The above core services will provide the basis of an electronic business system that will be available throughout Australia. As the system is developed, further services will be provided to ensure that Transigo remains current with the latest developments in technology and business practice.

A limited version of the scheme is already in operation, and a public launch has been scheduled for early in the second quarter of 1997.

CONCLUSION

Transigo will form the basis of the widespread introduction of electronic business throughout industry and government within Australia. It is being designed to include all the components necessary for an electronic business system.

In providing this service, Telstra has moved from the use of EDI as being the only service used for electronic commerce to electronic business where a range of services and technologies are used to automate all interactions between two organisations.

Further information about the Transigo scheme is available at http://www.transigo.net.au.

THE ELECTRONIC MALL BODENSEE (EMB): AN INTRODUCTION TO THE EMB AND ITS ARCHITECTURAL CONCEPTS

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INTRODUCTION

On the way towards the information society all of us are challenged: large companies as well as small and medium ones, public authorities, private households and all other institutions and organisations. One strategy to utilise the potentials of the information age and their enabling technologies is to establish regional electronic marketplaces. The establishment of electronic marketplaces with a regional focus and a simultaneous vision of a 'global village' is not contradictory but complementary (Zimmermann 1997). The Electronic Mall Bodensee (EMB) is a regional, but multi-national project that realises an electronic marketplace for a specific region in the heart of Europe. It covers parts of Austria, Germany and Switzerland.

The term 'electronic marketplace' is used in this context to designate an open, virtual electronic marketplace in the sense of the ancient Agora. On this classical marketplace people gathered to buy and sell, but also to socialise, argue politics, and exercise all the other prerogatives of citizenship (McFarland, 1994).

The EMB project was launched in January 1995 to develop and implement a regional, electronic marketplace in the region around Lake Constance based on the vision of the "Bodenseeleitbild" (IBK, 1995). One major goal is to strengthen the economic power of the region by utilising the potentials of the new telematic infrastructures of the information age. Therefore the EMB provides a platform for electronic commerce activities – especially for small and medium sized enterprises (SME) – and enables private households to utilise the emerging new media for (at least parts of) their everyday life as consumers and citizens – e.g. as described in (Venkatesh, 1996).

The initiators of the project were the Cantonal Office for Industry, Commerce, and Employment (KIGA) as a government agency in St. Gallen, Switzerland, and the Institute for Information Management at the University of St. Gallen. From the very beginning further partners from science, for example the University of Constance, Germany, and business were part of the project team.

The realisation of the EMB has to be considered under two viewpoints. On the one side the platform should be accessible from the very beginning. Therefore, current state-of-the art technologies and available commercial hard- and software packages are utilised. Until now Since its announcement, emb.net EMB has received a reasonable reputation within the German speaking Internet community and is one of the leading electronic marketplaces in Europe. Examples are existing WWW database interfaces or security solutions. As a result of this procedure EMB can be accessed since June 1995 after a set-up period of six months. Since its announcement, emb.net has received a reasonable reputation within the German speaking Internet community and is one of the leading electronic marketplaces in Europe. Since summer 1996 the EMB is operated by a new founded company, the EMB Inc. In addition to that the research partners in the project are developing and implementing new concepts and solutions. Intelligent electronic product catalogues (Schmid, 1996), electronic payment solutions (Himmelspach/Zimmermann, 1996), logistic services on the base of the CIL model (Computer Integrated Logistics) (Alt/Klein/Cathomen, 1994), electronic con-

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tracting services (Schmid 1997), search and navigation mechanisms and security and trust services are on the research agenda. Furthermore, EMB serves as an empirical field for attendant research, i.e. acceptance and diffusion studies (Zimmermann, 1996).

THE BASIC ARCHITECTURE OF EMB

In the following the basic concepts of the EMB architecture are outlined: the layer and the organisation model. Then the current network architecture and the integration of suppliers and their applications are described.

THE LAYER MODEL

The electronic marketplace emb.net EMB constitutes a virtual platform in the sense of an infrastructure that is available to all interested participants. In this aspect it consists of the following essential layers.

The Application Layer

The application layer represents the user's interface to the marketplace. Products and services from a broad spectrum of applications and sectors are accessible. They are implemented by common Web-technologies. Each application is designed and created by the suppliers themselves. Typical applications are electronic storefronts ('home pages'), access to databases like product catalogues, for example, including integrated order systems.

Fields of Applications

The EMB shall essentially cover all applications and information needs of the daily life of consumers and citizens as well as of businesses.

- In the first category there are electronic commerce applications for both businesses and consumers.
- A second major field concerns information from and about the region. Major examples are tourism information including a hotel reservation system, weather reports, politics, culture, sports, etc.

