



RFP for improved testing tools for European eHealth Interoperability Framework Use Cases

Brussels, 12 March 2014

Summary

The Request for Proposal (RfP) is addressed to organisations or individuals willing to develop testing tools that would further enhance testing for the profiles and standards needed to implement the Use Cases identified in the European eHealth Interoperability Framework (eEIF). The RFP specifically highlights the testing tools that are today missing or need to be improved.

After a short description of requirements such as the integration of the tools to the Gazelle Management tool, a list of testing tools are presented with reference to relevant technical specifications.

In order to have the opportunity to present the testing tools by the organisation, the RFP is open following the planning presented below:

February/March 2014: RFP communication on Antilope website

March to December 2014: Intention to develop tool should be communicated to the European Technical Coordinator (ETC) M. Eric Poiseau (eric.poiseau@inria.fr) and the ANTILOPE Work Package 3 leader M. Milan Zoric (Milan.zoric@etsi.org) that will maintain the list of potential new tools

September to December 2014: Validation of the new tools by the ETC

January 2015: Demonstration of the tools (Antilope Conference)

April 2015: Demonstration at the Connectathon in Luxemburg

1 Introduction

The eHealth European Interoperability Framework [5] is identifying a number of Use Cases that can be used across Europe to accelerate the ongoing transformation process that will help to increase eHealth interoperability. ANTILOPE Deliverable D1.1 [6] further elaborated the Use Cases and in particular described the realisation scenarios based on the associated profiles and standards. Further to that ANTILOPE deliverable D3.1 [8] identified existing testing tools that are suitable for testing the profiles and Use Cases that use them. It identified the areas where testing tools could be further improved and provided the corresponding description. This workflow is illustrated in Figure 1.

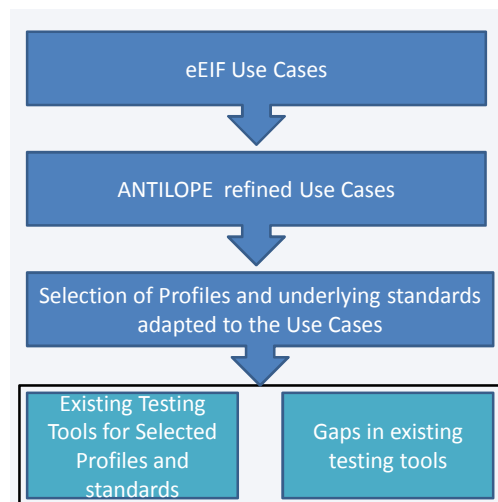


Figure 1 ANTILOPE analysis of testing tools for eEIF Use Cases

On the basis of identified existing testing tools and the description of required improvements, this RFP is inviting interested parties to engage in developing new or improved testing tools.

2 Context

The targets of this RFP are developer teams that want to develop testing tools addressing the Use Cases described in the eEIF (eHealth European Interoperability framework). The objective is to increase the coverage of Use Cases by improving the testing tools that already exist or to make new testing tools available in the future. Improvements of testing tools would lead to increased quality of the products that will implement profiles and underlying standards and would facilitate the adoption of the eEIF in the European area.

Some requirements shall be taken into account for consistency and coherence with existing test tools:

- Development of the tools shall follow the interoperability QMS improved in Antilope [3];
- Testing tool should be developed as open source;
- Testing tools should be integrated in the Gazelle Management tool which is the test bed platform commonly used in eHealth domain;
- The tools should be built on three tiers architecture as model/data and engine or processor.

The testing tools that will be made available in 2014 will be demonstrated at the next Connectathon in April 2015 in Luxemburg.

2.1 Open source

For the testing tools that would be developed in response to this RFP a very strong preference is that their source is freely available. This is of particular importance for future maintenance, bug fixing and improvement of testing tools.

The solutions where testing software is freely available may also be acceptable. However, their acceptability may depend on the conditions related to the use of their run-time environment.

The solutions where the source code is not available could be used as long as no other solution is available.

2.2 Integration with Gazelle

Among the testing tools one category has an overarching role as it manages the overall testing process.

For testing IHE profiles a specific open source tool Gazelle is extensively used. For this reason, it would be important that testing tools developed in response to this RFP are or can be integrated with the Gazelle test management tool. Commonly used in the IHE Connectathon, the gazelle Management tool orchestrates all the tests between systems using a selected test plan. Information including functional and technical aspects is available at <http://gazelle.ihe.net> and the source is available at https://gforge.inria.fr/scm/?group_id=703.

