

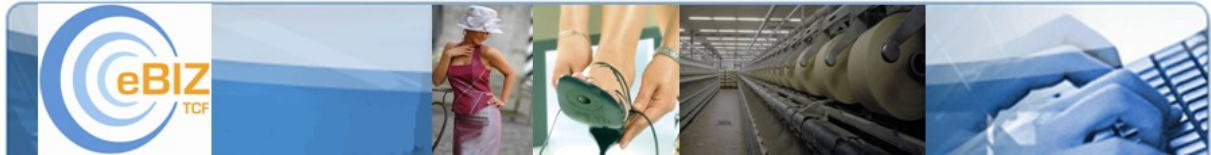


**An eBIZ TCF White Paper**

# **Advancing e-Business among Textile and Clothing SMEs in Greece and Hungary using UBL and ebXML**

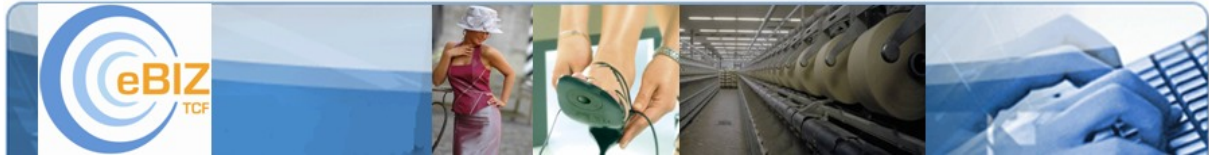
**Case Study of Adopting the eBIZ TCF Architecture**

By the NNS consortium partners



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## Executive Summary

In 2008, the European textile and clothing industry (according to data provided by Euratex, the European Apparel and Textile Confederation) was comprised of 160.000 companies that employed a total of 2.350 million employees. The textile and clothing supply chain in Europe is characterised by a large presence of small and medium size enterprises, with an average number of 16.6 employees per company in the EU of 27. Long term trends of globalization and trade liberalization have challenged the competitiveness of the textile industry in Europe. More recently, the economic and financial crisis has significantly affected the textile and clothing manufacturing activity in Europe.

Innovative e-collaboration combined with other new manufacturing and supply chain paradigms can provide some of the answers to strengthen or re-gain global competitiveness. Successful companies in the fast-moving fashion business respond quickly and efficiently to changing market and consumer requirements and reduce over-stock by fast re-ordering and delivery. SMEs can achieve this by operating in networks of virtual vertically integrated companies that collaborate using B2B e-business technologies. A key enabler to the adoption of these technologies is interoperability of business processes, business information and IT systems based on commonly agreed open standards.

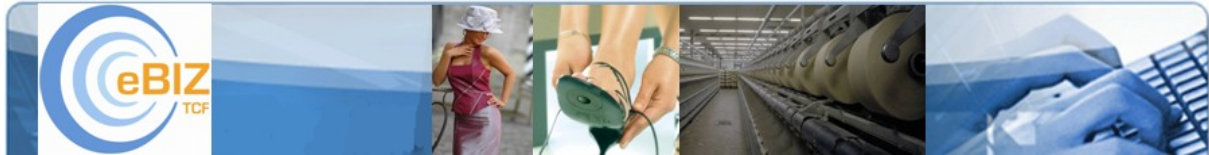
Achieving interoperability in the Textile/Clothing and Footwear (TCF) industries in Europe has been the objective of the eBIZ TCF project, a 2-year cooperation project launched in 2008 by the European Commission. The project aimed to boost and harmonize e-business processes and data exchanges resulting, among others, in the elaboration of a reference architecture to support interoperability and e-business collaboration in the TCF industries.

Within the context of the eBIZ TCF project, SMEs in the textile and clothing industry in Greece and Hungary have carried out a pilot implementation of the eBIZ TCF architecture, under the acronym NNS. The core of this pilot project was NOTA, a producer of women underwear / nightwear in Greece, and the pilot involved some of NOTA's suppliers and customers in Greece and Hungary. The project was coordinated by a University Research Group with broad experience in the apparel industry and an IT facilitator with strong experience in e-business standards and practical deployments. The main objectives of the pilot were: (1) to validate the eBIZ architecture; (2) to address the specific requirements and characteristics of SMEs; and (3) to confirm the business case for e-business in the textile and clothing industry.

The NNS pilot adopted the eBIZ architecture and deployed a solution based on the eBIZ profile of Universal Business Language (UBL, an XML standard), ebXML Messaging (ebMS, a robust messaging protocol for electronic business) and the GLN and GTIN identification standards. The pilot involved deploying low-cost, commercial-off-the-shelf ebXML messaging endpoints at the locations of the industry partners and configuring them according to the business processes in the eBIZ architecture, using ebXML standards. UBL import and export functionality was developed for the ERP systems used by the industry partners, and scripts were written to integrate the communication product and the ERP systems. The pilot confirmed the applicability of the eBIZ architecture, and provided feedback to the eBIZ architects during the project.

The NNS pilot is all about e-business among small and medium-size companies. This means that any solution must be low-cost and very easy to install, configure and use. It should support outsourced (remote) management, and provide very simple and robust interfaces. In NNS, a simple UBL file drop and pick-up were used along with content-based routing, providing a simple interface for SMEs that is even easier than email. The configuration is robust, can handle intermittent connectivity and does not require a fixed IP address or URL.

Finally, the NNS pilot confirmed the economic benefits of electronic business. The pilot confirmed a strong reduction in processing time for orders. Extrapolating from the limited exchanges in the pilot, NOTA could save up to twenty thousand Euros annually by processing customer orders electronically.



## Textile Industry e-Business and eBIZ TCF

### Textile and Clothing Industry in Europe

In 2008, the European textile and clothing industry (according to data from Euratex, the European Apparel and Textile Confederation) was comprised of 160.000 companies that employed a total of 2.350 million employees. These companies generated 198.2 billion Euros of turnover, 6.9 billion Euros in exports outside the European Union, 5.8 billion Euros in investments and an added value of 60 billion Euros.

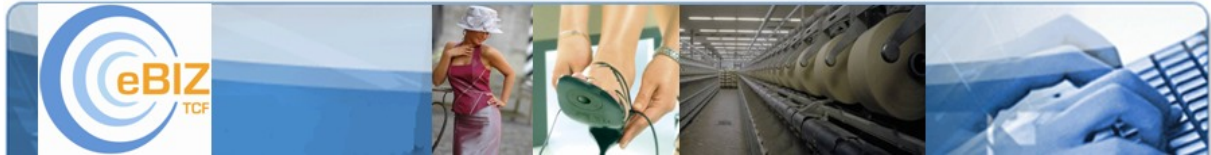
Innovative e-collaboration combined with other new manufacturing and supply chain paradigms can provide some of the answers to the European companies to strengthen or re-gain global competitiveness. Successful companies in the fast-moving fashion business respond quickly and efficiently to changing market and consumer requirements and reduce over-stock by fast re-ordering and delivery. Some large companies are achieving this by vertical integration of design, customer feedback, sourcing and manufacturing, distribution and retailing. Vertical integration, within the boundaries of a single large enterprise, is typically supported by enterprise resource planning (ERP) and supply-chain management (SCM) systems.

However, the textile and clothing supply chain in Europe is highly fragmented and characterised by a large presence of small and medium size enterprises. Enterprises of less than 50 employees account for 60% of the workforce in the EU clothing sub-sector and for almost 50% of the industry's added value. In fact, the average number of employees per company in the EU of 27 is as low as 16.6. However, the benefits of e-collaboration are not limited to large companies. SMEs can collaborate, share data and synchronize their business processes in networks of virtual vertically integrated companies in the value chain. This allows them to adapt quickly to changes in customer and market demand, as vertical integration does in large companies. The key for such connectivity in SME networks is interoperability of business processes, business information and IT systems based on commonly agreed open standards.

### E-Collaboration in the Textile and Clothing Industry

Over the years, a number of steps have been taken in the field of standardisation for electronic business in the textile and clothing industry. The first generation of standards was a Message Implementation Guide (MIG) for UN/EDIFACT developed by the EDITEX Europe Group in the early nineties. Unfortunately, the uptake of EDITEX was limited, due to the difficulty in implementing the standard, implementation costs, and the lack of telecommunications infrastructure. Use of EDITEX required EDI converters and substantial efforts to integrate them to legacy systems. In 1993, network connectivity was still very expensive, at 280 Euros per megabyte, as witnessed in one case of an EDI network used in Greece. In addition, extensive preparatory work was needed among trading partners before data interchange was possible.

