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D5.1. Survey on E-commerce Tools

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Survey on E-commerce Tools

1. Introduction

1.1 European Dimension of Electronic Payment Systems

In his speech at the final conference on consumer on-line payments, held under EPSO project[1], Mr. J-C Thebault, Director Financial Institutions, DG Internal Market, European Commission, stressed that although no widespread, effective, secure and cheap way to make cross-border internet payments in Europe yet existed, there were some factors that make the future of on-line payment in Europe more promising.

First, Mr. Thebault pointed the introduction of Euro across 12 member states. Whereas until the introduction of Euro it has been unprofitable to offer on-line payments means on a national basis, afterwards the market with the single currency became much wider, which "makes the proposition for e-payments a better business case".

Second, the latest progress in security technology enabled real options for e- and m-commerce payments. Different credit, debit or other prepaid payment means emerged that are both secure enough and user friendly. New payment methods, such as mobile payments, developed specifically for micro-payments are becoming more established.

Third, from a regulatory point of view, there is strong political backing to develop the Single Payment Area in the Internal Market. The Regulation very clearly forces suppliers of payment services to introduce much cheaper ways to make payments. The most promising way to do so, according to Mr. Thebault, is to switch to e-payments or other paperless payment means.

Regarding *security in payments over Internet and cross-border interoperability*, a number of EU – funded projects have been undertaken.

The SEMPER project[2] aims to provide an open, coherent and comprehensive approach to building a secure worldwide electronic marketplace. SEMPER is developing a generic architecture for secure electronic commerce over networks, in particular over the Internet. SEMPER architecture is independent of specific hardware and software platforms and of network architectures. The most fundamental electronic commerce services, such as secure offering, ordering, payment and information delivery, have been developed and integrated.

Regarding *security and new payment methods*, Payment System Technical Development Group (PSTDG) and Payment Systems Users Liaison Group (PSULG) have issued a working document on Payment by e-Purse[3] over Internet[4], which concludes that: "The e-purse is a very suitable alternative instrument for micro-payments (cents of euro) and payments of small amounts over the Internet:

- o If rolled-out on a large scale, the e-purse could be an economically viable instrument allowing to make cheap payments.

- o It enables people who do not have access to payment cards to pay on-line since the amount to be spent can be limited.

- o The payment by e-purse is guaranteed and there is no risk of payment repudiation for the merchant.

- o Its high level of security and "anonymity" make the e-purse an alternative to payments by debit/credit card or credit transfers over the Internet.

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[1] The ePSO project is part of the European efforts to leverage payment systems innovation in the move towards promoting e-commerce in Europe. The projects' objectives are to monitor and analyse the strategic views of market players and experts, and to strengthen communication across groups of actors, sectors, channels and countries, with a view to assist standardization and regulatory bodies to keep pace with the evolution of technology. For details, see / [2]

http://www.semper.org/deliver/d13/d13-public-view.pdf

[3] e-Purse is defined and considered in detail in subsection 1.2.6.5.

4 europa.eu.int/comm/internal_market/en/ecommerce/e-purse.pdf

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However, "The Commission notes with regret that there will be no cross-border interoperable e-purse, in euro on a large scale in 2002, at the time of the introduction of euro notes and coins."

1.2 European Legislation

1.2.1   Regulation on Cross-border Payments

On December 13, the European Parliament and Council of Ministers adopted a Regulation preventing excessive charges for cross-border payments[5] requiring **that bank charges for cross border payments in euros must be the same as for similar transactions within a single Member State**. The Regulation will also cover payments in non-euro currencies if the Member States where those currencies are used notify the Commission that they want the rules to apply. *A Regulation, unlike a Directive, is directly applicable in the Member States without national implementing measures.*

Under the Regulation:

o **Charges for withdrawals from cash machines and the use of bank cards (up to €12,500) must be the same,** when denominated in euros, for both national and cross-border transactions**, from 1 July 2002**

o **The charges for credit transfers (up to €12,500) between bank accounts must be the same, when denominated in euros, for both national and cross-border transactions, from 1 July 2003**

o Customers must be properly informed in advance of charges for making national and cross-border payments and of any changes to those prices

o **Use of the ISO standard codes, namely IBAN (International Bank Account Number) and BIC (Bank Identifier Code), becomes mandatory,** in order to allow banks to process credit transfers in a fully automated way

o Banks will no longer need to declare to the authorities any payment below €12,500.

Payments in non-euro currencies will also be subject to the Regulation if the Member States where those currencies are used notify the Commission that they want the rules to apply.

The Regulation's rules will be extended to cash machine withdrawals, use of bank cards and credit transfers up to €50,000 from 1 January 2006.

1.2.2   EC E-Commerce Directive 2000/31/EC

European Parliament adopted the E-Commerce Directive on 8 June 2000 (Directive 2000/31/EC) and it has become law within the next 18 months[6]. The chief aim of the Directive is to ensure that the Community reaps the full benefits of e-commerce by boosting consumer confidence and giving providers of information society services legal certainty, without excessive red tape.

1.2.3   Directive 97/5/EC on Cross-border Credit Transfers

Directive 97/5/EC of the European Parliament and of the Council of 27 January 1997 on cross-border credit transfers sought to improve cross-border credit transfer services and notably their efficiency. The aim was to enable in particular consumers and small and medium-sized enterprises to make credit transfers rapidly, reliably and cheaply from one part of the Community to another. Such credit transfers and cross-border payments in general are still extremely expensive compared to payments at national level. It emerges from the findings of a study undertaken by the Commission and released on 20 September 2001 that consumers are given insufficient or no information on the cost of transfers, and that the average cost of cross-border credit transfers has hardly

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[5] The Commission presented its proposal in July 2001 (see IP/01/1084 and MEMO/01/279). On 7 December, the Council reached agreement on the Regulation with certain amendments, which were endorsed by the Commission in the interests of achieving swift agreement (see IP/01/1668). Adoption by the Parliament followed on 13 December.
http://europa.eu.int/comm/internal_market/en/finances/payment/area/01-1827.htm
[6] http://europa.eu.int/comm/internal_market/en/ecommerce/2k-442.htm\

changed since 1993 when a comparable study was carried out.

1.2.4   Directive 98/26/EC on settlement finality in payment and securities settlement systems

The Settlement Finality Directive (Directive 98/26/EC)[7] adopted in May 1998 is aimed to reduce the systemic risk associated with participation in payment and securities settlement systems, and in particular the risk linked to the insolvency of a participant in such a system. It contributes to the efficient and cost-effective operation of cross-border payment and securities settlement arrangements, thereby reinforcing the freedom of movement of capital and the freedom to provide services within the internal market.
To this end, it contains provisions regarding

o *transfer orders and netting* (e.g. legal enforceability of transfer orders and netting, irrevocability of transfer orders, no unwinding of netting, etc.)

o *insolvency proceedings* (e.g. non-retroactivity of insolvency proceedings, determination of applicable law, etc.)

o *collateral security* (e.g. insulation from insolvency proceedings, determination of the law applicable to cross-border provision of collateral security)

The Directive applies to payment and securities settlement systems as well as any participant in such a system, and to collateral security provided in connection with the participation in a system, or operations of the central banks of the Member States in their functions as central banks.
The Directive entered into force on 11th December 1999

1.2.5   Directive 99/93/EC on electronic signatures

The Electronic Signature Directive (Directive 1999/93/EC of December 13, 1999 on a Community Framework for electronic signatures) provides that electronic signatures cannot be denied legal effect (for the validity of contracts and as evidence in court) solely on the basis that they are in electronic format. Most Member States have already recognised the equivalence between electronic signatures and hand-written signatures and the admissibility of electronic signatures as evidence in court proceedings.

The implementation of the Directive on a Common Framework for electronic signatures and certification service providers will change the validity of electronic contracts concerning formal issues. Electronic signatures accompanied by a valid certificate will have equivalent validity to hand-written signatures throughout the EU, thus removing problems caused by varying national laws regarding the validity of electronic signatures.

The EC Framework Directive for electronic signatures [8] says that electronic signatures cannot be denied legal effects just because they are in electronic format. The directive does not preclude the establishment of private-sector-based supervision systems or oblige certification service- providers to apply to be supervised under any applicable accreditation scheme. However, Member States are obliged to notify the EC of any approved provision of certification services.

This directive is an important contribution to enabling secure electronic commerce within the European Union. Electronic signatures will be used increasingly in the public sector within national and EU administrations and in communications between those administrations and with citizens and businesses, for example in the public procurement, taxation, social security, health and justice systems.

1.2.6   Directive 2000/46/EC on Electronic Money

Member states have until April, 2002 to convert the E-Money Directive into national law. The Directive defines the term 'electronic money' and regulates which institutions are allowed to issue e-money. It provides an important framework for all players in the market for payment services and may have a strong impact on the competitive position of European payment service providers. The effects of the E-money Directive on the future of e-money will largely depend on its translation into national law and its practical implementation. Therefore, at the moment, it is not entirely obvious how the Directive will affect the market for e-payments and the different

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[7] http://europa.eu.int/comm/internal_market/en/finances/payment/directives/98-26sum.htm
[8] The EC Framework Directive for electronic signatures came into force on 19 January 2000 (EU Member States must implement its provisions by 19 July 2001).

groups of payment providers9. One of the open questions is how extended loyalty schemes, bonus points and electronic barter schemes would be affected by the Directive. Though such schemes are usually fairly limited in scope, they could potentially grow into an alternative monetary system

1.2.7   Directive 2001/65/EC on fair VAT

Directive 2001/65/EC of the European Parliament and of the Council of 27 September 2001 amending Directives 78/660/EEC,83/349/EEC and 86/635/EEC as regards the valuation rules for the annual and consolidated accounts of certain types of companies as well as of banks and other financial institutions. The EU has published its Fair Value Directive (2001/65/EC), which is part of the process to change the EU's legal framework in order to allow EU-listed companies to adopt International Accounting Standards by 2005. The directive amends the Fourth and Seventh Directives to allow a move away from the historical cost model for the valuation of financial instruments towards a model of fair value accounting, in line with IAS 39.

1.2.8   The Fraud Prevention Action Plan[10]

To avoid that consumer confidence is undermined by fraud and counterfeiting of non-cash payments, the Commission of European Communities adopted in 2001 a Fraud Prevention Action Plan of non-legislative measures. It ascertains that "The payment industry has developed and implemented a wide range of technical fraud prevention measures. It is currently developing new technologies and implementing a comprehensive security strategy for both face-to-face and remote payments (e.g. introduction of the chip in credit cards[11] and new payment solutions for e-commerce)".
In this view, the Fraud Prevention Action Plan provides for the following actions points:

o   Retailers should protect their web-sites from unauthorised access and use of data;

o   The retail sector should implement the most advanced technology, which is economically viable.

The retail sector should have updated information on the status of the payment instruments presented for acceptance and receive clear guidance on how to deal with suspicious transactions, especially at point-of-sale staff.