An example if such a tool is illustrated in Figure 2.

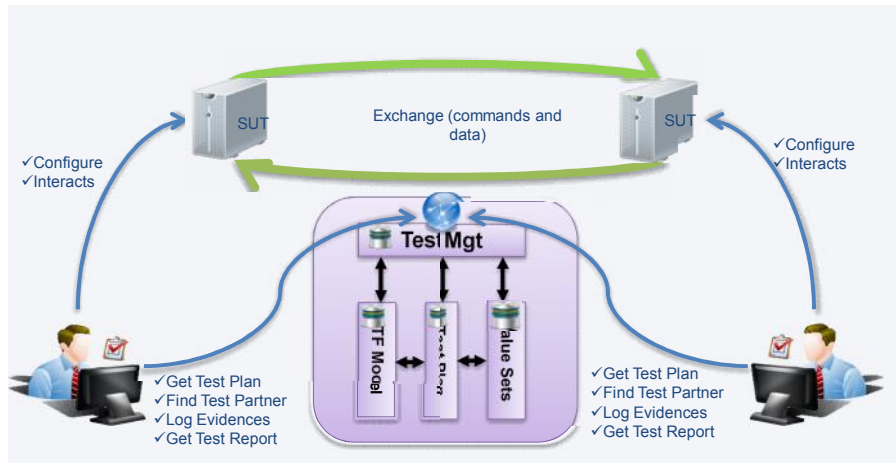


Figure 2. Test management tools

The Gazelle management tool is compliant with the specifications of the GITB (Global eBusiness Interoperability test bed methodologies).

Gazelle™© is composed of several components that includes the

- Gazelle Master Model that registers actors, transactions of the profiles and content profiles;
- All the interface for testers that provide a user- friendly access to the testing tools;
- Management of the testing sessions including test report validation;
- Proxy that captures messages that are exchanged between partners.

The testing tools such as validators, simulators, conformance testers are directly integrated in Gazelle™© and a list of existing tools are available at [4].

3 Testing tools

3.1 Categories of testing tools

ANTILOPE deliverable D3.1 clause 2.1 divided the testing tools into several categories:

- Test management tools: Gazelle is the commonly used tool;
- Conformance tester: automated tool that is capable of checking the behaviour of the system under test;
- Interoperability validators: automated tool that is checking the behaviour of two systems that are interoperating;
- Simulators/stubs: tool acting as a connection partner to the system that needs to be tested.
- Software libraries, test data generators, reference implementations, support tools and network sniffers.

This RFP will highlight the categories of testing tools that are desired. As different testing tool categories provide different level of support in performing the testing, the preference is clearly to have highest categories of testing tools such as conformance testers and interoperability validators. As long as conformance or interoperability testers are not available, other categories of testing tools can represent a solid alternative.

3.2 Guidance on testing tools needed

This RFP is highlighting the testing tools that would enrich the choice of testing solutions for eEIF Use Cases and other tools that will improve the test bed platform.

3.2.1 Profiles and standards

The overview of required testing tools is given in Table 1.

Table 1. Required testing tool improvements

Profile	Specification references	Required testing tool improvements
ATNA	http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol1.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2a.pdf	ATNA conformance testing tool. Syslog message generator for testing the ARR actor would facilitate test data preparation. Improvements in coverage of profile requirements.

Profile	Specification references	Required testing tool improvements
CHA: HRN	<p>Continua Design Guidelines version 2012 + errata www.continualliance.org</p>	<p>Data generator: CESL to be added to HRN tools Simulator/stub: No CESL HRN tools PHMR document type to be added to interoperability validator Coverage of HRN testing could be improved as there are HRN sender tests but there are no HRN receiver tests.</p>
CHA: LAN	<p>Continua Design Guidelines version 2012 + errata www.continualliance.org</p>	<p>Checking and improving the coverage – LAN profile requires use of ZigBee’s Health Care Profile. Data generation tools that exercise the partition cluster in the context of the 11073-20601 protocol are limited. The LAN testing infrastructure is split between Continua and ZigBee and is not well coordinated or covered from the perspective of integrated tooling.</p>
CHA: PAN	<p>Continua Design Guidelines version 2012 + errata www.continualliance.org</p>	<p>Support tool Checking and Improving the coverage: Missing some of the conformance items specified by 20601 Annex A Required ASN1 Structures. A number of these have been added piecemeal but there has been no comprehensive effort to address this issue.</p>