In recent years, Europe has made significant progress on e-business standards for the textile and clothing industry, as presented in the case of Moda-ML and TexWeave. However, an overall harmonisation has been lacking and in many cases, the results of these activities did not lead to a widespread adoption of these standards by the user community. As a result, the textile and clothing industry is lacking globally implemented e-business standards and has not sufficiently succeeded in its efforts to synchronise data and exchange business documents electronically.

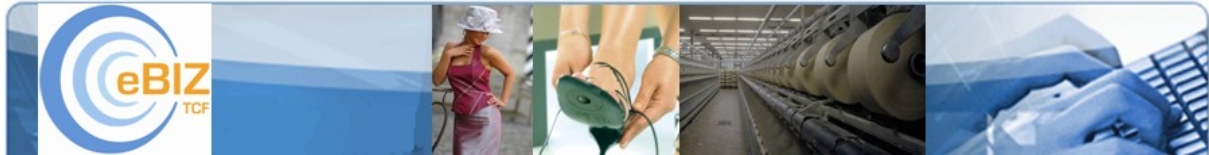


## eBIZ TCF

The eBIZ-TCF project, a 2-year cooperation project launched in January 2008 by the European Commission, was set up to boost and harmonize e-business processes and data exchanges in the Textile/Clothing and Footwear (TCF) industries in Europe. The project is particularly concerned with promoting the uptake of electronic business among SMEs in these industries. The three main partners of the eBiz TCF project are the European Apparel and Textile Confederation (EURATEX), the European Confederation of the Footwear Industry (CEC) and the National Agency for New Technologies, Energy and the Environment of Italy (ENEA). Key collaborating organizations are GS1 and Hermes Lab.

The major deliverable of the eBIZ project is the reference architecture for e-business in the textile, clothing and footwear sectors. This architecture aims to tackle the different requirements of both manufacturer-retail supply chains (downstream part of the supply chain) and manufacturer-supplier networks (upstream part of the supply chain) by providing them with an appropriate technical and methodological specifications framework.

The eBIZ project has also supported a large number of pilot projects aimed at implementing and validating the eBIZ reference architecture in production e-business projects involving textile, clothing and footwear SMEs in Europe. One of these pilot projects is the NNS project, presented in this paper.



## Overview of the NNS Pilot

NNS is one of the pilot implementations of the eBIZ TCF architecture. The project started in early 2009 and formally finished as a pilot at the end of that same year. The partners are currently participating in the eBIZ Interest Group. The pilot aimed to add value to the overall eBIZ project in terms of geographic coverage (with partners in Greece, Hungary and the Netherlands) and application breadth covering both upstream and downstream scenarios and in the use of UBL and ebXML standards and technologies.

### Industry partners

The heart of the NNS pilot beats at NOTA S.A, a pure SME company in the textile /clothing sector with real data exchange needs in order to harmonize its e-business processes with the support of e-business technologies and standards. NOTA was the perfect candidate for our project since, unlike the majority of SMEs in the industry, it has a very good record on data exchange and interoperability issues. NOTA was the first Greek company to implement –back in 1994- a full scale EDI project based on EDITEX and up to today, has been actively involved in a significant number of European R&D projects. In addition, NOTA presents a product offering (underwear / nightwear) that is significantly different compared to standard apparel, thus significantly enhancing the eBIZ project coverage.

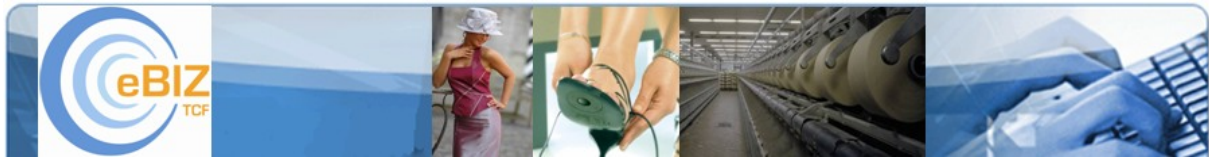
To cover the upstream scenarios, a NOTA key supplier was asked to join the pilot. Helkon Ruhairpari Kft has a long and well-established business collaboration with NOTA. There is a strong business case for electronic business among the two companies. Helkon, which is based in Hungary, also reinforced the geographic coverage of the eBIZ TCF project.

To cover the downstream scenarios, the pilot project partnered with two retailers delivering NOTA's products to the final customers. NOTA's owned stores are managed by a separate legal entity B&D Masselos Senc, which provides the pilot with a good application test bed. Ch. Mavrommatis Ltd operates two large and specialized lingerie retails stores in South Attica.

### Other Partners

The four companies described above constitute the application test bed of the NNS pilot and are complemented by NTUA SIMOR (pilot coordinator), which has an extensive experience in business process reengineering and information systems integration in the apparel industry.

In the NNS pilot, a consulting company based in the Netherlands, Sonnenglanz Consulting, acted as IT facilitator. This company has over six years experience in several very large scale ebXML production projects and is actively involved in international e-business standardization. The company previously collaborated with NTUA SIMOR in the area of electronic business in the home textiles (interior textiles, textile floor coverings and curtains) industry.



## Architecture of the NNS eBIZ Pilot

The NNS pilot project has adopted the eBIZ reference architecture, which contains extensive specifications of the eBIZ e-business exchanges, business documents, identification systems and communication protocols.

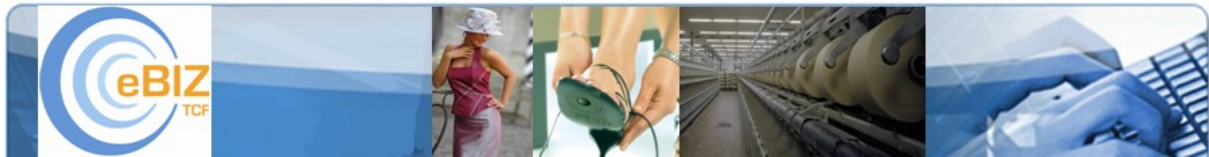
### Business Processes

The eBIZ architecture divides exchanges in the TCF supply chain in “downstream” and “upstream” parts. The “downstream” part is concerned with relations and business processes between producers of finished products and their customers (normally retailers). The eBIZ architecture distinguishes three main processes in the “downstream” supply chain as depicted in the following figure.

Process	Activity	Actors	Transactions
classical preorder	Initial transfer of order and article data (mandatory)	Producer Retailer	Article catalogue Initial order response
	Transfer of changes to the order	Producer Retailer	Change order response Order change reaction
	Finalizing of the order	Producer Retailer	Final order response
	Delivery (mandatory)	Producer Retailer	Article catalogue Despatch advice Receiving advice
	Invoicing	Producer Retailer	Invoice
	Report of sales data (mandatory)	Retailer Producer	Sales report
cyclic replenishment programs - CRP	Transfer of base article catalogue (mandatory)	Producer Retailer	Article catalogue
	Initial stocking of the area by retailer	Retailer Producer	Order Despatch advice Receiving advice
	Periodic (weekly) replenishment (mandatory)	Retailer Producer	Order Despatch advice Receiving advice
	Report of sales and Inventory movements (mandatory)	Retailer Producer	Sales report Inventory movement report
	Invoicing	Producer Retailer	Invoice
	Synchronizing of stock information	Retailer Producer	Inventory report
	Changes to the article catalogue (mandatory)	Producer Retailer	Article catalogue
	Transfer of base article catalogue (mandatory)	Producer Retailer	Article catalogue
replenishment on customer demand	Periodic transfer of article availability Information (mandatory)	Producer Retailer	Stock availability report
	Initial stocking of the area by vendor and buyer (Interactively ordered at the vendor) (mandatory)	Retailer Producer	Order Change order response Despatch advice Receiving advice
	Periodic replenishment (mandatory)	Retailer Producer	Order Change order response Despatch advice Receiving advice
	Report of sales and Inventory	Retailer	Sales report

