

INTEROPERABILITY TEST BED (ITB) (2016.25)

IDENTIFICATION OF THE ACTION

Service in charge	DIGIT B6
Associated Services	

EXECUTIVE SUMMARY

The ISA/ISA² programmes and other EU initiatives fund the development of several IT solutions. Before connecting new components to these systems (e.g. new partners to a communication network or new clients to a service), extensive testing is necessary, to avoid compromising an already operational system. Usually these tests require connecting the system to an instance of the service or the communication partner; consequently there is a need for a *reference implementation* of this service that is separate from the production instance. In a situation where the compatibility of different systems relies on conformance to a standard or specification, this conformance can also be assured through testing – either simply by connecting to the reference implementation (which is assumed to implement the specification correctly) or, more reliably, through the execution of detailed test cases to separately test each clause of the specification, or both.

The "Interoperability test bed" action was conceived under the ISA programme to provide an environment where reference implementations of different systems/services could be hosted – studies conducted during previous phases showed that a dedicated test bed software can support this by providing a user interface, a standardised way to execute tests and access test results, and some test automation. In addition, the use of a test bed also enables formal conformance testing against a specification.

The scope of the action has therefore been enlarged to encompass both hosting of reference implementations and provision of a test bed. Under the ISA programme some case studies / pilots were executed to demonstrate this with the help of a test bed software that was developed in the context of the CEN GITB workshop¹.

Under the ISA² programme, this would be extended into an operational service. In addition, the action will work on the sharing and reuse of test assets (through a dedicated Test Registry and Repository on Joinup, and a community of test bed owners and testers).

In view of the existing notion of Interoperability Agreements in the European Interoperability Framework (EIF), and the long-term perspective for the European Interoperability Reference Architecture (EIRA) to put forward interoperability specifications for all building blocks, testing the conformance of systems to such interoperability agreements and interoperability specifications will become crucial.

OBJECTIVES

ITB's (Interoperable Test Bed) primary objective is to provide a platform for hosting reference implementations of cross-border services, coupled to a test bed that provides a user interface as well as some degree of automation.

This platform would enable Member States' public administrations and their potential vendors to test existing systems or products against a neutral, reliable and responsive test environment of reference.

¹ <http://www.cen.eu/news/workshops/Pages/WS-2015-008.aspx>, accessed on 31/08/2015

The long-term vision is for ITB to become a test centre that deploys reference implementations on demand, cooperating with other test centres. Previous studies have shown that using a test bed conforming to the GITB specifications supports this cooperation well, both for the exchange of test artefacts and for the joint execution of tests.

SCOPE

With the hosting of reference implementations, ITB addresses both interoperability and conformance testing. Systems connecting to it demonstrate their interoperability with the test bed and with each other as well as with other systems of different type connected to the test bed. At the same time they deliver proof of their conformance to underlying standards (IOP agreements). The test bed that exposes these services can execute additional tests for more detailed conformance statements.

In addition to the testing service, the action will also facilitate the maintenance and operation of the test registry and repository (TRR) on Joinup, which was conceived by the GITB workshop and realised on the Joinup platform under the ISA programme.

ACTION PRIORITY

Contribution to the interoperability landscape

The contribution of the action to the interoperability landscape, measured by the importance and necessity of the action to complete the interoperability landscape across the Union

Question	Answer
<i>Does the proposal directly contribute to implementing the European Interoperability Strategy, the European Interoperability Framework, or other EU policies with interoperability requirements, or needed cross-border or cross-sector interoperability initiatives? If yes, please indicate the EU initiative / policy and the nature of contribution.</i>	The action offers testing services to various policy domains; and more general work is being undertaken to explore the testability of interoperability specifications.
<i>Does the proposal fulfil an interoperability need for which no other alternative solution is available?</i>	Some other initiatives run their own testing services, but there is no other generic test bed available for interoperability initiatives.

Cross-sector

The scope of the action, measured by its horizontal impact, once completed, across the sectors concerned

Question	Answer
<i>Will the proposal, once completed be useful, from the interoperability point of view, and utilised in two</i>	The test bed can be used in any policy area – it is itself domain-neutral, though individual

<i>(2) or more EU policy areas? If yes, which are those?</i>	testing services are domain-specific. Which domains will request testing services is not known at this time. There are new requests already from e-procurement initiatives; another candidate is e.g. justice. GITB-compliance and interoperability between different test beds can play an important role in cross-domain testing – a pilot was executed with the Gazelle test bed used in eHealth.
<i>For proposals or their parts already in operational phase: have they been utilised in two (2) or more EU policy areas? Which are they?</i>	Though the operational phase starts in 2017, the test bed is already used by two different initiatives in e-procurement.