Profile	Specification references	Required testing tool improvements
CHA: WAN	Continua Design Guidelines version 2012 + errata www.continualliance.org	Interoperability validator: BXI WAN server has been closed, so generated data no longer sends from the wanbridge. The source code to enable a WAN server is still available. Checking and improving the coverage: Need to create set devices for WAN special condition/error message generation. The user is currently expected to generate these devices messages which creates a non-standard test experience and adds to the difficulty of running the test suite. Validation of Time from PAN throughWAN is a critical area for clinical viability. There is limited system level testing for time.
BPPC	http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol1.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2a.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2b.pdf	A generator of valid Consent document is required. A conformance tester would automate testing and ensure that requirements are well covered. In particular this would mean testing of Use Case workflow in addition to content checking.
DIS	http://www.ihe.net/uploadedFiles/Documents/Pharmacy/IHE_Pharmacy_Suppl_DIS.pdf http://www.ihe.net/uploadedFiles/Documents/Pharmacy/IHE_Pharmacy_Suppl_PRE.pdf	Need a generator of Dispensation documents. Dispensation should be generated from a given Prescription. Useful to test the Dispensation workflow. Improved DIS testing tools should look to automate the testing while ensuring improved coverage of requirements

Profile	Specification references	Required testing tool improvements
PAM	http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol1.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2a.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2b.pdf	<p>Automation of workflow for PAM profile. The tools available nowadays allow the validation of the exchanged messages and the simulation of the missing partners.</p> <p>Automation of the exchange can be used to test the “server” actors in these profiles and thus provide means of more exhaustive testing, requiring less human interactions.</p> <p>The goal may be achieved as improved interoperability validator and/or as conformance tester.</p>
PDQ	http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol1.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2a.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2b.pdf	<p>Automation of workflow for PDQ profile. The tools available nowadays allow the validation of the exchanged messages and the simulation of the missing partners.</p> <p>Automation of the exchange can be used to test the “server” actors in these profiles and thus provide means of more exhaustive testing, requiring less human interactions.</p> <p>The goal may be achieved as improved interoperability validator and/or as conformance tester.</p>
PIX	http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol1.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2a.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2b.pdf	<p>Automation of workflow for PIX profile. The tools available nowadays allow the validation of the exchanged messages and the simulation of the missing partners.</p> <p>Automation of the exchange can be used to test the “server” actors in these profiles and thus provide means of more exhaustive testing, requiring less human interactions.</p> <p>The goal may be achieved as improved interoperability validator and/or as conformance tester.</p>

Profile	Specification references	Required testing tool improvements
PRE	http://www.ihe.net/uploadedFiles/Documents/Pharmacy/IHE_Pharmacy_Suppl_DIS.pdf http://www.ihe.net/uploadedFiles/Documents/Pharmacy/IHE_Pharmacy_Suppl_PRE.pdf	<p>There is currently no conformance testing tool.</p> <p>Current validator is checking message content.</p> <p>Coverage of profile requirements could be improved.</p>
PCD	http://www.ihe.net/uploadedFiles/Documents/PCD/IHE_PCD_TF_Vol1.pdf http://www.ihe.net/uploadedFiles/Documents/PCD/IHE_PCD_TF_Vol2.pdf http://www.ihe.net/uploadedFiles/Documents/PCD/IHE_PCD_TF_Vol3.pdf	<p>Several Tools are developed by NIST. See http://hit-testing.nist.gov:13100/PCD-HL7WebPreCon/</p>
SVS	http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol1.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2a.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2b.pdf	<p>There is currently no conformance testing tool.</p> <p>Current validator is checking message content.</p> <p>Coverage of profile requirements could be improved.</p>
SWF	http://www.ihe.net/uploadedFiles/Documents/Radiology/IHE_RAD_TF_Vol1.pdf http://www.ihe.net/uploadedFiles/Documents/Radiology/IHE_RAD_TF_Vol2.pdf http://www.ihe.net/uploadedFiles/Documents/Radiology/IHE_RAD_TF_Vol3.pdf http://www.ihe.net/uploadedFiles/Documents/Radiology/IHE_RAD_TF_Vol4.pdf	<p>Coverage of profile requirements could be improved.</p>
XCA	http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol1.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2a.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2b.pdf	<p>Coverage of profile requirements could be improved.</p>
XDM	http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol1.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2a.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2b.pdf	<p>There is currently no conformance testing tool.</p> <p>Current validator is checking data content.</p> <p>Coverage of profile requirements could be improved.</p>

