E-Commerce Integration Meta-Framework – Introduction (ECIMF-Intro)

CEN/ISSS/WS-EC/ECIMF

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1. Background and the Goal Statement

There have been many standardization activities in the area of e-commerce communication. The standard bodies and industry groups in multi-national levels have been promoting several standards. Some of these, with long-standing tradition (like EDI variants), have gained significant acceptance, especially among large industry players. However, these standards are often criticized for their complexity, high implementation cost, multitude of local variants, and extensive demand for expertise knowledge. Other frameworks for electronic commerce, defined more recently in the Internet age, try to avoid those mistakes, and they also have seen some acceptance in selected industry sectors (RosettaNet, OAG, cXML, xCBL, upcoming ebXML …).

However, the proliferation of mutually incompatible standards and models for conducting e-commerce resulted in even more increased demand for interoperability and expert knowledge. So, overall, the isolated efforts of industry groups and standard bodies created quite the adverse effect from what was intended, when it comes to wide acceptance of electronic commerce, especially in the SME market.

These issues slow down the spreading of e-commerce applications, and for this reason the industry is looking for methods to meet the exploding demand in the "new economy" to offer increased QoS, reduction of manual labor and cost, and to meet the requirements of nearly real-time reaction to changing market demands. At the same time the industry is aware that existing e-commerce frameworks require costly adjustments in order to fit their business model to that of specific frameworks, with the perspective that similar costs will follow if the business player wants to participate in other frameworks as well.

1.1.   E-Commerce Integration Meta-Framework scope

In response to these concerns from the industry, this CEN/ISSS project within Workshop for Electronic Commerce proposes the E-Commerce Integration Meta-Framework (ECIMF):

> ***A meta-framework, which offers a modeling language, methodology, and prototype tools for all e-commerce users to achieve secure interoperability of the service regardless of system platforms and without major adjustments of existing systems.***

The most important characteristic of this project is to provide a common platform and approach to enable interoperability without enforcing major changes to the existing infrastructure. This is in contrast with many other widely promoted approaches to interoperability, which require from partners to be strictly conformant to a common standard in order to participate in e-commerce.

There are strong reasons for preferring the "enable" instead of (now commonly endorsed) "enforce" approach:

- Business partners may have already made significant investments in building interfaces conforming to some standard(s).
- Commonly used integration methodologies are focused on data translation, which results in complex and inflexible solutions. Changing such integration solutions to accommodate new standards is often infeasible.
- There will always be legacy systems that need to be integrated with the "standard of the year" external interfaces. It is simply not realistic to hope that at some point in time all systems will adopt and fully conform to one common standard for every aspect of business communication.

For these reasons, the interoperability-enabling methodologies, such as the ECIMF approach, will play an increasingly vital role in the e-business communication.

The meta-framework, which the project aims to deliver, is understood as a combination of methodology, modeling notation (meta-models) and guidelines for aligning different aspects of e-commerce – hence the name "meta-framework", because using these artifacts the users will be able to build concrete integration frameworks.

The main purpose of this meta-framework is to facilitate the interoperability by mapping the concepts and contexts between different existing e-commerce frameworks, across multiple architectural layers. An important premise for this project proposal is the following definition of interoperability:

> ***The interoperability, as seen from the business point of view, takes place when the business effects for the two involved enterprises are the same as if each of them conducted a given business process with a partner using the same e-commerce framework.***

As a consequence of this premise, the project proposes using a top-down approach to the comparative analysis of the e-commerce frameworks, which starts from the business context level. The project also reuses the experiences of other projects in the area of enterprise analysis and modeling.

The project will also address integration of internal business processes and applications with external e-commerce interfaces required to conduct business electronically, whichever standard they conform to. This is just a special case of

interoperability between differing frameworks. However, this case is crucial for companies in adoption of any e-commerce standard.

1.2. Benefits

The development and adoption of the ECIMF standard should benefit especially the following groups:

- SME market:
  The small companies no longer will be forced to restructure at all costs their internal systems in order to conform to whatever framework their bigger partners have. The interoperability bridges that conform to ECIMF will allow them to do it gradually, based on the economic principles, while at the same time allowing them to participate in the e-commerce. This should result in more SME-s joining the e-market, even though their internal economy systems may not yet follow any standard e-commerce framework.

- System integrators:
  The system integrators will be able to use a consistent methodology, and a precise framework for defining the integration bridges. The results of their work can be implemented on various conforming platforms, no longer locking them (and their customers) into a single proprietary tool. The overall cost for the implementing the integration solution, its maintenance and amount of manual labor will be reduced.

- Software vendors:
  The software vendors will be able to offer competitive integration products that conform to the standard framework. This means that their products will be more attractive to the customers, who are more likely to choose a solution that guarantees them certain level of independence. At the same time though, the conformance to ECIMF should allow software vendors to offer clearly understood added values, which are now often misunderstood because of the difficulty in comparing proprietary methodologies.