Cross-border

The geographical reach of the action, measured by the number of Member States and of European public administrations involved.

Question	Answer
<i>Will the proposal, once completed be useful, from the interoperability point of view, and used by public administrations of three (3) or more EU Members States?</i>	The test suites planned for the e-SENS project are going to be used by all MS participating in the e-Tendering pilot. Testing for the European Single Procurement Document (ESPD) is expected to cover a large number of MS.
<i>For proposals or their parts already in operational phase: have they been utilised by public administrations of three (3) or more EU Members States?</i>	The test scenarios already implemented for e-Procurement (with the CEF e-Invoicing DSI and CEN) are meant to be used by parties in many member states, though the current numbers of users is still small (operational phase starts in 2017).

Urgency

The urgency of the action, measured by its potential impact, taking into account the lack of other funding sources

Question	Answer
<i>Is your action urgent? Is its implementation foreseen in an EU policy as priority, or in EU legislation?</i>	Not directly, but since the e-Invoicing directive requires Member States to have technical solutions in place, an urgent need for testing

	these solutions is anticipated.
<i>Does the ISA² scope and financial capacity better fit for the implementation of the proposal as opposed to other identified and currently available sources?</i>	Consistent with the agreement between ISA and the CEF programme, some of the testing services are developed by ISA and later handed over to CEF for operations.

Reusability of action outputs

The re-usability of the action, measured by the extent to which its results can be re-used

Can the results of the proposal be re-used by a critical part of their target user base, as identified by the proposal maker? For proposals or their parts already in operational phase: have they been re-used by a critical part of their target user base?

Output name	Operational test bed service
Description	The test bed and some reference implementations of specifications/services will be deployed in the DIGIT data centre and/or in other computing centres (e.g. test centres in the Member States). Testing services will be made available to service owners and users (public administrations and other stakeholders) - subject to conditions that will be laid down based on a preliminary examination conducted under the ISA programme.
Reference	<i>Not yet available</i>
Target release date / Status	Q2 2016, depending on the availability of cloud services in the DIGIT data centre or alternative hosting facilities in Member States.

Output name	Test Registry and Repository (TRR)
Description	The Test Registry and Repository was created, based on specifications coming from the CEN GITB project, and integrated into Joinup under the ISA programme. It is a repository that can hold various types of assets related to testing, e.g. test beds, test cases, assertions, validation schemas etc. Under the ISA ² programme it will have to be maintained, promoted and new test artefacts added to it.
Reference	
Target release date / Status	First version released October 2015, to be continuously maintained

Name of reusable solution	Test bed installation package
Description	The test bed software used by ISA, which was originally developed by the GITB project, with all additions and improvements developed by the ISA team, is made available as

	an easy-to-install Docker image.
Reference	
Target release date / Status	First version released in 2016, will be continuously updated
Critical part of target user base	Since the test bed is also made available as a service (see section Error! Reference source not found.), the majority of users will be using this service instead of installing the software. However, the ease of deployment in a virtual machine becomes crucial when testing services are handed over to the respective communities to be operated by themselves.
For solutions already in operational phase - actual reuse level (as compared to the defined critical part)	The testbed running the CEF e-Invoicing tests is currently shared between CEF and ISA. When ISA's test bed service is migrated to a separate hosting space, the CEF service will be the first independent instance of the test bed software.

Name of reusable solution	Various test cases
Description	All test cases developed in the context of the action, with their related test artefacts (e.g. assertions, validation schemas etc.) will be made available for reuse in the test registry and repository (TRR) on Joinup
Reference	
Target release date / Status	continuously released since Q2 2016
Critical part of target user base	
For solutions already in operational phase - actual reuse level (as compared to the defined critical part)	

Level of reuse by the proposal

The re-use by the action of existing common frameworks and elements of interoperability solutions.

Question	Answer
Does the proposal intend to make use of any ISA ² , ISA or other relevant interoperability solution(s)? Which ones?	
For proposals or their parts already in operational phase: has the action reused existing interoperability solutions? If yes, which ones?	Test bed software from the CEN GITB workshop agreement. Current test cases are based on validation

	<p>schemas, schematron rules and process descriptions developed by PEPPOL, CEN and e-SENS.</p> <p>CEF e-Delivery software is being used as a reference implementation of the AS4 protocol.</p>
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Interlinked

The link of the action with Union initiatives to be measured by the collaboration and contribution level of the action to Union initiatives such as the DSM.

