

ICS 35.240.60

English version

## Feasibility Study for a Global eBusiness Interoperability Test Bed (GITB)

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## Foreword

This CWA (CEN Workshop Agreement) contains a feasibility study of the Global eBusiness Interoperability Test Bed (GITB) Methodologies project. This CWA was produced within the GITB project, carried out under the framework of the CEN/ISSS eBusiness Interoperability Forum (eBIF). The production of this CWA was formally accepted at the GITB kick-off meeting on 21 November 2008.

The CWA contains:

- Motivation and approach to eBusiness testbeds
- Baseline assessment of testing requirements from use cases
- Baseline assessment of testing capabilities comprising existing testbeds, testing methodologies and frameworks
- Conceptualization of a global eBusiness Interoperability Testbed
- Recommendations

The draft CWA was presented and discussed with industry representatives during two Open meetings, the first held in Brussels on 15 and 16 June 2009 and the other during the eChallenges Conference held in Istanbul on 22 October 2009. The public comment period run from 9 August until 9 October 2009.

The endorsement was carried out electronically from December 2009 until 20 January 2010. The following companies supported the CWA :

Automotive Industry Action Group (AIAG)  
 CESI (China Electronics Standardization Institute)  
 Drummond Group Inc.  
 ENEA  
 European Business School (EBS)  
 Enterprise Interoperability Centre (EIC)  
 ETSI  
 FSCOM  
 Fujitsu America, Inc.  
 Icelandic Standards  
 KorBIT  
 Korea Institute for Electronic Commerce (KIEC)  
 Lappeenranta University of Technology  
 Logar ehf  
 National Institute of Standards and Technology (NIST, US)  
 National Technical University of Athens / Greek Interoperability Centre  
 Odette International Ltd.  
 Pragmeta Knowledge Clout  
 Royal Bank of Scotland  
 SRDC Yazilim Arastirma ve Gelistirme ve Danismanlik Tic. Ltd. Sti.  
 SAP  
 SupplyChange bvba  
 Unimaze Software

University of Belgrade – Faculty of Organizational Sciences (FOS)

The CWA has been approved by CEN Workshop eBES members electronically in December 2009. A list of CEN Workshop eBES members is available at the CEN/CENELEC Management Centre.

This CEN Workshop Agreement is publicly available as a reference document from the National Members of CEN: AENOR, AFNOR, BSI, CSNI, CYS, DIN, DS, ELOT, EVS, HZN, IBN, IPQ, IST, LVS, LST, MSA, MSZT, NEN, NSAI, ON, PKN, SEE, SIS, SIST, SFS, SN, SNV, SUTN and UNI.

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## 1. Scope

This document presents preliminary results of an on-going feasibility analysis for Global Interoperability Test Bed Methodologies (GITB) for eBusiness testing.

While eBusiness scenarios are widely adopted by users in industry, governments and the public sector, it is still cumbersome for them to reach interoperability of eBusiness solutions and to achieve conformance with standards specifications. Previous experiences demonstrate the need for more advanced testing methodologies and practices which cope with the relevant set of standards for realizing comprehensive eBusiness scenarios (i.e. business processes and choreography, business documents and transport and communication), and a test bed addressing the specific requirements of multi-partner interactions.

The work on GITB is motivated by the increasing need to support testing of eBusiness scenarios as a means to achieve better compliance to standards and greater interoperability within and across the various industry, governmental and public sectors. Furthermore, the joint approach for developing a test bed across different world regions would positively affect development cost, capability, and compatibility of future testing facilities by leveraging best of class expertise and shared resources. GITB intends to increase the coordination between the manifold industry consortia and formal standards development organisations with the goal to increase awareness of testing in eBusiness standardization and to reduce the risk of fragmentation, duplication and conflicting eBusiness testing efforts. It thereby supports the goals of the European ICT standardization policy<sup>1</sup> to increase the quality, coherence and consistency of ICT standards and provide active support to the implementation of ICT standards.

The feasibility analysis is the first of the three development phases and will be followed by the architecting phase and the realisation phase.