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- In the third main sector EMB provides information resources that are of interest for regional businesses and households, i.e. easy, WWW-based access to technology or R&D databases.
- The fourth field is actual, regional information, i.e. news and current events.
- The City-Net offers an umbrella for emerging local city online systems based on the Internet.

The Market Service Layer

This visible component of the application layer will be completed by an invisible layer of (generic) market-services. They shall support and enable the initiation and settlement of (market-) transactions at every stage in a convenient and efficient manner and thus support the information-, contracting- and settlement phase of a market transaction. These shall be generic and available to the participants as 'plug-and-play' solutions. Realised services are right now, for example, several different directories, an edited presentation of the content, search tools, secure communication through supporting the SSL-technology, basic product catalogues including an order system, etc. In the future more sophisticated services as described above will be offered.like contracting-, payment and logistic services as well as advanced forms of electronic product catalogues especially for distributed environments. Of course these services will run in a trustworthy environment.

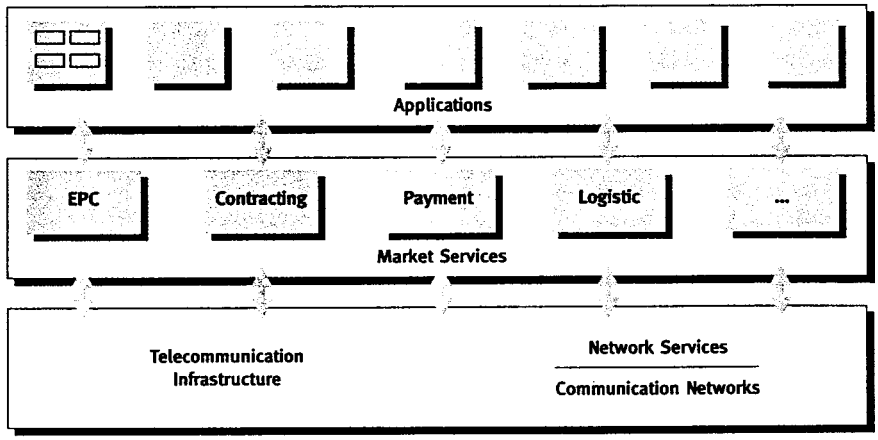

Figure 1: The layer model of the EMB

The Telecommunication Infrastructure

EMB is not operating its own network infrastructure, but utilises the existing, public available infrastructures and technologies. Thus communication among the participants takes place by means of existing 'data highways'. This enables especially private households and medium and small businesses to be fully linked to the electronic data exchange chain using commercially available low-cost hardware and software components.

In essence, EMB is open to everyone. Nevertheless, it is also possible to define closed user groups for special needs such as communication and information exchange among the branches of a company. Nowadays this sometimes is called an Intra- or Extranet.

THE ORGANISATIONAL MODEL

Basically there are three different roles that can be identified within a system like EMB: Suppliers, Customers and Intermediaries.

Suppliers are institutions that offer goods and services. On the platform EMB there are different kinds of active suppliers: (a) commercial companies (industry, trade, services, tourism, media, etc.), (b) non-commercial, but professional organisations (tourism-, educational-, health-, social-, cultural- or technology transfer organisations, public authorities, cities, etc.) and (c) non-commercial institutions (sport and other clubs, private persons, etc.).

Customers demand the goods and services offered by the suppliers. Typical customers using the EMB are SMEs, private households, but also all kinds of other organisations.

Intermediaries assume a very substantial function within our economy and thus within the electronic marketplace as well – see (Sakar/Butler/Steinfield, 1995). They provide services on all layers of the layer-model and thus fulfil very important functions within the whole EMB system. These functions are substantial requirements that enable activities like electronic commerce. First of all EMB as a whole serves as an inter-(cyber-)mediary: it provides a platform as described above.

The underlying communication networks that connect the EMB as well as users to the telecommunication infrastructure are provided by telecommunication companies like Swiss Telecom or Deutsche Telekom. On the network services layer EMB acts as a service provider operating the different servers. Net-, especially Internet-Services, are offered by Internet- and Online-Service Providers. Their services connect the EMB servers to the Internet and enable user to access the EMB via Internet.

On the market service layer EMB itself provides services as described above. In the future service companies together with EMB and / or other (regional) electronic marketplaces will offer advanced services like advanced directory services, mediating electronic product catalogues (EPC), payment, logistics or contracting. Trusted third parties (TTPs) will generate and support a trustworthy environment as a basic requirement for conducting electronic commerce- and other activities.

