

All CommerceNet members are being encouraged to deploy their eCommerce applications and services as eCo System-compliant objects. Each such object is assured a basic level of interoperability (achieved through a standard "agent" interface, and access to core security, accounting, payment and directory services) and can thus build upon each other's services. Members with related applications are being organized into task forces and charged with creating frameworks that abstract the common functionality. Each task force will define literally what it means to be, for example, a payment service, a catalog service, a procurement service, a shipping service, or a spot market for memory chips. The task forces will also be defining the business objects on which these messages operate – invoices, contracts, products and the like. Collectively, the messages and objects represent a Common Business Language – a long overdue object-oriented alternative to the ad hoc text strings currently used in EDI transactions.

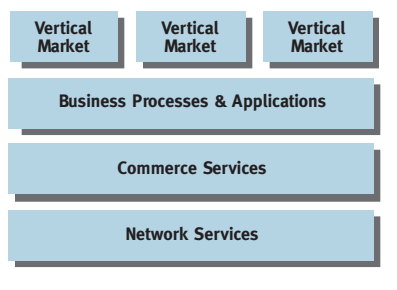


Figure 2: Architecture Overview

In summary, the eCo System project is expected to make several valuable contributions to Internet Commerce: an architectural framework that supports interoperation and reuse of eCommerce services in a manner accessible to both agents and browsers, and compatible with all major Internet commerce platforms; a common business language that provides a robust semantic foundation for next generation Internet commerce services; an ongoing process and organizational framework for achieving broad industry consensus on interoperability and reuse issues critical to open digital markets.

## PERMANENT IT-SUPPORT IN ELECTRONIC COMMERCE TRANSACTIONS

BY MARKUS LINDEMANN, ALEXANDER RUNGE, UNIVERSITY OF ST.GALLEN, SWITZERLAND\*

### INTRODUCTION

Electronic Commerce (EC) is at the beginning state of the big take off. Tools and systems, that support doing business electronically are already developed and present. Enough companies support EC, the diffusion is growing and the awareness is increasing.

However, a lot of users still have doubts about Electronic Commerce, especially according to trustworthiness and legal aspects. Also, the lack of a permanent and continuous IT-support across all phases of Electronic Commerce transactions implies a complicated and inconvenient usage.

The final take off of Electronic Commerce can be increased by providing trustworthiness in future developments and a permanent and continuous IT-support in the short span. This article focuses on the outline description of the required permanent and continuous IT-support for doing business electronically. Some issues about trustworthy environments are also mentioned.

### BIBLIOGRAPHY

- Bons, R. W. H., Lee, R. M., Wagenaar, R. W. (1995). "Obstacles for the development of open Electronic Commerce" *Proceedings of the 2nd Edispuut workshop 1995*
- ISO/IEC JTC1/SC30 (1996a). "Basic Semantic Repository (BSR) Project. Purpose, Objective, Procedures. Rules and Guidelines for the Specification of Basic Semantic Units (BSUs) and Bridges" *Working Draft document ISO/BSR/CCNO 10*.

### BACKGROUND AND STATE OF THE ART

Electronic Commerce transactions involve actions in three phases as described in the next chapter. Tools and systems for a support in some phases of Electronic Commerce transactions do exist and are comfortably usable in individual phases. Therefore, an integrating environment has to be built up. However, it is of no use to simply provide platforms and with them a permanent IT-support. Those platforms cause further apparent problems of Electronic Commerce, as described in the chapter after next, which have to be taken into consideration.

### PHASES OF ELECTRONIC COMMERCE TRANSACTIONS

Individual researchers distinguish several phases of market transactions (e.g. five phases of business transactions in (Zbornik 1996, 138) or a very detailed description of phases of business transactions in (Krähenmann 1994, 219)). According to (Schmid 1993) an Electronic Commerce transaction can be classified into three major phases:

- ◆ In the information phase relevant information for potential transactions is exchanged. Business partners inform themselves about alternative partners for a transaction and their bids, prices and further conditions.
- ◆ Negotiations between a supplier and a customer will be held during the agreement phase. At best, it will end in a contract, which determines the rights and duties of the involved market participants.
- ◆ The exchange of products itself and the according payment, logistic, insurance and custom services take place in the settlement phase.

Today, transaction costs contribute a considerable part to the total price of products. Telematic Systems have a great potential to cut these transaction costs. The new opportunities of Electronic Commerce platforms open a great potential for new cost-cutting emerging services, which electronically support these various phases of Electronic Commerce transactions.