Phase 1: Feasibility study	Phase 2: Conceptualization of the target architecture	Phase 3: Realisation
An analysis of the benefits, risks, tasks, requirements, required resources for a global eBusiness interoperability test bed (GITB) based on business use-cases; current state of eBusiness testing facilities.	<p>Analysis of alternative approaches to architecting and implementing a global eBusiness interoperability test bed.</p> <p>A recommended architecture and process to implement the test bed that follows from the requirements and architectural analysis with clear rationale.</p> <p>Assessment requirements from international stakeholders</p>	<p>Implementation of test beds as shared testing facility</p> <p>Provisioning of testing services to industry users, software vendors and SDOs</p>

Figure 1-1: Global eBusiness Interoperability Test Bed – Three Phases

During this initial phase, the feasibility analysis was performed by gathering the requirements from three industrial use cases at multiple levels (i.e., business, functional, and non-functional requirements) and analyzing the requirements along with existing testing capabilities using a shared conceptualization for eBusiness test beds developed in this study. The comparison between the existing eBusiness testing capabilities and GITB requirements led to an assessment

<sup>1</sup> European Commission: Modernising ICT Standardisation in the EU - The Way Forward, Whitepaper. COM (2009)324final 3 July 2009

of functional and non-functional gaps between the requirements and the capabilities. This gap analysis informs whether a shared, operational test bed is desirable and feasible to complement eBusiness standards development efforts.

Within a shared test bed effort, users, standards development organizations (SDOs), test service providers, and software vendors could benefit from sharing the workload, agreeing on the interpretations of the standards, and working in a synchronized manner. A shared, international test bed capability would leverage synergies between existing testing activities and provide an opportunity to collaborate across national standards bodies.

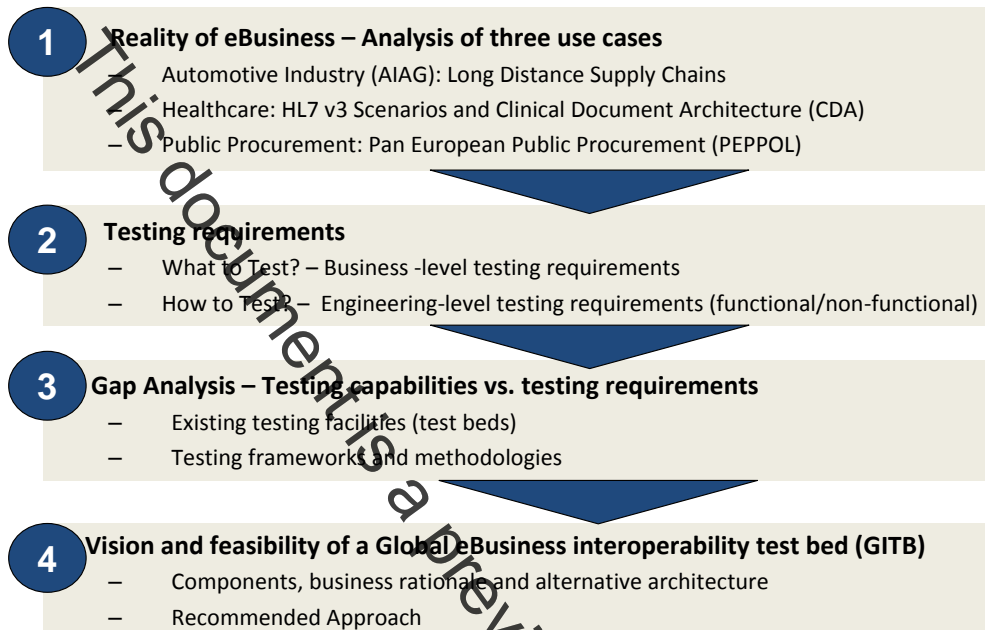


Figure 1-2: Overview of the Feasibility Study (Phase 1)



## 2. Definitions, Symbols and Abbreviations

### 2.1 Definitions

For the purpose of this document, the terms and definitions given in ISO/IEC 9646-1 [1, 2] apply.

#### 2.1.1 eBusiness Specifications

**eBusiness specification:** An eBusiness specification comprises all bilateral or multilateral agreements that need to be in place between two or more partners in order to conduct eBusiness. eBusiness specifications relate to the three different layers in the eBusiness interoperability stack: transport and communication layer, business document layer, and business process layer. In many situations, eBusiness specifications comprise a set of standards or a profile.

**Profile:** A profile represents an agreed upon subset or interpretation of eBusiness specifications to achieve interoperability.

**Business process:** A business process is a flow of related, structured activities or tasks that produce a specific service or product (serve a particular goal) for a particular customer or customers. It often can be visualized with a flowchart as a sequence of activities.

**Business document:** A business document is a set of structured information that is relevant to conducting business, e.g., an order or an invoice. Business documents may be exchanged as a paper format or electronically, e.g. in the form of XML or EDI messages.

