European Union’s GENESIS Project
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GENESIS was an EU-co-funded project where cross-organizational / cross-country B2B and B2G processes were implemented using UBL, BPMN, BPEL, and CCTS. Besides BOC (Austria), the implementation partners were from SAP (Germany), Insiel (Italy), Singular (Greece), and Logo (Turkey). User partners – mainly from governmental institutions – were based in Eastern European countries such as Romania, Bulgaria, and Lithuania.

The main goal of the project, with the full title, “GENESIS: Enterprise Application Interoperability via Internet-Integration for SMEs, Governmental Organizations, and Intermediaries in the New European Union,” was the research, development, and pilot application of the necessary methodologies, infrastructure, and software components that allow the typical, usually small and medium, European enterprise to conduct its business transactions over the Internet. It can do so by interconnecting its main transactional software applications and systems with those of collaborating enterprises, governmental bodies, and banking and insurance institutions with respect to the current EC legal and regulatory status as it exists in the new EU candidate and associate countries.

The scope of GENESIS can be depicted as a cube, as pictured in Figure 1.

Figure 1. Cube showing the various concerns of the GENESIS project.

As the figure shows, GENESIS focuses on the following transaction types, to be carried out through application to application (A2A) interconnection of existing enterprise applications like SAP R/3:

- Business to Business (B2B) transactions such as orders, purchases, invoicing, payments, etc.
• Business to Government (B2G) transactions and information exchange such as VAT declaration and payment, tax declarations, INTRASTAT reporting, etc.

• Business to Intermediaries (B2I), including electronic transactions from the enterprise applications towards Banks (account interrogation, fund transfers, etc.) and public insurance organizations (salary payments, VAT payment, etc.).

• Other supportive transactions, such as financial data exchange between SMEs and certified professional accountants.

The four categories of transactions above (B2B, B2G, B2I, Supportive) shall be taken from the current manual fulfillment status to the new Internet-enabled interoperable operation using an approach comprised of three levels:

• The processes level (where the processes followed in each country/business sector will have to be analyzed and mapped).

• The information level (where the various business documents and exchanged information is analyzed, resulting in ontologies, models, and, finally, XML descriptions according to the existing standards).

• The systems level (where technical specifications and pilot implementations are produced for the A2A interconnection).

GENESIS is trying to solve problems in several fields, all connected with each other:

In the field of BPM, the creation of a unique set of prototype business processes (not covered by the existing standards, with respect to the national legislation particularities) that will portray the followed practices of eastern EU SMEs and VSEs and shall constitute a reference point in the area of B2B, B2I, and B2G processes. GENESIS shall propose enhancements in existing EM and BPM tools to support the MDA/EAI lifecycle.

In the field of information and data modeling, the creation of a prototype set of data models using semantic constructs (such as ontologies) shall depict the minimum data needs of the most common business processes for B2B, B2G, and B2I in the EU. The production of XML schemas, enhancing existing standards (or its existing repository of data models with new ones from the representative countries) such as ebisXML, xCBL, UN/CEFACT, or RosettaNet, shall cover business processes and countries that are not covered by the standards today.

In the field of Service Oriented Architectures, it was the goal to design and develop a functional server-based system along the ebXML architectural approach (CPPs, CPA) and following the current SOA specifications (UDDI, SOAP, etc.) for new EU member states and associated countries.

An indicative list of business transactions was created (based on the UBL 2.0 standard) in order to provide an initial reference for the users to identify the most important business processes. Then a model driven architecture (MDA) approach was utilized to end up with executable business process specifications ready to be deployed in the GENESIS server, implemented in Java.

All of these modeling activities were carried out with the help of BOC’s BPM tool ADONIS. In the first modeling phase, workshops were conducted together with end-users (SMEs) to capture their Private Business Processes in ADONIS’ own “BPMS” modeling notation. In this first phase we focused solely and completely on a business view.

