



CASE STUDY



CONTRIBUTORS



Challenge

- Enhance the testing capabilities of the TMForum Interface Program Compliance Test Kits (CTKs)

Strategy

- Manage semantic-level tests for the interface messages separately from the CTK codebase

Nomos Solution

- Domain experts specify semantic-level tests as OCL rules using the Nomos toolkit
- Toolkit generates java libraries for inclusion in the CTK

Benefits

- Improved testing, uncovering previously undetected errors
- Easier authorship and maintenance of semantic-level tests
- Simpler CTK code
- Reusable tests across multiple CTKs

Using the Nomos Software OCL Toolkit to enhance the OSS/J TCK Framework for the TMForum Interface Program

Tasked with driving down the costs of telecommunications OSS integration, the TMForum's Interface Program is responsible for the development of interface standards including MTMN, MTOSI, OSS/J and IPDR. The standards work doesn't just involve the production of paper-based interface specifications. The TMForum also builds Reference Implementations (RIs) and Compliance Test Kits (CTKs) because it knows that implementing to the interface standards is faster and cheaper for its members when off-the-shelf RIs and CTKs are available to their implementation teams. Developing improved processes and infrastructural frameworks to simplify the production of the RIs and CTKs is just another of the ways in which the TMForum works to streamline the process of standards adoption and reduce interoperability costs.

The Challenge

As part of OSS/J, a Technology Compatibility Kit (TCK) Foundation had been developed by Xebia for use in the creation of TCKs for OSS/J interfaces. The challenge was to see if the TCK Foundation could be enhanced to make it easier and faster to build more comprehensive tests into the TMForum Interface Program CTKs¹. Nomos Software and Xebia worked on a proof of concept project, focusing on the existing OSS/J Order Management interface.

The Solution

The OSS/J TCK Foundation was updated to include an integration point for independently-defined interface-specific tests that are defined through the Nomos Software OCL Toolkit. The result is a very simple mechanism for adding a set of tests for particular interfaces.

The tests for the OSS/J Order Management interface are specified as OCL rules using the Nomos Software web-based user interface. These tests perform semantic-level checks on the XML-based interface messages, doing more advanced checking than is possible using XML schemas. For example, a check is included to make sure that all RequestCreateEvents include RequestValue keys. Once the tests are defined, a set of java libraries (jars) are generated by the toolkit. These jars are then included in the Order Management TCK.

¹ Test kits in OSS/J are referred to as TCKs (Technology Compatibility Kits). In the TMForum Interface Program, test kits are referred to as CTKs (Compliance Test Kits).



The TCK Foundation ensures that the tests are executed for all messages sent and received on the interface. Where messages do not pass the tests, the violations are logged and an exception is thrown. Including tests for a specific TCK requires no update to the TCK Foundation apart from the inclusion of the Nomos generated jars.

The Benefits

Using the Nomos Software OCL Toolkit simplifies the process of developing and maintaining semantic-level tests for the interface messages. During the proof of concept project, errors were uncovered in the existing OSS/J reference implementations, errors that were previously undetected because the TCK did not perform all the required semantic-level tests.

Managing the semantic-level tests for the messages separately from the TCK was found to be very useful. Domain experts are able to define a comprehensive set of tests at design-time. Many of the detailed checks are now expressed as tests in the OCL toolkit and can be removed from the TCK codebase, leading to simpler TCK code that is easier to read and understand. Moreover, adding and removing these tests through the Nomos toolkit is easier than updating the TCK code for the same tests. Even the practicalities of distributing updated code is simpler. Updating a rule in the Nomos toolkit and deploying a new jar is easier than updating the TCK java code and redistributing.

Furthermore, a number of the tests written for the Order Management interface were in fact tests that applied to all of the OSS/J interfaces. Using the Nomos Software OCL Toolkit, it was possible to write these tests once, and to include them in the TCK Foundation. The Foundation then ensures that these tests are run for all OSS/J interface messages, and not just for the Order Management messages. Without the Nomos toolkit, these tests must be duplicated for each TCK. This then reduces the number of tests that have to be authored and maintained for each TCK.

But most importantly, when the Nomos Software toolkit was used to generate TCK tests, errors were uncovered with the existing Reference Implementation. If the original TCK had included these tests, the RI would not have been approved,

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Using the Nomos Software OCL Toolkit makes it easier to generate a robust testing suite that can be used both by the TMForum to test the RIs, and by TMForum members to test their commercial implementations. This drives down the cost of implementing standards compliant interfaces, and ultimately drives down the cost of OSS integration.