#### 2.1.2 Testing Purposes

**Implementation under test (IUT):** An implementation of one or more eBusiness specifications, being that part of a real System Under Test (SUT), which is to be studied by testing.

**Conformance testing:** A process for testing that an IUT is compliant to a standard. Conformance testing is usually realized by a test bed connected to the IUT. The test bed simulates the protocol processes against the IUT by the mean of test scripts. Each test script focuses on a specific standard requirement and aims to deliver a verdict that indicates the implementation statement of the standard requirement.

**Interoperability testing:** A process for testing that several IUTs can interoperate using a protocol standard. This type of test is executed by operating IUTs and enforcing them to interoperate following a specific behavior. The interoperability test process can also be piloted by a test bed, using test scripts like in conformance testing.

#### 2.1.3 Testing Requirements

**Business level requirement:** A business-level requirement specifies the subject of testing. It answers the question: *What type of concern to test for?* A type of concern is defined by

- (1) a specific aspect or quality of SUT to be assessed and ;
- (2) an eBusiness specification or profile.

For example, *Conformance to eBusiness Specification* is a type of Business-level requirement as it describes a capability addressing a specific concern to test for and it consists of

### A.3 Relationship between generic functional requirements and non-functional requirements

Key Capability Index for Engineering Level Functional Requirements		Refinements	Reusability		Maintainability	
			Modularity (M)	Plug & Playability (P)	Extensibility (E)	Robustness (R)
Test Execution Model	[Fuc-TCE/R01] Capability of test preparation and setup		✓			
	1) Capability of providing the setup information to SUT(s)	How to provide?	✓		✓	
		What kind of information?	✓		✓	
	2) Capability of requesting SUT's parameters and information	How to get?	✓		✓	
		What kind of information?	✓		✓	
	3) Capability of test case customization	What kind of information?	✓			
	4) Capability of configuration of setup information	What kind of information?	✓		✓	
		Who does testbed configure?	✓		✓	
	[Fuc-TCE/R02] Capability of controlling test steps		✓			
	1) Capability of display of test flow and test progress		✓			
	2) Capability of requesting/storing user's information	How to get?	✓			
		What kind of information?	✓			
	3) Capability of binding user's information into test case		✓			
	4) Capability of manual execution of test steps		✓		✓	
	[Fuc-TCE/R03] Capability of message exchange			✓		
	1) Capability of sending/receiving message payloads?	What kind of protocol is used?		✓		✓
	2) Capability of uploading/downloading message payloads			✓		
	3) Capability of capturing message			✓		
	[Fun-TCE/R04] Capability of message pre/post-processing		✓			
	1) Capability of decomposing messages	What part of message is decomposed?	✓		✓	
	2) Capability of retrieving the value from message	What kind of language is used for query?	✓			✓
	3) Capability of generation message template from schema	Does message template include fixed/dynamic values?			✓	
	4) Capability of generation test data for a specific message template				✓	
	→ Capability of message				✓	
	[Fuc-TCE/R05] Capability of validation & recovery			✓		✓
	1) Capability of detecting unknown problems			✓		✓
2) Capability of employing the existing validation engines	What kind of validation engine is used?				✓	
3) Capability of recovery from errors					✓	
[Fun-TCE/R06] Capability of reporting			✓			
1) Capability of display of error location			✓			
2) Capability of display of test log information			✓			
3) Capability of display of the detail test result			✓			
[Fun-TCE/R07] Capability of B2B system emulation (optional)			✓			
1) Capability of emulation of an arbitrary business unit			✓			
Test Case Design	[Fuc-TCM/R01] Capability of representing test configuration information		✓			
	1) Capability of representing declaration of messaging protocol to		✓		✓	
	[Fun-TCM/R02] Capability of representing test procedural information		✓			
	1) Capability of representing message to be sent		✓		✓	
	2) Capability of representing messages choreography		✓		✓	
	3) Capability of representing conditional expression (test step) for test case		✓			
	4) Capability of representing iterative expression (test step) for test case		✓			
	5) Capability of representing manual steps		✓			
	[Fun-TCM/R03] Capability of representing test verification information		✓			
	1) Capability of using external document for verification (e.g. XML Schema)		✓		✓	
	[Fun-TCM/R04] Capability of representing test suite which contains a set of test cases					
	1) Capability of representing precedence relationships between test				✓	
[Fun-TCM/R05] Capability of representing test data						
1) Capability of representation of user's defined values				✓		
2) Capability of representation of automatically generated values (i.e. using metadata)				✓		

Figure A1-3: Relationship between generic functional requirements and non-functional requirements