



Options for a Self-Certification Program at OASIS

TAB Approved White Paper

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Editor(s):

OASIS Technical Architecture Board (TAB)

- Jacques Durand
- Patrick Durusau
- Chet Ensign
- Ashok Malhotra
- Kevin Mangold

Abstract:

This document presents options from the TAB regarding possible self-certification initiatives in response to a request from OASIS staff.

Status:

This document has been approved by the TAB.

Interested parties should send comments on this specification to the TAB at askthetab@lists.oasis-open.org

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1 Executive Summary

Self-certification is defined as a relatively light-weight initiative in terms of resources and cost largely under end-user control and with the end-user bearing full responsibility for claimed test results and the resulting certification statement. Once made operational, a self-certification platform would also require a lower level of ongoing cost to OASIS and would avoid potential for implementer complaints that could be a risk in a completely in-house testing and certification service. A self-certification program has the potential to be a valuable component of the 'One Stop Interop Shop' strategy.

After reviewing how several other organizations approach self-certification, and based on the experience of the authors, a summary of recommendations is provided below.

1. **OASIS should assess the readiness of TCs.** There is a cost to OASIS and to the TCs in supporting any self-certification solution (Web site, staff assistance, additional operations and documentation). Is there a real demand from TCs and are they ready to provide the effort needed for a self-certification program? How many of them? Thus:
 - a) OASIS needs first to assess if there is enough interest from its current TCs (e.g. poll)
 - b) Define indicators that TCs are ready for self-certification: are the TCs ready to put some effort in this? A big hurdle is the (conformance) test suite and tools. This typically takes some significant effort to develop, and it needs TC expertise, oversight and commitment even if developed externally.
2. **TCs should be the main driver behind their self-certification program. OASIS staff should work with TCs expressing interest in self-certification to determine the viability of their proposal and whether it can result in an OASIS-sponsored self-certification effort. If the proposal is deemed viable, OASIS should facilitate and exercise managerial oversight similar to the way staff manages TCs today.** Setting-up a self-certification program for an OASIS standard involves substantial effort from the TC members and/or their companies regardless of the self-certification option selected. In all cases, the motivation should come from the TC. The TC must expect to act as the ultimate authority to confirm results, resolve disputes and issues about test results. For these reasons a self-certification program should be motivated, driven and preferably managed by the TC.

OASIS needs to act as the checkpoint, to ensure that the proposals have the resources and maturity to be successful. Once a project is approved, OASIS will provide reliable back-end resources (Web-based forum, certification calendar, database of test artifacts for each self-certifying TC) and assistance in managing these resources and supervising their access. OASIS staff should also expect to occasionally assist in the testing logistics, especially if some run-time test resources (e.g. a conformance service) are hosted by OASIS.

One option that TCs may wish to consider is working with a 3rd party certification organization, especially if their industry is supporting such an effort. (See the LegalXML ECF / IJIS Springboard case study in Section 8.) Such an organization could be accredited by OASIS, and function with oversight from the TC. An option like this could address funding and expertise constraints that might otherwise prevent a self-certification effort from succeeding.

3. **OASIS should define and support a range of options for certification.** Different options will require varying levels of resources and effort, and for these reasons TCs may elect different options: one size does not fit all. Under any scenario, however, the TC must ultimately take responsibility for

affirming the results and certifying to OASIS that the entity undertaking self-certification met the requirements to use the logo or webpage listing. A few options are described here, each one allowing for variants:

- a) **Uncontrolled self-certification:** each candidate defines or uses its own test framework and test suite, and executes its own testing, without oversight. The testing is based on minimal test material produced by the TC, typically a set of test assertions and test guidelines. The candidate posts its test results, and remains open for particular inquiries from 3rd parties (e.g. customers) about test details. This option does not provide much guarantee – it is “user beware” – But is easiest to support by OASIS and TCs.
- b) **Resource-based local self-certification:** In this option, the testing is entirely done on the user side, but the resources necessary to do so are provided by the TC. The user downloads test framework components and test suites and runs them locally. WS-I is an example of this style of certification. This option provides more guarantee, as the tools and test suites are same for all candidates and are developed and validated by a third party.
- c) **Service-based self-certification:** In this option, testing is provided as a remote automated service. In addition to the test tools and test suite being developed by a third party, the core of the testing operation takes place on or is controlled by the service site, which is where test results are collected. A variant would allow the user to upload its implementation or part of it on the service site.

In (b) and (c) above, a test suite needs to be defined, and this work should be done by parties familiar with the standard – preferably, as a TC deliverable.