1.2.9   Plans for the future

The European Commission has presented a proposal for a directive to modify the *rules for applying V*AT to *certain services supplied by electronic means* as well as subscription- based and pay-per-view radio and television broadcasting. *The objective of the proposal is to create a fair market for the taxation of digital e-commerce* in accordance with the principles agreed at the 1998 OECD Ministerial Conference. A basic principle of the EU VAT system is that no new or additional taxes are needed for e-commerce. Existing taxes should be adapted so that they can apply to e-commerce. **The proposal mainly concerns the supply, over electronic networks** (i.e. digital delivery via the Internet), **of software** and computer services generally, as well as information and cultural, artistic, sporting, **scientific, educational, entertainment or similar services.**
The proposal will ensure that when these services are supplied for consumption within the European Union, they are subject to EU VAT, and that when these services are supplied for consumption outside the EU, they are exempt from VAT. The proposal also contains a number of facilitation and simplification measures aimed at easing the compliance burden on business.
In order to get a clear picture concerning the transposition of the Settlement Finality Directive (Directive 98/26/EC) in the Member States, the Commission will launch a study to research the actual situation in spring 2002. This will allow for an assessment of the implementation of the Directive as well as for the elaboration of additional proposals - if appropriate - in this field. The results of this study will be used for the report on the application of the Directive, to be addressed to the European Parliament and Council in December 2002.

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9 Electronic Payment Systems– Strategic and Technical Issues – Background Paper No. 1 Electronic Payment Systems Observatory (ePSO) December 2000

[10] http://europa.eu.int/comm/internal_market/en/finances/payment/fraud/fraudprevent/prevfraud_en.pdf

[11] To be completed by 2005 in the European Union according to the current plans (source: VISA and Europay/ MasterCard)

1.3 Implications of EU Legislation in E-commerce

1.3.1   Which Law is Applicable?[12]

One of the big questions raised by e-commerce is, "which law is applicable?". **The E-commerce Directive** provides that information society service providers (ISSPs) are subject to the law of the Member State in which they are established **(the so-called country of origin principle)**. As long as ISSPs comply with this law, they are free to pursue their activities throughout the community. Certain areas are excluded from the application of the principle of the country of origin because some existing directives require the application of the law of the country of destination, or because the mutual recognition principle cannot be achieved and there is not sufficient harmonisation to guarantee an equivalent level of protection throughout the Community.

These directives relate, for example, to contractual obligations concerning consumer contracts, copyright, related rights and industrial property rights, and permissibility of unsolicited commercial communications by e-mail.

1.3.2   Consumer Protection

Legal provisions for consumer protection vary significantly between EU Member States (for example, in Germany it is not legal to offer a life-time guarantee; on advertising targeted at children the Finnish approach is very different from the British approach). Existing and prospective EU rules (enshrined in, for example, the Distance Selling Directive, the E-commerce Directive and the Data Protection Directive) aim to protect the consumer, although some of these have a corresponding downside for business. A clear, common set of consumer protection standards still does not exist in Europe.

1.3.3 Right of Withdrawal

The Distance Selling Directive states that the consumer has the possibility of withdrawal from the contract without reason or penalty (except for the direct cost of returning the goods i.e. postage). In the case where the supplier has met his obligations regarding the provision of information, the consumer has at least seven working days (depending on national regulations) to cancel the contract:

Since merchants are legally obliged to cancel an order and refund the consumers money if the consumer is not satisfied, why not use this as a marketing tool in the form of a money back guarantee? For example, the following text may serve as a marketing tool suggested:

"If you are not completely satisfied with our product, return it within seven days and we'll give you a complete refund – no questions asked!"

1.3.4 Direct Tax

It is unlikely that e-commerce will have any significant impact on direct taxation (e.g. income tax, corporation tax and taxes on profit) in practice.

Web sites and servers through which sales are made cannot constitute a taxable presence in another country. A web site alone is not a fixed place of business and so does not create a taxable presence in another jurisdiction.

1.3.5 Indirect Tax

There are however important considerations for indirect taxation (e.g. Value Added Tax or sales tax) such as when different rates of tax apply to goods and to services. A book (a product) may attract one rate of tax, but in digital form be considered a service by the tax authorities and thus attract a different rate of tax. It should be noted that the EU recognizes digitally delivered 59 products such as software, digital music, digital books, etc as services.

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[12] All Sections below except if otherwise stated are taken form "Don't Panic! Do E-commerce -A Beginner's Guide to European Law Affecting E-commerce", **Published by the European Commission's Electronic Commerce Team** (Information Society Directorate General) http://europa.eu.int/ISPO/ecommerce/books/dont_panic.pdf

1.3.6   VAT

The Internet enables companies to reach customers without regard for national boundaries. That said, cross-border sales must nevertheless comply with specific indirect taxation rules like Value Added Tax (VAT) and withholding taxes. Payment of VAT is determined based on what, where and to whom goods and services are sold. The rules within the European Internal Market differ for goods and services.

The VAT liability on supply of goods is determined by the physical movement of goods when a sale takes place and by the status of the customer. The way goods are taxed in respect of VAT is not affected by the growth of the Internet. The existing VAT system applies to goods purchased electronically and then delivered by traditional means.

Goods

VAT and Goods

Customer	VAT Requirements
Same EU Country	You charge local VAT rate
Business in different EU country	Customer submits and pays VAT in her country
Consumer in different EU Country	If under threshold, customer pays VAT at your rate and you submit VAT; if over threshold, customer pays VAT at own rate and you submit in customer's country
Non-EU country	VAT is zero-rated

Where a business established in the EU sells goods to a private citizen (i.e. not engaged in business) within the EU, the VAT rules for mail order apply. These are based on thresholds. Each EU country has a threshold of either 35,000 or 100,000 Euro per year. If a company's sales of goods to consumers in another Member State exceed that threshold, the company must hire a tax representative in that Member State, register for VAT in that Member State, charge customers VAT at that Member State's rate and have their VAT representative file VAT returns in that Member State. If sales are below the Member State's threshold, VAT is charged at the rate applicable in the company's country and is filed locally. There is currently a lack of harmonisation in VAT rates, with standard rates ranging from 15-25% in the EU.

What concerns Diogene:

Services

VAT and Services

Customer	VAT Requirements
Same EU Country	You charge local VAT rate
Business in different EU country	Customer submits and pays VAT in her country
Consumer in different EU Country	Customer submits VAT at your rate, you submit locally
Non-EU country	No VAT

Products such as digitized music or games, or other intellectual property **such as training material or consultants' advice are, from the perspective of EU VAT legislation, classified as supplies of services and so taxed as services. Moreover the EU mail order rules regarding turnover thresholds do not apply.**

The current VAT rules for services do not adequately address the supply of services delivered on-line by digital means, notably in the case of services traded between EU and non-EU countries. At the time of writing,

electronically delivered services originating within the EU are always subject to VAT irrespective of the place of consumption, whilst those from outside the EU are not subject to VAT even when delivered within the EU. This situation has the potential to constitute a major distortion of competition and to place EU service providers at a disadvantage in relation to non-EU service providers. However, this could soon change. The European Commission has presented a proposal for a directive to modify the rules for applying VAT to certain services supplied by electronic means as well as subscription-based and pay-per-view radio and television broadcasting. The objective of the proposal is to create a fair market for the taxation of digital e-commerce in accordance with the principles agreed at the 1998 OECD Ministerial Conference. A basic principle of the EU VAT system is that no new or additional taxes are needed for e-commerce. Existing taxes should be adapted so that they can apply to e-commerce.

1.4 Fundamentals of Electronic Payment Systems

1.4.1   Electronic Money

The term "electronic money" (according to [SEM96][13]) has been used in different settings to describe a wide variety of payment systems and technologies.

- o **"Stored-value"** products are generally **prepaid payment instruments** in which **a record of funds owned by or available to the consumer is stored on an electronic device** in the consumer's possession, and the amount of stored "value" is increased or decreased, as appropriate, whenever the consumer uses the device to make a purchase or other transaction.
- o "**Access" products** are those typically involving **a standard personal computer, together with appropriate software, that allow a consumer to access conventional payment and banking products and services, such as credit cards or electronic funds transfers,** through computer networks such as the Internet or through other telecommunications links.

The E-Money Directive defines e- money rather formally. However, what is currently designated by "e-money" – the existing e-money schemes, according to Electronic Payment Systems Observatory (ePSO)[14] is actually the "stored value" products described above. E- money schemes have the following central features:

• E-money is mostly a product issued by banks.

• Software-based e-money is basically non-existent.

• All schemes are account-based.

• Complete anonymity[15] is only possible if prepaid value can be purchased with cash[16].

• E-money can be spent offline[17]. Except for Mondex[18], however, no scheme offers person -to-person (P2P) functionality or the possibility of directly re-spending received e-money balances.

• Some e-purse schemes can be used on the Internet. However, they cannot be used for cross-border payments.

Existing e-money features seem to have a lot in common with debit card payments. Compared with online debit cards, the major advantage from the users' point of view is higher speed and lower operational costs. It also allows payments at the unattended point of sale without online connection (such as, for instance, parking meters or vending machines). A disadvantage is the need to re-load the card from time to time (usually involving payment of a fee). Also, in most schemes there is no PIN protection. Compared with offline debit cards, the advantage of e-money is that it does not involve any counterparty risk for the payee. The payee substitutes credit

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13 [SEM96] Security of Electronic Money, Report by the Committee on Payment and Settlement Systems and the Group of Computer Experts of the central banks of the Group of Ten countries, Basle, August 1996

14 Innovation and Regulation -The Case of E-Money Regulation in the EU, Background Paper No. 5, Electronic Payment Systems Observatory (ePSO), 12 January 2002

15 The anonymity as a property of electronic payment systems is defined further in this chapter.

16 Only a few schemes offer this option and it is not widely used.

17 Offline/On-line payment systems are defined further in this chapter.

18 The Mondex company is presented in Chapter "E-commerce Tools Hosted At Intermediary"

risk vis-à-vis the customer against credit risk vis-à-vis the issuer. For the issuer, there is no credit risk because e-money is prepaid. However, technical and operational risk management becomes more complex because there is no online control of transactions.

1.4.2   Electronic Commerce System

According to most definitions the electronic commerce system is a system that performs electronically all (or almost all) activities, connected with conventional commerce process. The purpose of converting these activities into electronic form is to improve the commerce process, especially:

- o   to speed up the commerce process and the turnover of money (using faster medium for commerce process activities)

- o   to create new types of goods (especially electronic goods or "soft goods", e.g. electronic publications, electronic services, multimedia products)

- o   to make the commerce process more convenient for the customer

- o   to find new types of commerce activities (e.g. information retrieval services)

- o   to find new types of customers and to globalise the customer area

1.4.3   General Structure of an Electronic Payment System

An electronic payment system contains following parties:

- o   Client (customer) - party that gets electronic money from client bank (issuer) and pays to the merchant.

- o   Merchant - party that gets electronic money from client and send these money (in the form of payment transactions) to the merchant bank (acquirer).