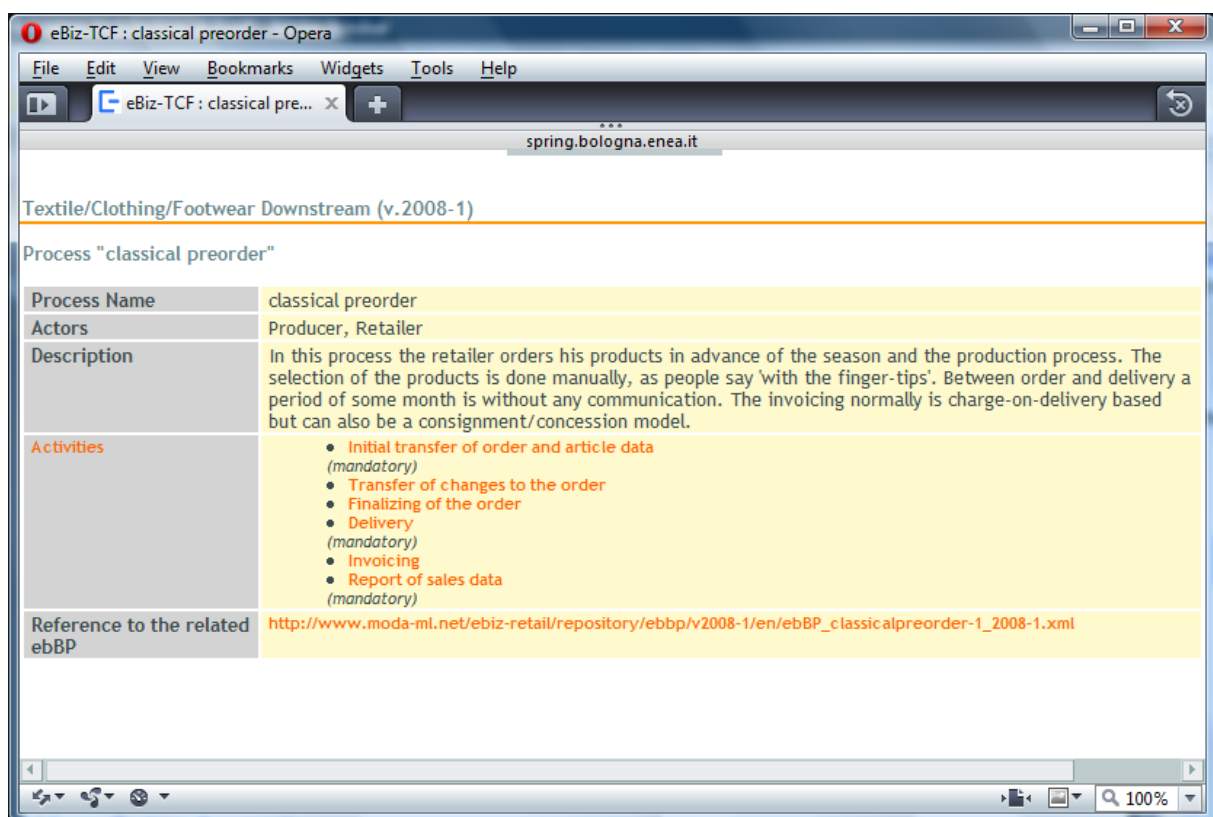
**Figure 1: The three eBIZ TCF Downstream Business Processes**

In the eBIZ architecture, the term “upstream” is used when referring to that part of the supply chain between producers of a finished product and their suppliers of materials, component parts and processes used in manufacturing products. It is also used when referring to the whole of the supply chain involving the sub-contracting of finished products and the sub-contracting of materials and component parts or of processes used in manufacturing products.



The NNS pilot involves both “downstream” and “upstream” communication. However, the upstream business model of the NNS pilot is presented with the particularity of subcontracting finished products: Helkon produces products (full packages) for NOTA, which it sells using the NOTA brand. We therefore simplified our architecture by adopting the “downstream” business processes and activities for all interactions, including upstream communication. The NNS B2B scenario tested for compliance with the eBIZ-TCF architecture is quite straight forward. It involves the “classical preorder process” in the communication between NOTA and its supplier Helkon and the “classical preorder” and “cyclic replenishment” processes on the interaction between NOTA and its retail customers.

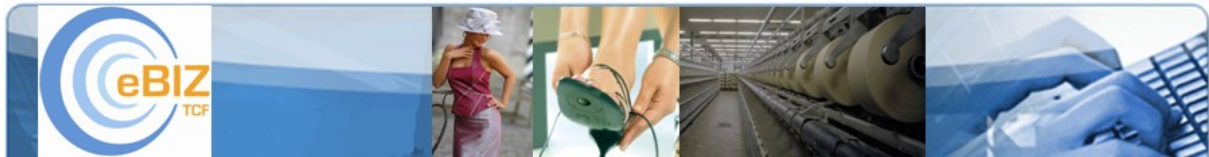
The eBIZ architecture defines business processes at the upper level, breaking them down in activities and supporting each activity with the necessary business documents. The following screenshot shows the entry page for the definition of the “classical preorder” business process.



**Figure 2: Downstream Business Process “classical preorder”**

The screenshot contains a reference to a so-called “ebBP” XML document. The abbreviation ebBP refers to “eXML business process” and ebXML refers to “e-business XML”. The ebXML framework is a framework for electronic business under the ISO 15000:2004 standard. Major portions, including ebBP, are developed within the OASIS standards organization. The ebBP standard defines a technical notation for B2B business processes, collaborations and transactions and allows designers of B2B architectures like eBIZ to identify the choreography of documents exchanged between business partners. In the NNS pilot, we have used these ebBP files to configure our business partner agreements (see section Business Agreements starting on page 10).

A lesson learned is that there is a minor mismatch between the eBIZ upstream business processes and the business processes in the NNS pilot. This is due to NOTA’s relation to its partners, as discussed in the previous section. NOTA is the brand owner of its collection and therefore sends the



Article Catalogue to its supplier Helkon. The identifiers for the catalogue items in that catalogue, expressed as GS1 Global Trade Information Numbers (GTIN), are owned by NOTA, not by Helkon. This is the opposite of what happens in the downstream communication where the producer sends the catalogue to the retailer and not vice versa.

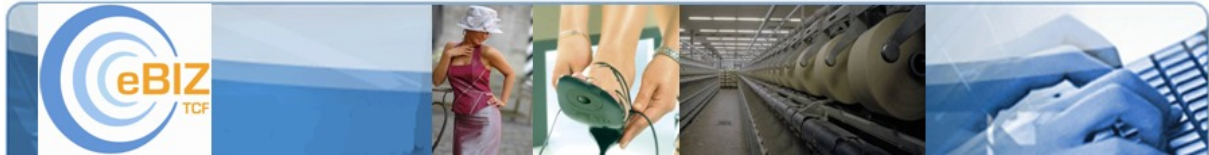
## Business Documents

The eBIZ architecture proposes different sets of e-business standards for the upstream and downstream parts of the supply chain. For the downstream part, a TCF profile of the OASIS Universal Business Language (UBL) standard, version 2.0, is utilized. UBL 2.0 defines a set of thirty XML schemas for business documents, many of which are applicable in textile and clothing e-business. The architecture for the “upstream” communication uses substantially different standards: Moda-ML for textile and clothing and SHOENET for footwear. However, as NNS is only concerned with finished textile products, we simplified our architecture and reduced the number of supported standards by using UBL in the “upstream” supply chain as well. Part of an example UBL document (article catalogue sent from Helkon to NOTA), conforming to the eBIZ profile and exchanged within our pilot, is displayed in the following figure.

```
<Catalogue xmlns:udt="urn:un:unece:uncefact:data:draft:UnqualifiedDataTypesSchemaModule:2"
  xmlns="urn:oasis:names:specification:ubl:schema:xsd:Catalogue-2"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:qdt="urn:oasis:names:specification:ubl:schema:xsd:QualifiedDatatypes-2"
  xmlns:ccts="urn:oasis:names:specification:ubl:schema:xsd:CoreComponentParameters-2"
  xmlns:stat="urn:oasis:names:specification:ubl:schema:xsd:DocumentStatusCode-1.0"
  xmlns:cbc="urn:oasis:names:specification:ubl:schema:xsd:CommonBasicComponents-2"
  xmlns:cac="urn:oasis:names:specification:ubl:schema:xsd:CommonAggregateComponents-2"
  xsi:schemaLocation="urn:oasis:names:specification:ubl:schema:xsd:Catalogue-2
    http://docs.oasis-open.org/ubl/os-UBL-2.0/xsd/maindoc/UBL-Catalogue-2.0.xsd">
  <cbc:UBLVersionID>2.0</cbc:UBLVersionID>
  <cbc:CustomizationID>eBIZ-TCF-v2008-1</cbc:CustomizationID>
  <cbc:ProfileID>eBIZ-TCF-ArticleCatalogue</cbc:ProfileID>
  <cbc:ID>1</cbc:ID>
  <cbc:IssueDate>2009-12-08</cbc:IssueDate>
  <cac:ValidityPeriod>
    <cbc:StartDate>2009-01-01</cbc:StartDate>
  </cac:ValidityPeriod>
  <cac:ProviderParty>
    <cac:PhysicalLocation>
      <cbc:ID schemeName="GLN">5209999001264</cbc:ID>
    </cac:PhysicalLocation>
  </cac:ProviderParty>
  <cac:ReceiverParty>
    <cac:PhysicalLocation>
      <cbc:ID schemeName="GLN">5209999001264</cbc:ID>
    </cac:PhysicalLocation>
  </cac:ReceiverParty>
  <cac:CatalogueLine>
    <cbc:ID>1</cbc:ID>
    <cbc:ActionCode>add</cbc:ActionCode>
    <cbc:MinimumOrderQuantity>0</cbc:MinimumOrderQuantity>
```

