Open**ADR** 2.0 Development and Certification Test Harness

OpenADR 2.0 is an application layer message exchange protocol used for two-way communication of Demand Response (DR), price, and Distributed Energy Resource (DER) signals between electricity service providers and their customers. The technical requirements for the protocol are defined in the OpenADR 2.0 Profile Specifications.

The OpenADR Alliance uses the OpenADR 2.0 Certification Test Harness developed by QualityLogic to certify OpenADR 2.0 devices. The same development and test tool is available to implementers of OpenADR so you can validate conformance to the specification during your development process and again prior to submitting your device for certification.

The OpenADR 2.0 Certification Test Harness development and test tool contains four separate test suites:

- VEN Push Test Suite
- VEN Pull Test Suite
- VTN Push Test Suite
- VTN Pull Test Suite

Each test case has a defined a set of prerequisites, a test scenario consisting of a sequence of VEN/VTN message exchanges, and an expected result. Execution of a test scenario will result in payload exchanges between the DUT and the Test Harness.

Several forms of analysis are performed on this payload exchange *(page 2)*

Features

- Robust development test harness
- Same test harness used for OpenADR certification
- Test includes support for 'a' and 'b' profiles
- Pass/Fail reporting and detailed transactions logs for bug isolation
- Schema and conformance rule validation of payloads

Benefits

- Reduce development time and cost
- Confirm device compliance to OpenADR 2.0 'a' and 'b' profiles
- Speed time to market and increase customer confidence
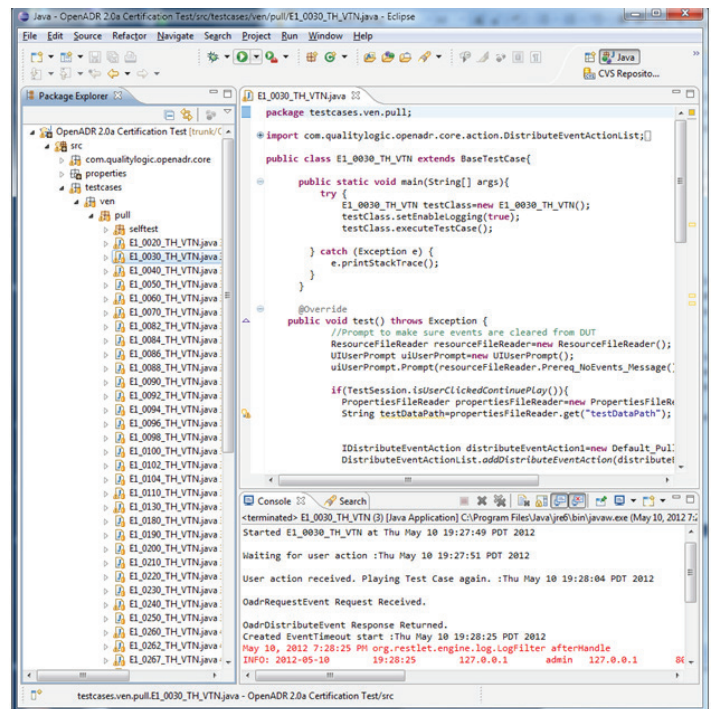- Pre-certify to save time and money

Test Suite Architecture

All OpenADR 2.0 interactions are between a Virtual End Node (VEN) and a Virtual Top Node (VTN). When a test is run, the test harness plays the role opposite that of the device under test. For instance, when testing a VEN Push implementation, the test harness will play the role of a VTN Push implementation.

OpenADR 2.0 Certification Test Harness screen showing major functional areas: controls, test cases, test code, and the Console window that displays indications during test execution.