Question	Answer
Does the proposal directly contribute to at least one of the Union's high political priorities such as the DSM? If yes, which ones? What is the level of contribution?	This action is a supporting instrument – its contribution is therefore indirect.

PROBLEM STATEMENT

A considerable number of building blocks for cross-border services have been developed in publicly (EU and MS) funded projects. The connection of new components to a distributed, system requires thorough testing of these components, to avoid compromising the productive system. The absence of test facilities can impede technical implementation and adoption of solutions by Member States. By providing organizational and technical resources, ITB was conceived to provide reference systems for tests and development.

EXPECTED BENEFICIARIES AND ANTICIPATED BENEFITS

Beneficiaries	Anticipated benefits
Member States' Public Administrations	European national authorities and agencies tend to shy away from international data communication with embedded and integrated information systems for public services because the implications are too complex and the fidelity of the various systems under other nations' responsibility cannot be judged properly. ITB provides the means to test and verify the requirements and to do this repeatedly without threatening fragile and safety-critical production systems. Testing can be greatly simplified and cost savings achieved because Member States can test one-to-one against the test-bed as opposed to far more complex and time-consuming one-to-many tests.
Citizens	Citizens may have difficulties in trusting the security of their personal data in their own country's public communication systems. Once communication is extended either across borders or across application domains doubts may

	become even larger. A truly neutral, resourceful and trusted test-bed service may alleviate such concerns. The test-bed will also be able to progress the introduction of new cross-border, cross-domain applications which may benefit citizens.
Industry	ITB will give vendors (in particular SMEs) early access to requirements and standards relevant for the implementation of new cross-border and cross-domain communication. In addition, it provides an opportunity to test and eventually certify products against the requirements.

ORGANISATIONAL APPROACH

Expected stakeholders and their representatives

Stakeholders	Representatives
European Commission Services	Project Managers
Member States' public administrations	ISA Coordination Group
CEN GITB Workshop and potential successors	Project officer in DG GROW, CEN secretariat
DIGIT data centre and other potential hosting providers (Test centres in Member States)	Cloud hosting services
Test centres in Member states	Various contact persons, facilitated through the ISA Coordination group
Service owners, e.g. ISA action owners or CEF DSI owners, funded projects	Project officers

Identified user groups

- Users of the test bed service are the owners of systems to be tested. Typically they are the members of a community where new digitized processes are introduced (centralized or peer-to-peer). For example the e-Invoicing/e-Procurement test cases are being used by the owners of e-Procurement systems (public administrations and private companies/service providers).
- Users of the test bed software and other deliverables from the action (requirements, service delivery model etc.) can also be other test centres that want to provide similar services to their customers.
- Users of the Test Registry and repository are, again, other test centres and communities, or test bed owners, that want to either retrieve reusable testing assets (test beds, test assertions/test cases, validation artefacts) or publish and distribute their own resources.

Communication plan

Already under the ISA programme, contacts have been established with a number of system owners that might want to test their products/services. These contacts will be maintained and extended mainly through the respective project officers in the Commission. Demos and presentations to these and other potential users are foreseen.

The contact with several open source test bed software providers (including GITB) will be maintained through participation in their events and web meetings and through reviews of software and specifications.

Setting up the Terms of Reference for hosting is foreseen to be conducted still under the ISA programme, but might extend into ISA². At the same time, contacts with test centres in the Member States (established through the ISA coordination group) will be maintained and extended, through targeted phone calls, web meetings and potentially face-to-face meetings. These test centres could in the long run either become hosting providers (of the ISA² test bed or of a separate independent instance) or become partners in a network of test centres that develop and run tests together and share test artefacts.

Governance approach

The action will be managed by DIGIT with the support of an external contractor. Whenever major deliverables are to be published, the validation of the MS representatives will be sought.

While the test bed will physically be run in a data centre (likely at DIGIT), the deployment of new reference implementations, the development of test cases and other artefacts, the management of user demands for testing facilities (both from owners of specifications and services and from owners of systems claiming conformance to these specifications and from users of the service) will remain in the hands of the ITB action.

A rough frame for this has already been established in deliverables produced under the ISA programme (e.g. hosting requirements, eligibility criteria for users of testing services – see documents referenced in section **Error! Reference source not found.**) and will be further refined.

