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Chapter IV

The Formalization of CAME Architecture

An informal description of a CAME framework based on the service object concept is presented in Chapter 3. Now the focus will be on the representational formalism of a CAME environment that can be used to implement a CAME environment to provide flexible modeling support for information systems design activities. A conceptual framework for a CAME environment using building blocks specification or a ***meta-meta model*** *will be the main concentration in this chapter.*

The modeling techniques that are used to design information architectures of modeling techniques are popularly known as ***meta modeling techniques****. To formalize the informal architectural building blocks of a CAME environment given in Chapter 3, one needs a uniform meta modeling technique capable of specifying the CAME service object primitives. Many examples of such techniques can be found in the literature; therefore, first the arguments for using PSM, task structure and LISA-D (Hofstede, 1993) base modeling technique as the meta modeling technique are stated. The architectural building blocks of the meta-meta model, which represent the service object based theory for CAME environments that can be used to provide a flexible modeling support for information systems design activities are presented in the remainder of the chapter. In this meta meta model the transaction service is not formally specified in order to keep the presentation limited to the method engineering needs. A formal and descriptive specifications of all these basic CAME services are available in Dahanayake (1997). The notational convention of PSM modeling technique is given in Appendix A.*

META MODELING TECHNIQUE

A **meta modeling technique** is a special kind of information modeling technique that is used to represent the way of working and the *structural* and *representational* aspects of the way of modeling of a method. This definition implies that the main distinction between formalization and meta modeling is that a meta model of a modeling technique does not capture the formal semantics of its technique but only the syntactical aspects.

A CAME environment deals with complex application domains, and meta models of techniques often contain complex object types, for example, when decomposition is allowed in a modeling technique. Most meta modeling techniques are incapable of coping with the complex domain of modeling knowledge in a natural way. Welke (1989) gives several examples of concepts in modeling knowledge corresponding to complex structures, for example, the expression of syntactical rules of hierarchical process decomposition in a DFD technique. In such situations a powerful constraint language is more appropriate. The current generation of meta modeling techniques 'flatten' these complex structures, which leads to over specification. In Wijers (1991) it is concluded that the introduction of the notation of complex concept to reduce over specification would be a useful extension to meta modeling techniques.

The representation of the way of working of a modeling technique requires a process perspective, whereas the representation of the way of modeling requires a data perspective. Therefore, to represent such complex meta models of information modeling techniques requires a meta modeling technique with sufficient expressive power.

An important principle that is included in the definition of information modeling is the conceptualization principle (Griethuysen, 1982). This principle states that conceptual models should deal only and exclusively with aspects of the Universe of Discourse. Any aspect irrelevant to that meaning of conceptual model should be avoided. Examples of these conceptually irrelevant aspects are the aspects of external or internal data representation, physical data organization and access, as well as all aspects of particular external user representation such as message formats and data formats.

Conceptuality is an important requirement of the meta modeling technique, because no implementation decisions should have to be made in