4. **OASIS should define the policies and common resources.** Any program will need to have a minimum of processes and a minimum of testing facilities to provide a degree of confidence in the meaningfulness of the results. Resources that OASIS should provide include:
 - **Documentation and support materials:** (a) for TCs that want to set up a self-certification program for their work, (b) for implementers who want to use the program to evaluate their products, report results and, if appropriate, take advantage of the certification claims. This documentation would include forms, legal material, guidelines for using logos and making claims, etc.
 - **Web resources:** A self-certification program Web site that serves as a forum for the “certifying” community across TCs but also within each program – i.e. as a channel for handling feedback and resolving disputes, for reporting test results and publishing claims.
 - **Policies:** OASIS should be in charge of the overall certification policies that apply across self-certification programs. The primary goal of such policies is to ensure common processes and a consistent way to define certification programs. OASIS should focus in particular on the output of such programs: the rules for publishing test results and claims, a common format and template for these.
 - **Incentives:** The ultimate goal for any participant in a self-certification program is to be able to present their claim of certification to their own community. OASIS should define the means for documenting such claims (e.g. logos, certified webpage listings), the limits on how the claims may and may not be used, and the responsibilities of the TC is confirming to OASIS that a participant has met the necessary tests for making the claim.

2 Background

Certification provides a stamp of approval on an implementation. One of the earliest certification authorities was Underwriters Laboratories. Established in 1894, it concerns itself primarily with the safety of electrical devices and appliances. Another example of a certification organization is The Open Group which has offered certification programs over many years. For vendors, certification can be a very important endorsement and a great help to marketing but Standards Development Organizations are often reluctant to get into certification because the process can be difficult, political, expensive, and fraught with risk.

An emerging model in the industry is self-certification, where a certification seeker performs some series of checks or tests and publishes the results as a means of demonstrating to interested parties whether and to what degree their product conforms to a standard. While there are many questions about the quality and reliability of such an approach, as opposed to third-party certification, the benefit to the standards organization is that the approach is less expensive to implement and carries less risk for the organization.

Self-certification and self-testing provide a method for interested parties to sign up, perform the checklist activities, report the results and then take advantage of whatever claims, listings, test-marks, etc. that the sponsoring organization permits.

This paper discusses various points on the certification spectrum and the choices that OASIS could make.

3 Definitions and Objectives of a Self-Certification Project

A **certification program** consists of a process for testing an implementation against the conformance criteria for a standard and assets and equipment to support that process. The program describes which [certification] artifacts are involved, what parties are involved in producing, managing or using these artifacts, and what is their precise role with respect to the artifacts in the program.

We use the term **certification project** to mean the overall process in OASIS of establishing the environment and procedures that allow it to run **certification programs**.

This study is focusing on **self-certification**, defined here as a form of certification where the certification seeker carries out the tests themselves, reports the results, and requests permission to use the designated 'seal of approval' in whatever form(s) it takes.

The benefits and desirable objectives for a self-certification project in OASIS are :

1. To expand the benefits and facilities offered by OASIS to its members, Technical Committees, and groups interested in bringing standards development work to the consortium.
2. To offer a consistent, well thought-out mechanism for self-certification that makes it easier for a Technical Committees to produce a self-certification platform with confidence that the results will meet OASIS objectives (as opposed to TC's having to come up with something on their own).
3. To provide to the community and the market an indicator of adherence of an implementation to a standard – i.e. a way to assess the quality of an implementation in terms of its faithfulness to the standard, its coverage of the standardized features, and its robustness..
4. To encourage and foster the creation of a common test environment for a standard, that in turn helps establish a common interpretation of the standard by future implementers.

A contingent benefit is better standards due to timely implementation feedback, when the test artifacts supportive of self-certification are developed in time.

Finally the expected effect beyond the above, is a faster adoption of standards and a faster time to market of related products.

4 General Recommended Approach

There are a number of dimensions affecting certification testing which OASIS needs to consider in designing a self-certification program. The dimensions are:

1. Variability in the rigor of the certification process and related claims: ranging from the weakest (a statement of use for a subset of the specification), up to a formal certification procedure supervised by a third party.
2. Potential variability in the ownership of test assertions, test suites and data sets.
3. Variability in the style and logistics of the testing and test framework. Options include (a) test tools downloadable from OASIS for entirely local testing, (b) test server hosted by OASIS (or by a member or a third party) accessed remotely by the implementation under test, (c) uploading of an implementation under test on a test site, for an entirely remote testing.

It should be noted that an “implementation under test” is broadly interpreted here as any form a specification can be implemented as: i.e. a document, a file or data artifact, a processor or program, a service, a process.