- o   Acquirer (usually the bank of merchant) - party that gets the transactions (i.e. electronic money) from its merchants and clears these payment transactions with appropriate issuer (client bank).

- o   Issuer (usually the client bank) - party that gives the electronic money to its clients and later receives these money from the acquirer.

- o   *(Optional)* E-commerce Service Intermediary – the so-called Commerce Service Provider (CSP) -party that processes the payment by hosting all or main modules of payment-processing software, processing the transactions, and guaranteeing security.

Whereas the first four parties are presented in each and every e-commerce transaction, the fifth one- that of an e-commerce service intermediary (Commerce Service Provider) is optional. Commerce Service Providers (CSP) enable businesses of different sizes, including small ones, to enjoy credit card facilities at their web site to enable e-commerce at prices that are easily affordable. How does the CSP Payment Gateway Systems work?
The CSPs set up a transaction server with a leased line direct to the acquiring banks' credit card clearing server. The merchant will sign an agreement with a CSP to make use of its transaction server to enable credit card transactions. From the customer point of view, he or she will enter their credit card information into the secure web form encrypted by Secure Socket Layer (SSL) technology. The relevant information is sent to the CSP server19, which will be processed jointly with the acquiring bank's credit card clearing server. Should all details match – such as credit card numbers, expiry dates, cardholder's name and billing addresses – the acquiring bank's server will approve the transaction and perform the relevant debit from the purchaser's credit card account. At the same time, the CSP server will issue a digital receipt to the purchaser with a unique receipt number and a digital purchase order to the merchant to proceed with the relevant transaction i.e., deliver the goods.
The whole process is transparent to the user and the merchant. The advantage for the customers is that their credit card information is hidden from the merchants hence reducing the risk of fraudulent or careless use of the information. The advantages for the merchants are that:

(i) they cannot be accused of fraudulent transactions as they never receive the card information and

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19 Sometimes the process of transferring transaction data (i.e. consumer credit card information and purchasing data) from merchants to processing networks and the return of authorization results is called transaction processing, but in this report we shall use the definition from the previous section for transaction processing.

(ii) they do not need to obtain any further approvals from any banking institution or perform any further transaction. All they need to do upon the confirmation of purchase from the CSP is to deliver the purchased goods and services. The CSPs will profit in terms of monthly and set up fees, and the transaction commissions.

1.4.4 *Safety Realization of Electronic Payment System*

The safety of electronic payment system is the key element of electronic commerce. Currently the key technology to ensure the safety of system is as follows: Security Socket Layer (SSL) and Safety Electronic Transaction (SET), which are mainly two kinds of important communication protocols, either of which can offer a method of reliable payment through internet. Several kinds of coding protocols are in use on Internet, every layer of the corresponding seven layers of the network modes has its relevant protocol. For instance, we have application layer of SET protocol, and session layer of SSL protocol. Among all the protocols, SSL and SET have the closest relation with EC.

1.4.4.1 Security Socket Layer protocol (SSL)

SSL is the protocol that encodes the whole session among computers and provides the safe communication service on Internet. It is widely used among sensitive information concerning capital balancing. Two kinds of coding are used in SSL:

o   Public coding key is used in process of connection

o   Special coding key is used in process of session.

The type and intensification of encoding are different according to the declaration made during the process of connection of two ends. One SSL session needs only one "hard" code operation. SSL provide the safe connection between two computers. The payment system is always constructed by way of transmitting credit card number through SSL connection; the bank of network and other financing payment system is constructed on SSL as well. Though the EC development is accumulated by credit payment under base of SSL, yet more advanced technology of payment system should be adopted to make the EC spread its area more broadly.

1.4.4.2 Secure Electronic Transaction SET

Secure Electronic Transaction (SET)[20] is both a *security protocol* and a *payment system for computer networks.* In the second half of 1995 two separate draft specifications for making secure payments over insecure networks such as the Internet were published: the Secure Transaction Technology (STT) sponsored by Visa International and Microsoft, and the Secure Electronic Payment Protocol (SEPP) sponsored by MasterCard International. However, in early 1996 Visa International and MasterCard International published for comment a joint draft specification called Secure Electronic Transactions (SET). Currently SET has won support from many large internal companies like IBM, HP, Microsoft, Netscape, VeriFone, GTE, Terisa and VeriSign, etc. Thus it has become the industrial standard virtually.

SET protocol aims to offer a solution for business by way of credit card payment among the customer, the supplier and the bank. SET aims to solve the safety problem in electronic payment of credit card.

1.   Ensure the confidentiality of information and avoid being wiretapped when information is transmitted on line. Only the authorized legal person can get and decode the information;

2.   Ensure the entity of payment information, secure the data transmitted can be received fully without any alteration in the middle way;

3.   Attest the supplier and the customer, verify the validity of supplier, card holder and business activity which do business on the public network;

4.   Secure wide mutual operationality, ensure the communication protocol, message formatting and standard being adopted have the common adaptability. Thus various products of different supplier can be integrated on public interlinking networks.

SET protocol is more complex than SSL protocol, for by SET not only single session between two ends can be coded, but also multi-session among multi-ends can be coded and recognized.

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20 [SET96] Secure Electronic Transaction Technical Specification, VISA, MasterCard, 1996

SET made possible the work of information integration, verification of all financing data and coding of sensitive data. It realized the financing payment safety work of attesting cardholders, supplier, payment request, payment authorization and records of payment by use of advanced technology like data coding and digital signature.

1.4.5 The Role of Cryptography

The role of cryptography is very important in the design of electronic payment systems. The application of cryptographic mechanisms can help achieve objectives such as confidentiality, data integrity, authentication, and non-repudiation (see [SEM96][21]).

The cryptographic mechanisms used in electronic payment systems include secret key encryption/decryption, one-way hash functions, challenge-response cryptographic protocols, digital signatures and key management protocols.

The cryptographic principles and building blocks described above are used to achieve security functions such as confidentiality, data integrity, authentication, and non-repudiation. Confidentiality is typically achieved by using triple-DES as the encryption method. Although it can also be done by applying asymmetric algorithms, owing to performance and price considerations the symmetric algorithms are generally preferred.

DES is also referred to as single-DES, to distinguish it from triple-DES. Triple-DES encryption consists of three consecutive operations (encryption; decryption; encryption) in which two DES keys are used (or a double-length DES key). Triple-DES has been developed in response to the increasing processing capabilities of computers and ensures that an exhaustive key search would still demand a considerable amount of resources.

Data integrity and authentication (including non-repudiation) are achieved by using DES, triple-DES and public key algorithms such as RSA, and by applying well-known hashing and MAC algorithms, such as MD-5, SHA-1 and RSA[22].

1.4.6 Types of Electronic Payment Systems (EPS)

1.4.6.1 Identifiable/ Anonymous

Identifiable payment system allows the issuer of electronic money to identify the participants of every transaction and gives him the possibility to trace the path of electronic money. *Anonymous payment system* preserves one of the property of real metal coins - the anonymity and intractability. The issuer has no possibility to follow the path of electronic money.

1.4.6.2 Based on secret-key cryptography / on public-key cryptography

According to the cryptographic mechanisms that are used, the electronic payment systems are based on secret-key cryptography or on public-key cryptography.

1.4.6.3 On-line/ Off-line

On-line systems require direct communication connection with the electronic money issuer (usually the bank) during every transaction (credit or debit). Off-line systems allow to perform payment transaction without such on-line connection with the issuer. Note that "online" means payments with online authorisation of the issuer and "offline" means payment without online authorisation of the issuer. Thus, there can be online payments at the real POS and offline payments at the virtual POS.

1.4.6.4 Electronic Payment Systems without Electronic Money

The most characteristic property of electronic payment systems without electronic money is that the *payment instrument (e.g. magnetic payment card, smart card, or personal computer) does not contain any electronic money*. The payment instrument performs only identification and authentication of the client and sometimes is used for cryptographic securing of the messages or for non-repudiation of the client. The messages,

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[21] [SEM96] Security of Electronic Money, Report by the Committee on Payment and Settlement Systems and the Group of Computer Experts of the central banks of the Group of Ten countries, Basle, August 1996

22 RSA and MAC are not discussed here due to space limitations.

exchanged between the client and other party also do not contain any electronic money – they contain orders to transfer money from account to account. Payment systems without electronic money are typically identifiable and on-line payment systems.

Electronic Banking System

Electronic banking systems can have many different names – home-banking, internet banking, Telebanking, etc. Electronic banking system performs exchange of banking information between bank and client using a personal computer, modem, and telephone line. System usually allows common passive operations with client accounts (e.g. examine account balance and history of account) and also some active operations (e.g. sending payment orders). It is clear from the nature of the electronic banking system that *this system does not contain any electronic money.*

Magnetic Payment Card

Magnetic payment card is used for withdrawal of the cash from ATM (Automatic Teller Machines) or for performing cashless payments. The card itself *does not contain any electronic money*. All relevant information are located in bank central computer and payment card (together with PIN) is used only for identification and authentication of client.

Figure 1. How does an ATM work?
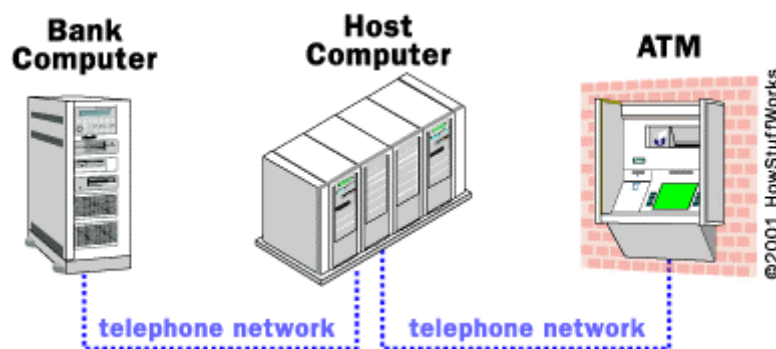
Payment Smartcard

Payment smartcard is used instead of magnetic payment card. The smartcard itself does not contain any electronic money and all information are stored in bank computer. Payment smartcard is direct replacement of magnetic payment card and has the same functionality as magnetic card. Its advantage is higher level of security – it is harder to copy it, it can locally verify the PIN code and it can effectively limit the number of unsuccessful PIN attempts.

Payment Systems for Computer Networks

Payment systems for computer networks are both without electronic money and with electronic money. Because of implementation complexity of electronic money the most of these systems are without electronic money. The main characteristics of these systems are that the payment instrument is personal computer and the communication is performed over the Internet. It is desirable that no additional hardware is required on the client side. Because of relatively big computational power on the client side the cryptographic mechanisms are usually based on public key cryptography.

As mentioned, beside a protocol, SET ([SET96]23) is a payment system for computer networks, at that one of the most known ones. **SET is aimed at transactions made using existing payment products, such as credit and debit cards, rather than electronic money products**. The specification identifies five parties to any transaction: the cardholder, issuer, merchant, acquirer and payment gateway. The cardholder initiates the purchase across the network from his personal computer. Use is made of "trusted software" and authentication information on the PC.