Profile	Specification references	Required testing tool improvements
XDS	http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol1.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2a.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2b.pdf	<p>There is currently no conformance testing tool.</p> <p>Current validator is checking data content.</p> <p>Coverage of profile requirements could be improved.</p>
XCPD	http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol1.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2a.pdf http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2b.pdf	<p>Automation of workflow for XCPD profile.</p> <p>The tools available nowadays allow the validation of the exchanged messages and the simulation of the missing partners. Automation of the exchange can be used to test the “server” actors in these profiles and thus provide means of more exhaustive testing, requiring less human interactions.</p> <p>The goal may be achieved as improved interoperability validator and/or as conformance tester.</p>
XDS.b-I	http://www.ihe.net/uploadedFiles/Documents/Radiology/IHE_RAD_TF_Vol1.pdf http://www.ihe.net/uploadedFiles/Documents/Radiology/IHE_RAD_TF_Vol2.pdf http://www.ihe.net/uploadedFiles/Documents/Radiology/IHE_RAD_TF_Vol3.pdf	<p>There is currently no conformance testing tool.</p> <p>Current validator is checking data content.</p> <p>Coverage of profile requirements could be improved.</p>

3.2.2 Other tools

The following tools will improve the testing session:

- **Workflow management tool:** Tools that improve the management of the test such as a generic workflow manager that automatizes test scripts that can be used with the testing conformance tools.
- **Sample database:** a database containing samples of documents such as prescription, dispensation, patient summary,... will serve as reference database and will support the tests of the consumers of those documents
- **Requirement catalogue:** the catalogue contains collection of requirements extracted from specifications or referenced use cases, profiles and standards. A selection of the requirements can be used to define a subset of requirements suitable at the project, national/regional or European level.

4 Validation process

4.1 Process

The objective of the validation is to ensure that the developed test tools meet the expected requirements. The tools will be tested using test data references if they are available. A test plan and test scripts need to be described.

The acceptance criteria are defined by the Technical Manager of the Gazelle Management Tool. If the tool passes the validation, they will be demonstrated at the next Connectathon in 2015.

The following step should be followed:

1. Registration of the tool as a future testing tool for the eEIF: this registration allows the technical manager to prepare test criteria for the validation process;
2. Test methods provided to the developer team by the technical manager in charge of the validation of the test tools. The test plan will describe the tests and requirements that tools have to pass;
3. Test in-house: the developer team will test their tools using the provided test methods to improve their tools before the validation step. The logs will be submitted to the technical manager for validation before going forward in the process;
4. Integration to Gazelle Management tool: the tools are integrated with all the components of Gazelle;
5. Validation of the tool using reference test data: the tools are validated by the Gazelle Technical Manager.

5 Conclusions

Tentative planning of the actions is as follows:

- RFP communication on Antilope website: February/March 2014
- Intention to develop tool should be communicated to the technical coordinator and the ANTILOPE Work Package 3 leader that will maintain the list of potential new tools: March to December 2014
- Validation of the new tools: September to December 2014
- Demonstration of the tools: January 2015 (Antilope Conference) and April 2015 at the Connectathon In Luxemburg

All technical questions should be sent to eric.poiseau@inria.fr

References

- [1] FP7 Project HITCH Deliverable 2.1: Tool Selection
- [2] FP7 Project HITCH Deliverable 2.2: Tools of the future
- [3] FP7 Project ANTILOPE Deliverable 2.1: Quality Management System for Interoperability Testing
- [4] IHE test tools index
http://ihewiki.wustl.edu/wiki/index.php/Index_to_Preconnectathon_Test_Software
- [5] European Commission – ISA Work Programme eHealth European Interoperability Framework (eHealth EIF): A population of the technical level of the eHealth EIF (4/4)
- [6] FP7 Project ANTILOPE Deliverable 1.1: Refinement Definition document
- [7] CDA-CH II: SPECIFICATION FOR CREATING TEMPLATES FOR THE HEALTH LEVEL 7 CLINICAL DOCUMENT ARCHITECTURE, Based on the HL7 Clinical Document Architecture (CDA), Release 2, Phase 2, Version 1.2a, 01 October 2011, HL7 User Group Switzerland
- [8] FP7 Project ANTILOPE Deliverable 3.1: Testing tools overview: Testing tools gap analysis with description of required new tools

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