**STATUS QUO OF ELECTRONIC COMMERCE**

The authors of (Baert et al. 1996, 9) and (Spar, Bussang 1996) identify missing standards and legal regulations as one of the major reasons, why business activities on the Internet advance slowly. However, barriers for the growing diffusion of Electronic Commerce are evident in many areas with the following characteristics:

Missing permanent IT support across all transaction phases

- ◆ Many projects of enterprises and research institutions, especially in the Anglo-Saxon area, are about to develop tools to improve the handling of individual transaction phases. All these projects are isolated solutions, which confine themselves exclusively to one phase. Permanent and continuous support across all phases of Electronic Commerce transactions does not exist.

Technical solutions

- ◆ Some research and development projects and products do put their focus exclusively on technology issues. Requirements from the business perspective are not yet taken into account sufficiently.

Missing instruments for the negotiation of electronic contracts

- ◆ The confidential, trustworthy and verifiable exchange of documents demands specific requirements, such as Non-repudiation, Authentication, Confidentiality and Integrity (Bons, Lee, Wagenaar 1996, 5). "New rules are required for concluding contracts electronically and legally proving them" (Baert et al. 1996, 9).

Klein, S., Schad, H., Webster, J. (1996). "EDI Integration in the Health Sector (INTHES)" Working Paper IM HSG/CEM/29, University of St. Gallen, April 1996.

Zbornik, S. (1996). "Elektronische Märkte, elektronische Hierarchien und elektronische Netzwerke", Dissertation University of St. Gallen, January 1996.

Krähenmann, N. (1994). "Ökonomische Gestaltungsanforderungen für die Entwicklung elektronischer Märkte", Dissertation University of St. Gallen, January 1994.

Baert, C., Hecht, T., Kuron, R., Lacoste, G., Livas, D., Petersen, C., Schunter, M., Weber, A., Wildhaber, B., Whinnet, D. (1996). "Deliverable D05 – Survey Findings, Trial Requirements, and Legal Framework – Results from First Year of Project SEMPER" Report A C026/SMP/CT2/DS/C/005/B1, December 18th 1996.

Spar, D., Bussang, J.J. (1996). "Geschäfte im Cyberspace" In: Harvard Business Manager Magazine, 39pp, Nr. 4/1996.

Schmid, B. (1993). "Elektronische Märkte" In: Wirtschaftsinformatik, pp 465-480, Nr. 5/1993.

Zimmermann, H.-D. (1997). "The Model of Regional Electronic Marketplaces – The Example of the Electronic Mall Bodensee (EMB)" In: Telematics and Informatics (in print).

Self-contained Electronic Commerce systems

- ◆ Many of the suppliers that design and develop systems have proprietary self-contained systems. These systems are good approaches but very seldom open or integrated.

Missing standardization in the area of Electronic Commerce

- ◆ As mentioned, systems developed by businesses and research departments are proprietary systems, which may differ a lot from each other and are hardly integratable. These systems are not standardized and therefore raise the problem of missing compatibility.

**MODEL FOR PERMANENT IT-SUPPORT**

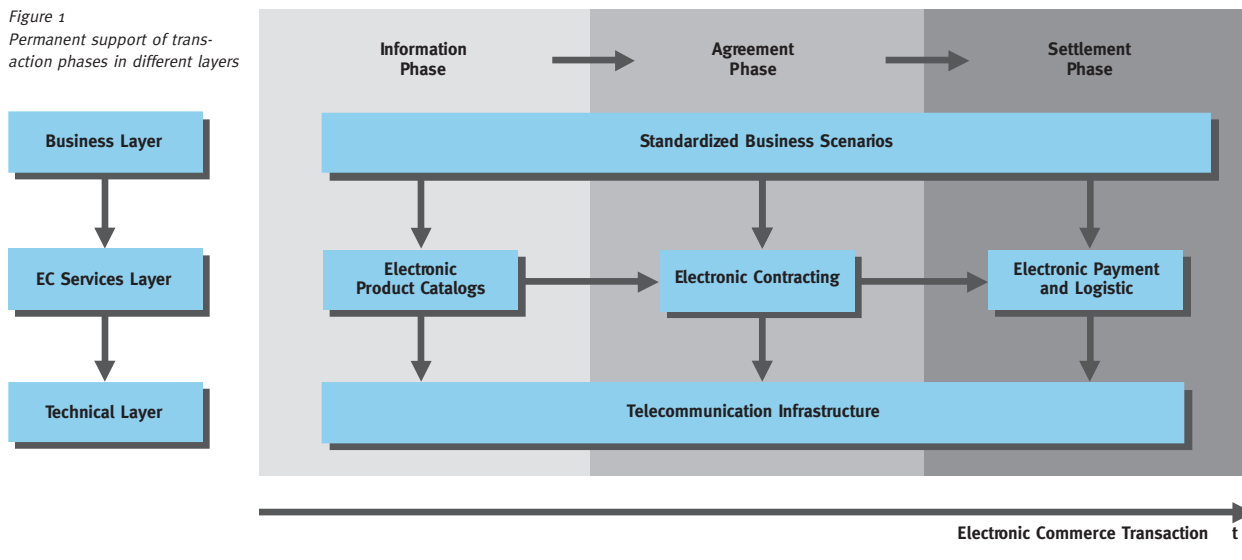
The principle idea of the envisioned approach is to achieve a permanent and constant conclusion of Electronic Commerce transactions. Therefore, following (Zimmermann 1997), at least three layers of an Electronic Commerce platform have to be distinguished: business layer, services layer, and technical layer.

