Active Role-based Access Control Model with Event-Condition-Action Rule and Case-Based Reasoning

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Abstract

A role-based access control model (RBAC model) is proposed to improve the control of access to the resources of a company. As organizational structures have evolved, the RBAC model has been unable to meet the changing requirements. Several refined RBAC models have been presented. Even though several improved models have been established, some difficulties remain in their implementation. They include the authority associated with various roles is not easily established, users' permissions change dynamically, and human intervention into assignment, among others. To apply the RBAC model in a real environment, these difficulties must be overcome. An active database solves the problem associated with a traditional database. The Event-Condition-Action rule (ECA rule) can generate a reaction of dynamic changes immediately and automatically, without the need for human intervention. Case-based reasoning (CBR) can be used to identify an uncertain event and support ECA rule enforcement. Therefore, the main purpose of this study is to combine the role-based access control model with the active database. The proposed model, which has active rules, and so is a role-based access control model, exploits the characteristics of the active database to assign roles to users based on the event trigger, user and environmental conditions, and to assign permissions to roles using the RBAC model. The proposed model solves the problems associated with dynamic changes of a user's permission and the need for human intervention for user-role assignments, and contributes automatically access control. Finally, examples are considered to illustrate the efficiency and security of role assignments based on the proposed model.