During the process of software development, developers use softgoals and inter-dependencies to analyze and record in a softgoal interdependency graph their intentions, design alternatives and tradeoffs and rationale. The evaluation procedure is then used to determine if their softgoals have been met.

In this chapter, we present the remaining components of the NFR Framework: refinement methods and correlations. These two components help the developer generate a softgoal interdependency graph, by allowing for knowledge about ways of softgoal refinements and their interactions to be captured, catalogued, tailored, reused and improved. They show the impact of one softgoal upon another.

Refinement methods and correlations can be defined, collected and organized into catalogues. Catalogues are then available for sharing, reuse and adaptation, within the same application contexts and across different ones. This helps alleviate time-consuming and often difficult searches for know-how.

Refinement methods and correlations elaborate existing graphs. This is done by using the developer’s expertise and knowledge about the domain and functional requirements, while considering elements of the graph. Applicable patterns are examined, and appropriate methods and correlations are selected.

Refinement methods are used by the developer to refine and extend a particular portion of a graph. Methods can be taken from catalogues or from the developer’s expertise.
Correlation rules, in contrast, may elaborate any part of an existing graph. The graph is examined for patterns which are matched with a catalogue of correlation rules. This matching can be done by a developer “by hand,” or can be done by a software tool.

The chapter concludes with a discussion of the overall process of using the NFR Framework, and a review of work which is related to the Framework.

4.1 REFINEMENT METHODS

Refinement methods (or methods) are generic procedures for refining a softgoal or interdependency into one or more offspring. When a number of methods are collected and catalogued, they can offer appropriate vocabulary and subject matter for dealing with NFRs.

Recall that there are three kinds of refinements used to relate softgoals to each other. Section 3.2 presented decomposition, operationalization and argumentation refinements. Three corresponding kinds of refinement methods are applied (used) to guide these refinements:

- **NFR decomposition methods**,  
- **operationalization methods**, and  
- **argumentation methods**.

Methods are used to systematically make refinements, using the three kinds of softgoals and several contribution types.

NFR decomposition methods iteratively refine NFR softgoals into more specific NFR softgoals. When NFRs are sufficiently refined, the developer then uses operationalization methods to satisfice such NFRs. Along the way, design decisions can be recorded using argumentation methods.

During the development process, softgoals may be refined by the developer in an ad hoc manner. However, this can be time-consuming, especially when the know-how for such a refinement is not readily available, as it takes time and effort to search for the source of the know-how. Even when available, the know-how might not be properly encoded, making it harder to be shared, extended, tailored, or reused. Refinement methods help to alleviate these difficulties.

Now we move onto the three major kinds of methods mentioned earlier, namely, NFR decomposition, operationalization, and argumentation methods. Let us start with NFR decomposition methods.

4.2 NFR DECOMPOSITION METHODS

Recall that initial NFR softgoals are often coarse-grained. Thus they do not permit the consideration of tradeoffs and design decisions which normally require more specific details. In addition, initial NFR softgoals can be ambiguous, and invite many interpretations from different groups of people.