Presentation of Electronic Commerce Prototypes and Business Ideas

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The Graduate Students Bazaar

In the discussion of incubators and transfer of knowledge from academia to industry it is worth noticing, that our graduate students may actually produce innovative business ideas almost ready for investment. Likewise, many prototypes in e-commerce have been build by students. In general, our students have tested many new technologies before leaving for industry. In both E-commerce and IS study programs electronic commerce prototypes has been build by students, sometimes bringing the results close to research or at least establishing a "proof of concept".

The rationale behind the *Graduate Student Bazaar* at Bled E-commerce Conference this year is two folds:

1. We want to let the students show some of the inspiring electronic commerce prototypes and business ideas to both academia and business oriented participants.

2. The student attendance at a research conference may attract more students to pursue a research career, e.g. continuing towards a Ph.d degree.

This year's *Graduate Student Bazaar* is intended to be a combined "trade fair" and "poster session". Students present their e-commerce prototypes and discuss their ideas with conference participants taking a break or passing by. All student projects are presented in parallel.

As can be seen from this list of presentations, the student projects include running e-commerce solutions as well as posters. The projects might propose new innovative or revolutionary e-commerce solutions or new ways to implement e-commerce, as well as new ideas for business in Cyberspace, e.g. *Cyber Ventures*.

The Graduate Students Bazaar will be addressed by Mrs. Rosalie Zobel, Acting Director of Directorate General Information Society Directorate General, European Commission. Mrs. Rosalie Zobel will talk about related opportunities for young researchers within the 5th frame work program of the European Commission.

Projects for presentation

The Bazaar Admission Committee issued a call for student participation in this event in April 2000 with very short dead-lines and despite the bad timing and problems in financing graduate students attendance this year, we are able to present eight projects:

1. **Building a mall prototype using IBM Net.Commerce technology**
    Matjaz Janeziè, Bernard Grum, University of Maribor, Slovenia.

2. **IBM Net.Commerce 3.1 based Business-to-Business e-commerce prototype**
    Ales Keber, Bernard Grum, University of Maribor, Slovenia.

3. **Integration of e-commerce and legacy systems**
    Martin Hyldahl Knudsen, Christian Johansen, Copenhagen Business School, Denmark.

4. **XML/EDI prototype**
    Rene Kasan, University of Denver, USA.

5. **Use of the XML for electronic commerce between SMEs and large organisations**
    Grega Zver, Roman Novak,, Neja Zupan, University of Maribor, Slovenia.

6. **Use of mobile technology for electronic commerce between SMEs and large organisa-tions**
    Ziga Mrak, Neja Zupan, University of Maribor, Slovenia.

7. **WAP technology based mobile banking prototype - Informative bank calculations**
    Miha Percic, Rok Kokalj, University of Maribor, Slovenia.

8. **Mobile banking prototype – checking account balance on mobile phone**
    Sandi Jordan, Uroš Hribar, University of Maribor, Slovenia.

The Bazaar Admission Committee

Project URL:
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Building a mall prototype using IBM Net.Commerce technology

Based on IBM Net.Commerce, which is a software program for web stores development, we tried to find the possibilities of building a web mall. IBM Net.Commerce offers an integrated environment to build a mall so we wanted to find out how that would work in real life.

The prototype presented was developed in a frame of the undergraduate diploma. So the time to build it was about three months.

Project Description

The prototype consists of numerous web stores that have a common shopping basket. Shops are built using the model Business-to-Consumer. Products are placed in different product groups, categories and sub-categories. The mall is completely web centric, all a potential business partner would need to manage a web store is an Internet connection, and a computer with a web browser.

The idea behind big brick and mortar shopping centers is to offer an environment where a given number of individual stores can be built so the consumer has bigger choice. In the beginning the prototype developed in the Net.Commerce was imitating that idea. An attempt was made to establish an environment for web hosting, where there are separate stores on one server that have one front entrance. But later in development a shift to the electronic market was made. We attempted to develop a market place, which would offer the consumer buying in many stores and paying only once.