**Figure 3: UBL Catalogue**

The eBIZ profile of UBL is defined in the TCF architecture. It defines many constraints to tailor UBL to the TCF domain and to facilitate highly automated processing of UBL documents. For instance, it



specifies the use of GS1 Global Trade Identification Number (GTIN) standard to identify products and Global Location Numbers (GLN) for party identification. Business partners can use the UBL XML schemas and additional definitions in the ISO Schematron format, developed by the eBIZ architects, to validate UBL XML documents. In the NNS pilot, the responsibility of being able to send and receive eBIZ UBL documents is with each of the trading partners, and their IT providers. In the project, the objectives of the eBIZ architects to facilitate automatic business processing have been validated. Two lessons were however learned in our use of the UBL profiles:

First, the eBIZ architecture defines standard code systems for many identifiers, but not for colour codes. For known products, the recipient of a catalogue can interpret codes using a lookup table that links a GTIN or the supplier colour code to the internal colour code. However, it is not possible to automatically import catalogues that define products that are new to the recipient, i.e. that have an unknown GTIN or an unknown supplier colour code.

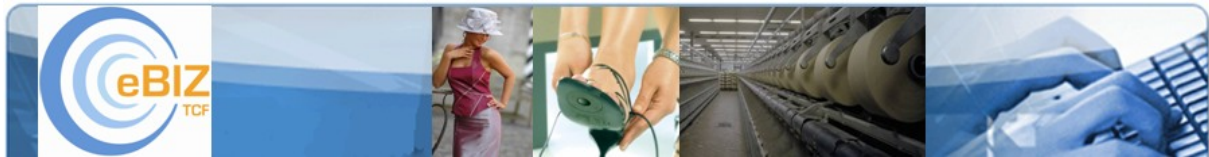
Second, while the use of XML documents obviates the need to manually enter the content of business documents into a business application, at the same time, it should not prevent employees from checking the input for errors or unlikely situations. Therefore, it is often advisable to add a 'review and approve' step in the business application, which protects the database against mistakes. However, this means that UBL documents cannot be processed fully automatically, or in a completely unattended fashion.

### [Business Agreements and System Configuration](#)

A key element to the ramp-up of electronic business among trading partners is the agreement on key configuration parameters. These parameters include the definition of who the trading partners are, which business processes they are executing, which activities constitute the processes and which documents they are exchanging during these activities. It also includes communication parameters, such as the Internet address of the communication server and any certificates used to secure the exchange of messages. In an eBIZ compliant environment, two partners need to reference a particular business process (e.g. "TCF downstream") and specify the role that each of them performs in the process (e.g. "Producer" or "Retailer"). In the NNS pilot, we adopted the ebXML Collaboration Protocol Profiles and Agreement (CPP/CPA, ISO 15000-1) standard to express business agreements and configurations. For the development and management of the collaboration protocol agreements we utilised a CPA toolkit developed by the IT facilitator, prior to the NNS project.

The necessary business process parameters for the definition of CPAs are already expressed in the definition of eBIZ business processes (see above, page 7, Business Processes), which were made available as ebBP documents. The ebBP documents are XML documents and can be processed automatically using appropriate tools. In the NNS pilot, we converted the eBIZ TCF ebBP documents to the appropriate XML-based format for input in the CPA toolkit. The conversion of the ebBP files into this format can therefore be handled using any XML-to-XML mapping tool. In the NNS pilot, we used the W3C XSLT (XSL transformation) language to write an XSLT style sheet that automates the conversion. By importing the result of this conversion into the CPA tool, it is possible to set up a business collaboration based on the specified business process. The tool provides a graphical interface to select such a business process (which it refers to as a *service*).

The CPA tool allows business partners to identify themselves and enter their communication details and their roles in a particular business process. For identification, the NNS pilot complies with the eBIZ architecture and adopts the GS GLN standard (see the next section, Partner Identification). The communication details include the network address of the message handler of the partner and the public keys of the certificates that the partners use to secure connections and/or message content.



CPA Creation

### Create a CPA based on a Service and Partners

**Select a Service specification**

Service IDentification: eBIZ-TCF ([Show msg: cpa-t](#))

**CPA Identification and Validity**

(Postfix) CPA ID:  Use of a postfix (optional)  
 Use the value as a full CPA ID (optional)

Start Date:  (optional)  
 End Date:  (optional)

**Assignment of partners to roles**

Role	Partners
<input checked="" type="checkbox"/> Producer	eBIZ.TCF.Masselos <input type="text"/> (ID) ( <a href="#">Show</a> )
<input checked="" type="checkbox"/> Retailer	eBIZ.TCF.Mavromatis <input type="text"/> (ID) ( <a href="#">Show</a> )

**Contact information**

Name: Ernst Jan van Nigtevecht  
 E-mail: E.JVN@Sonnenglanz.net

**Connection type**

Direct  
 Via an Intermediary (default)

**Figure 4: Selecting partners' roles in the business process**

Having selected a business process, the next step is to assign the *roles* in the business process to specific interfaces. Any of the business partners registered in the toolkit's registry can be selected. The collaborations in eBIZ TCF are binary, i.e. they involve two partners, each performing specific roles. This is illustrated in Figure 4, where *Masselos* is identified as *producer* and *Mavrommatis* as the *retailer*. The result of running the toolkit is a single collaboration protocol agreement (CPA), between these two partners for these specific roles.

The toolkit is not limited to binary collaborations. It also supports what ebBP refers to as "multi-party collaborations" that involve more than two partner roles. In that case, multiple CPAs are generated, one for each pair of interacting business partners. The toolkit is Web-based and contains a repository that stores business process configurations, profile information of partners and generated CPAs. It allows business partners (or any service providers that manage their messaging systems) to log in and download the CPAs. This is displayed in Figure 5.

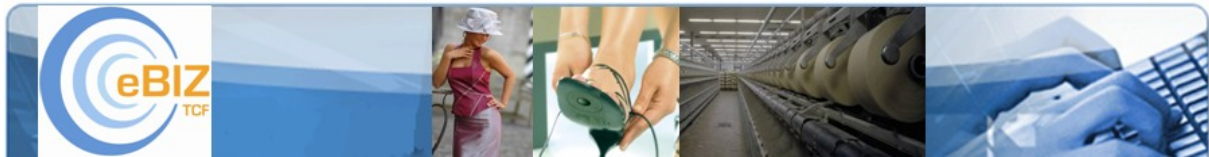
CPA Creation

### Create a CPA based on a Service and Partners

**CPA's created:**

Partners	CPA : with the Roles
<i>Masselos - Mavromatis</i>	<a href="#">CPA</a> Producer - Retailer

**Figure 5: CPA created**



Provided the relevant partners use messaging software that supports the CPA standard, their communication servers can be configured by importing and activating the generated CPAs. Once these CPAs are imported and active, the business partners can exchange messages and execute the eBIZ TCF business processes.

