A Modelica Library Organization Method Supporting Online Modeling and Simulation

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Today, the trend of achieving networked collaborative innovation and design of complex product based on Modelica is predictable in the industrial field. However, the existing file-based Modelica library organization method designed for single-machine environment does not satisfy the model management requirements for dynamic collaborative modeling and sharing under the network environment. Aiming at this problem, a new organization method of Modelica library based on database is proposed. The main principle of this method is that the organization objects are models rather than files. Through interacting with database storing metadata describing models, it is available to achieve model management based on the granularity of single model.
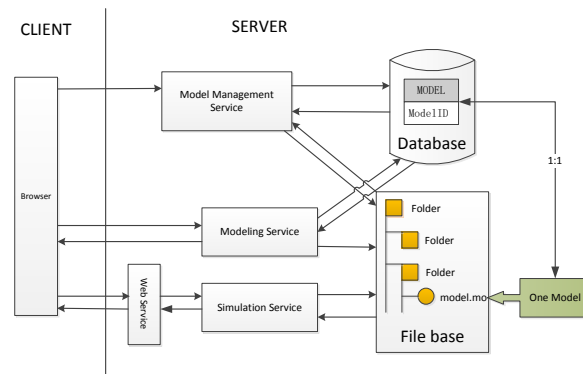

Figure 1. Model management framework.

As shown in Figure 1, in the B / S architecture, we use a combination of model database and model file base to provide data support for modeling and simulation, users can interact with the browser to execute modeling and simulation and get model management service.

Database is used to store the basic properties (metadata) of model and the information of relationships (reference, inheritance, etc.) between the models. And file base is organized by *mo* files based on file directory to support online compiling and simulating service using the existing compiler. The model management service can be implemented on the basis of attributes of models in the database. For example, the display and renting authority of model could be accessed via simply changing publishing state. If this model has been published, it can be rented and referenced by other users to acquire re-use. Instead, others cannot search it on the Internet. The modeling service saves the models' mo file in the file base and the models' metadata in the database. Besides, solving results can be stored in the file base by simulation service. In this framework, one model's descriptive information (metadata) in the database corresponds to one mo file in the file base. So, the management of model resources based on the granularity of single model can be reached conveniently.

Finally, an online service platform supporting multi-domain physical modeling and simulation in the web environment - CoModel (http://www.comodel.net.), has been researched and built based on this organization method of Modelica library. The fact that at present the platform shows good performance, proves that this data supporting method is advanced and effective to achieve online modeling and simulation.