


## PUBLISHABLE EXECUTIVE SUMMARY

### 1. Project Identity

**Table 1:** Project Identity

<b>Project Acronym:</b>	ELLECTRA-WeB
<b>Project Full Title:</b>	European Electronic Public Procurement Application Framework in the Western Balkan Region
<b>Project Number:</b>	045153
<b>Project Type:</b>	Specific Targeted Research Project (STREP)
<b>Priority:</b>	Information Society Technologies (IST)
<b>Start date:</b>	1 January 2007
<b>Duration:</b>	24 months
<b>Project website:</b>	<a href="http://www.ellectra-web.eu">http://www.ellectra-web.eu</a>
<b>Project Logo:</b>	

### 2. Project Objectives

The prospect of full economical and political integration of Western Balkan countries into the EU's structures has increased the need to strengthening a single European Market. The one major challenge common to all countries of the region remains the building of strong, fully functioning states capable of delivering on the needs of their citizens, of ensuring effective regional co-operation and of more advanced relations with the Union. In this context, Western Balkans should give high priority to the implementation of e-Government. As electronic public procurement is one of the main contributors to e-Government, ELLECTRA-WeB has put the focus on it.

The capital investment of implementation has been identified as one of the main barriers for the deployment of electronic Public Procurement, ePP, solutions in the EU. This issue is more compelling for areas under accession to the EU, such as the Western Balkan Region. The cost of implementing electronic public procurement solutions may even prove prohibiting for Western Balkan Public Organisations with less available budget for internal development, such as local authorities, hospitals, education establishments, public museums, public agents in tourism or commerce, NGOs and other civic society associations, unless means for reducing it are found. ELLECTRA-WeB takes the stand that if the development costs are minimised for all

interested parties, this could be a major step forward towards the adoption of electronic Public Procurement and, hence, towards the economic integration of the Western Balkan Region with the EU.

The ELLECTRA-WeB project intends to uniformly assist Western Balkans and EU Public Organisations and Suppliers to respond to the 'development cost' challenge in an effective way. This is achieved in ELLECTRA-WeB by capitalising on state-of-the-art software engineering technologies, namely, Model-driven Engineering (MDE), and Service-Oriented Architecture (SOA). The project intends to realise a development environment in the form of an electronic Public Procurement Application Framework that will drastically reduce the development complexity, time and cost of SOA-based electronic Public Procurement solutions in Western Balkans and the EU, while ensuring that the developed solutions are in total accordance with the EU legal framework on public procurement.

Hence, the overall objective of the ELLECTRA-WeB project is to "specify, develop, test and evaluate a complete Open Source electronic Public Procurement Application Framework and a set of Supporting Guidelines that will enable, on the one hand, Western Balkan and EU ICT solution developers to cost-effectively develop, and, on the other hand, Western Balkan and EU Public Organisations and Suppliers to easily deploy trusted, interoperable, user-friendly, secure and EC-compliant electronic Public Procurement solutions".

### **3. Technical Approach**

ELLECTRA-WeB takes the technical stand that e-Government, and in our case, electronic Public Procurement solutions need to be developed in accordance to the state-of-the-art, 3-tier, SOA technology. As ELLECTRA-WeB intends to capitalise on the cost-effectiveness of the MDE approach to software development, the ePP Application Framework is specified as consisting of:

- A set of **Open Source MDE-enabling Tools** appropriately customised and integrated into the ECLIPSE IDE environment, and capable of supporting MDE-based development of 3-tier, SOA-based ePP solutions, and
- **ePP-specific MDE Modules**, which are specified, maintained and processed by the MDE-enabling Tools to enable the development of 3-tier, SOA-based ePP solutions. These Modules include the ePP Domain and PIM Models, and corresponding PIM-to-PSM and PSM-to-Code Transformation Rules.

The selected integration of customised *open source* MDE-enabling Tools for the ePP Application Framework, released under the ECLIPSE Public License, is:

- **Persistency tier:**
  - Papyrus UML Editor, (developed by Papyrus)
  - MOFScript Generation Engine, (developed by SINTEF)

- **Business Logic tier:**
  - BPEL Visual Designer, (developed by ORACLE)

- **User-Interface tier:**
  - JSF Editor, (developed within ECLIPSE community)

ELLECTRA-WeB implements the following MDE-enabling Modules which are required for the development of 3-tier, SOA-based, ePP solutions:

- **Persistency tier:**
  - *ePP Domain Model and Platform Independent Model* expressed in UML which model the 'reality' of public procurement, as resulting from the relevant EC Directives and the IDABC study on electronic public procurement.
  - A set of MOFScript-based PIM-to-PSM and PSM-to-Code *Transformation Rules* that are capable of:
    - Creating database objects for the classes represented in the ePP PIM Model.
    - Generating code (Web Services) for the operations of the classes in the ePP PIM Model.
- **Business Logic tier:** Executable *BPEL diagrams* for the specification of the business logic (processes) related to public procurement procedures. Appropriately specified BPEL diagrams orchestrate Web Services generated by the Transformation Rules, above. Note that, no actual transformation rules are needed to be developed for the Business Logic tier, since the selected BPEL editor constitutes a MDE-enabling transformation engine from BPEL to XML, itself.
- **User Interface tier:**
  - As our work is based on the IDABC guidelines for implementing ePP solutions, the user-interface of an ePP solution developed with the ePP Application Framework will be based on the IDABC ePP Demonstrators' design and look-and-feel. Therefore, the User-Interface tier of the ePP Application Framework is defined as a *JSF-based specification* of the user-interface based on the design and look-and-feel of the IDABC ePP web-based Demonstrators.