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23 [SET96] Secure Electronic Transaction Technical Specification, VISA, MasterCard, 1996

SET specifies the use of message encryption, digital signatures and cryptographic certificates to provide confidentiality of information, integrity of payment data and authentication of cardholders and merchants. SET specifies RSA-based cryptography using 768, 1,024 or 2,048 bit keys and a hierarchy of certification authorities

1.4.6.5 Electronic Payment Systems with Counters

The simplest implementation of electronic payment system with electronic money is to represent the money amount, carried by the client, as a value of counter, stored in the secure hardware token that is used as a payment instrument. When the payment instrument is credited, the counter is incremented by credited value. When the debit operation is performed, the counter is decreased by value paid. The system is rather simple and also the messages exchanged between parties are simple and independent on the exchanged monetary value. The security of such system relies on the security of payment instrument and on its resistance against unauthorised tampering. When the payment instrument is "broken" then the attacker can create an arbitrary amount of fictive money. The most common variants of counter-based payment system are prepaid card and electronic purse.

Prepaid Card

Prepaid cards (according to [PREP]24) have developed first as a single-purpose payment instrument for which the card issuer and the merchant have been one and the same party (e.g. telephone cards or parking cards). Such cards have not raised central bank concerns because the value embedded in them (i.e. the value of counter) did not have a wide range of uses and, therefore, did not have the characteristics of money. Prepaid card is usually implemented by smart card, but in case of small amounts the magnetic card can be also used. *The prepaid card is a typical anonymous off-line payment system.*

Electronic Purse (e-Purse) with Electronic Cheques

Drawing on the experience of prepaid cards a new payment instrument is under development in many countries: the multi-purpose prepaid card, also known as the "electronic purse". Electronic purses differ from other cashless payment instruments in that they are supplied in advance with generally accepted purchasing power. They can be loaded at bank counters, through Automated Teller Machines or through specifically equipped telephones, against a debit entry in a bank account, or against banknotes and coins. The embedded purchasing power is drawn down at the point of sale by an electronic device that can suitably adjust the information on the card.

Inside of electronic purse is again a counter that directly represents monetary value. When the purse is debited, the counter decreases its value and purse issues an electronic message (electronic cheque) with debited value. The electronic cheque is cryptographically secured. The merchant stores received electronic cheques in its payment instrument (usually called point of sale or payment terminal) in the form of payment transactions. The transactions are then submitted by merchant to bank and consequentially the merchant's account is credited. *The electronic purse is a typical identifiable off-line payment system.*

1.4.7   Implementation of Electronic Payment Systems in Europe

1.4.7.1   Scratch Cards[25]

The recent past has witnessed the emergence of a number of payment systems for use on the Internet involving the use of the "scratch cards" familiar from pre-paid schemes for mobile telephony. One of the earliest examples was the now seemingly defunct "Cybermoola" system in the US, and there have been schemes in the UK (World Online) and Sweden as part of the "Jalda" solution, and most recently in Austria with roll-out plans for Germany ("Paysafecard"). As in telephony, the user buys a plastic card, usually in a protective envelope. On its back, the card bears a 16-digit PIN, which is revealed by scratching away a coating applied to hide the PIN from view, and this is used to set up and later access an account containing the amount the user has paid in advance. The PIN number is used instead of a signature to make payments from the account to a merchant in an Internet transaction. There are obviously other possible ways to communicate the PIN to the account holder, such as cards without protective coating or e-mails, but scratch cards are currently finding favour.

At first glance, schemes of this kind would seem to stand an extremely good chance of achieving a breakthrough as a complement or an alternative to the credit card/debit card schemes currently dominating Internet payments:

o   The card bearer does not need to have a bank or credit card account;

o   Anonymous payments are possible;

o   There is no need to transmit any details of bank or credit card accounts across networks perceived to be vulnerable to interception;

o   The solution does not require consumers or merchants to invest in any kind of technology or to download special software;

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[24] [PREP] Report to the Council of The European Monetary Institute on PREPAID CARDS by the Working Group on EU Payment Systems, May 1994.
25 ePSO-Newsletter Issue 6 – March 2001

o The payment mechanism is familiar to many users from mobile telephony;

o The schemes can potentially be used on a range of platforms, including PCs, mobile phones and other hand-held devices, set top boxes;

o It is possible to make very low-value payments.

Solutions of this kind are particularly attractive to young people without bank accounts of their own, who have considerable spending power and by this means are able to extend their reach to the Internet and e-commerce or m-commerce. Beyond this group, which is itself sufficiently attractive to spur the development of payment schemes, there are other users who for a number of reasons prefer payment instruments with one or more of the properties mentioned.

1.4.7.2 e-Purses[26]

Austria: There are about 4.8 million "Quick" cards issued by Europay in circulation, most of them rechargeable and mounted on the bank card, which is still also equipped with the magnetic strip for use at ATMs. An anonymous disposable card is available but not being widely advertised. A small number of companies is accepting e-purse payments for meals purchased in staff canteens. Several municipalities have installed parking machines accepting e-purses. Overall there seems to be a slight upward trend in frequency of use of "Quick" e-purses. At the same time, the average value of transactions is declining due to the purse slowly finding its niche for the type of payments mentioned.

Belgium: The "Proton" card operated by the Banksys company and issued uniformly by all Belgian banks is widely regarded as the most successful European e-purse scheme, although the number of cards issued (30 million world-wide) is lower than the 50 million claimed for the "GeldKarte" in Germany alone. "Proton" is only available in the rechargeable form and it can be used for domestic use – recharging and payments – over the Internet. Customers wishing to make cross-border payments can only do this via the "SmartAxis" software, which supports "Proton" as one payment option in a whole range. The number of cards issued in Belgium is 8 million (July 2000), some 3 million cards were active in November 1999. The number of transactions in July 2000 was 3.8 million, the average value per transaction in October 1999 was 150 BEF (under 4 Euros). Correspondingly the main areas of application are payphones and vending machines. "Proton" is involved in an international cooperative effort to offer e-purse interoperability based on CEPS (Common Electronic Purse Specification) to start in January 2001.

Denmark: "Danmønt" (Dancoin) is one of the systems already described in the "Country Synthesis Report". It is a national card, restricted to domestic use and currently not available for use on the Internet. It is available in rechargeable and disposable formats, in fact the disposable cards form the majority with an estimated 600,000 active cards against 50,000 rechargeable cards in November 2000. "Danmønt" cards were used for 1.87 million transactions in the third quarter of 2000. Figures on the average values of transactions are not given, but main use at present is for payments to canteens and laundries.

Finland: "Avant" was also covered in the ESTO "Country Synthesis Report". It is another national card restricted to domestic use, available in both rechargeable and disposable form. The card can be used both for reloading and for purchases over the Internet, although its use is probably currently restricted to a single merchant. The rechargeable version of the card is mounted on the same chip used at ATMs for cash withdrawal and can also use these for recharging, Finland having coming a long way on the route to converting its ATM infrastructure to chip technology. The main area for use is probably telephone calls from public phones. A factor that could well be a major barrier is a charge of 2 FIM to recharge the card when it has been spent.

Germany GeldKarte is the German electronic purse system supported by the whole banking industry and based on a formal agreement between the five banking associations within ZKA (Zentraler Kreditausschuss which is the top level committee for all major decisions dealing with payment systems of the banking industry). One main advantage of GeldKarte is that it is based on an open standard, so that every interested provider fulfilling the requirements of the specification can contribute with hard- and software to the system. GeldKarte was tested during a pilot in 1996 in Ravensburg and Weingarten while introduction at the national level started in 1997. The chip for GeldKarte is usually integrated in the Eurocheque Card or bank customer cards. So there are about 50 million e-purses issued. This impressing figure has to be qualified by the fact that only about 0.5 million of these cards are really used.

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[26] ePSO-Newsletter Issue 3 – November 2000

Italy: There are two e-purse schemes, "Minipay" issued by SSB and "VisaCash" issued by Visa, which have not yet progressed beyond local trials. The Italian Identity Card will in future be based on smart card technology with a roll-out in some of the largest cities (Rome, Milan, Bologna, Turin, Florence) beginning in December 2000. It is expected that the issue of cards to all 57 million Italian citizens will be completed before the beginning of 2003. Beside serving as an identity card, the card will contain medical data and is also planned to be adopted as a payment means with both credit card and debit card functions. While no specific mention is made of e-purses, it would be simple to add such a function.

Netherlands: In the Netherlands, 20 million debit cards with chips have been issued by the Dutch banks. 13 million of those cards, issued by a group of 67 banks, contain the electronic purse by the name of Chipknip (launched in October 1996). The remaining 7 million are so-called Chipper, issued since the launch in July 1997, by the 6 banks that are part of the ING Group. Of these 6 banks the Postbank, with its customer base of more than 6 million, is the largest issuer. The purse functionality of both schemes is identical in terms of maximum loading amount (227 euro) and the impossibility to transfer freely between users. Both schemes have national coverage and are not ready (nor meant) for international use. The purses are reloadable, a pilot with a non-reloadable purse is currently taking place. Both chip cards are multifunctional. Not only do they allow for e-purse payments, they can also be used as part of an authentication mechanism for making payments over the Internet. Some slight differences exist as to the non-financial service options (a phone book, loyalty schemes) available on Chipper and Chipknip.

The loading procedures of the schemes differ. The loading procedure for the Chipknip must be performed by using the debit card pin code in separate loading devices, located at banks, or by using a personal home loading device. The loading of the Chipper takes place by using a Chipper code at either a phone cell or in a personal home loading device. The Chipper code must be different from the debit card pin code. This approach (which prevents a number of attacks on the debit card pin code) allows a multitude of private and public low-end loading devices to be used, including the KPN phone cells.

Switzerland: The Swiss e-purse, CASH, which is incidentally also the name of the Swedish system, is based on the Belgian PROTON technology. It has been in operation since February 1997 and is available only in rechargeable form for purely domestic transactions, a minor exception being Liechtenstein. There are roughly 3.5 million cards in circulation. These were used for an estimated 17 million transactions with an average value of five Swiss francs (under 3 Euros) in 2000. There are about 25,000 points accepting the e-purse so that the average use per day per terminal is under two transactions. Internet use is not yet possible but projected for the future. A major barrier is the refusal of several major retail chains to accept the e-purse. It can be used in a number of municipalities to buy transportation tickets and a manufacturer of phones for public use has started equipping phones with a card reader for e-purses.

1.4.7.3   Credit/ Debit Cards

While the interchange fee is mostly discussed for credit card schemes, it is an issue for all four party systems (payer, payee, issuer, acquirer). Thus, interchange fees may be an important issue for many types of electronic payment system. The issue arises because in a four-party system two players, the issuer and the acquirer jointly produce a service for the payer and the payee.