TCs may have different objectives, different constraints and commit different resources in a certification initiative for their standard(s). The TAB has reviewed several initiatives (see Section 5) and observes that several self-certification variants have been successfully deployed by different organizations. Therefore, OASIS should remain open to supporting a number of certification variants, described later in this report. Over time, some variants may prove more successful than others – then it would be time for OASIS to reassess the certification program and focus on supporting a few preferred solutions.

OASIS should however exercise some control on the following aspects across the various certification solutions it would support, and across TCs adopting these solutions:

- **What is being claimed at the closure of a certification exercise.** For consistency as well as for OASIS reputation and also liability concerns, what a party can claim as result of an OASIS-supported certification exercise, should be normalized. A small set of claim templates should be defined that must be used, what each type of claim means should be precisely defined. The party responsible and vouching for that claim should be clearly identified (is it just the implementing party? The TC? OASIS? A third party?).
- **How the claim of self-certification can be publicized.** The key benefit for any certification seeker is the ‘stamp of approval’ that certification provides. Whether this is a logo, a listing on a webpage, publicity through various channels, or other means of recognition, consistent application and prevention of misuse of the indicator is important to the integrity of the program. It should be clear from the start what claims OASIS allows, when and how they will be awarded, and any limitations on their use.
- **The format of test artifacts, and in particular of test results.** OASIS should strongly encourage a standardized format for test results across all certification initiatives, so that it is possible to use same tooling for browsing these artifacts, for consistent look and feel, and post-processing of these results by third parties.
- **Documentation** and support materials for: (a) TCs that want to set up a self-certification program for their work: Proper assistance will need to be provided by OASIS staff, along with

documentation and best practices. (b) Implementers who want to use the program to evaluate their products, report results and, if appropriate, take advantage of the certification claims. This documentation would include, forms, legal material, guidelines for using logos and making claims, etc.

- **Certification Program Site:** a Web page that serves as single access point and portal for all parties involved in a certification program, This is where results of such testing will be reported and claims published. This is also where a documented channel should be provided for handling objections and resolving disputes. The site should be managed by OASIS.
- **Staffing support.** Regardless of various roles and external operational support (see certification program options) there will be a need for OASIS staff to supervise the program, monitor its results, and maintain the program site.

More detailed material supporting and describing the above recommendation is provided in the rest of this document.

5 The Artifacts and Roles involved in a Certification Program

5.1 The Artifacts

Various artifacts may be involved in a certification process related to a standard. They are called here **test artifacts**. These test artifacts will need to be managed and maintained during a certification program. They should be seen as relatively independent items, from a management viewpoint, even if they obviously refer to or derive from each other. They require different skills. Consequently each one of these artifacts may have a different responsible party (for its management, for its ownership) even within the same certification program.

5.2 Conformance Clauses

Conformance clauses are typically included in the standard to be certified. However, additional conformance profiles (and their clauses) can be defined outside the standard – e.g. by a community of users. Such additional clauses, when relevant to the certification, will need to be defined and made accessible in some way.

The recommendation is here to have them contributed to and published by the TC in some form. Alternatively, the new conformance profile may not be contributed to the TC, in which case it should be made accessible on the certification program site.

All conformance profiles and their clauses that are relevant to certification should be made available from the certification program site, regardless whether they originate from the TC or not.

Note that conformance profiles and clauses are not necessary to some self-certification options (see later).

5.2.1 Test Assertions

Test assertions written for assessing conformance must refer to conformance clause(s). Test assertions are the blueprints (abstract design) for test suites.

A test assertion is a testable expression for evaluating the adherence of [part of] an implementation (the “test assertion target”) to a normative requirement statement in a specification. A test assertion describes the expected output or behavior for the test assertion target within specific operation conditions, in a way that can be measured or tested.

It is expected that a TC will produce a set of test assertions associated with one or more conformance profiles, as the TC has the expertise on how to test for the normative statements in its standards. But it is also expected that test assertions may be developed outside a TC, in the same way that additional conformance profiles may.

The recommendation is here to make test assertions available from the certification program site when they exist. Test assertion sets should always be associated with a conformance profile (when they address a conformance profile) and also referred to by with the test suites that are derived from them.

Externally developed test assertions should be contributed to and published by the relevant TC. Alternatively, such test assertions may not be contributed to the TC, in which case they should be made accessible on the certification program site.

See test assertion guidelines as developed by OASIS TAG TC at: <http://docs.oasis-open.org/tag/guidelines/v1.0/cn02/guidelines-v1.0-cn02.pdf>

5.2.2 Test Suites

Test suites must refer to conformance clause(s), and should refer to the Test assertions they implement if any have been defined.