Lessons Learned

Following valuable lessons were learned:

- IBM Net.Commerce is a very complex tool for developing an electronic market,

- the line between hard-coding and simple adjustments is very thin,

- a separate server is required to build prototypes like an electronic market,

- fast servers, computers and network connections are needed build web stores.

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IBM Net.Commerce 3.1 based Business-to-Business e-commerce prototype

IBM Net.Commerce is a software program for web stores development. The core of the software is a relational database (DB2 or Oracle) with a relational database model. On top of that, a whole set of solutions is built to enable electronic commerce. IBM Net.Commerce, release 3.1 is used at the University of Maribor, Faculty of Organizational Sciences in the educational process for e-commerce prototypes development.

The prototype was developed in a frame of electronic commerce course at the undergraduate level. The students had 30 lab hours to develop the prototype from scratch. The course was very oriented towards technology, so less time was spent on content.

Project Description

The prototype is a business-to-business store for selling see diving equipment. Shops selling such equipment are specialized so the number of products on stock is small, and stores order products from manufacturers via paper catalogue. A central electronic store would enable stores to place small orders quickly and easily.

The prototype offers an integrated catalogue with numerous products with descriptions that are placed in different product groups. Shoppers are placed in hierarchically organized groups to support the business-to-business model. It is completely web centric so everything what a potential business partner needs is an Internet connection, a web browser and a computer.

Lessons Learned

Following valuable lessons were learned:

- IBM Net.Commerce is a very good tool for understanding the logic of web store development,

- future prototypes should have more emphasis on content,

- Business-to-Business model gives much more in-depth understanding of a web store development process,

- fast servers, computers and network connections are needed build web stores.

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Integration of e-commerce and legacy systems

Based on a course, Electronic Commerce in Practice, we have worked on a paper describing our experience with the integration of e-commerce and ERP (Enterprise Resource Planning) systems. The course included the development of a prototype store on the Internet, which in our case was developed in association with the manager of a small chain of grocery stores. In the development of this store, it became evident that integrating the store with the existing ERP system was a problem. In fact, it was a problem that exceeded the development of the store itself in terms of workload, and we decided to investigate the problem further.

Project Description

The IBM product Net.Commerce is a suite of applications that are designed to ease the development and deployment of Internet based stores. However, the product does not provide adequate functionality for integrating the package with back-end ERP systems. Some attempts have been made but they are generally aimed at companies with large standardized ERP implementations, which are not found in small companies. The utilization of Net.Commerce is therefore a less tempting alternative for smaller companies. The integration problem is however far from confined to the Net.Commerce product. On the whole, integration of e-commerce suites with ERP-systems is a problem that has not been thoroughly addressed, because of the inherent problems connected with providing integration support between different systems that have unknown requirements.

We propose a solution to the problem, by introducing a mediating component, - a translator, which operates between the e-commerce system and the ERP-system. For export of data (i.e. orders or product data) we envision the translator to work with a set of standards for data export, which have been provided and documented by the developer of the respective system vendors.

This solution could be the answer for many small companies that haven't got the resources to implement a unique solution for their specific mix of systems.

Lessons Learned

During the course of our work with the net.commerce prototype, we learned among other lessons, that:

- Integration of legacy and E-commerce system is far from an easy task to undertake.

- Middleware technology can make the process easier as well and give a more robust solution.

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XML/EDI prototype

A software prototype of an XML/EDI business interchange environment using repository technology has been developed by a university-based e-commerce center in collaboration with of the US-based XML/EDI group, who also served as an informal advisory group to the students on the project team. In addition to demonstrating proof of concept of an XML/EDI repository, it also served as an example of university-industry collaboration in the electronic commerce arena.

When this project started in 1998, tool support for XML technology was still in its infancy. Nonetheless, the project team decided to practically demonstrate feasibility of XML based EDI on the Web using an early version of POET CMS combined with a repository approach. POET CMS is a document management system that stores SGML/XML encoded information into an object-oriented database. Moreover, this IT system provides an interface that enables direct Web access.