The use of credit cards is still broadening and debit cards have been very successful in the past 10 years. Using figures from the BIS and the ECB it can be calculated that the use of debit and credit cards in 12 industrial countries (Belgium, Canada, Denmark, Finland, France, Germany, Italy, Netherlands, Sweden, Switzerland, United Kingdom, United States) grew from 9.3 billion transactions (1987) to 33.7 billion transactions (1998). If the US are excluded the rise is even more spectacular, from 2 billion to 10.5 billion transactions. This has important implications for merchants. Card acceptance is no longer a tool to attract one or the other extra buyer. For instance, in the UK the share of card-payments in per cent of all retail payments (incl. financial transfers) rose from 3.4% (1989) to 12.8% (1998). According to its own estimates Visa has a market share of 7.95% of Global Personal Consumption Expenditure. Thus, card acceptance is becoming more and more a necessary part of the business. The increasing number of card transactions increases the fees that have to be paid. However, since cash and checks are still in use there are no corresponding cost savings.

It could be argued that the acquirer can simply charge the payee and the issuer the payer. However, such a view neglects that the services provided by the acquirer and the issuer are not really independent. They jointly provide a payment service to the payer and payee. The payee does not just pay the acquirer for settlement

services and risk reduction. He also pays for access to the group of cardholders whom he wishes to become customers. Conversely, the payer (as well as the acquirer) benefits from the network of merchants that accept the card.

What can be observed is that most interchange payments are made by the acquirer to the issuer. However, in Australia debit card acquirers receive a fee from issuers. Thus, it is not entirely clear who should pay whom. Equally, it is difficult to determine the level of fees. At the moment interchange fees vary substantially between countries and between different service providers. The Cruickshank report uses cost estimates and concludes that interchange fees in the UK should be lowered. Similarly, German banks use cost estimates to justify the introduction of an interchange payment from debit card acquirers to issuers. However, cost-estimates always involve highly subjective judgements and are a blurred guideline, at best. Finally, when interchange fees are evaluated it should also be taken into account that three-party systems often charge higher fees overall than four-party systems.

1.5 Existing Banking Solutions

According to a study that examines the performances in transacting cross border payments in a number of different EU Member States[27], chosen as benchmarks for the description of the payment processing system, the most common payment systems and carriers used to transact cross-border payments are S.W.I.F.T., EBA, Target (only on request of the customer), and cheques.

The Bank of Finland Bulletin 2001[28] holds, however, that: "There are no common standards – electronic or paper-based – for sending or receiving customers' international payment orders or invoices. Several standards have been proposed, but none enjoy sufficiently or support to gain broad international acceptance. The leader, perhaps, is the SWIFT network and SWIFT standards, which are generally used in international payment traffic between banks.

These standards are relatively loose and still require several manual (or semi-manual) steps when a customer payment order is transmitted from sender to receiver. The interbank settlement method presently used for cross-border payments is quite intricate.

Future systems will need to be more efficient and uniform."

The carriers and payment systems used to process payment orders (S.W.I.F.T., EBA, and possibly Target) and the information requested to initiate payment processing are generally common between the different countries. The main differences, apart from the different levels of straight-through processing, relate to the charging method in use.

1.5.1.1   SWIFT (correspondent banking)[29]

This is the traditional, and currently by far the most common, method of making cross-border payments. Points to note about SWIFT are that:

- o   it is a highly secure, well-established network with very broad membership
- o   it provides access to all 'in-country' local clearings
- o   it is flexible in terms of level of beneficiary information required
- o   the costs are well understood
- o   the time taken for payments to reach beneficiary is variable

1.5.1.2   TARGET Trans-European Automated Real Time Gross Settlement Express Transfer System[30]

TARGET is a system being established by the European Monetary Institute, the precursor of the new European Central Bank, to facilitate the working of the single currency area. Key points to note are:

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[27]   Published on: http://www.europarl.eu.int/workingpapers/econ/pdf/123_en.pdf

Member States surveyed are: Italy, Germany, Ireland, Austria and Belgium.

[28] Bank of Finland Bulletin, 2001 • Vol. 75 No. 2

[29] http://www.royalbankscot.co.uk/economics/world_economy/emu/rbs_views/publications/archived_emu/issue4.htm

[30] http://www.royalbankscot.co.uk/economics/world_economy/emu/rbs_views/publications/archived_emu/issue4.htm

- a large value payment system maintained by EU-area central banks;

- irrevocable same-day value payments with settlement in real-time

- access via CHAPS Euro (or CHAPS if 'UK In')

- primary use likely to be for monetary policy purposes and very urgent wholesale transactions (e.g. settlement of large foreign exchange deals)

- costs still unknown at this stage, but likely to be high

- take-up for commercial payments doubtful

- still possible that access for out/pre-in countries (likely to include the UK) will be restricted

The number and total value of cross-border payments handled in the TARGET system – a large-value payment system maintained by EU-area central banks – increased during the early part of the year. In March (2001) the daily average number of payments was 44,000 and their total value was EUR 510 billion[31].

1.5.1.3 EBA system

One disadvantage of the EBA system, which is still working below its full capacity, is the fact that it operates on a net settlement basis. It settles with the European Central Bank only once a day, and it is up to each bank to decide when to make funds available. To make possible the availability of the funds on the same day it would be better to have a real-time settling procedure. Considering the systems outlined above, Target is the one which transacts the highest number of payment orders, followed by EBA and by the national European settlement systems. This applies especially for wholesale transactions; but in case of retail payments this is reversed because correspondent banking is the most used approach, followed by EdBA and Target. The following table gives the main characteristics of each transaction processing system.

1.5.1.4 Direct Debiting

Direct debit is a form of payment where the customer gives the merchant their bank account details along with written permission to debit funds directly from their account. Direct debit rules vary from country to country. Depending on where customer lives, with their permission, merchant may be allowed to debit customers' account repeatedly, or just once, for variable amounts, or for one single amount month after month. Direct debit can be used to pay an invoiced amount, or to pay in advance for a product ordered by mail or on the Internet. There are a number of benefits associated with Direct Debit

Once a customer has given the merchant their mandate, they do not have to worry about things such as payment due dates, leaving enough time for their payment to be registered on merchant's system, or whether their payment will get lost in the mail. Since the merchant originates the payment, it is always made on time.

A formal specification of the Automated Direct Debiting can be found in the "FINANCIAL SECTOR CROSS BORDER AUTOMATED DIRECT DEBITS" issued by the European Committee for Banking Standards (ECBS)[32]

This report is intended to provide the basis on which cross-border, automated direct debit services may be developed using National Direct Debit Schemes, which will remain unaffected. It is designed to specify the key elements with enough precision and unambiguity to allow processing to be automated, but with sufficient flexibility to encourage competitive service and product development.

This ECBS technical report specifies data elements and operational procedures for cross-border, automated direct debits, which have the following characteristics:

o   Fully automated from the creditor's Financial Institution (FI) to the debtor's Financial Institution,

o   Mass volume, batched,

o   Containing a defined level of remittance information.

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[31] Bank of Finland Bulletin, 2001 • Vol. 75 No. 2, p.22
[32] FINANCIAL SECTOR CROSS BORDER AUTOMATED DIRECT DEBITS, EUROPEAN COMMITTEE FOR BANKING STANDARDS, Version 2, Issued: February 2000, http://www.abb-bvb.be/gen/downloads/TR205V2.pdf

Figure 1 : Business Information flow model for cross border direct debits

Key :

➤ Interbank international Direct Debit

─➤ Other Direct Debit instructions/information

─ ─➤ Funds transfer (reimbursement flow)

─ ─ ─ . The border between countries

DCS Domestic Clearing System

Note : - Due to the large variety of processes, the reporting authorities do not figure in the model
        - Direct Debit instructions and funds transfer information may be carried in the same file

According to the report, Direct debiting is actually a part of a much more general process, namely **«Collection»** (collecting = obtaining payment of money). This term covers not only direct debiting, but also invoice, commercial paper and cheque collection. Direct debiting is different from the other types of collection **in the initial phase of the business process**, namely the «Relationship setting up» (where the parties agree on the externals of the collection process, e.g. finality and legal aspects etc.).

Direct debiting consists of two main phases:

o   The relationship setting up and

o   The operational process of each transaction: debit, credit, rejection, revocation and reversal.

The relationship setting up is an important part of the direct debit payment method but it is not automated in most National Direct Debit Schemes.

1.5.1.5 Credit / Debit cards systems33

The credit card system itself (MasterCard, VISA, etc.) has developed internationally uniform standards and has been structured over the complete payment cycle, so that it can function through a recognised identification system in every country without adaptation procedures[34]. The limited number of institutions involved in the payment process permits the adoption of centralised network solutions and more automated systems so that these systems are usually more developed and less problematic than credit transfers or cheque processing. Cardholder, merchant, acquirer and the banking system are the four parties involved in an international credit card system such as MasterCard or VISA, which act as clearing centres.

The process can be divided into two stages:

o The authorisation phase, which is requested from the merchant to the banking system through the acquirer; and

o The clearing and settlement stage. During the latter the payment request arrives from the acquirer and is sent from the banking system to the issuing bank, which provides the debiting of the amount on the cardholder account. The banking system then provides the payment statement directly to the cardholder. The latter itself bears no costs and the merchant pays to the acquirer a commission ranging from 2% to 5% depending on the country.

The total charges for the use of credit cards are split between

o An interchange fee, which is paid by the acquirer to the issuer;

o The clearing and settlement fee, paid by the issuer and the acquirer to the international system (Europay International, MasterCard International); and

o A transaction fee, paid by the issuing bank to the banking system.
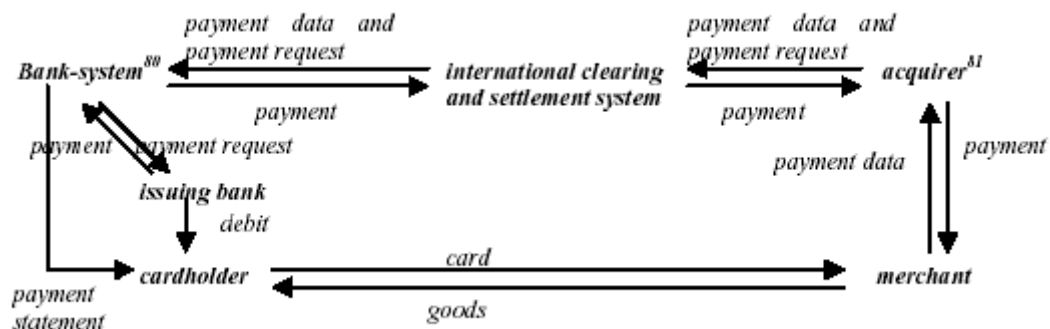
At purchase, the signature of the customer gives automatic authorisation to whoever presents the receipt. to proceed with accreditation of the amount concerned. In contrast to credit transfers, no payment statistics are required officially by the controlling institutions for the credit card, and this saves time and reduces costs. Furthermore the commission for the credit card service is paid by the merchants and not by the customers, as in the case of credit transfers. The purchases made are charged on a monthly basis.