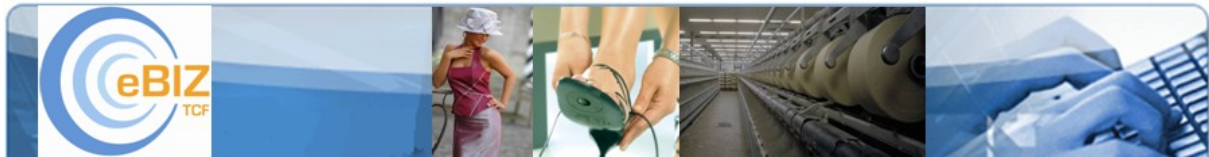
The CPA toolkit currently supports version 2.0 of the CPA standard. The version is compatible with version 2.0 of the ebXML Messaging standard that was used in the NNS pilot project. The CPA hyperlink on Figure 5 returns the CPA between NOTA (producer) and retailer (Mavrommatis). The CPA tooling makes it very easy to set up a new CPA among trading partners. Based on some basic setup parameters, a CPA can be generated in minutes.

```
<?xml version="1.0" encoding="utf-8"?>
<tns:CollaborationProtocolAgreement xmlns:axsl="http://www.w3.org/1999/XSL/TransformAlias"
  xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:tns="http://www.oasis-open.org/committees/ebxml-cppa/schema/cpp-cpa-2_0.xsd"
  xmlns:ds="http://www.w3.org/2000/09/xmldsig#" xmlns:xlink="http://www.w3.org/1999/xlink"
  xsi:schemaLocation="http://www.oasis-open.org/committees/ebxml-cppa/schema/cpp-cpa-2_0.xsd
  http://www.oasis-open.org/committees/ebxml-cppa/schema/cpp-cpa-2_0.xsd"
  tns:cpaid="CpaId-eBIZ-TCF-Producer-Retailer-5209999001264-5209999001295-001" tns:version="1.0">
  <tns:Status tns:value="agreed"/>
  <tns:Start>2000-01-01T00:00:00Z</tns:Start>
  <tns:End>3000-01-01T00:00:00Z</tns:End>
  <tns:ConversationConstraints tns:concurrentConversations="0" tns:invocationLimit="0"/>
  <tns:PartyInfo tns:partyName="Masselos"
    tns:defaultMshChannelId="Producer_defaultDeliveryChannel_ProfileBestEffort_TransportSecurity"
    tns:defaultMshPackageId="defaultPackage_Profile">
    <tns:PartyId tns:type="urn:oasis:names:tc:ebcore:partyid-type:iso6523:0088">5209999001264</tns:PartyId>
    <tns:PartyRef xlink:href="http://www.nota.gr/" xlink:type="simple"/>
    <tns:CollaborationRole>
      <tns:ProcessSpecification tns:name="classical preorder Business Collaboration"
        tns:version="1.0" xlink:type="simple"
        xlink:href="http://www.ebiz-tcf.eu//ClassicalPreorderBusinessCollaboration"
        tns:uuid="Classicalpreorder1_20081"/>
      <tns:Role tns:name="Producer"
        xlink:href="http://www.ebiz-tcf.eu//ClassicalPreorderBusinessCollaboration"/>
    <tns:ServiceBinding>
      <tns:Service tns:type="http://www.moda-ml.net/ebiz-retail/repository/ebbp/v2008-1/en/"
        >classicalpreorder-1_2008-1</tns:Service>
      <tns:CanSend>
        <tns:ThisPartyActionBinding
          tns:id="Producer_S1_Producer_Retailer_S_ReqBtArticlecatalogue60_bdArticlecatalogue83"
          tns:action="ArticleCatalogue" tns:packageId="defaultPackage_Profile">
          <tns:BusinessTransactionCharacteristics tns:isAuthenticated="transient"
            tns:isAuthorizationRequired="true" tns:isConfidential="transient"
            tns:isIntelligibleCheckRequired="false">
```

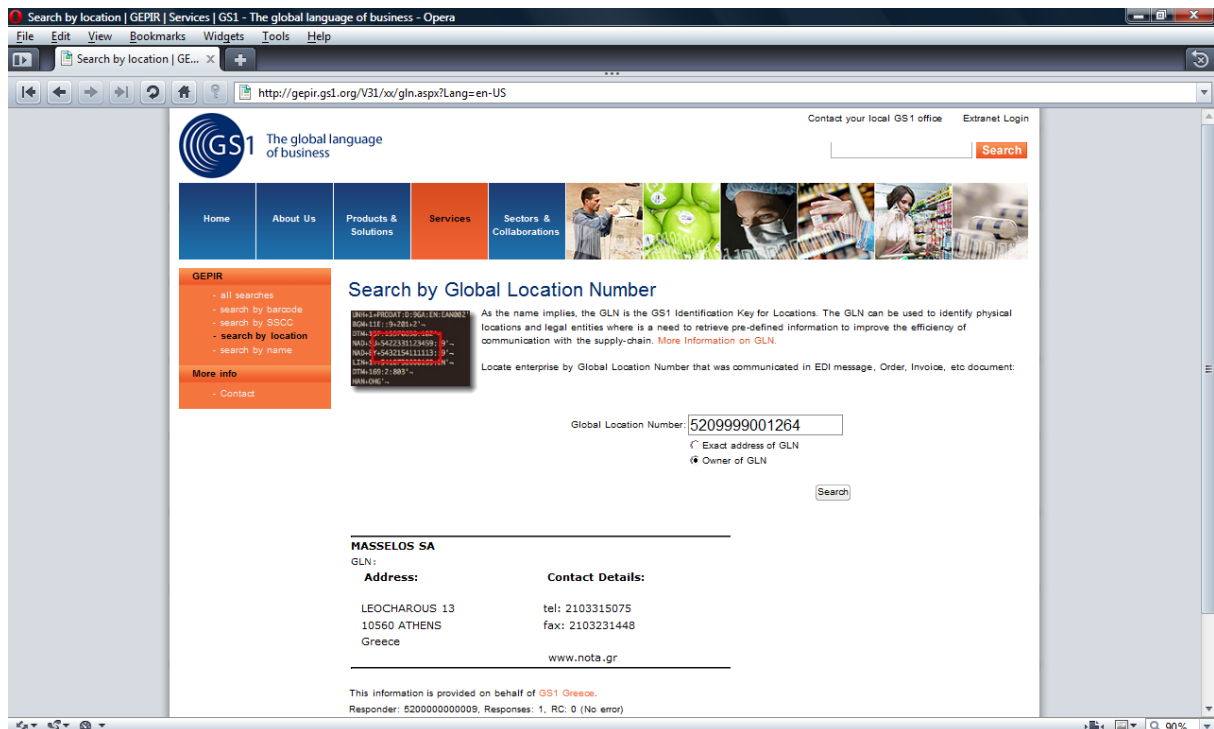
Figure 6: CPA between Masselos (as Producer) and Mavrommatis (as Retailer)

## Partner Identification

The ebXML partner identification system supports partner identification code *values* and identification *types*. The code *value* is an address identifier of a business partner expressed in an identification system that is itself identified using a code *type*. Within the eBIZ reference architecture, a single identification system is defined: the Global Location Number (GLN) system of the GS1 standards organization. The NNS pilot has adopted the GLN identification system, so the Collaboration Partner Agreements all use the same identification type. The identification code values have been obtained for all partners from the GS1 national organizations in Greece and Hungary.



A key benefit of standardized identifiers like GLN is that services like the GS1 Global Electronic Party Information Register (GEPIR) can be used. GEPIR is a distributed database that contains basic information on over 1,000,000 companies in over 100 countries. It provides a lookup function based on GLN that can be accessed from <http://gepir.gs1.org/>. A screen shot of GEPIR with one of our partners is displayed in Figure 7. Services like GEPIR are expected to evolve over the next few years and to provide better support to setting up e-business relationships (such as providing information on supported interactions or communication configuration parameters) and forming Collaboration Protocol Agreements. This would be a big boost for the adoption of e-business among SMEs.