1.3. Relationship to various global e-commerce frameworks

The aim of the ECIMF project is not to propose yet another e-commerce framework. We recognize the efforts of various standardization bodies and industry groups to provide global solutions in this area (e.g. ebXML[1], RosettaNet, xCBL, OAGIS framework, Hewlett-Packard's e-Speak[2], Microsoft's BizTalk[3]), as well as other projects offering tailored solutions for specific market or industry sector.

The ECIMF project does not compete with any of these frameworks. We welcome and look forward to cooperate with their representatives in order to enhance the results of this project. The need that the ECIMF wants to address is the interoperability between these frameworks, especially for the transitory periods in SME environment (economic and manpower limitations), which are required for adoption of any of the frameworks.

In our opinion at least two factors will continue to adversely affect the wide-spread adoption of e-commerce: one is the fact that quite a few businesses already made commitments to some of the existing frameworks, in terms of internal expertise,

investments, partnerships, and adjustments to the technology and models for business interaction imposed by these frameworks. This situation is combined with the current approach to system integration, which very often locks up the companies to specific system integrator and specific proprietary solutions.

The other limiting factor is that extensive knowledge and experience is still required to adequately understand the differences between the frameworks, and even more to implement some level of interoperability – both between the e-commerce frameworks themselves, and between legacy systems and any given framework. Also, though more and more modern frameworks use UML and UMM to describe parts of their models, there is no general meta-framework that would allow implementing interoperability in a structured way, not to mention the fact that many frameworks are defined using imprecise, natural language descriptions.

It's worth noting a fact that is often overlooked: the differences between e-commerce frameworks are much deeper than just differences in their protocols, scenarios and data formats. There is a need for a unified methodology to compare and align also the semantics of central concepts in order to properly understand these differences.

The development of the ECIMF standard will build on the experiences from projects such as:
- ebXML: specifically Business Process Specification Schema (ebBPSS), Collaboration Protocol Profiles and Agreements (ebCCP),
- UN/CEFACT Unified Modeling Methodology (TMWG-N090R9),
- e-Speak [2] framework, consisting of Service Framework Specification v 2.0 (SFS2.0),
- RosettaNet Implementation Framework v. 2.0 [4] (RNIF2.0),
- BizTalk 2.0 framework [3] (and BizTalk Server commercial tools),
- OAG Integration Specification (OAGIS 7.1),
- OMG's Model Driven Architecture (MDA),
- eCo framework [5]

and others in order to provide a sufficiently broad and general model for alignment between the frameworks.

Consequently, we see the ECIMF project as a complementary and necessary part of e-commerce adoption, reducing the cost and amount of labor required to adopt any e-commerce framework.

2. Project Details
See the companion specifications (ECIMF-GM, ECIMF-TS, ECIMF-POC) for the detailed methodology, technical specification and Proof of Concept.

The following list shortly describes the scope for the ECIMF definitions:

- **Meta-framework modeling methodology** – an approach to model the interactions and transformations required for mapping between different e-commerce frameworks:
  - Top-down analysis, based on the business process integration
  - Multi-layered modeling approach
  - Calibration of concepts within corresponding contexts (semantic translation)

This part of the project requires close collaboration with the experts in order to reuse as much as possible the experiences collected by groups like ebXML, RosettaNet, OAG, EDI community and others.

This part of the documentation is contained in the ECIMF-GM document.

- **Meta-framework modeling language** – a precise notation to describe the concepts of the e-commerce frameworks, the contexts in which they occur and interact, and the required transformations between them:
  - Business context correspondence (compatibility of economic goals)
  - Semantics of the base building blocks (actors, messages, transactions), data models
  - Scenarios for message exchange (business processes)
  - Access to external resources (URLs, directories, catalogues, databases, etc…)
  - Messaging models
  - Security models and services, as far as they affect the business process and interoperability on the technical level
  - Transport protocols
  - etc.

For the business process modeling we suggest substantial reuse of the results of ebXML BP work (cf. ebBPSS), with additions of the modeling notation and language to express the transformations between the business processes on different layers.

This part of the documentation is contained in the ECIMF-TS document.

- **Proof of Concept** – the project will aim to provide a Proof of Concept implementation of the tool-chain needed for realization of the proposed methodology, demonstrating the interoperability between some concrete e-commerce frameworks. The tools developed by the project will be published under Open Source license, freely available for both private and commercial use.
  This part of the documentation is contained in the ECIMF-POC document.

3. Project Deliverables and Timescales

The timeframe for this project is set up to be 18 months, in the period of June 2001 – December 2002. The manpower allocated on permanent basis to this project is currently as follows (expressed in percentage of time involvement times number of people):

- WebGiro: 50% x 1 person
- KTH: 25% x 2 persons

Furthermore, the list below presents prospective manpower that is likely to be involved on a regular basis:

- KTH: 25% x 1 person
- HP: 50% x 1 person
- Microsoft: 50% x 1 person

Additionally, in later stages of the project, we intend to find enough interest for the proof of concept implementation of the ECIML-compliant agent from our industry partners to allocate additional programming resources.

We invite other workshop members, research organizations, user groups and industry representatives to contribute their resources and experiences to broaden the scope of the project. The choice of particular topics for proof-of-concept activities results from the limitations of the resources, and the need to provide useful results in a limited time.