open**ADR**
ALLIANCE

E1_0386_TH_VTN	Tue May 01 12:00:52 PDT 2012	Tue May 01 12:01:35 PDT 2012	PASS	TraceLog_010512_120052_203.txt
E3_0432_TH_VEN	Tue May 01 12:12:17 PDT 2012	Tue May 01 12:12:22 PDT 2012	NA	TraceLog_010512_121217_298.txt
E3_0432_TH_VEN	Tue May 01 12:42:14 PDT 2012	Tue May 01 12:43:43 PDT 2012	NA	TraceLog_010512_124214_947.txt
E1_0240_TH_VTN	Tue May 01 12:56:50 PDT 2012	Tue May 01 12:58:32 PDT 2012	PASS	TraceLog_010512_125650_122.txt
E1_0030_TH_VTN	Tue May 01 13:09:16 PDT 2012	Tue May 01 13:09:32 PDT 2012	PASS	TraceLog_010512_010916_630.txt
E0_0185_TH_VTN	Tue May 01 13:15:46 PDT 2012	Tue May 01 13:16:05 PDT 2012	PASS	TraceLog_010512_011546_093.txt
E0_0185_TH_VTN	Tue May 01 13:16:09 PDT 2012	Tue May 01 13:16:28 PDT 2012	PASS	TraceLog_010512_011609_552.txt
E0_0185_TH_VTN	Tue May 01 13:16:31 PDT 2012	Tue May 01 13:16:50 PDT 2012	PASS	TraceLog_010512_011631_133.txt
E0_0185_TH_VTN	Tue May 01 13:17:02 PDT 2012	Tue May 01 13:17:21 PDT 2012	PASS	TraceLog_010512_011702_253.txt
E0_0185_TH_VTN	Tue May 01 13:17:49 PDT 2012	Tue May 01 13:18:09 PDT 2012	PASS	TraceLog_010512_011749_229.txt
E0_0185_TH_VTN	Tue May 01 13:18:25 PDT 2012	Tue May 01 13:18:45 PDT 2012	PASS	TraceLog_010512_011825_239.txt
E1_0030_TH_VTN	Tue May 01 13:20:34 PDT 2012	Tue May 01 13:20:54 PDT 2012	PASS	TraceLog_010512_012034_659.txt
E1_0030_TH_VTN	Thu May 10 19:27:49 PDT 2012	Thu May 10 19:28:36 PDT 2012	PASS	TraceLog_100512_072749_889.txt

Test Results Summary Screen

- Message interaction patterns are as expected, including correct response and request payloads

- Properly formed XML.

- Conformance to OpenADR 2.0 schema.

- Specific conformance rules defined in the OpenADR Profile Specification are followed. For instance, an OpenADR 2.0 conformance rule states that the payload element signalType must contain the string "simple". This is not validated by the schema, so it is done as a separate conformance rule analysis step.

- The intent of the test case is met. The test case may expect the VEN to send an optType of "optOut", and if this is not received, the test case will fail.

Optional Test Cases

Some test cases are dependent on the ability to configure specific values on the Device Under Test. If those value are not configurable, the OpenADR 2.0 PICS document, which is available on the Alliance web site (www.openadr.org), provides a list of questions that determine which optional test cases can be skipped.
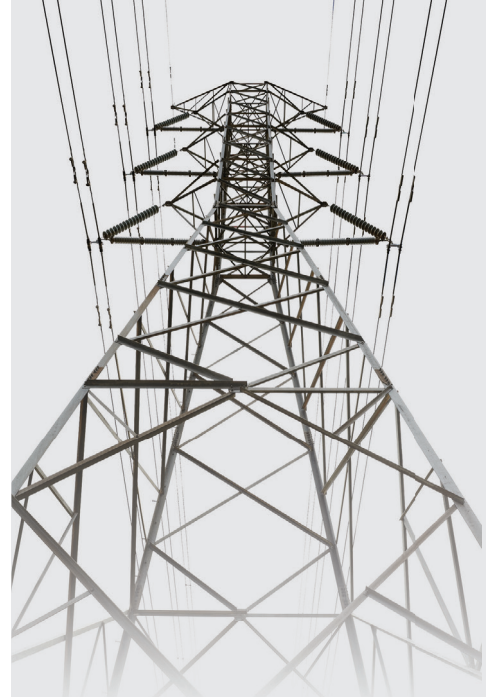
Development Environment

QualityLogic's OpenADR 2.0 Certification Test Harness development and test tool was developed and is executed in the Eclipse Integrated Development Environment (IDE).

Other Development Resources

QualityLogic also offers OpenADR Training Workshops, Technical Support Contracts and a Cloud-based VTN for testing VEN implementations.

For more information or to purchase the OpenADR 2.0 Certification Test Tool visit **www.openadr.org/openadr-test-tool**.

For development support, including workshops and support services please visit **www.qualitylogic.com**.

More information on the OpenADR Alliance is available at www.openadr.org

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