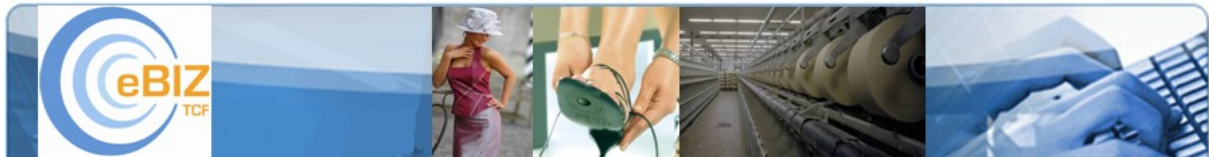
**Figure 7: Global Electronic Party Information Register (GEPIR)**

## Communication Protocol

The NNS pilot uses the ebXML Messaging Services, version 2.0 (ebMS 2.0) standard as its communication protocol. Like the ebXML Business Process (ebBP) and Collaboration Protocol Profiles and Agreements (CPA) standards, ebMS 2.0 is part of the ISO 15000 series. The ebXML Messaging standard was used in NNS because it complies with the eBIZ TCF architecture and is a mature, interoperable and proven technology used in many deployments worldwide.

The ebMS protocol provides secure and reliable messaging of business documents in XML, EDI or other formats. It can use multiple alternative lower-level transport protocols, including SMTP and HTTP. Although the eBIZ architecture favours SMTP, we decided to use HTTP, since the majority of ebMS deployments we are aware of (included ones we were involved in) seem to prefer HTTP over SMTP.

Security is a common concern among companies of any size, and SMEs are no exception. To secure the messaging between partners in the NNS pilot, the ebMS communication servers use encrypted network connections established using server authentication and client authentication based on digital



certificates. More advanced methods of securing messages are supported in ebMS 2.0. However, the need to deploy them in full scale was not present in the course of the NNS pilot.

The ebMS 2.0 standard also provides a standard business document header. This header is in XML format and contains standard header fields using standard semantics. Some of these fields have values that are specified in the collaboration protocol agreements. They identify the sender and destination of the message, the CPA that is used, the business service and actions the message relates to. Other header fields are set per message and provide unique message identification and correlation. In the NNS pilot the responsibility of setting these fields on outgoing messages is taken care of by the integration scripting.

There is a choice of commercial and open source implementations of ebMS. The NNS project evaluated three messaging products that support ebMS and decided to use the Axway Gateway Interchange B2B product as its Message Service Handler (MSH). Figure 8 displays the message tracker interface of this product from the NOTA perspective, having received the previously shown article catalogue from its partner (upstream supplier) Helkon.

**Search results for: All messages-last 1 hour**  
 Results as of: Παρασκευή, 19 Φεβρουάριος 2010 4:28:56 μμ EET  
 Restricted to messages originating between: 19/2/2010 3:28 μμ and 19/2/2010 4:28 μμ

**Local server**  
 Showing 1 - 3 of 3 messages

Select an action... Click a table cell for more filtering options

Click Details to view message details. Or, place the cursor over the Details link for 2 seconds to display a pop-up of attributes.

<input type="checkbox"/>	Type	Origination	From ID	To ID	Status
<input type="checkbox"/> Details	Payload	Φεβ 19, 2010 04:21:32 μμ EET	5209999001264	5990033301005	Delivered
<input type="checkbox"/> Details	Payload	Φεβ 19, 2010 04:21:31 μμ EET	5209999001264	5990033301005	Delivered
<input type="checkbox"/> Details	Payload	Φεβ 19, 2010 03:34:16 μμ EET	5990033301005	5209999001264	Delivered

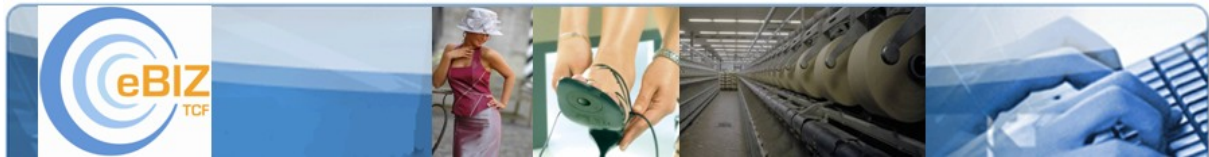
**Figure 8: Message Tracker of Axway Gateway Interchange**

Axway Interchange was chosen as it is a mature and easy to use product that has a good track record in the industry. It is available in multiple editions, one of which is a low-cost version targeted to SMEs. One other pilot project in the eBIZ TCF project, with participants in Spain and Portugal, also uses ebXML Messaging version 2.0, but uses the Hermes open source product. ENEA has used an implementation of the newer ebXML messaging version 3.0 specification in e-business pilot projects.

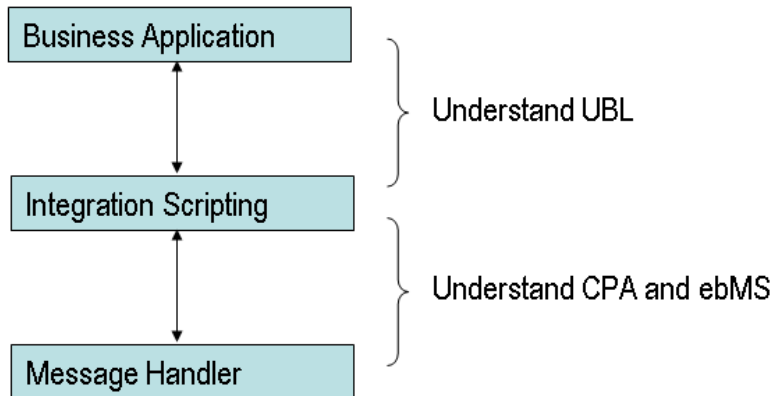
## Integration

In the textile industry, partners use a wide variety of business applications, including retail management systems (RMS) and enterprise resource planning (ERP) software. Most of these applications are custom applications, sometimes developed in-house. To engage in e-business with trading partners, SMEs face the challenge to adapt these applications to support the agreed business scenarios, processes, activities, transactions, document types and formats, at the lowest cost and using the simplest approach possible.

To support a wide variety of business applications, and to avoid being tied to a particular communication product, the NNS pilot chose to support the least complex interface possible: import and export of UBL XML documents from the file system. The assumption was that business applications of trading partners should not have to support the ebMS 2.0 protocol, know about CPA



configurations or implement the interfaces to the messaging product. Similarly, our desire was to be able to use generic messaging products that have no specific built-in functionality to support UBL. To support these requirements, we introduced an integration layer that decouples the business application from the Message Service Handler product. The relation between these layers, and the requirements placed on each of them, is displayed in Figure 9.



**Figure 9: Integration Layers**

In the NNS project, the integration layer between the business application and the communication product is implemented using the Python scripting language, which provides both flexibility and adaptability. This integration layer understands both UBL and ebXML (CPA and ebMS). On outgoing messages, Python scripting inspects the exported UBL documents and derives all the required routing information from both documents and agreed CPAs. The scripting retrieves the destination identification and selects the right collaboration agreement to allow the message handler to construct messages containing UBL documents. This includes the following metadata:

- A UBL document is of a particular type (e.g. *Article Catalogue* or *Invoice*). The eBIZ architecture assigns profiles of UBL document types to particular activities (e.g. *Initial transfer of order and article data* or *Invoicing*). These activities are reflected in the *Service* and *Action* fields in the business header of ebMS messages. The values of these fields must be set appropriately on outgoing messages, and validated on incoming messages.
- Similarly, the ebMS header identifies sender and recipient of messages encoded as the *From/PartyId* and *To/PartyId* fields in the ebMS header, using GS1 Global Location Numbers. A UBL document contains information about various partners related to the business transaction. For instance, a UBL Invoice contains an *Accounting Supplier Party*, an *Accounting Customer Party*, and a *Buyer Customer Party*. For each exported UBL document, the scripting inspects the XML document structure to determine its destination.

The scripting is aware of all CPAs configured in the MSH, which it reads on start-up. This is done by pointing the scripts, via a configuration in its property file, to the location on the file system where Axway stores its configured CPAs. By sharing the CPAs between the scripting and the messaging product, the consistency between these layers is assured, since both derive the same routing information from the CPAs.

Based on the UBL document type, the destination PartyID and the CPA with the identified business partner, the appropriate routing information is derived from the CPA. This includes all information



needed to construct a valid ebMS business document header that matches a current CPA. The scripting associates this routing information with the UBL document and submits it, along with the XML document, as metadata to the messaging product. The integration scripting operates using *pattern-action* rules. The *patterns* define constraints on XML structures (expressed using the XPath pattern language) in UBL documents. The *actions* are custom script functions. These functions create message objects with the appropriate metadata, business documents and attachments and typically end by invoking the *SendRequest* operation of the MSH, with an identified destination. The location of destination information is dependent on the UBL document type. For example, the destination of an Article Catalogue document is the UBL *ReceiverParty*, where the destination of an Order Change document is the UBL *BuyerCustomerParty*.