The **debt card** system operates like the credit card one, with the difference that debit cards authorise merchants to debit electronically the amount of the transaction on the bank account of the customer. The funds, in contrast with the credit card system, are transferred almost immediately from the customer's account to the merchant's account. The cardholder pays a fee and the merchant a commission, depending on the acquirer. The debit card volume is expected to grow over the coming years~ already this year it accounts for approximately 60% of the total of Visa cards and 70% of the total expenditure done.

For the International Eurocheque payment system the parties involved are the Eurocheque holder, the merchant, the bank of the merchant (accepting bank), the issuer and Europay International. The settlement

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[33] Published on: http://www.europarl.eu.int/workingpapers/econ/pdf/123_en.pdf, p.23

[34] Credit cards are used for different payment amounts across the Member Sates. For example in France and in Great Britain the average amount paid is .24, while in Italy the amount is higher and approximately .77.

process is a little more complicated than the one performed for the international credit/debit card system.
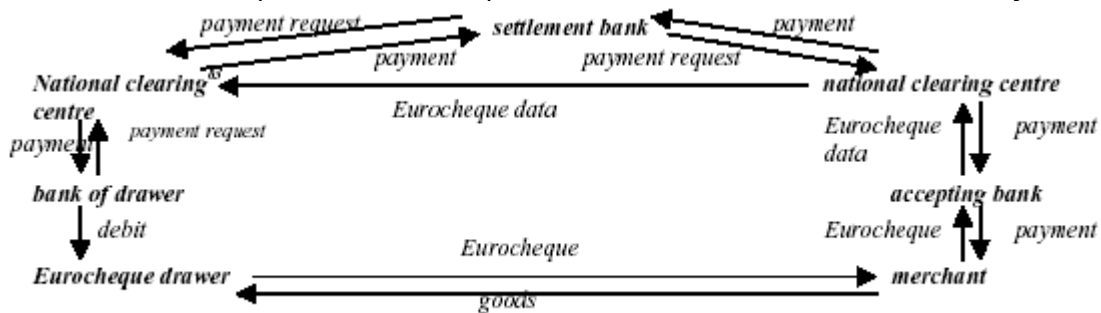
The total costs can be split between:

o   An *interchange fee;*

o   A *clearing and settlement fee* paid by the clearing centre to the card scheme; and

o   The *processing costs* paid by the bank of drawer of the Eurocheque to the national clearing center[36].

1.5.1.6   Automate Clearing House (ACH) Networks

Automated Clearing House (ACH) is an organisation for the automated processing of payments, which may be a part of the domestic clearing system and/or act as an entry/exit point for cross border payments[37].

The Automated Clearing House (ACH) Network[38]

The ACH Network is a highly reliable and efficient nationwide batch-oriented electronic funds transfer system governed by the NACHA OPERATING RULES, which provide for the interbank clearing of electronic payments for participating depository financial institutions. The American Clearing House Association, Federal Reserve, Electronic Payments Network, and Visa act as ACH Operators, central clearing facilities through which financial institutions transmit or receive ACH entries.

ACH payments include:

*   Direct Deposit of payroll, Social Security and other government benefits, and tax refunds;

*   Direct Payment of consumer bills such as mortgages, loans, utility bills and insurance premiums;

*   Business-to-business payments;

*   E-checks;

*   E-commerce payments;

*   Federal, state and local tax payments.

The volume of ACH payments in 2001 exceeded 7.99 billion, up 16.2 percent from 2000. The value of these payments was $22.2 trillion, representing a 9.2 percent increase. Annual transaction volume on the ACH Network   increased   by   more   than   one   billion   payments   for   the   first   time   in   2001

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80 Source: KBC slides.

81 The acquirer provides the authorisation.

[36] The drawer of the Eurocheque pays 1.6% of the transaction to the foreign bank and .1.24 plus 0.50% to the national service providers.
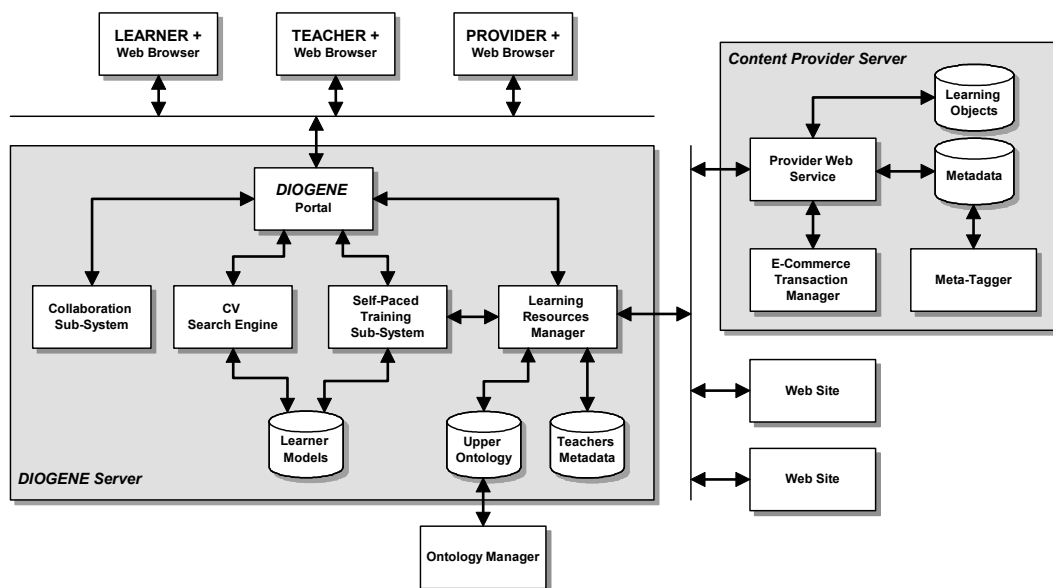
[37]   FINANCIAL SECTOR CROSS BORDER AUTOMATED DIRECT DEBITS, EUROPEAN COMMITTEE FOR BANKING STANDARDS, Version 2, Issued: February 2000, http://www.abb-bvb.be/gen/downloads/TR205V2.pdf

[38] http://www.nacha.org/About/what_is_ach_.htm

2. Diogene' s Requirements

This report syntheses results coming from the analysis of commercial tools for e-commerce able to be exploited by the DIOGENE E-commerce Transaction Manager. According to Description of Work in the Work Package 5 in the Technical Annex, the design of the e-commerce transaction manager must take into account those existing commercial tools.

2.1 E-Commerce Transaction Manager- Description and Features

LEARNER + Web Browser   TEACHER + Web Browser   PROVIDER + Web Browser

Content Provider Server

DIOGENE Portal

Collaboration Sub-System   CV Search Engine   Self-Paced Training Sub-System   Learning Resources Manager

Provider Web Service   Learning Objects   Metadata

E-Commerce Transaction Manager   Meta-Tagger

Learner Models   Upper Ontology   Teachers Metadata

DIOGENE Server

Web Site

Web Site

Ontology Manager

The **E-Commerce Transaction Manager** is a module that is part of the Diogene's Content Provider Server. In terms of the *General Structure of Electronic Payment System* described in the previous chapter, *each organization that hosts a Content Provider Server* will become a merchant in a separate process. As the Diogene's Portal has the responsibility to redirect each user to the appropriate Content Provider Server, depending on the type of learning resource the user requests, the organization that hosts this Content Server will eventually enter into a trade relationship with that user in the role of the merchant selling a particular learning resource to the customer – the user.

The E-Commerce Transaction Manager is responsible for performing e-commerce transactions between users requesting contents - *the customers* and the provider of learning resources (Learning Objects)– *the merchant* in order to provide customer with the ability to exploit requested Learning Objects for a limited period of time in the context of his/her training activities.

What is meant here by "e-commerce transaction" is *a transaction* that is *performed to settle a payment over Internet.*

Formally defined, a *transaction* is an abstraction of an atomic and reliable execution sequence[39]. A transaction defines an atomic scope of work performed by a database server. From the start transaction command until the commit/rollback command, all requests to modify database tables will either succeed (commit) or fail (rollback) together[40]. This is done to ensure that related changes to a database complete as a single consistent unit. There is no such thing as a partial completion of a transaction. Since a transaction can be made up of many steps, each step in the transaction must succeed for the transaction to be successful. If any one

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[39] http://www.jguru.com/faq/view.jsp?EID=2555

[40] http://community.borland.com/article/0,1410,25686,00.html

part of the transaction fails, then the entire transaction fails. When a transaction fails, then the changes that had been made are said to be "rolled back." In effect, this is acting similar to the way the Undo command works in most word processors. A *transaction processing system* is responsible for carrying out this undo[41].

Sometimes, in the narrower context of an e-commerce transaction, the process itself of transferring transaction data (i.e. consumer credit card information and purchasing data) from merchants to processing networks and the return of authorization results is called also *transaction processing*[42]. In contrast to the former definition, this one takes account only of "raw" input data -consumer credit card information, purchasing data, etc., the "processed" output data- the authorization results, and the transferring of raw and output data, without dwelling on details of how exactly the processing of a transaction occurs. However, the actual transaction processing is done by a transaction processing system in terms of the former definition.

Depending upon *which party actually hosts the transaction processing system*–the merchant, or the e-service intermediary – the Commerce Service Provider (CSP), we distinguish between two types of e-commerce tools able to be exploited by the Diogene's E-commerce Transaction Manager. If the CSP hosts the transaction processing system, we say that the *e-commerce tool is hosted at the intermediary*; otherwise, the *e-commerce tool is hosted at the merchant.*

Usually a merchant needs a CSP, if they are not specialized in software and e-commerce software, and hence require that other party carry out the payment processing (transaction processing). In that case the transaction processing system (defined above) is hosted at the CSP and almost all the merchant needs to do to sell on-line comes down to "subscribing" for the appropriate service offered by the intermediary (Commerce Service Provider). There are, indeed, some e-commerce tools that are "distributed" between the merchant and the service provider –for example a product that allows merchant to store customer data locally, but let the commerce service provider process the payment transaction. Some tools can be used both by banks- acquirers or issuers, and by merchants (separately, not in the role of related parties), which shows that merchant who wish to process payments at the level of a bank institution can do so.

From economic point of view, the following possibility should be considered: At the initial stage of exploitation of DIOGENE, an e-commerce tool may be chosen that is hosted at intermediary, i.e. – the payment processing occurs at the intermediary (CSP). This requires an insignificant initial investment of about 250 EURO to pay for the one-off set-up fee. Of course, each transaction will be charged a fee according to CSP pricing, and additional fees may be incurred for allowing a payment in multiple currencies or links to other payment processors, but given that initially the expected number of transactions per period would be small, and Diogene would have not reached its targeted mass of customers (and its potential as a whole), this possibility may prove less risky and cheaper.