Furthermore, the repository approach ties in when examining both XML's purpose and structure. Designed as a versatile data description and exchange means, this language consists of a document type definition (DTD) that defines how a valid document is supposed to look like and the encoded data itself. When submitting an XML document electronically, a parser can check whether the data is tagged in accordance with the grammar stored in the DTD. Since XML data and DTD can be stored separately, a repository that holds such DTDs is envisioned. By employing such a setup, EDI partners could refer to a common denominator for their transaction in form of a DTD stored in a particular, standardized (and industry specific) repository. As a consequence, participation in EDI scenarios would be easily possible and open for everyone due to low technical entry barriers.

Regarding this project, a scenario-driven approach was chosen. The team managed to set up POET's CMS on a university server and to establish bi-directional document access through the Internet. Bi-directional means that it was possible to store valid XML documents representing schematic invoices straight into the CMS system and to retrieve those invoices via browser interface from a physically different client machine. Moreover, the underlying DTD was retrieved from a third instance (a public ftp account) representing a repository.

Lessons Learned

Theses are the main lessons: (1) technically, the team managed to employ POET's CMS as a database in an EDI context; however, it proved to be a cumbersome process. (2) The underlying ideas and concepts showed viable in principle although a real database driven repository could not be tested since not available at this time. (3) Standardization of exchange formats (DTDs) combined with availability and proper maintenance of repository content is key in this setup.

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Use of the XML for electronic commerce between SMEs and large organizations

Electronic data interchange (EDI) is a specific type of inter-organizational information system. It facilitates the transmission of structured machine-readable data from computer to computer memory across organizational boundaries. Such technology uses agreed standards to facilitate the inter-organizational exchange of business documents. From 1000 enterprises (EBES/EWOS 1997) 90% have invested in EDI, but less than 1% of the SMEs are involved in EDI. That indicates that the current method of exchanging business data is not suitable for most SMEs.

Structured business documents in the form of XML, are key enablers in the process of exchanging data in e-commerce. However, businesses may face some challenges when implementing XML technology. Since XML files utilize friendly, readable tags, they can become large when compared with cryptic, encoded files. XML files for application data exchange could be transmitted whether over the Internet or within an enterprise. XML is a key ingredient of new initiatives such as Biz-Talk and it is also moving into traditional application areas such as EDI. The XML/EDI framework opens the door to a new paradigm for processing documents and exchanging transactions.

Project Description

Our prototype shows how to browse XML catalogs and order products. SMEs and end consumers can use usual Internet browsers (i.e. Internet Explorer) to explore XML page. But large companies and other entities that have their own information system can process data stored in the same XML page. That is possible because XML was designed principally for the exchange of information in the form of computer displayable "documents". The same XML file can be used for both purposes.

Lessons Learned

- SMEs could easily start e-commerce,
- on the SMEs site no expensive equipment is needed (Internet access, computer and a browser)
- BizTalk JumpStart Kit is a very complex tool for developing information systems with EDI,
- on the server site (presumed on the large company site) hard-coding is needed,
- good infrastructure to establish B2B electronic data interchange,
- future prototypes should have more emphasis on connections with data basis.

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Use of mobile technology for electronic commerce between SMEs and large organizations

The concept of electronic commerce started developing when some world's shifts were made: The Bangemann report "Europe towards the Global Information Society", Memorandum from President Clinton, White book, Chairman's Conclusions IS Forum. Areas to be promoted are indicated in the report and among them were telematics services and electronic commerce for SMEs that should increase competitiveness and participation of SMEs in global trading.

Many large retail companies have enthusiastically pursued electronic commerce with their suppliers with benefits, such as; reduced transaction costs, increased accuracy, and timeliness. However, a large proportion of suppliers, by number, usually SMEs supplying small range of products remain outside the electronic replenishment system. These suppliers often lack the computer expertise, knowledge, training and resources to implement electronic commerce. Furthermore, with relatively simple business operations and a small number of trading partners, they have little to gain from the integration and connectivity that experience electronic commerce offers.

The lower cost in accessing this new form of information technology has brought about a radical change among trading partners. More and more organizations are beginning or considering using the mobile technology and Internet for electronic commerce. The growth in electronic commerce in particular will continue immaterial of the medium or the type of software used, as mobile technology can be interactive and relatively inexpensive.