After submission of messages, the messaging product packages the referenced XML document, constructs the ebXML business header from the supplied metadata and sends the message using the agreed transport and routing parameters. At the same time it ensures transport security and message reliability. The integration script and the messaging system can be set to run as a service that is started at start-up. Our partners can shut their servers down at the end of the day, and continue engaging in e-business messaging with partners after starting them back up again the next morning without any manual action other than switching on their computer and ADSL router.

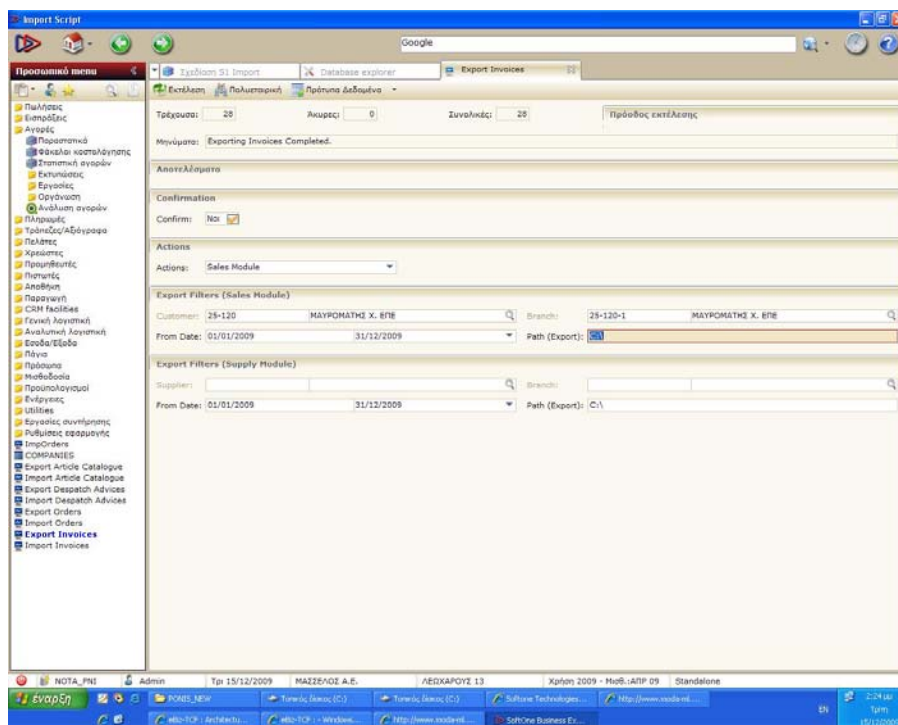


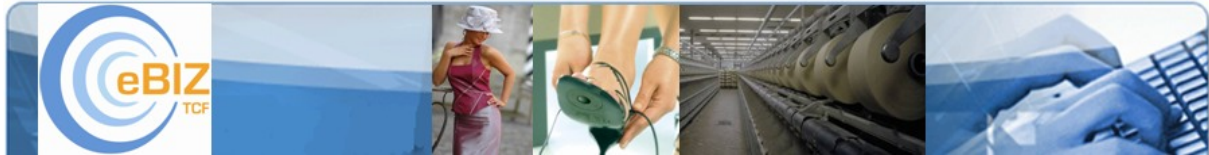
Figure 10: SoftOne UBL export

## E-enabling Business Applications

The last and probably the most significant part of the NNS pilot is putting all the aforementioned standards, protocols and technologies together to in real life business production. Whereas the solution components described previously (standards, messaging and integration software) are quite generic and support a broad variety of users, the industry partners all need to invest in adapting these applications to support import and export of UBL documents. NOTA uses the S1 ERP system, by



SoftOne, which supported the development of UBL import and export functionality. A screen shot of an export of invoices to be sent to Mavrommatis is displayed in Figure 10.



## Results and Outlook

### Validating the eBIZ Architecture

The NNS pilot is an implementation of the eBIZ architecture. It has adopted the eBIZ process specifications and derived the business agreements from their machine-readable (ebBP) versions. It uses the eBIZ UBL profiles and ebXML Messaging for all the exchanged messages. NNS adapted the business applications to import and export UBL XML documents. Except for some minor issues, discussed previously in this document, we argue that our pilot has positively validated the applicability of the eBIZ architecture in real life scenarios. The use of unambiguous identifiers for partners (GLNs) and products (GTINs) offers an enhanced level of automation. The availability of XML processing functionality in business applications and the strong support to XML processing in modern tools like Java and Python significantly reduce the costs and efforts of integrating business applications with messaging tools. The ebXML Messaging protocol provides secure and reliable B2B communication over the Internet. Modern messaging software products like the Axway product, utilized in this pilot, have proven to be easy to install and configure. At the same time they provide the necessary level of security and reliability needed to execute business transactions.

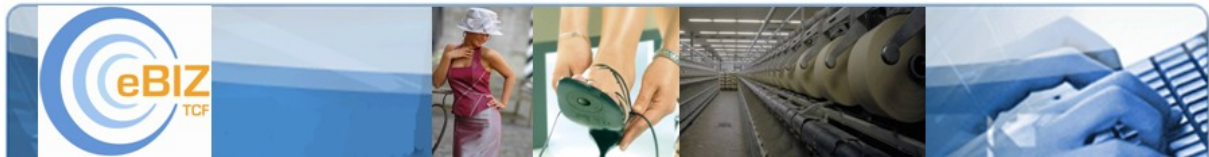
### Addressing SME Requirements

Traditionally, setting up e-business communications has been complex and expensive, thus acting as a major barrier to the adoption of e-business among small and medium-size enterprises. Our pilot project confirmed that the eBIZ architecture constitutes a major improvement as it provides pre-defined processes, scenarios and activities and profiles the UBL standard to support a high level of automation and interoperability. The architecture therefore offers significant support to the process of setting up and executing e-business. In the NNS project, several additional steps have been taken to make e-business simple and cost-effective.

Like the NNS industry partners, most SMEs nowadays have at least a basic level of Internet access. Even small retailers have Internet connections, sometimes to run payment terminals or for basic Web and email access. Most textile SMEs exchange at most a few hundred business documents with trading partners per day, and many less than that. This means that the cheapest (lowest bandwidth) ADSL contract is usually sufficient.

In this project, the IT provider leveraged this basic level of Internet connectivity and used a remote access and support product to access the computer systems of the various partners, working with their IT administrators to set up and configure the systems. No travel time and expenses were needed. The Axway product is very user-friendly, is quickly installed and can be configured for partner communication easily by loading pre-built, customized CPA XML configuration files. As a result, a system for one of our partners can be fully operational and secure with the first business partner within hours. This means that the initial cost of setting up e-business connectivity can be limited: the SME does not need to have any knowledge of B2B technology or training in the messaging product. Connectivity among trading partners is peer-to-peer. No Value Added Network (VAN) service or mailbox provider is needed.

At the level of integration, very few if any textile SMEs employ software developers that can write software using the application programming interfaces (APIs) of messaging products to submit or receive messages for their applications. The Python integration scripting hides the Axway interfaces and offers the simplest interface possible to send documents: SME users only need to be able to drop



UBL XML files in configurable directories. To check for messages, they need to periodically watch other (again, configurable) directories for incoming documents. The scripting knows about eBIZ UBL structures and keeps track of configured partners by checking which CPAs are configured in the MSH.

At the level of communication protocol and message transport, the use of HTTP for exchanging ebXML documents implies that a company must be able to set up a point-to-point connection to the server application of a trading partner, as and when it needs to send a document. In an SME environment, this can be a challenge. Many SMEs do not have a registered domain, and most of them cannot offer a resolvable server URL. Some do not even have a static IP address. As a result, we cannot rely on either a URL or an IP address. In the NNS pilot, we used a dynamic DNS provider that provides a public URL for the messaging endpoints of our partners. This URL is stable even if the SME gets a different IP address assigned by its ISP every time it connects to the Internet. Since incoming messages are still based on incoming HTTP connections, network security (firewall) settings must be configured to allow these incoming connections. The newer versions of ebMS and CPA (version 3.0) support a message polling mechanism where incoming messages are pulled on the backchannel of outgoing HTTP connections. This has the advantage of obviating the need for most network security re-configuration. It is hoped that these specifications will be more widely implemented in the near future so that the textile and clothing industry can take advantage of these new features.