#### **4. Expected end results**

The ELLECTRA-WeB project will deliver the following:

- **'As-is' and 'To-be' Analysis** of the public procurement environment in WB with the purpose of facilitating the adoption of the ePP in the region, by

studying the current legislative, administrative and IT environment as well as by identifying the changes needed for the deployment of ePP in WB.

- **An ePP Application Framework** for the cost-effective, MDE-based development of 3-tier, SOA-based electronic public procurement solutions. The ePP application Framework consists of:
  - A set of **Open Source MDE-enabling Tools** customised and integrated into the ECLIPSE IDE environment, and capable of supporting MDE-based development of 3-tier, SOA-based ePP solutions, and
  - **ePP-specific MDE Modules**, which are produced by the MDE-enabling Tools and enable the MDE-based development of 3-tier, SOA-based, J2EE applications that support the 'open' and 'restricted' public procurement procedures. The ePP-specific MDE Modules include, UML-based ePP Domain Model, PIM Model, and MOFScript-based Transformation Rules for the implementation of the 'open' and 'restricted' public procurement procedures.
- **A 3-tier, SOA-based, J2EE electronic Public Procurement solution** supporting the 'open' and 'restricted' public procurement procedures. The solution will be developed via the ePP Application Framework and it will be tested and evaluated by the WB Public Procurement Agencies in terms of the cost-effectiveness of its implementation as well as its compliance to the European legal framework.
- **Guidelines for Public Administration and Suppliers** that will assist them to adopt electronic public procurement solutions and harmonize their internal processes and systems with the European legal framework.

## **5. Work Performed and Results Achieved so far**

During the 1<sup>st</sup> year of the project duration, the following main streams of work were performed:

- Analysis of legal, administrative and IT environment of public procurement in WB and identification of the changes needed towards the adoption of ePP in WB, ('as-is' and 'to-be' analysis, respectively).
- A working ePP Application Framework has been developed. This involved the following:
  - The selection, customisation and integration into the ECLIPSE IDE of the open source MDE-enabling Tools that are capable of supporting the specification, maintenance and processing of UML models, MOFScript-based code generation, BPEL diagrams, and JSF-based interfaces.

- The development of the actual UML-based Domain Model that represent the 'reality' of the 'open' and 'restricted' public procurement procedures.
- The production of the corresponding UML-based ePP PIM Model for the Persistency tier, Business Logic tier (*not complete*) and User Interface tier (*not complete*).
- The development of the PIM-to-PSM and PSM-to-Code, in the form of MOFScript-based Transformation Rules that generate database entities and Web Services in J2EE, (*not complete*).
- A proof-of-concept prototype that helped in resolving early research challenges was realised in M6. This prototype was evaluated by means of generating a complete J2EE application for a small part of the electronic public procurement process, i.e., that of the 'user registration', using corresponding UML models, JSF-based interfaces and the MOFScript-based Transformation Rules. No additional hand-written code was required.

## **6. Expected impact**

WB and EU public procurement agents and IT solution providers can use the ELLECTRA-WeB Application Framework to cost-effectively adopt electronic public procurement by, either deploying the developed within the ELLECTRA-WeB project solution, or customise this solution to their particular requirements by means of customising the provided models and diagrams to develop the desired solution. One can always use the ePP Application Framework to develop an electronic public procurement from scratch by copying the work undertaken by the ELLECTRA-WeB project.

## **7. ELLECTRA-WeB Consortium**

The ELLECTRA-WeB Consortium brings together a team of experienced partners with complementary skills and expertise. It consists of one EU software development company (INTRASOFT International), a prestigious EU Research Institution in Software Engineering (SINTEF), one Management Consulting company (PLANET), five Western Balkan ICT companies (C-CENTER, EXIT-IT, EON, ECCF and CIM) and three Central Public Procurement Agencies (MSTRS, PPB and PPO).

**Table 2:** Consortium Members

No	Participant name	Short name	Country	Logo
1	INTRASOFT International S.A.	INTRASO FT	LU	
2	Stiftelsen for industriell og teknisk forskning ved Norges Tekniske høgskole	SINTEF	NO	
3	PLANET A.E	PLANET	GR	
4	C-CENTER Engineering & Consulting SHPK	C- CENTER	AL	
5	EXIT CENTAR – IT Business Support Center	EXIT-IT	BH	
6	Ministry of Finance (Public Procurement Office)	PPB	FYROM	
7	St’Cyril and Methodius University of Skopje (Faculty of Economics)	ECCF	FYROM	
8	Public Procurement Office	PPO	SE	
9	Evolution Online D.O.O.	EON	SE	
10	Ministry of Science and Technology, Republic of Srpska	MSTRS	BH	
11	CIM College D.O.O.	CIM	SE	