Business Layer

A permanent IT-support of Electronic Commerce transactions at the business layer is realized by means of an integration of applications and an alignment of the preferred way of doing business with a matching of external conditions. The integration of applications refers mainly to software engineering aspects like data integration. A generic approach for this is e.g. the Basic Semantic Repository (BSR) by ISO (ISO/IEC JTC1/SC30 1996a). A permanent IT-support of Electronic Commerce transactions also provides potentials for new forms of electronic business. They are developed as process models and business scenarios by means of modern theoretical knowledge and practical experiences in the field of Business Process Reengineering (BPR), inter-organizational BPR (ioBPR), Business Network Redesign (BNR), and Electronic Data Interchange (EDI). (Klein, Schad, Webster 1996, 15ff) give a brief literature review about BPR, ioBPR, BNR, EDI and develop a (generic)

## FOCUS THEME

Figure 1  
Permanent support of transaction phases in different layers



process model for EDI integration in the health sector.

### Services Layer

Each phase of Electronic Commerce transactions is supported by services, which are specialized to support one transaction phase (e.g. electronic product catalogs in the information phase, electronic contracting tools in the negotiation phase, and additional services for the settlement of Electronic Commerce transactions such as payment or logistic services, insurance or custom services). However, a permanent IT-support is only realizable, if all services interact. It is obvious that the negotiation and settlement phase rely on information of the phases before. A permanent IT-support on the layer of services is necessary for a permanent settlement of business transactions. Essential for the success and acceptance of Electronic Commerce is furthermore a trustworthy environment, in which all services work reliably. Especially in open systems as the Internet with its security problems, a need for a settlement of transactions within a trustworthy environment is obvious.

### Technical Layer

At the technical layer, a permanent IT-support must be provided among all Electronic Commerce players. An important

*\*Markus Lindemann  
(Markus.Lindemann@iwi.unisg.ch) and  
Alexander Runge  
(Alexander.Runge@iwi.unisg.ch)  
are research assistants of  
Professor Beat Schmid at the Institute  
for Information Management.  
Markus' main research interests are  
in the field of Electronic Data  
Interchange (EDI), the Internet and  
Electronic Commerce. Alexander  
concentrates on security, trustworthi-  
ness and confidentiality in Electronic  
Commerce.*

aspect from the point of view of EC and EDI is a combination of the "classic" EDI world with the Internet in general and the World Wide Web (WWW) specifically. Today, both worlds mostly co-exist: Big companies use EDI via VANS and clearing centers, small and medium sized enterprises (SMEs) use the Internet for doing business electronically. Increasingly, even private households use the Internet for electronic shopping. Functions, which are to be supported in this surrounding include any IT-aspects for a support of transactions, ranging from network infrastructures to data-representation and transfer syntax. In detail, these functions cover the organization of interoperability between IT-systems for EDI transactions,

the definition of interfaces between VANS and Internet WWW as well as the identification and inclusion of necessary service providers. National and international telecommunication service providers serve these functions and therefore these aspects do not represent a research interest but a financial challenge.

### CONCLUSION

Tools and systems for a support of individual phases of transactions (electronic product catalogs in the information phase and electronic payment systems in the settlement phase) do exist and are comfortably usable. There are even systems available that support the electronic contract negotiation. However, these systems still need some improvement and additional integration to turn into a complete cost-efficient, trustworthy, and convenient Electronic Commerce platform. The further research at the Competence Center Electronic Markets (CC EM) will focus on these important aspects.

### ACKNOWLEDGEMENT

This article is based on work carried out in the Competence Center Electronic Markets (CC EM) since 1989 under the leadership of Prof. Dr. B. Schmid. The authors also want to thank the project partners of the CC EM.