Assuming the above resources, the planned deliverables consist of the following:

- **General ECIMF methodology (ECIMF-GM):**
  A document (CWA) describing in detail the multi-layered approach, and the specification of the ECIMF methodology. This part will result from the discussions on the general methodology on how to approach the business process integration. The intention is to keep this part vendor- and tool-independent. Depending on the involvement of the project members, this document can have a value of either general guidelines, or formalized methodology. Our aim is to provide the latter.

- **ECIMF technical specification (ECIMF-TS):**
  A document (CWA) containing the formal technical specification for modeling notation constructs, and the serialized form for the models (i.e. the ECIML and the MANIFEST specifications).

- **The Proof of Concept implementation (ECIMF-POC):**
  This deliverable includes the tools to support the methodology – the ECIMF Navigator based on the Conzilla for conceptual navigation and calibration, integrated with a ManifestFactory implementation in order to produce the MANIFEST recipes based on the model. It will also contain a Proof of Concept mapping of two business processes from different frameworks. This part may include additional examples of mapping, depending on the contributed resources.

If the timeframe and the resources available will be sufficient, a basic ECIML-compliant agent implementation will be created to support the Proof of Concept mapping.

The following milestones are planned for delivering the results:

3.1.   Initial Proof of Concept (POC) for the approach
Deliverables:
- Reformulate and elaborate on the FAM CWA material in order to show how Conzilla tool can provide structured and contextualized added value to a textual description.
- Provide an initial description of the methodology for comparing the e-commerce frameworks (this will form the draft of ECIMF-GM document).
- Prepare a simple example of mapping the differences between two e-commerce frameworks (e.g. BizTalk and e-Speak), using the proposed approach.

Timescale: 12 June 2001 (Oslo meeting)

3.2.   Initial ECIMF specification and basic integration with Conzilla
Deliverables:

- Initial version of the ECIMF-GM and ECIMF-TS documents, and models of a concrete business process in two selected e-commerce frameworks.
- Customization of the Conzilla tool to support the modeling notation introduced in ECIMF-GM.

Timescale: mid-October 2001

3.3.   Refined ECIMF specifications and extended tool-chain

Deliverables:
- Refinement of the ECIMF specifications based on further comparative modeling of the selected frameworks.
- Extended support for the process in the tool-chain: integration of Conzilla, scripting language and the ECIML code generation to form the ECIMF Navigator tool.

Timescale: 1Q2002

3.4.   Further refinements to ECIMF specifications, and a reference ECIML-compliant agent implementation

Deliverables:
- More refined ECIMF specifications, and additions to the tool-chain to support the specification.
- Depending on the support from industry partners, a basic reference implementation of the ECIML-compliant server.

Timescale: 4Q2002

4. Project resource funding

The project resources allocated on a permanent basis, as mentioned in the previous section, are funded primarily by WebGiro AB, Sweden, who is also in the discussions with its partners regarding the level of their participation.

After the project completion, in order to spread the adoption of the developed models and techniques, there will be a need for specific resources to set up and maintain the registry and repository of the MANIFESTs, as well as provide further refinements to the ECIMF. It is yet to be defined how these resources will be funded (e.g. industry group, membership community, already existing or upcoming registries [ebXML, UDDI], …).

5. External Liaisons

The project team will coordinate its activities with the following projects:
- Other relevant CEN/ISSS/EC-WS projects
- New ebXML (OASIS and UN/CEFACT groups),
- RosettaNet,
- OAG,
- CommerceOne,
- OMG,
- BSR,
- others – tbd.

6. Summary

The ECIMF project described here is intended as a generic meta-framework modeling approach, which allows the domain experts, system integrators and e-commerce parties to

define precisely what is needed for the different frameworks to interoperate. The present situation when multiple conflicting e-commerce models are advertised and to some extent accepted calls for a systematic approach to more and more frequent interoperability and quality of service issues. Also, the spread and adoption of e-commerce among SME-s depends on their ability to integrate their internal business processes with external e-commerce interfaces.

The project deliverables include the meta-framework definitions, the methodology for analysis and transformation between e-commerce frameworks, and the prototype tools for navigation and alignment.

We are also aiming at providing an Open Source implementation of the basic functionality for the ECIML-compliant agent (E-Commerce Integration Toolkit – "ECIT"). The full-fledged version of the ECIT can be realized e.g. as an infrastructure service, or as an in-house server for specific organizations or corporations, and may include competitive commercial solutions from the software vendors.

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[1] The ebXML project, http://www.ebxml.org/specdrafts/ .

[2] The e-Speak framework, Hewlett-Packard, both as a commercial product http://www.e-speak.hp.com, and an OpenSource free Java implementation of the complete framework at http://www.e-speak.net .

[3] The BizTalk framework, Microsoft, http://www.microsoft.com/biztalk/techinfo/BizTalkFramework20.doc , BizTalk repository at http://www.biztalk.org, and the commercial product BizTalk Server http://www.microsoft.com/biztalk , which additionally contains the mapping and orchestration tools.

[4] RosettaNet, http://www.rosettanet.org .

[5] The eCo Framework, CommerceOne, http://www.commerce.net/eco .