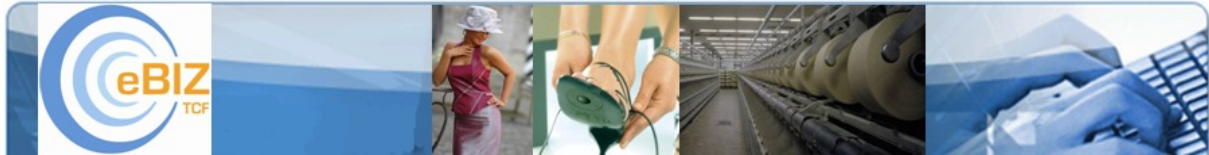
Another characteristic of an SME environment is that servers are typically not available full-time. Many SMEs switch off their computer equipment outside business hours. When this happens, business partners cannot remotely connect and send them messages. To address this issue, the NNS pilot makes use of the ebMS reliable messaging protocol. This protocol is based on automated message acknowledgments and scheduled retries in situations where no acknowledgment is received. In the pilot we are using retry count and retry interval settings that accommodate very long periods of unavailability, up to several days. Again, the message polling feature of the newer version of ebXML Messaging (version 3.0) allows the recipient to determine the transmission time of messages, thus providing additional flexibility.

The NNS pilot uses CPA templates derived from the eBIZ ebBP documents. SMEs can outsource the maintenance of CPAs to a service provider, as the industry partners in the NNS pilot did by working with an IT partner. The CPA tooling makes it very easy to set up a new CPA among trading partners. Based on some basic setup parameters, a CPA can be made in minutes. The Axway messaging product can be accessed remotely for maintenance using secure (encrypted and authenticated) channels, allowing CPAs to be installed remotely. Usually, a new business configuration can be operational in at most a few hours, and often much faster.

## Business Case

The assumption behind the NNS pilot is that introduction of electronic business in the textile industry increases efficiency, by decreasing operating costs, and therefore increases the profitability of the industry. Our experience from the NNS pilot confirms this.

In a year, NOTA receives approximately 15.000 orders. Before eBIZ, roughly 90% of these orders were received by phone or fax, 4 % by e-mail and 6% by legacy/proprietary EDI systems. Currently, it can take NOTA from two to seventy-two hours to receive an order, in the case of physical delivery by the sales rep. The processing of an order takes between four and five minutes for each of the alternatives. After taking the order, entering the data in the ERP system takes another two to four minutes. So, the average time to process a single order ranges from six to nine minutes. With XML, this is reduced to between one minute and a minute and a half, per order. In the wider context of the eBIZ project, similar results have been measured and are reported on at the eBIZ TCF site. These



include a decrease in order processing time from 25% up to 93% due to the introduction of eBIZ TCF compliant exchanges.

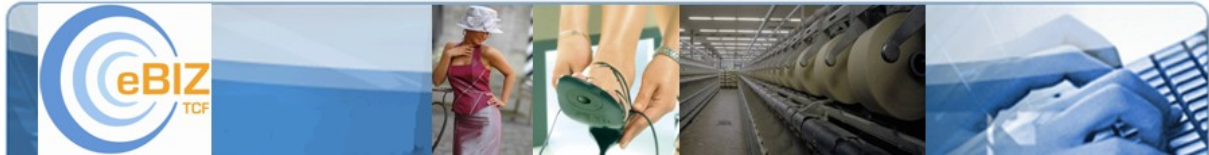
In the hypothetical situation where all of NOTA's orders are received and processed as UBL XML order documents, the company would save between twelve and twenty one thousand Euros per year. This just covers the exchanges of the orders, and therefore does not include the savings that can be made from electronic exchange of article catalogues, invoices, sales reports, inventory reports and price lists. It also excludes the benefits that would arise from an increase in effectiveness, by reducing lead times, response times and general increase in flexibility.

### Next Steps

The NNS pilot has been a small-scale project with a limited number of participants and a small number of documents exchanged. As the project has demonstrated the benefits of e-business, the industry partners are looking into expanding the range of partners and documents exchanged.

Based on the results and experience of the NNS pilot, the IT partner is developing a service offering for the textile and clothing industry, which aims to offer very low-cost, robust exchange of UBL documents using ebXML messages.

The NNS partners strongly believe that the eBIZ findings can be replicated in other industries and that initiatives and EU projects similar to eBIZ TFC could be set up to promote e-business in these industries. The overall concepts and approach of the eBIZ project (e-business collaboration, standardization, integration, interoperability, process automation) can be transferred to other industrial sectors, provided that the particularities of the industry specific business and exchange models are well documented and taken into account in e-business architectures for those industries.



## More Information and Further Reading

The NNS pilot was part of the eBIZ TCF project. The main reference to eBIZ TCF is the project Web site, <http://www.ebiz-tcf.eu/>. The three main partners of eBIZ TCF are the European Apparel and Textile Confederation (EURATEX, <http://www.euratex.org/>), the European Confederation of the Footwear Industry (CEC, <http://www.cecshoe.be/>) and the National Agency for New Technologies, Energy and the Environment of Italy (ENEA, <http://www.enea.it/>). Key collaborating partners are Hermes Lab and GS1.

Quantitative data on the textile industry included in this white paper is based on the 2008 annual report of Euratex, available online at <http://www.euratex.eu/system/files/attached-files/Euratex+-+2008+-+EN.pdf>. A survey of the state of the art in e-business in the textile industry, based on 2005 data, is provided by an e-business watch sector study available at [http://www.ebusiness-watch.org/studies/sectors/textile\\_clothing/textile\\_clothing.htm](http://www.ebusiness-watch.org/studies/sectors/textile_clothing/textile_clothing.htm).

The NNS pilot project is based on the eBIZ TCF reference architecture, which is available on-line at <http://spring.bologna.enea.it/ebiz/>. Further appendices and extensive additional documentation are available at this site, which contain information on eBIZ TCF scenarios, processes, activities, transactions and business documents, including the three ebXML Business Process specifications available in ebBP format that we used to generate our CPAs.

An on-line community of participants in eBIZ TCF and interested parties has been set up as a group at the LinkedIn social networking site. It is available at <http://www.linkedin.com/groups?gid=2438948>. People interested in the project are encouraged to join this group.

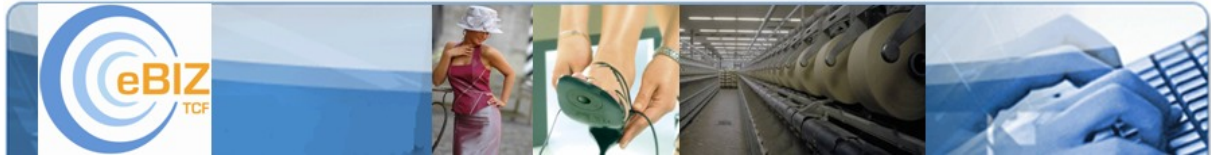
For communication, the NNS pilot adopted version 2.0 of the OASIS ebXML Messaging Standard, endorsed by ISO as ISO/TS 15000-2:2004. A useful entry point for information on ebXML is the portal for ebXML standards, <http://ebxml.xml.org/>. Apart from information on the standards, this portal also includes various other case studies using ebXML Messaging.

The pilot has used the entry-level version of the Axway B2Bi product (called "Activator"), information on which is available at <http://www.axway.com/resource-library/datasheet/b2bi-endpoint-activator>.

The CPAs in the NNS pilot are created and managed using a CPA toolkit. This toolkit is currently a custom software product. It may become available with an open source license in the near future.

The NNS integration scripting is developed using Python, open source implementations of which can be downloaded from <http://www.python.org/>. The scripts also use the *lxml* library for XML processing in Python (available from <http://codespeak.net/lxml/>) and custom integration scripting for Axway Gateway Interchange and UBL.

The OASIS Universal Business Language (UBL) version 2.0 is adopted and profiled within the eBIZ architecture as the standard for e-business in "downstream" scenarios. As discussed in this white paper, the NNS pilot is also using UBL in the "upstream" communication. More information on UBL is available from the UBL information portal, <http://ubl.xml.org/>.



## Contact Information

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