The application layer is used by different intermediaries offering their services. For example, the EMB itself operates an intermediary service for 'technology transfer' (Krüger, 1996). This application offers a comfortable, unified, Web-based interface to several regional, national and international databases in the field of research & development, public tenders, etc. For example, SME are able to look for the latest news about research programmes of the European Union, to look for potential R&D and co-operation partners within the region or to offer free processing capacities. Thus this application creates a real added value for the companies. The application was developed and is run by an EMB partner.

Other examples are (a) the 'politics server' within the EMB that provides information about the regional political activities including a directory of political parties and initiatives and the political representatives in the respective regional or national parliaments or even on the European level and (b) the active and systematic collection and provision of cultural information about the region (Franken, 1996).

In summary, EMB clearly focuses on the provision of value added services that enable activities like electronic commerce and others. Thus the main activities of

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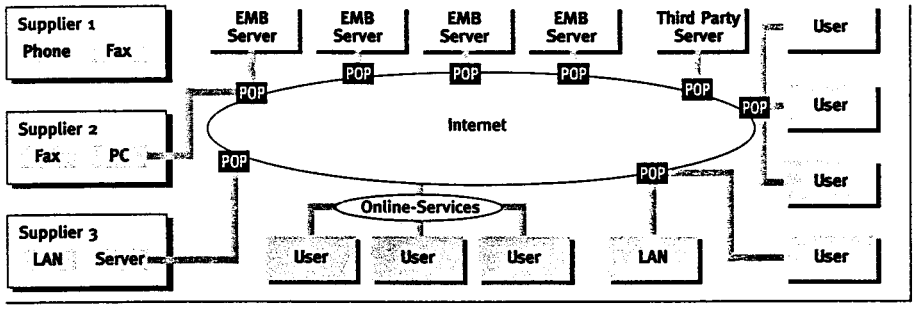

Figure 2: The Net-Architecture of EMB

EMB are to be recognised on the market service- and on the application layer, while the necessary telecommunication infrastructures are used as available on the market.

THE EMB-NET-ARCHITECTURE

The EMB net-architecture is designed as a totally open system. The four EMB-servers are connected to the Internet via Internet Service Providers (ISP). Users access the EMB using the Internet or Online Services with Internet access.

Integration of applications and suppliers

In respect to the open philosophy of the EMB applications can be integrated into the EMB in several ways.

(a) The application as a whole is stored on an EMB server.
(b) One part of the application is stored on an EMB server, other parts are stored on a third party or the supplier's server.
(c) The application is stored on a third party server as a whole and is linked into the EMB.
(d) The application is stored on the supplier's server as a whole and is linked into the EMB.

Also the suppliers themselves can be connected to the EMB in different ways. The supplier has to be connected to the EMB or the Internet in some way to receive feedback and orders from customers or to update their applications.

A supplier with no connection to the Internet (Supplier 1 in figure 2) will receive feedback by fax (or even 'snail mail'). Therefore EMB is operating a fax-gateway. Updates of their applications cannot be done directly and have to be organised by service companies with an Internet connection.

A supplier with an Internet account (Supplier 2 in figure 2) is able to receive customer feedback and orders directly by e-mail. He is also able to update the application himself, for example, using file transfer services. Therefore several suppliers within the EMB have ftp-accounts and access rights, for example, to upload new pricing information, special sale actions or new product information.

Suppliers with a permanent Internet connection (Supplier 3 in figure 2) will get feedback with (almost) no time lag. The EMB application can easily interact with the internal information system, for example, the inventory control or order management system. If they operate an Internet-server as well, they are able to store parts of their application on their own server, for example, very sensitive data or special calculation modules.

CURRENT STATE OF EMB AND RECENT ACHIEVEMENTS

The first WWW-server has been running since June 1995. More than 400 primarily regional suppliers of different types offer information and goods over the EMB platform. More than 150 companies, most of them small or medium sized (SME), offer Electronic Commerce applications. There are a lot of advanced applications beside electronic storefronts that offer access to databases, product catalogues and order systems. All applications have interactive feedback forms as a standard feature.

More than one third of the visitors are using an Internet provider, 40% access EMB via schools and universities and 15% of the accesses come from companies. An analysis of the visits via Internet providers shows that nearly three quarters of all users utilised a POP within the region of the EMB and are thus residents of the region.

Realised benefits by EMB-suppliers

Until now most of the commercial suppliers on EMB have achieved reasonable benefits. They are not spectacular but reasonable:

- Utilisation of new communication channels to support existing customers and to acquire new ones.
- Utilisation of new and additional sales channels.
- Enlargement of traditional markets with minimum costs.
- Improved quality of information for customers (individual, actual).
- Reduced time-to-market for special offers, sales, etc.
- Gain of an innovative image for the early adopters.
- Gain of know-how.