A test suite is a set of test cases. A test case is a set of material - test tool(s), software or files (data, programs, scripts, or instructions for manual operations) - that can verify the adherence of a test assertion target to one or more normative statements in the specification. Often, however, the term “test suite” (and test case) only stand for the code/scripts/data that implement test assertion logic, not including the tools and processors that execute them.

Typically a test case is derived from one or more test assertions. Each test case includes: (1) a description of the test purpose (what is being tested - the conditions / requirements / capabilities which are to be addressed by a particular test), (2) the pass/fail criteria, (3) traceability information to the verified normative statements, either as a reference to a test assertion, or as a direct reference to the normative statement.

Test suites associated with a certification program should be published on the certification program site. Ideally, the code for a test suite should be open-source, so that users understand the details of the test logic, and possibly uncover some flaws and unexpected conditions in the test suite.

5.2.3 Test Automation Framework (or Test Harness)

Test harness or tools developed to execute test suite(s).

A test automation framework or test harness is a collection of tools, [software](#) and test data that integrates the function libraries, test data sources, object details and various reusable modules. These components act as building blocks which need to be assembled and configured to represent a usable test environment. The framework provides the basis of test automation and simplifies the automation effort.

Typical components of a test framework are: test drivers, simulators, reference implementations, test analyzers, man-in-the-middle components, sniffers, shims, logging components.

5.2.4 Test Results

Test results (ranging from a detailed test report to a general fail/pass assessment).

Test results should be posted on the OASIS site as part of the procedure for any of the certification options. OASIS should add a disclaimer declining responsibility for the validity and trustworthiness of the posted results.

It is recommended that test results be normalized in a processable format - e.g. as an XML file -, preferably based on same schema for all OASIS test programs. The reason for this is that these test results may need to be further processed. In particular:

1. A general program - e.g. a standardized XSLT stylesheet - can then be designed to render and navigate these test results in a Web browser. See for example the test reports samples in Tamelizer (<https://code.google.com/p/tamelizer/>, the most recent download package, contains html test report samples inside the “Example_files” sub-package).
2. In case a third party (e.g. a community of users) designs an additional conformance profile that is not registered in the test framework but is supported by an existing test suite (e.g. requires a particular subset of the test suite to pass), then the third party may want to download and process further the test result produced by the OASIS test framework, to generate its own assessment for its own conformance profile – e.g. using its own tool unbeknownst from the OASIS standard community.

5.3 The Roles

Various parties may play different roles for each one of the above artifacts:

A party may be (a) OASIS, (b) an OASIS TC, (c) a TC member, (d) a 3rd party outside OASIS.

The role(s) a party can play with respect to any of the above artifacts is one or more of the following:

1. **Validating authority** (i.e. having the authority to declare whether the artifact is well-formed or fulfills its expected function in the certification program)
2. **IP owner** (i.e. owning all rights on the artifact – typically is developer of the artifact)
3. **Licensed user** (i.e. having some right of use for the artifact)
4. **Operator** (facilitates or assists the operation or usage of the artifact on behalf of 3rd parties or end-users. E.g. helps users to set-up their test configuration and prepare their “system under test” (SUT)).

As an example, a possible self-certification program describing the role(s) of different parties with respect to the above artifacts is given below:

- A test suite is developed, either by the TC or a TC member. This party may remain the “IP owner” of this artifact, but as it is a deliverable of the TC, it contributes it to the TC under the TC IPR mode. OASIS and its membership become “licensed users”. The TC or OASIS is also the “Validating authority” for that test suite, i.e. provides assurance that it fulfills its expected function.
- A test tool/harness that can execute the test suite (and other test suites) in a remote service mode is developed by a 3rd party authorized by OASIS, who pays “as a service” for the software. OASIS becomes the “licensed user” of that test environment.
- OASIS provides access to the test framework to users or implementers of the standard. Either OASIS staff or its SaaS provider, becomes “Operator” of the test framework.
- The end-user posts its test results on the OASIS site. The test framework “operator” also acts as “Validating authority” for these test results, i.e. provides assurance that the results are valid as a result of proper usage of the test framework .

6 Certification Variants

6.1 Variants of Certification Claims

Certification generally proclaims that an implementation conforms to a certain standard, at a certain level. But certification may also just state that some testing procedure has been used toward the goal of conformance, without referring precisely to a conformance objective (level or profile). We define the following kinds of claims or statements:

Statement of proper evaluation (or “proper testing”): such statements do not refer to a particular conformance objective, but to a recognized and authoritative means of evaluation – typically a test suite or test tool - of the adherence to normative requirements in the specification.