In the second phase, so-called Public Business Processes were created with the BPMN modeling notation – necessary in order to filter out those parts of the processes that have some kind of connection to entities outside of the company – other companies, governmental bodies, or banks. In parallel, business documents were modeled in ADONIS, using the principles of UN/CEFACT Core Component Technical Specification (CCTS) and allowing for an integrated modeling of
processes and data. The UBL 2.0 business documents and common library were used as a reference. While the BOC team led the process modeling activities, the SAP team directed the data modeling activities, with modeling activities realized in cooperation with potential end-users of the GENESIS system in several countries. In addition, an online survey was conducted. The process and data modeling were then united as business documents within the business processes in ADONIS.

In a third phase we abstracted and re-modeled the Public Business Processes to form so-called "Abstract Collaboration Processes" in BPMN notation. Similar to the UBL transaction types, these GENESIS Collaboration Processes are a blueprint for generalized business transactions on a trans-European level. They were used to export BPEL scripts from ADONIS, which is the basis of the orchestration of the GENESIS production server. Then the implementation of the GENESIS production server was jointly completed by the server implementation partners, SAP, Singular, Logo, and Insiel.

Small, Medium and Very Small Enterprises (SMEs and VSEs), which represent more than 93% of the total enterprises in the EU, will benefit through the

- Significant reduction of required effort and time for checking, entering, verifying, and completing transactions in ERP or financial applications. It is estimated that in a typical medium enterprise (approximately 50 B2B transactions daily) the effort to be gained exceeds 20 person-months on a yearly basis.
- Significant increase in correctness of data for inserting documents into the existing ERP system (invoices, purchase orders, etc.) in contrast to the traditional way. It is estimated that the number of human data entry errors in the ERP will be eliminated (zero levels) as the documents will be automatically entered into the system.
- There will be no need for re-entering data, printing, or sending through a non-secure manner (e.g., fax, mail).
- Significant decrease of the cost of ownership of similar B2B e-Business systems as usual project-based solutions will be substituted by COTS components.
- Foster the e-Business operation, to the users. Through experience with GENESIS in pilots and events with demonstrations, trial sessions, etc., the level of awareness for the need of interoperable solutions will be increased on the user’s side.

The GENESIS system adds value because organizations save time and money, depending on

- Initial "set-up" (negotiation) when dealing with a business partner for the first time
- The number of foreign business partners vs. domestic partners
- The number of business documents in a process (e.g. order, invoice)
- Then number of fields (information entities) in a business document
- The frequency of a transaction might be low (monthly) for one partner, but high for the other (e.g., for a government you have to multiply with the number of companies in the country).
- Risk mitigation for time-consuming interactions to get correct and complete business documents.
- The GENESIS system will make it easy for companies to conduct business with international partners, even if they have little experience.

Logo, a project partner from Turkey, estimates for its customer Istikbal, a wholesale company, a significant reduction of processing time when using the GENESIS system. For example, the frequency of the ordering process at Istikbal is about 1000 orders (200,000 order lines) per month, each at an average processing time of 15 minutes. The estimated to-be value with the use
of the Genesis system is 5 minutes. This would reduce the overall effort per month from 250 hours to 83 hours. When assuming 8 hours as one working day, this would mean 31.2 person days (as-is) compared to 10.4 person days (to-be).

The GENESIS project clearly showed the importance of BPM within a project that uses a model driven architecture approach. Using a tool such as ADONIS as a common modeling repository, it was possible to survey real-life business processes in SMEs and governmental institutions in several European countries.

The following list shows the basic decisions we made to enable a smooth harmonization process to get from user-specific processes to generically valid processes:

- Since BPMN is a standard that was already selected as the modeling language to describe the public processes and that matches the requirements of the collaboration process description, it was used to describe the collaboration process flows and interactions as well.
- Due to the fact that B2B models are well documented by UBL 2.0, it was used as a reference for the harmonization of the public processes.
- Models from the other sectors B2G and B2I are based upon end-user specific implementations of the processes.

Under the following link you can find a screen video showing a project example for the BPMN modeling and BPEL generation element:

http://www.genesis-ist.eu/LinkClick.aspx?link=new%2fVideo+-
+GENESIS+ADONIS+BPEL+Export.zip&tabid=82&mid=421

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