CS 4389: Introduction to Data Security

Homework 3 – RBAC using XACML policies

Due Date: November 26th, 2012

The main goal of this homework is to implement Role-based Access Control (RBAC) using the eXtensible Access Control Markup Language (XACML). Additional goals of this homework are to gain hands-on experience with authoring and enforcing XACML policies using Sun's XACML implementation.

Homework Components

The main components of the homework are as follows:

1. **RBAC Mappings:** Define sample mappings that capture the core RBAC, namely a **role-to-user** mapping, which captures the relationships between roles and users, and a **resource-to-role** mapping, which captures the relationships between resources that need to be protected and roles.

   A sample of possible mappings that you could use is given below:

Role-To-User	**Resource-To-Role**
Guest: John	File1: Guest, Users, Admin
Users: Jim	File2: Guest, Users, Admin
Admin: Mary, Jim	File3: Users, Admin
	File4: Admin

2. **Policy Authoring:** Author an XACML policy per resource (File1, File2, File3, and File4 in the mapping above) using the Java classes provided. Authoring a policy requires you to use the following procedure:
   a. Build an XML file from the Role-To-User mapping file using the LoadDataXML.java and XMLCreator.java files.
   b. Construct an XACML policy per resource based on the roles defined in the Resource-To-Role mapping file using the PolicyBuilder.java class.

   Note that to author the XACML policies, you will need to figure out which methods to use from the various classes specified above.

3. **Policy Enforcement:** Write a JUnit test that enforces the XACML policies you have created in step 2. Note that your test should include both, cases where a user is given access to a resource and cases where a user is denied access to a resource. To enforce an XACML policy, you will need to use the XPDP.java class. Again, note that you will need to figure out which methods to use from XPDP.java to correctly enforce a policy.

Homework Deliverables

You will need to submit the source code you have written to implement RBAC using XACML policies. Also please put a documentation that discusses your code and outlines how to execute it.

Resources

The following resources are a good place to start working on this homework:

- Documentation on XACML

  https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=xacml

- Documentation on Sun's XACML Implementation

  http://sunxacml.sourceforge.net/

  Note that you will not be directly using Sun's XACML implementation, since the Java classes provided with this homework abstract this implementation from you. However, you will need to add the sunxaml.jar file provided with this homework to your development environment. Furthermore, several classes are provided with this homework, in addition to the ones mentioned above. These classes are internally used by the classes specified above.