

A dynamic compressed accessibility map for secure XML querying and updating

ABSTRACT

By specifying a fine-grained access control on the XML data, an accessibility map is required to determine the accessibility of XML nodes for a specific subject (e.g. user or role) under a specific action (e.g. read or write). In the recent years, several research works have been done to reduce the overall storage cost of accessibility map with rapid determination of accessibility of XML nodes at runtime but there is no effort to implement the accessibility map in a compact format for dynamic environment where the accessibility of XML nodes can be updated frequently. In this paper, we propose a Dynamic Compressed Accessibility Map called DCAM to implement the accessibility map in a compact format which can be used in dynamic environment. Moreover, we suggest an efficient lookup method to determine the accessibility of XML nodes by labeling the authorization nodes in the DCAM with the dynamic XML labeling scheme. We also propose an efficient method to accelerate the process of checking the access authorizations for a set of XML nodes retrieved from the XML query processor when the access locality among the XML nodes in the XML tree is high. Besides, we define a set of constraints on the process of XML updating in order to maintain the DCAM in a compact format with minimum maintenance cost. The experimental results demonstrate that the DCAM is more efficient in both the space and time requirements for secure XML querying and updating.

Keyword: Access control; Encoding and labeling scheme; Privacy; XML querying; XML updating