- What is claimed: that the implementation underwent a recognized testing procedure in a proper way, and that the test outcome can be trusted as valid, regardless of how successful the outcome was.
- Value: (a) to allow implementers to assess the quality of their implementation, (b) to allow a user community or a 3rd party to assess the quality and the extent of an implementation of the standard (i.e. what features, what options are implemented, and how faithful to the standard).
- Examples: WS-I self-certification process is an example of *statements of proper testing*: it does not set a precise conformance objective to be reached (*even if the underlying standard does*) but nevertheless allows for posting detailed test results, for other parties (e.g. customers) to assess. No particular conformance level was associated with the test suite for that profile, nor any conformance level being claimed – but the quality of the testing (coverage of the Web service profile features, outcome of each test case) was for any third party to assess from the details of the posted test results.

Statement of conformance (to a level or profile): Ideally, certification must address some conformance objective expected by the market or the community of users. A conformance objective is typically a conformance level or profile for the standard at hand, which is described as a conformance clause in OASIS specifications (see [Conformance guidelines]), or may be defined outside the specification – e.g. as an industry-specific conformance profile extending some of the pre-defined conformance clauses.

- What is claimed: that the implementation underwent a recognized testing procedure focused on conformance in a proper way, and that the test outcome reliably indicates that the implementation satisfies the conformance objective (or to what extent it satisfies it).
- Value: to allow a user community or a 3rd party to assess whether or how well an implementation of the standard meets a conformance objective that has meaning for the market.
- Examples: OpenID certification program offers a set of conformance profiles to test for. Certification of a profile requires that an implementation returns either Success or Warning results for every test case in the profile. No certification can be claimed with any Failed results for the profile.

NOTE: even when only “proper testing” (or “proper evaluation”) certification is provided, a user community can reuse the test results it produces as input to a separate and external conformance testing phase – e.g. by identifying a set of tests that need be passed during the “proper testing” phase to meet an industry-specific conformance profile that neither the TC nor OASIS have any knowledge about.

6.2 Some Certification Program Options

There are several options re. testing and for a self- certification program. We outline here some options, each one of them allowing for many variations.

- **Uncontrolled self-certification:** The user or vendor just declares its implementation or product to be conforming to a particular conformance profile based on local proprietary testing, referring to the related conformance clause and possibly a set of related test assertions.

This is the low end of the certification spectrum and has little value.

- **Service-based self-certification:** In this option, the testing is provided as a remote service. The Technical Committee (or some of its members) creates the test suite(s) as one of its deliverables (acting as both IP owners and validating authority of these). The test framework or tools for running the test suite are separately created e.g. by a TC member’s company which is then the IP owner. The Technical Committee approves the test tools (acting as validating authority of these). The main components of the test harness are hosted by OASIS as a service, with staff acting as operator. Or, a variant would have the test harness hosted as a service in a Cloud, with either staff or a TC member acting as operator.

The test harness service can operate in different modes: (a) as a test driver, remotely driving the user implementation which remains local to the user site, or (b) as a server simulating a business party and/or validating the interaction and artifacts initiated from the user implementation. In both cases, a service-side configuration step is required to prepare for the interaction.

Vendors/users post the results for the public to see, on the certification program site. The test service usually generates the test results automatically, formats them and posts them, ready to be published on notice from the user. OpenId is an example of this style of certification.

- **Resource-based self-certification:** In this option, the testing is entirely done on the user side, but the resources necessary to do so are provided. The user downloads test framework components or tools and operates them locally. The test tools undergo the same development and validation options as for service-based self-certification. Vendors/users post the results for the public to see, on the certification program site. The test tools usually generate the test results automatically in a desired format. The user posts them for publishing. WS-I is an example of this style of certification.

The above options lend themselves to other variations:

- In any of them, either “statement of proper testing” or “statement of conformance” may be the objective.

- In any of them, various roles about artifacts involved may be assigned to different trusted parties (OASIS staff, TC members, TC members' companies, members of an open-source project, third-party service provider)

