

## **Map symbol and map symbolization sharing based on DCOM**

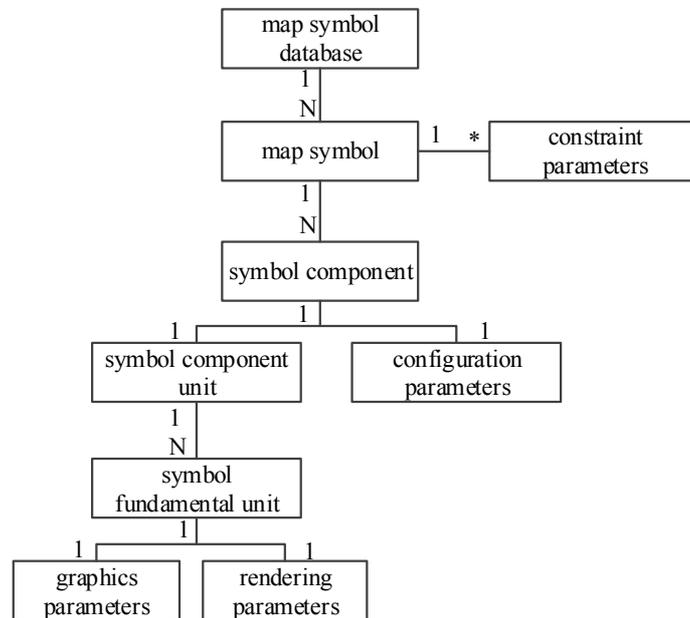
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The study of map symbols is one of the basic problems in cartography. The sharing and interoperation of spatial information is the tendency and hotspot in the geographical information field, but the research on the theory and technology of the map symbol sharing relatively gets behind. It is a serious problem to share map symbol and symbolization among different GIS systems and mapping software due to differences in data structures, map symbol model, map symbol drawing mechanism, symbolization interfaces and so on. So we present an approach to share map symbol and map symbolization service based on DCOM with a vector map symbol model.

### **1. Vector map symbol model**

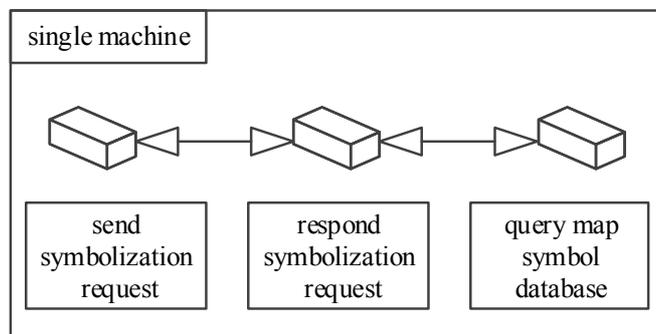
As shown in Fig. 1, in the unit-parameter model, a map symbol database is a collection of map symbols; a map symbol is a collection of symbol components; a map symbol component is a collection of symbol component units with configuration parameters; a symbol component unit is a collection of symbol fundamental units. Symbol fundamental unit is the elemental unit of a symbol. It is also the basic element of the symbol database. Some symbols may contain a variety of special regulations with national fundamental scale maps specification, such as the obvious turning point of a rural road must be the real part in a dashed line symbol. These regulations could be described in the parameter. Symbol component unit configuration parameters are used to define the spatial relationship and rendering order of symbol component units. Symbol fundamental unit graphic parameters are proposed to define the geometry and coordinate characteristics, and rendering parameters are used to describe the fill and outline style and so on. The structure of Unit Parameter Model is well hierarchical, so XML documents are selected to store map symbol database.



