phase can directly impact the success or failure of a project. It is critical that project management utilize all available tools to identify potential problems and risks as early in the development as possible, especially in the requirements phase. The Software Assurance Technology Center (GSFC) and the Quality Assurance Division at NASA Goddard Space Flight Center are working on developing and applying metrics from the onset of project development, starting in the requirements phase. This talk will discuss the results of a metrics effort on a real, large system development at GSFC and lessons learned from this experience. The development effort for this project uses an automated tool to manage requirements decomposition.

This report focuses on the metrics used to assess the requirement decomposition effort and to identify potential risks. The objective of the requirement assessment was to: determine how requirements were being distributed across planned releases, determine to which release the most requirements were allocated, and characterize the expansion of requirements from one level to the next. This report illustrates the requirement metrics development and its application with examples from a large software development effort and shows how the derived metrics were used to identify some areas of project risk.

This report discusses how metric analysis in the requirements phase can be accomplished on any government or industry project. The use of an automated tool to manage requirement development facilitation of metrics for improved insight into development and risk assessment will also be expanded.

Eliciting Requirements: Beyond the Blank Sheet of Paper

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This report will show how we have successfully avoided the "blank sheet of paper" problem in eliciting business requirements. We did this in a context in which we had explicitly separated business specification ("analysis") from solution specification ("design"); in producing a precise, compact, understandable, yet complete business specification for a non-trivial business problem; and in which business analysts of a non-consulting company became self-reliant and comfortable with the approach in a reasonably short period of time. More generally, "research" terminology (e.g., "invariant", "generic relationship") essential for writing such a specification was quickly understood and freely used by all industry participants.

The "blank sheet of paper" problem can appear when a requirements engineer is entering an uninvestigated business area, or is bombarded by a large, unstructured body of material. Elicitation of requirements demands the adoption of an appropriate frame of reference and "units of thought". In the absence of existing materials, the "unit of thought" is absent and candidates may be unclear. Conversely, when bombarded with inappropriately structured materials (frequently including concepts beyond-the-scope of the business problem) in the form of examples, scenarios, state machines, message definitions and so on, there may be too many candidate units of thought, all of which may be inappropriate for elicitation.

We will show how business patterns help to produce complete, explicit and rigorous business specifications understandable by both business users and system developers. These specifications require rigorous expressions of behavioral semantics - that is, assertions - rather than loose, "intuitive", descriptions. We will present examples of both elementary patterns - such as "composition" - and non-elementary patterns - such as "assessment" and "information gathering". Unlike typical programming constructs, instantiations of business patterns are inherently interactive and so must adapt to their changing environment.

Selection of an appropriate pattern for eliciting the requirements of a particular business situation provides a structured - and unambiguous - way to understand the problem and specify an appropriate information management solution: the sheet of paper is no longer blank. Equally, in using requirements specified in this way, readers familiar with the patterns (perhaps encountered elsewhere in the requirements for the same project) can reuse their own knowledge; all readers benefit from the clear separation of overall structure from details specific to a particular application of the pattern.

1090-705x/97 $5.00 © 1997 IEEE