6.3 A Conformance Certification Program Example

1. **About the test suite:** TC publishes a OASIS standard ABC. It also produces a test suite as part of its deliverables (a CS). The test suite is in form of "program+data": i.e. some scripts and associated data files that need be interpreted by a test tool.
 - **Artifact (to be managed):** Test suite.
 - **Owner:** same as owner of the standard: the collective of TC members under the IPR mode of the TC. (and OASIS?)
 - **Provider:** OASIS is hosting the artifact, available for download, under OASIS/TC IPR licensing terms.
 - **Validating authority:** the TC is attesting the quality (correctness) of the test suite.
2. **About the test tools:** A TC member (Bob) volunteers to develop and contribute a test tool that can interpret and automate the test suite.
 - **Artifact (to be managed):** Test tool.
 - **Owner:** TC member Bob (or his/her company XYZ)
 - **Provider:** company XYZ agrees to let OASIS host a package of the tools for download, under RF licensing conditions. OASIS becomes the provider of this artifact, to users.
 - **Validating authority:** the TC is attesting that the test tool does a good job interpreting the test suite and that it qualifies for the certification program.
 - **Operator:** the user (certification candidate) operates the tools by itself in this scenario (see #3 below)
3. **About the test results:** A product vendor (OASIS member or not) downloads the test tool + test suite, and performs local conformance testing on its implementation. The test results are posted on the certification program site.
 - **Artifact (to be managed):** Test results.
 - **Owner:** vendor
 - **Provider:** Once uploaded on the certification program site, OASIS becomes provider of the test results for TC members to consult, or for anyone to consult (yet as owner, the Vendor could remove the results, or replace them with more recent ones).
 - **Validating authority:** (a) the test tool owner validates proper usage of the tools. (b) the TC validates the test results contents as complete and valid.
4. About the **certification claim:** Vendor is asking OASIS to certify its product for the desired conformance level, based on test results. OASIS is consulting the TC who agrees that the results show conformance at the requested level. The certification claim is posted on the certification program site.
 - **Artifact (to be managed):** Certification claim.
 - **Owner:** OASIS
 - **Provider:** OASIS posts the certification on the (OASIS) certification program site,
 - **Validating authority:** the TC or OASIS

A variant for (2):

(2b) About the test tools: A TC member (Bob) volunteers to develop and contribute a test tool that can interpret and automate the test suite. Bob's company decides to contribute a test tool to open-source org OOO, as project "tools4ABC".

- **Artifact (to be managed):** Test tool.
- **Owner:** project “tools4ABC” members, operating under OOO IPR rules.
- **Provider:** OOO org is provider. “tools4ABC” tools package for download, under OOO RF licensing conditions.
- **Validating authority:** the TC is attesting that the “tools4ABC” tools do a good job interpreting the test suite and that it qualifies for the certification program.

NOTES:

- There might be other secondary artifacts involved that may need to be managed under a certification program, e.g. a test plan. Or, the implementation under test itself (e.g. could be uploaded to the certification program site, in some scenarios). Or, the configuration file of test tools that is specific to a test plan + implementation. Or, a test forum to facilitate discussion among the user community candidate for testing.
- The certification program site is itself an artifact (**Owner:** OASIS , **Provider/Operator:** KAVI)

7 Other Aspects of Certification

The following aspects must be considered and may be the basis for more refined requirements or a factor in choosing a certification option.

7.1 Cost

Certification has a cost. The cost of certification increases as we move up the levels of certification.

7.2 Fraud

The benefits and cost of certification may tempt some into fraudulent claims of certification. Measures to detect and prevent fraud become stronger at each step up the levels of certification.

7.3 Reusability of Test outcomes

Additional levels or profiles of conformance may be defined/added by external parties representing market trends or specific user communities for a standard, long after the standard has been released, and after initial test suites have been developed for the standard.

Testing tools and suites may have been developed prior to these “market-driven” conformance objectives, and may be unaware of these. It is then desirable that the outcome of these test tools be reusable in a second phase, by parties interested in assessing these new conformance objectives.

This is especially the case when the certification is only about a statement of proper testing (see 2.1): in this situation, a third-party (e.g. a certification authority for a particular user community) may want to reuse the test outcomes, and do follow-up testing e.g. to determine if specific test cases in the test suite were passed, that are required for this conformance objective.

The “test results” artifacts must then satisfy some proper formatting to lend itself to this reuse.

7.4 Conflict Resolution

A vendor’s certification may be challenged either by another vendor, a member of the TC or even a member of the public as the certification data is publicly visible. Since certification will often be used for marketing, this makes challenges all the more likely in competitive situations. OASIS needs to put in place a mechanism to arbitrate such challenges and organizations pursuing OASIS certification must agree to abide by the mechanism before starting the certification process.

Here, for example, is a process OASIS may put in place for conflict resolution.

If the certification process is managed by a TC the TC must take responsibility for deciding such challenges. If the parties do not agree to the TC’s decision they can appeal to OASIS staff, The decision of the OASIS staff shall be final and there is no further recourse.

Or, OASIS may appoint an external agency to arbitrate and resolve challenges. The decision of this agency shall be final.

8 Case Study: OASIS LegalXML Electronic Court Filing TC and IJIS Springboard

Law courts run on paper. Lots of it. Almost everything that happens in a court of law starts with by submitting a document to a court and that sets off a flurry of additional filings and responses. The LegalXML Electronic Court Filing TC formed to help courts become more productive by developing a standard for electronic filing. Because of the many different kinds of courts and cases, the different workflows and rules, the many different types of issues and interdependencies that can arise, the standard and its implementation are complex and challenging.