Project Description

To use the opportunities of new form of mobile technology, we built a prototype. The prototype will show SMEs that do not needed to buy any expensive and time-consuming technology (referring to long learning how to use technology and using it) to conduct business electronically. We will use mobile telephone (Nokia 7110) to connect to the Internet and palm size PC to browse prepared simple web sites that enable overview state of orders and invoices.

Lessons Learned

- SMEs could easily start e-commerce,
- on the SMEs site no expensive equipment is needed (mobile phone and palm PC)
- on the server site simplified Purchase-Order Web page is needed,
- good infrastructure to start B2B EDI between SMEs and their large business partners,
- future prototypes should have more emphasis on using common tools for e-commerce.

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WAP technology based mobile banking prototype - Informative bank calculations

The existing e-banking offer of SKB bank includes heavily supported informative bank calculations, as sales and purchase rates of exchange, conversion of the exchange rate, calculation by the current middle Bank of Slovenia middle exchange rate, Slovene tolar binding, foreign currency binding, mortgages, etc. Our prototype will be limited to a single calculation.

In the future the customer will be able to use these services with mobile phone by connecting to the bank server using the WAP protocol based mobile devices. After connection the customer will see bank's WML page on the screen of the mobile device and will select one of the "informative bank calculation service". These services will have to be as simple as possible, without unwanted search through a number of choices. This is also the purpose of the WAP services, to be used at occasions when the service could not be made faster and simpler.

Project Description

The "Exchange rate calculation" is a service, by which the customer can calculate one currency into another by the SKB exchange rate. For the building of the prototype Nokia Wap Server technology was used. To calculate one currency into another the customer will have to fill three fields within SKB bank WAP page "Exchange rate calculation". The purpose of the first field is to tell the amount of money, which the customer wants to calculate into another currency. The second and the third field enable the customer to choose the names of the two currencies, between which the calculation will be done. The amount of money and the name of currencies will be shown on the screen of the mobile phone as a result of any calculation.

Exchange rate calculations are quite frequently used services at any bank in Slovenia, and its WAP service is expected to be used a lot, especially because it is reachable at any time from anywhere. And this exactly is the advantage of WAP and the reason why WAP is and will be even more popular.

Lessons Learned

Working on this project was very important for us to realize how important WAP will be in our lives. WAP is a new technology that enables services we had never seen before. Especially because they are new and unique, it is important to know how to use them as efficiently as possible. Building the prototype was also very useful because of the cooperation with SKB bank that made our work very realistic. This way we also realized, how much the companies are aware of the advantages that WAP technology will bring.

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Mobile banking prototype – checking account balance on mobile phone

Mobile banking is the fastest developing part of mobile commerce due to its convenience. In our university laboratory for mobile commerce, a prototype of mobile banking has been developed in co-operation with one of the major banks in Slovenia. The whole mobile banking solution will be composed of different banking services. Every service will be developed as a separate prototype and at the end they will be integrated into a mobile banking system.

One prototype will enable users to check their account balance. A user will have to use WAP (Wireless Application Protocol) enabled mobile phone in order to connect to banking server over WAP through mobile network and Internet When the user login to a service the account balance will be displayed on the mobile phone.

To develop the prototype, Nokia WAP Toolkit was used. Nokia WAP Toolkit is a developing and testing tool for WAP services. For testing purposes we have used Nokia WAP server as gateway between mobile network and Internet. Mobile service is written in Wireless Markup Language, which is very similar to XML.

Project Description

This prototype enables users to check their account balance. When user wants to check account balance first he/she have to enter mobile banking service URL address into the phone. Then phone connects to the Internet through mobile network using WAP. When connected to the server the phone displays bank logo and the user have to enter username and password to login to the banking system. He can than choose which account balance he want to check. And the data about his account is displayed on the phone. Displayed data consists of account number, account balance, date of last change and what is the limit of this account. Finally, the user can log off, and close the connection to server.

Lessons Learned

We learned a lot about Wireless Application Protocol and Wireless Markup Language. By developing the prototype we found that services for mobile phones have to be very different than services designed for Internet. Mobile phones are very limited: small display, slow CPU, short memory and low bandwidth. So when we are developing mobile services, we have to consider all the limitations. We also learned that the biggest problem in using mobile phone is entering data into service forms.

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