Further effects

Even if the EMB has been online only since June 1995 there are some effects regarding the economic development that can be assigned to the activities of and around EMB.

- According to a survey of the University of Berne there is a concentration of companies using Internet in the Swiss part of the region (the survey only examined the situation in Switzerland) (Griese/Sieber, 1996).
- There are a lot of activities of setting up local or regional electronic marketplaces that are clearly influenced by the EMB. Some even copy the EMB structures, others take the main ideas and first experiences of the project. Within the new formed Electronic Mall Group (EMG), initiated by the University of St. Gallen, different regional marketplaces co-ordinate their activities.
- The regional governments of all three involved countries are gathered in a

committee and have themselves committed to support the development of EMB related projects in the coming years.

- The EMB project serves as a reference project in the involved countries as well as on a European level.
- EMB is involved in the G7-project "A Global Marketplace for SME".

Although there is right now no detailed statistical evidence of the benefits of the EMB project, there are some indications that show the positive effects and stimulation on businesses, citizens, governments and the region as a whole.

CONCLUSION

Even if the EMB is still in its infancy the project can be assessed as a success until now. Some of the identified success factors are as follows:

- The regional focus creates an identity and a point of reference for the people of the region and gathered a critical mass of participants within a short time.
- The open basic philosophy and the concept as a neutral, across the border platform.
- The broad base of support by companies, universities, and public authorities.
- The ease of access and use.
- The mix of commercial and non-commercial applications.

The main obstacles for a faster development of the EMB and especially the Electronic Commerce applications are the missing market services for integrated business transactions like contracting-, payment-, logistic- or trust-services.

eCo System – CommerceNet's Architectural Framework for Internet Commerce

BY JAY TENENBAUM, COMMERCENET, USA*

PROJECT OVERVIEW

The eCo System project addresses the interoperability of eCommerce applications, services, and platforms – arguably the most important and vexing issue in realizing the vision of a global Internet marketplace. The good news is that these are proliferating at an astounding rate from vendors all over the world. The bad news is that nothing talks to each other, or builds on each other. For example, we have about 20 members who have developed proprietary payment solutions, and another dozen with incompatible security solutions. What consumers want, by contrast, is a universal wallet that can hold any payment instrument, as well as a digital identity card or two that they can use to obtain many additional credentials, such as credit cards, licences and membership cards. Similar interoperability issues exist at every level – directories, catalogs, collaboration tools, EDI protocols, shopping agents, shipping services, markets, etc. We are well down the path toward digital anarchy.

CommerceNet is responding by leading a broad industry initiative to develop and deploy eCo System (as in eCommerce), an object-oriented architectural framework for Internet commerce. The framework acts as middleware, insulating application and platform developers so that digital markets can function and utilize each others services. The framework also enables applications to be rapidly assembled from reusable building blocks and shared network services. The project is challenging from a technical perspective because things are moving so fast that there's seldom time even for de facto standards to emerge. Instead, we must often deal with de facto interoperation – getting incompatible products that are already in the marketplace to somehow communicate. This may be accomplished through negotiation protocols ("I don't care what standard you use, just tell me what it is and I'll speak it"), bridging gateways, and mediators (smart gateways).

The project is equally challenging from a business perspective – getting the market leaders in each area to the table and getting them to agree on how best to approach interoperability. The eCo System project is thus more than just an architectural framework. It's an ongoing process for achieving broad industry consensus on interoperability and reuse issues critical to open digital markets.

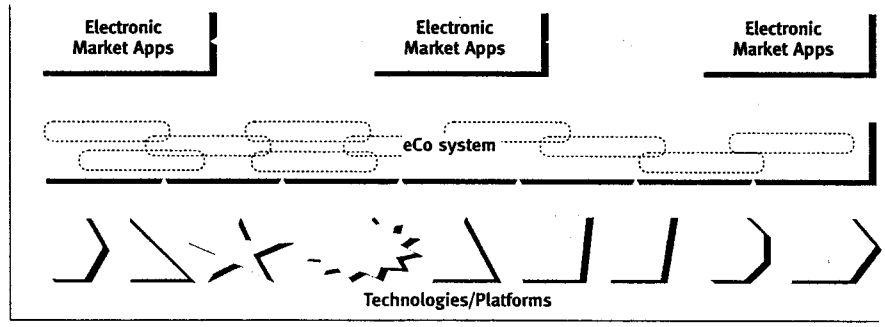

Figure 1:
What is needed for a working eCommerce System

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