In mid-2012, the Technical Committee was approached by the IJIS Institute (Integrated Justice Information Systems Institute). The Institute was developing a program called Springboard to bootstrap the interoperability of NIEM (National Information Exchange Model)-based exchanges. The IJIS saw a testing framework for the TC's ECF (Electronic Court Filing) V4.01 as something the legal market could use and that it would be likely pay for.

The effort kicked off in March 2013 [1] with a call for participation. The breakdown of the work was that Springboard would manage the logistics of developing a Springboard Service Conformance Package and test cases that would be used for conformance testing. The TC would be responsible for defining the conformance targets and the requirements for each target. The project was envisioned in three stages:

- 1: Develop the conformance package establishing testable conformance targets
- 2: Implement and test the test harness. (Participants were not charged during this phase.)
- 3: Release, monitor and report on conformance tests on behalf of the TC

They also drafted language for the certification acknowledgement that would be published for those who successfully passed the certification. Certified entities are listed on the Springboard web site [3].

The development of the test cases and test harness itself was to be contracted out. Springboard would serve as project leader and as informal certification authority on behalf of the ECF TC. The initial work was funded by a federal grant. The plan was that once the test harness was up and running, implementers would pay an annual fee to license and run the tests.

The test cases themselves were extensive. Based on the Process Model diagram in the Core Spec, they initially estimated as many as 52 suites of test cases would be needed.

The TC also indicated their interest in hearing what the team encountered during the analysis and development of the test cases. During the course of the project, the Springboard team identified a number of issues that had the potential to affect interoperability (e.g. no linkage between wsdl and schemas, inconsistent direction on reliable messaging standards, many MAY requirements in the core spec that could affect interoperability) [2]. In addition to resolving these so that work on the test suite could continue, the TC took these back and ultimately published an Approved Errata to address them.

The Springboard ECF Certification Initiative was declared operational in July 2014. The general conformance testing process was:

- i. Party contacts IJIS (the test project host)
- ii. Preliminary, one-hour conference call to assess readiness (non-binding discussion of detailed process)
- iii. IJIS and party conduct an engineering walkthrough
- iv. Party integrates into their environment
 - 1. Party first acquires an open source version of soapUI, the tool used in the test harness
 - 2. The proprietary version is then licensed
- v. Party runs connectivity tests and conducts conformance tests
- vii. The party reports the results and then licenses the certification mark

The Georgia Administrative Office of the Courts was the first organization to successfully complete Springboard certification of their implementation [4]. The project team wrapped up in Sept 2014. Ongoing test harness support and technical assistance transitioned to IJIS Help Desk.

The ECF TC / IJIS Springboard collaboration produced an operational self-certification test harness hosted on a third party platform. It illustrates many of the considerations outlined in this white paper:

- The Technical Committee must be committed to supporting the effort. Through their regular communications, the development team needed the TC to make decisions on the scope of project and to decide how statements in the standard were to be interpreted in practice. Minutes from the meetings of the project team record broad attendance by representatives of the committee.
- The development of the test cases uncovered a number of discrepancies in the standard that could affect interoperability of different implementations. This was valuable feedback that the TC fixed through the errata process.
- There is cost involved in setting up an operational test suite. For the ECF / Springboard initiative, the cost was covered under a government grant. Ongoing operation is funded through a licensing fee.
- Setting up a test suite will take time. It is, in its own way, another implementation of a specification. The ECF / Springboard test suite was produced operational roughly 2 ½ years after the project started. Time required will of course depend on the scope and complexity of the test cases covering a standard, but those taking on such a project should set realistic expectations for the time required.

[1] <https://lists.oasis-open.org/archives/legalxml-courtfilling/201303/msg00012.html>

[2] <https://lists.oasis-open.org/archives/legalxml-courtfilling/201310/msg00002.html>

[3] <https://meet.mitre.org/ikirillov/487SZHT4>

[4] (<https://lists.oasis-open.org/archives/legalxml-courtfilling/201405/msg00028.html>)

9 What Do Other organizations Do?

9.1 WS-I

WS-I had set a testing working group in charge of defining test suites and test tools for each one of its Web service profiles. These test tools could be downloaded and used locally for self-testing. A self-certification program was set that allowed users to claim WS-I compliance and use the WS-I logo on their product, by simply uploading test results on the WS-I site, without any other condition on how many test cases had to be exercised, and how many had passed the test. These are fairly light self-certification requirements: no conformance profile or level was defined that needed to be met.

