Validation and Verification of an XML Interface

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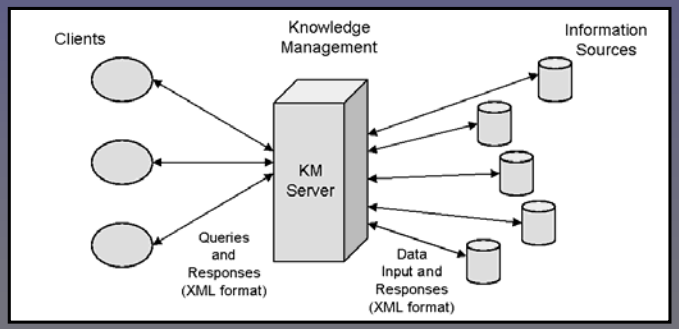
This work aims to validate and verify the XML interface to a complex knowledge management system. In particular, we automated the creation of test queries and the analysis of test responses for the application's test suite.

Introduction:

To use the knowledge management system, clients and information sources submit queries to a server and receive responses (please see figure below). All messages are in XML format and access control mechanisms are in place.

Current testing requires developers to manually create and maintain several different XML files for test queries.

Current testing also requires developers to inspect each individual test response from the server, which can be tedious.



Simplified View of Knowledge Management System

Results:

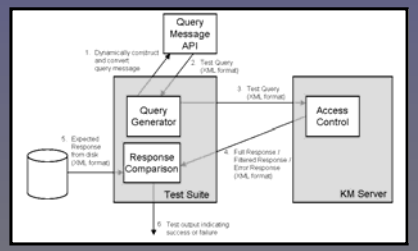
Previously undetected bug was found due to the new automatic test output reports.

Methods:

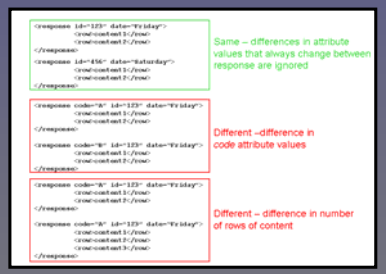
1) Dynamically generate test query messages in XML format from the test suite code. The message objects are constructed and converted to XML by calling an existing API.

2) Automatically report the success or failure of tests by comparing actual test responses with expected test responses. The comparison algorithm uses a W3C DOM tree to compare the XML content of the responses.

3) Current and future testing efforts include trying to penetrate the access control mechanisms with attack messages.



Test Suite Design



Comparison Examples

Discussion:

Adding tests to the test suite and inspecting test output is now easier and more efficient. More extensive testing will hopefully improve the reliability, dependability, and security of the knowledge management system.

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