TECHNICAL APPROACH AND CURRENT STATUS

The approach that was originally proposed would consist of the establishment of a Framework contract under which particular requirements to provide a test bed for a specific system would be covered by the corresponding specific contracts.

Under the ISA programme, testing requirements of existing systems have been analysed, showing that there is a need for hosting facilities to run test systems on demand, but that it would also be beneficial to provide additional functionalities through a test bed (see figure below). The intention is to provide such hosting, preferably as a cloud service, with the proof-of-concept software from the CEN GITB WS as a first candidate for the implementation of the test bed.

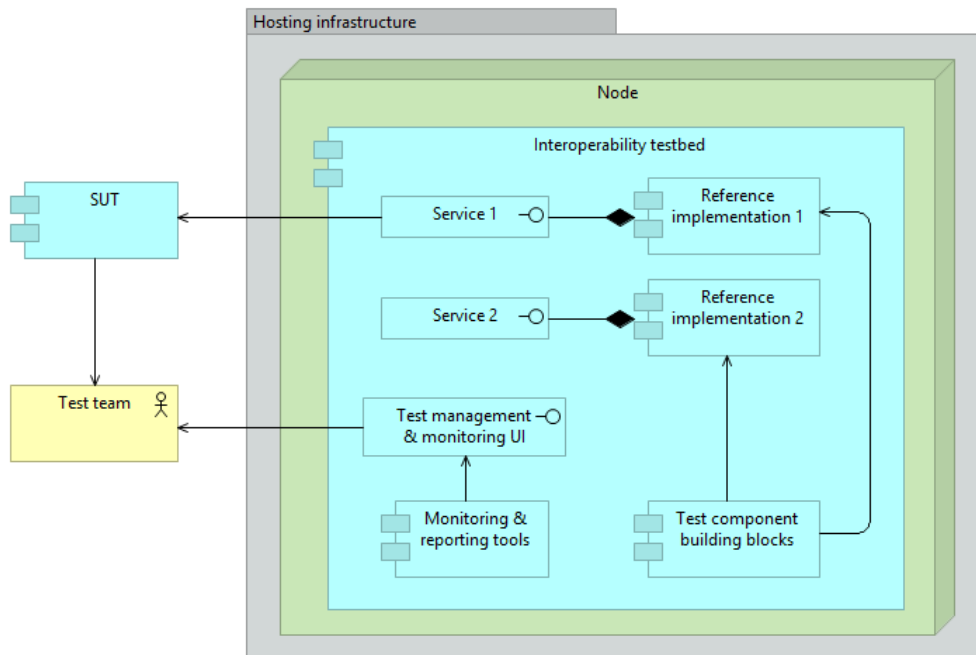


Figure Testing using a test bed

Over time, new reference implementations will be added to provide additional test services, and test cases developed for the automation of simple interconnection tests as well as conformance tests against standards and specification.

COSTS AND MILESTONES

Breakdown of anticipated costs and related milestones

Phase: Initiation Planning Execution Closing/Final evaluation	Description of milestones reached or to be reached	Anticipated Allocations (KEUR)	Budget line ISA/ others (specify)	Start date (QX/YYYY)	End date (QX/YYYY)
Execution (continuing from ISA programme)	<ul style="list-style-type: none"> Establish hosting of test bed 	150	ISA ²	Q2/2016	Q3/2016
Execution	<ul style="list-style-type: none"> Set up governance Deploy reference implementations Develop conformance tests 	200	ISA ²	Q3/2016	Q2/2017
Operation	<ul style="list-style-type: none"> Governance of Operation Operational Hosting Test development 	246	ISA ²	Q1 2017	Q4 2017

	Total	596			
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Breakdown of ISA funding per budget year

Budget Year	Phase	Anticipated allocations (in KEUR)	Executed budget (in KEUR)
2016	Execution /Operation	250	250
2017	Execution /Operation	246	
2018			
2019			
2020			

Planning for the tendering procedures to be launched for the action

Call for tenders foreseen Global amount in KEUR	Call for Tenders Duration in years	Indicative planning of publication (QX/YYYY)

ANNEX AND REFERENCES

Description	Reference link	Attached document
CEN GITB specification	Global eBusiness Interoperability Test Bed (GITB) Phase 3: Implementation Specifications and Proof-of-Concept	
Hosting requirements, deliverable from previous contract under the ISA programme	"Hosting requirements" (report to be published)	
Eligibility criteria for test services, deliverable from previous contract under the ISA programme	"Eligibility criteria for systems to request testing facilities" (report to be published)	