9.2 OpenID Foundation (<http://openid.net/foundation/>)

The OpenID Foundation has a program called OpenID Certification. Its purpose is to enable implementations of OpenID Connect to be self-certified against specific conformance profiles. The process relies on conformance test suites developed by the foundation. Certified implementations are allowed to use the OpenID Certified logo on their websites, on their deployments and on other materials, and to be listed on the OpenID website's list of conforming implementations. The program appears to still be in its pilot phase.

The foundation plans to have a fee must be paid when a Certificate of Conformance is submitted. Stated intent of the fees is to cover the costs of the program.

According to the terms and conditions of the program, when an implementer submits a Certification of Conformance to OIDF, they are asserting that they successfully tested their Deployment using the Conformance Test Suite software and they are verifying that the Deployment conforms to an OpenID Connect Conformance Profile. Results of the tests must be included in the submission.

OIDF's terms and conditions state that while it reviews the submission for procedural completeness, the foundation "relies on the veracity of Implementer's Certification." OIDF however retains right to ask for additional information and to reject or remove the certification at its sole discretion.

If the Implementers submission is accepted, it is published by the foundation. Once published, the implementer can use "selected OIDF trademarks" including the logo. They also make clear that implementers cannot imply that the certification constitutes an endorsement by OIDF or that OIDF has independently confirmed its claims.

Current certified implementations are listed at <http://openid.net/certification/> and include ForgeRock OpenAM13, Microsoft ADFS for Windows 10, PayPal Login with PayPal and Salesforce Summer 2015 Release. Certified implementations are also listed at <http://oixnet.org/openid-certifications/>.

The terms and conditions for the program can be found at <http://openid.net/wordpress-content/uploads/2015/03/OpenID-Certification-Terms-and-Conditions.pdf>. A FAQ is available at <http://openid.net/certification/faq/>. See also <http://openid.net/2015/07/24/the-path-forward-for-self-certification/>.

In order to replicate a similar service at OASIS, the consortium would need at a minimum:

- Conformance profiles for the OASIS specifications being covered. Presumably these could be based on the published conformance clauses but would likely require more detail.
- Test suites for carrying out the actual tests. Depending on the specification, test suites might need to be available on multiple platforms, languages, etc. in order to adequately ensure meaningful test results.
- Documentation to support the program including legal documentation (e.g. terms and conditions agreements, certification submission forms), explanatory materials (e.g. landing page, how-to pages, FAQ) and more.

- Locations for publishing the certifications and related information.
- Staffing to oversee and run the program and maintain its infrastructure.

9.3 OpenID

Don Thibeau's presentation to the OASIS Board on July 30, 2015 described the OpenID self certification process. OpenID creates a set of questions that an implementation must answer. The answers are posted on a public bulletin board. I presume anyone can look at the bulletin board but not change the answers. There is no audit but depending on the answers a ranking is assigned. The mechanism to combat fraud is the public nature of the bulletin board and the ability to question the answers of your competitors. I am not clear on how the appeals process works. This is an experiment in its early stages and whether or not this public scrutiny of individual claims works is still open. On the positive side, this is a low cost, low overhead mechanism.

Another potential downside is that the OpenID model is designed for one, single standard/specification -- every standard within every TC would need to implement its own "OpenID model". The difficulty here would be the development and validation of tests/test cases.

9.4 NIST

The National Institute of Standards and Technology (NIST) puts out numerous publications covering various policies/rules, protocols, and specifications. NIST administers the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP provides accreditation services through various laboratory accreditation programs (LAPs), which are established on the basis of requests and demonstrated need. Each LAP includes specific test or calibration standards and related methods and protocols assembled to satisfy the unique needs for accreditation in a field of testing or calibration. NVLAP accredits public and private laboratories based on evaluation of their technical qualifications and competence to carry out specific calibrations or tests.

9.5 W3C

W3C has had discussions and proposals for starting a certification effort for several years but, as of now, they do not have a certification program. They do, however, create extensive test suites for their standards with test harnesses and dashboards for reporting results.

9.6 IDESG

The Identity Ecosystem Steering Group (IDESG) is formulating a program of promoting voluntary conformance to the requirements and standards of their framework called the *Self Assessment Listing Service (SALS)*. SALS allows identity related service providers to self-assess against sets of common requirements in checklist format and then submit the results to the IDESG for publication in the organization's public listing. The IDESG does not validate the information it receives from Providers, but it does provide processes through which other stakeholders in the identity ecosystem can raise questions about Provider listings, enabling a form of "neighborhood watch" for the IDESG community to help assure that Provider information is accurate.