

### 3.4.3 Product Family Engineering

The product family engineering element specifies a product family model as a generalization of the software product model. It differs in three respects: (1) it elevates from the project level to the program level, (2) generalizes the representation of a product to an aggregate representation of a product family as a whole, along with an associated means of deriving the representation of an instance product from its representation of the product family, and (3) it encompasses not only software engineering but also systems and hardware engineering as needed to realize a complete product.

The motivation for creating a concrete realization of a product family is that it represents a set of products whose realizations are physically similar but individually differ in aspects of their resulting observable behaviors. Given a notation for representing the common portions of products and how differences are realized, a family is described such that customized instances can be derived.

Differences among instances of a family are characterized by deferred decisions as defined in the decision model element of the domain definition. Any product model fragment that differs among instances of the product family is expressed in a notation that supports resolution according to a predicate over one or more deferred decisions. Such fragments can be viewed as an annotation that can be resolved manually or using an adaptability mechanism (as described in section 4.1).

A partial resolution of the decision model associated with a product family corresponds to the definition of a product subfamily. A representation of a product family for which all fragments have been resolved according some complete resolution of the associated decision model is a representation of the product model for a single instance of that product family.

A family may in principle include instances that are not viable to construct in practice (i.e., being equivalent to a subfamily), in which case another instance that is a sufficiently close approximation to the envisioned instance would have to suffice.

## **Representing a Product Family**

(an adaptable form of a product model based on dec model and sw prod model)

7 model facets (rqmts, openv, design, analytics, components, verif, deliv), all expressed in adaptable form

deriving documents from model content (role of deliv for oper-use docs; dev-use doc in each model facet)

## **Verifying a Product Family**