With the expansion of Diogene's activity, however, and the increase in the number of customers (i.e. learners), the number of transactions per given period will increase, which is the main prerequisite for choosing the second alternative – an e-commerce tool hosted at merchant. In any case, it is a better solution when the merchant for some reasons wishes to keep all customer data, concerning the payment transaction, at their place (at their disposal). But although payment platforms hosted at merchant are usually offered with high integration potential towards acquirers' systems, it is the merchant responsibility to integrate this platform with the acquirer and other payment networks. Also, an e-commerce tool hosted at merchant would require more resources in terms of skilled IT specialists and additional software to support the solution.

2.2 Classification Criteria

For their better and clearer understanding, e-commerce tools examined in this report are divided into two main categories -"E-commerce Tools Hosted at Intermediary" and "E-commerce Tools Hosted at Merchant". Further, each tool is described under a heading bearing the name of the vendor of the e-commerce tool. This is done, as it is more customary for a reader to know the name of a vendor company – such as IBM, Oracle, Sun, etc. than to know the name of a particular product/ solution of this vendor. Finally, the tools are classified according to the following criteria:

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[41]http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnproasp2/html/whatistransactionprocessing.asp

[42] http://www.datagauge.com/signiofaq.html ; http://www.verisign.com/products/payflow/faq/transaction.html#1

2.2.1   Technological Description of the Product/Solution

This criterion applies to tools, which are hosted at the merchant only. Detailed information can be found here about the technologies, which are used in developing the product as well as about software integration issues.

2.2.2   Level of use / Implementation in Europe

The extent to which a product /solution is used worldwide and more importantly – in Europe. Eventually, it is *our subjective opinion* as to whether the product has good chances to be implemented in European context, given that many existing products/solutions are intended and used mainly in US. This opinion is based on the following measures:

1. Prominent customers of the product/solution and relevant press releases for this product/solution;

2. The number of countries in which the product is sold through local offices of the vendor, the different language versions of the product and the technical support offered locally.

It would have been most objective to determine the level of use of a given product/ solution by the number of copies/licences sold. Unfortunately, this data is very rarely (if at all) if available. In this survey it is not used.

2.2.3   Difficulty to use

This can be measured only after a trial of the product/solution. However, for many of products listed here no download is offered.

2.2.4   Performance:

This generally means the number of transactions that a server can process within an hour. Depending on the tool considered, features concerning reliability might be included here, such as: what happens in case of database outage – how completion of in-flight transactions is ensured.

2.2.5   Security:

Features regarding security are included here, such as:
Encryption methods and security protocols used (HTTPS, SSL, DES, Triple DES), validation of transactions (by digital certificates, etc.), Web Server authentication, firewalls, provision of real-time authorization to keep users updated on the status of their transaction.

2.2.6   Flexibility:

2.2.6.1   Towards customers:

It actually means the ability to easy accommodate the product/solution to the specific needs of customer. Includes: supporting many types (means) of payment, supporting payment in multiple currencies; may include flexibility to build segments in targeted market of merchant and to position the product in these segments;

2.2.6.2   Towards installation / integration

Includes options for installing the product/solution on different operating systems, and/or integration with existing (legacy) systems

2.2.7   Integration Issues

2.2.7.1   Integration with Commerce Service Providers/ Multiple Acquirer Integration

Generally in this subsection are included possibilities of integration with other Commerce Service

Providers (CSP), or payment processing networks (for example, if a given CSP does not support particular payment type, or particular currency of payment). Because one of the products included here provides a possibility for integration with multiple acquirers *("links and alternative routes to multiple acquirers, if an individual acquirer become unobtainable")* the "Multiple Acquirer Integration" is the second title of this subsection.

2.2.7.2   Integration with Existing Systems

The "existing systems" is a rather broad term. Depending on the context, in this subsection may be included issues regarding: legacy infrastructure integration (i.e. integration with systems, already installed and running at the merchant's place), possible integration with products, extending the functionality of the current product/ solution (but not necessarily to be used together with the current product)

2.2.7.3   Integration with Diogene

Although Diogene may be considered an "existing system" in terms of the above definition, in this section may be included particular steps to integrate the product/ solution with Diogene, or an opinion as to the ease of integration of the product/ solution with Diogene. This opinion will be based on the features of the product/ solution.

2.2.8   Summary

As the aim of this report is not to recommend "the best and only one" e-commerce tool, able to be exploited by the Diogene's E-Commerce Transaction Manager, but rather to represent the relevant successful market solutions and compare their strengths and weakness, a short analysis is given below each Summary heading, which weighs the pros and cons of the presented tool as well as its proximity to the requirements of Diogene Transaction Manager.

3. E-commerce Tools Hosted at Intermediary

3.1 WorldPay

Vendor: WorldPay
http://worldpay.com/uk/index.html
Head Office: Cambridge, UK

USA Head Office: Sterling, Virginia
Branches: Germany, Sweden, Spain, Italy, Japan, Singapore.

WorldPay is a leading e-Commerce solutions company, providing one-stop services to enable businesses to trade successfully online.

WorldPay's services range from an entry level store builder and secure online payment processing solutions, to high-end, multi-currency transaction processing systems for larger organisations with an established web presence.

3.1.1   Product: FuturePay

3.1.2   Description:

FuturePay provides *an Internet based solution where payments are taken periodically by credit or debit card. This is ideal* for subscriptions to web sites, online magazines, hosting services. In fact, it is appropriate for *any application where payments are taken by installments.* WorldPay accepts payment information via the web, capturing card and customer details for authorisation of payments via the banking network. Transaction results can be viewed by the merchant, and their customers and automatic messaging facilities provide digital receipts directly to both parties from WorldPay.
FuturePay is available as two solutions:

- Solution one allows a fixed payment, which is taken at scheduled intervals

- Solution two allows variable payments, usually billed after the event, when the total value to be charged to a customer is known

3.1.3   Payment Means:

- Credit Card
- Debit Cards

3.1.4   How it works?

1. The customer browses the merchant's catalogue

2. The customer adds products to their 'basket', then decides to pay

3. The merchant's WorldPay facilities issue an encrypted 'purchase token' containing the purchase details

4. WorldPay decrypts and interprets the encrypted 'purchase token'

5. WorldPay present the payment form to the customer

6. The customer enters their card details and submits the form

7. The card is authorised

8. Authorisation is sent to WorldPay

9. Acceptance confirmation is sent to the merchant

10. WorldPay sends the response to the customer

11. Funds transfer takes place

12. Merchant can use Customer Management System (CMS). CMS is a service provided to all WorldPay clients (the merchant) that enables them to access their account information online. Merchant can access the system by username and password, and upon entering the system they can view the transactions passing through their account. Information provided within this system not only contains the customer's name, address, value of transactions etc, but also merchant's remittance details, and currency conversion rates (if applicable).

3.1.5   Key Features

- Processing managed by WorldPay

- Detailed account reporting

- Transaction notification sent to both customer and merchant every time a payment is processed

- Merchant or the customer can cancel a scheduled payment at any time

- The customer can be given a choice of payment terms and dates

- Ceiling limits can be predefined

3.1.6   Level of use / Implementation in Europe

We estimate that since the company is worldwide represented, and especially represented in Europe, the product/solution is quite common and widely used. Besides the headquarters in Cambridge, UK and the USA Head Office in Sterling, Virginia, separate branches are established and provide support in Germany, France, Italy, Spain, Sweden, South Africa, Singapore, Japan, China, South Korea, Canada, Australia, New Zeeland.

3.1.7   Difficulty to use

As the Vendor processes the e-transaction, all difficulties to use relate to the computer literacy of the merchant.

3.1.8   Performance:

No information can be found as to the number of transactions the tool can process per hour for a given merchant.

3.1.9   Security:

All transactions are encrypted using 128 bit Secure Socket Layer (SSL) architecture (dependent on browser support), and are signed using Thawte digital certificates.

3.1.10   Integration Issues:

3.1.10.1 Integration with existing systems

A range of integration methods are provided through WorldPay Select to meet the needs of a diverse community of eCommerce traders. These methods provide support for solutions from small one-off customised applications through to large organisations integrating their own legacy systems with the help of third-party developers. WorldPay Select payment pages are responsible for capture of customer card details, removing the need for the customer to have a secure web-server or secure customer databases, whilst a callback model allows the customer site to respond appropriately to card authorisations. This callback system can be used to provide information to web applications that need to be dynamically updated in response to authorisation messages.

3.1.11   Price:

One off set up fee of **£100,   plus:**

Processing charges	
Setup Fee*	£75
Annual Fee - includes 3 free currencies	£150
Additional charge per currency	£50
Service charges per transaction**	
Credit Cards	4.5%
Debit Cards	50p
Remittance Charges***	
Remittance in GBP to UK bank accounts	35p
Remittance in any other currency to UK or non-UK bank accounts	£2.50
WorldAccess Setup Fee	£50

* £50 non refundable
** This is the ONLY fee charged, there are no additional charges payable to banks or other third party organisations.
*** This charge is incurred by WorldPay when remitting funds into merchant's bank account. With WorldDirect merchants will normally receive weekly remittances 4 weeks in arrears. The minimum remittance amount is £10 for sterling or the equivalent of £100 in the case of other currencies. The merchant may arrange for periodical remittance for amounts greater than the above. The charge is per remittance (NOT transaction) and does not include intermediary or receiving bank charges

(if any) that may be levied. Remittance charges depend upon the charges made by the relevant banks and may be changed without notice.

3.1.12   Summary:

The advantage of WorldPay is that it is an established international company, widely represented in Europe. However, it offers only traditional types of payment means over Internet – by Credit and Debit cards. Besides, FuturePay – the e-commerce tool able to be exploited by Diogene's Transaction Manager – is intended for payments taken at fixed periods of time, such as subscriptions to web sites, online magazines etc., which is not appropriate for one-off, random purchases as may be the case with "buying" access rights to an on-line course. In comparison with other payment processing products, pricing is similar. Unfortunately, no information about the performance of the system can be found in terms of number of transaction the system can process for a given merchant per hour. This is usually closely related to the fees charged per transaction.

3.2 AllCash

3.2.1   Vendor: AllCash

http://www.allcash.de/english/index.html

Head Office: Moers, Germany

ALLCASH GmbH is a Germany-based specialist provider of services **encompassing an entire range of systems for automatic payment and data transfer.** ALLCASH is based in Moers, Germany and is active internationally. Together with credit institutes, umbrella organisations from trade and industry and public institutions, ALLCASH ensures shorter lines of communication during the transfer of data.

The ALLCASH Internet payment system is certified by the German Engineering Control Association (TÜV) Rheinland/Berlin-Brandenburg and is operated on an environment authorised by the Central German Credit Loan Committee (ZKA) of all banks and savings banks.

3.2.2   Partners/ Alliances:

o   A deal with WorldPay to increase Internet payments through the debit card network;[43]

o   A partnership with Ultradocs International BV from Heerlen, Holland is established[44]. Ultradocs is a Dutch start-up is a company specialized in software solutions for EBPP- Electronic Bill Presentment and Payment, the electronic depiction of accounts, payment slips and documents. By the cooperation of both companies a secure solution is developed, which enables bills representation and payment over Internet. At first, the system will be available for the business-to-business sector, later also for transactions with consumers.