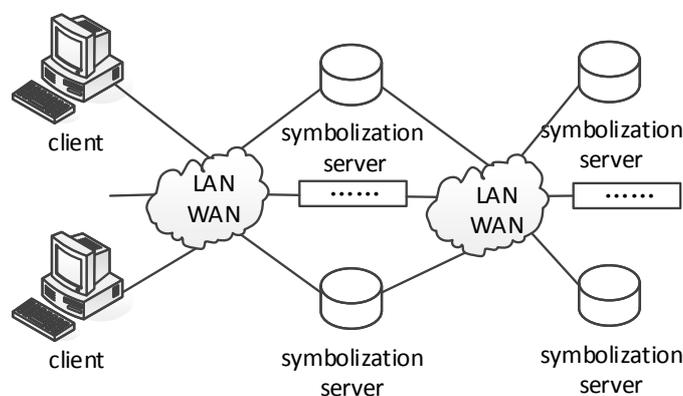
**Figure 1.** Vector map symbol model: unit-parameter model.

## 2. Map symbol and symbolization sharing based on DCOM

The traditional symbolization steps could be classified as initializing a symbolization request, responding symbolization request and querying map symbol database (Fig. 2). All the three steps are in the same computing process. The main difference between traditional symbolization step and symbolization using DCOM is that symbolization requester and responder of symbolization using DCOM are in different processes of different computers on a network.



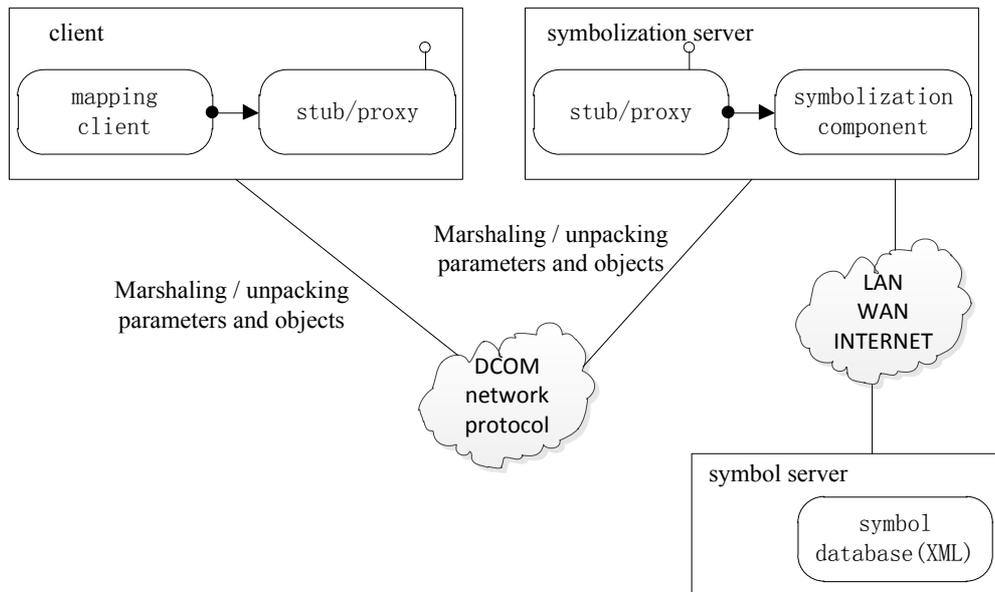
**Figure 2.** The traditional symbolization process



**Figure 3.** The system architecture of symbolization using DCOM

The system architecture of symbolization using DCOM is shown in Fig. 3 and Fig. 4. There are three parts for symbolization: client, symbolization server and map symbol server. The client is the requester of map symbolization, and it is responsible for requesting symbolization service and rendering symbolization result. The symbolization server is a provider of map symbolization service. It is used to response the client's symbolization request and marshal back the symbolization result to the client. The map symbol server provides map symbol databases used in symbolization of symbolization server and client. The symbolization service using DCOM could be divided into three parts: the client, the symbolization server and the symbol database server. The client is the caller of the symbolization service. It's responsible for requesting symbolization and rendering symbolization result. The symbolization server is the provider of the symbolization service. It's used to response the symbolization request of the client, symbo-

lize the features and return the symbolization result to the client. The symbol database server is a platform used to share symbol database.



**Figure 4.** Map symbolization service mechanism with DCOM