Requirements Definition: The Essential Precursor to a Successful Project

by Ray Wright

In many instances, the greatest contributing factor to the failure of a project is the failure to define its target goals at the project's outset. Defining goals is carried out in the project phases of requirements elicitation and requirements definition. Each of these phases may be revisited in several iterations within the project life cycle, but it is essential that they are clearly and thoroughly defined as the first step in the project. If the needs of the users are not thoroughly understood and described before development begins, then it is likely that the end results of that development will not meet the users' requirements and expectations. The requirements definition document must define the boundaries of the system and identify the scope and constraints of the proposed solution. ESI Technology Corp. in Natick, MA is now providing this structure to the DoD's project of transforming the CHCS application to object technology.

The sources for requirements capture are the customers and potential users of the proposed system. Effective communication with the interested parties must be established and utilized. Useful techniques for eliciting the users' view of their requirements are interviews, questionnaires and workshops.

The developers' understanding of the users' requirements must then be communicated back to the users. A formal way of organizing and documenting the requirements is needed, with the resulting document becoming the contract between customers, users and developers. Current best practice, especially when developing object oriented systems, is to identify requirements through the development of a "use case" model that describes a set of use cases that is representative of the significant behavior of the whole system. Each use case describes the behavior of the system in a particular set of circumstances and defines how the system interacts with external entities called actors. Accompanying each use case diagram should be a textual description of the use case. In addition to the use case model, a supplementary requirements specification is also needed to capture system behavior which does not fall within the functional descriptions contained in the use case model. Defining a common vocabulary to be used in all textual descriptions is a useful way of maintaining consistency and avoiding misunderstandings.

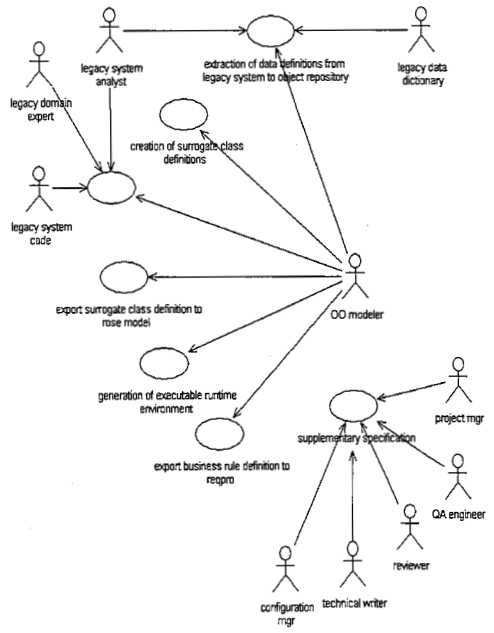
A notation for developing use case diagrams is part of the Unified Modeling Language (UML), which is the de facto standard for object oriented analysis and design.

Actors are identified by examining all external entities with which the system interacts, such as:

(1) Primary users (the users of the system's major functions)
(2) Secondary users (the users of the system's supporting and administrative functions)
(3) External systems (hardware, software or both)

Each actor should be given a name which concisely describes their role and should be described succinctly in terms of their needs and requirements.

Use cases are identified by considering the needs of the actors. These needs can be categorized by what the actors need to do; what data they need to access; what external events the actor will need to inform the system about and what system events the system needs to inform the actor about. As with actors, each use case should be named and described in the language of the common vocabulary.



Use Case Example 1.1

The next steps in this process are to:

(1) Describe which actors will communicate with each use case

(2) The direction this communication will take

(3) The results of the communication

When the use cases which constitute the use case model have been described an important next step is to review them to identify common patterns of behavior. These common behaviors can be abstracted into general meta-level use cases.

The end result of the requirements definition process should be a rigorous, complete description of the users needs.

If the requirements definition meets these criteria a solid basis will have been established for developing a system.. Furthermore, it should be possible to create and maintain realistic budgets and timelines, resulting in systems delivered on time and within budget. M

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