3.2.3   Product:

ALLCASH unified transaction platform
http://www.allcash.de/english/leistungen/leistungen_epayment.html/

3.2.4   Description:

ALLCASH offers a uniform interface for processing transactions in e-commerce via the Internet payment system**.** *All current Internet payment processes are supported.* The ALLCASH unified transaction platform is

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[43] http://www.worldpay.com/uk/news/archive/2000/news_allcash.shtml/
[44] http://www.nrw-nl.com/english/success/allcash.html

centrally actuated by *http POS*[45] terminal, and the data is transferred encoded using SSL. With the ALLCASH Unified Transaction Platform, *ALLCASH provides merchants with a uniform interface that covers all common payment procedures on the Internet:*

- o **Credit card transactions over SSL:**
  EUROCARD / MasterCard, VISA, JCB, Diners Club and American Express

- o **Credit card transactions over SET:**
  EUROCARD / MasterCard, VISA. ALLCASH will serve as host for all necessary certificates.

- o **Electronic direct debiting (ELV):**
  German direct-debiting transactions

- o **European direct debiting:**
  European direct-debiting transactions (European Direct Debit)

- o **paysafecard:**
  The first German Internet-based prepaid system offers merchants a payment guarantee and can be easily connected to the ALLCASH proxy system for micro-payment transactions.

- o **Micropayments:**
  The ALLCASH proxy system is used for micro-payment transactions. It is easy-to-install and configuration is simple. It can currently be used with the paysafecard.

- o **paybox:**
  The innovative paybox payment system is used to confirm payment over mobile phones for customers shopping on the Internet. The dual-channel concept provides effective protection against fraud for trader and customer alike.

- o **VAPOS:**
  VAPOS provides merchants with the power to authorize credit-card payments over an Internet browser, by entering the payment data by hand or as a file.

- o **Client Check:**
  Checks of identity, address and credit standing.

- o **Module for shop operators:**
  Connection with ALLCASH interfaces using modules and cartridges.

3.2.5   Payment Means/ Multi currency support:

Credit Cards, MasterCard/ EuroCard, Visa, Diners Club, Eurocheque cards in *18 trading currencies*.
It is also possible to process direct debits in Germany and in other European countries. New payment processes, such as HomePay, Paybox and Paysafecard are supported; building up on the paysafecard system, ALLCASH offers a micro payment solution.

3.2.6   How it works:

1. The customer selects the desired items in an Internet shop and places them in his/her shopping basket.

2. The customer decides on one of the methods of payment offered by the merchant (debit card, credit card), and establishes a secure connection using a 128 bit SSL, to the ALLCASH-IPS Gateway Server. ALLCASH transfers an Applet onto the PC of the online customer via this secure connection.

3. The customer enters his/her payment transaction data into the applet. These are transmitted to the

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[45] POS stands for **P**oint **O**f **S**ale. This is a rather broad definition that can include merchandising aids, displays and the methods used to enable transactions. It may mean the hardware and software that runs both the front counter and back office operations of a business. There are POS systems (i.e. http://www.summitcn.com/) that may run on a stand-alone PC or on a Network, with or without POS system hardware. *Http POS* is a *point of sale* software that runs on a Network over the http protocol.

ALLCASH-IPS Gateway Server, together with the shopping basket data.

4. The ALLCASH-IPS Gateway Server checks with the merchant system whether the order is actually arrived. In this way, ALLCASH further safeguards the shopping basket and the order against tampering.

5. The ALLCASH-IPS submits the payment transaction data for authorization to the corresponding credit card processor via ZKA (Central Credit Committee)- certified network.

6. The outcome from transaction is transmitted to the customer and to the merchant.

7. The amount is credited to the merchant account.

3.2.7   *Level of use / Implementation in Europe:*

We estimate that since the company is the first to be certified by the German Engineering Control Association (TÜV), and also has active partnership with WorldPay to promote Internet payments, its product/solution could be used in a wider European context.

3.2.8   *Difficulty to use*

As the Vendor processes the e-transaction, all difficulties to use relate to the computer literacy of the merchant.

3.2.9   *Security:*

ALLCASH has its own Trust & Service-Centre to guarantee the security for electronic transactions and also communication in all networks and electronic services. Encryption methods such as 128-Bit SSL and Triple DES are being used. The SET Method is in development.

3.2.10   *Performance:*

No information can be found as to the number of transactions the system can process per hour for a given merchant.

3.2.11   *Flexibility:*

3.2.11.1 Towards Customer:

Individual services are differentiated in the incoming message so that new services such as paybox can easily be added following a successful implementation. With the ALLCASH Unified Transaction Platform, ALLCASH provides merchants with a uniform interface that covers all common payment procedures on the Internet.

3.2.12   *Integration Issues*

3.2.12.1 Integration with Diogene

Integration with Diogene must be easy, as AllCash "offers a uniform interface for processing transactions in e-commerce via the Internet payment system".

3.2.13   Pricing

AllCash Pricing List as of IV 2002

1. **Set-up Fee** –Installation and License Fees per additional (attached) shop

   a) *Supply and Installation of **UtxP** (base) -*   ***one-off***   ***205.00€***

plus	Payment credit cards, ELV (SSL)	one-off	25.00 €
plus	SET (only for credit cards)	one-off	280.00€
plus	Paybox	one-off	25.00€
plus	Paysafecard [46]	one-off	25.00€

   b) *Supply and Installation of **VAPOS***   ***one-off***   ***130.00 €***

plus	Payment credit cards, ELV (SSL)	one-off	25.00 €

2. **Service Fee** - maintenance, servicing and service - per additional (attached) shop

   service for UTxP / VAPOS   *monthly*   ***25.00€***

3. **Transaction costs** - for all payment means - credit cards, debits, etc.

1 to 500 TA / month	per transaction	0.25€
501 to 1000 TA / month	per transaction	0.16€
from 1001 on TA / month	per transaction	0,09€

4. **Duration time of contract :**   **24 months!**

!!!! The implementation costs of the Unified Transaction Platform (UTM) incurred in the Shop's system are at the expense of the shop's owner. Some scripts are available to facilitate the implementation. With the virtual terminal (VAPOS) only one Internet Browser with one Internet on-line connection is necessary.

3.2.14   Summary:

An important feature of AllCash is its uniform interface for processing transactions that covers all common payment procedures on the Internet. The product offers wide range of payment possibilities over Internet. Support is provided for *Credit card transactions over SSL*, *European direct debiting*, etc. It is possible to process direct debits in Germany and in other European countries, but emphasis is put on German – specific payment processes - *Electronic direct debiting (ELV)* /German direct-debiting transactions/, *Paysafecard* -the first German Internet-based prepaid system, P*aybox*- used to confirm payment over mobile phones for customers shopping on the Internet.

However, AllCash is active extremely in Germany, emphasizing on the domestic payment means. To extend its presence abroad, AllCash entered into a strategic partnership with WorldPay. It is this partnership, which allows currently foreign retailers to gain shoppers, which use AllCash, given that German shoppers in general tend to purchase offline using debit cards[47].

To sum, we do not recommend AllCash as a possible solution for Diogene, for reasons of either lacking solid international experience or relying on third parties (such as WorldPay) to provide and gain its customers an international access.

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46 No fees are imposed currently on the processing of Paysafecard. All prices are subject to the legally valid value added tax.
47 http://www.worldpay.com/uk/news/archive/2000/news_allcash.shtml/

3.3 Bibit Internet Payments

3.3.1   Data from EPSO DB[48]:

Bibit was founded in 1997. It is a Dutch company , and its investors include: The Dutch Ministry of Economic Affairs, Paribas Deelnemingen nv, the Twinning Growth Fund and Continuum. New investor in July 2001: Residentie Investments, a Dutch venture capital company.

Among the technology partners of the company are: Microsoft, IBM, Oracle, INTERSHOP, Mercantec, and Allaire (ColdFusion).

The geographical scope of the company's activity includes: USA, Netherlands, Belgium, France, Spain, Portugal, UK, Ireland, Norway, Sweden, Finland, Denmark, Germany, Austria, Switzerland About 50% of the merchants are based in NL and Belgium, the rest is spread over the other countries with an emphasis on Germany and Scandinavia.

Bibit is specialized in international Internet payments, allowing the consumer to pay a foreign Internet retailer using a payment method which is customary in his/her own country. The consumer is thus able to pay in his/her own currency using a familiar method, while the retailer is paid in his/her own currency.

The state of deployment of Bibit's services is an international one, allowing cross-border payment. In July 2001, Bibit has secured eight million euros of extra funding and will use it for sales and marketing as well as global expansion

Bibit is an International payments facilitator offering Internet multi-currency payments (while offering merchants to outsource the processing) and billing (but the main service is the Bibit Payment Service).

Bibit is a payment intermediary aggregating over 50 payment systems in its portfolio, and facilitating merchants and users to choose among available internet payment systems. The payment methods include, among others, bank transfers, credit card and debit card based payments (e.g. SSL, SET), e-purses (e.g. Mondex and Proton), mobile payments like Paybox, WAP payments, P2P payments like PayPal and EBPP.

An indication of Bibit's success in the Netherland is that KPN Telecommerce (a direct competitor providing Internet solutions) decided to migrate its clients (that used the KPN Nettransact solution) to Bibit.

Few figures are released: In July 2001, over 1000 merchants had signed up the service. Vendor: Bibit Payment Services

Home page:
http://www.bibit.com/

Head Office: Kosterijland 20, 3981 AJ Bunnik, The Netherlands

Branches:

- o   Los Gatos, CA 95033, United States;

- o   Heathrow UB7 0EB, United Kingdom;

- o   45886 Gelsenkirchen, Deutschland;

- o   94568 RUNGIS CEDEX, France;

- o   3981 AJ Bunnik, The Netherlands.

3.3.2   Partners/ Alliances:

Alysis Technologies (Nasdaq: ALYS), a leading provider of end-to-end, component-based electronic bill presentment and payment (EBPP) software, signed[49] a joint marketing agreement with Bibit Internet Payments. The alliance with Bibit will allow Alysis to offer more than 50 bill payment methods to European customers as part of the Alysis WorkOut® EBPP solution.

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[48] http://epso.jrc.es/, last update 20/7/01

[49]http://industry.java.sun.com/javanews/stories/story2/0,1072,32698,00.html

3.3.3   Clients[50]:

Dell

Both Bibit's geographical coverage and its system's functionalities convinced Dell Home and Small Business (H&SB) to outsource its payment handling to Bibit. With the implementation of Bibit's payment service, Dell H&SB gives its customers across EMEA real-time access to a wider range of their preferred payment methods, as well as speeding up the payment process, and at the same time streamlines its back office processes.

Nec

In 2001, NEC CI engaged The Data Warehouse Practice (TDWP) to develop a customized data management software solution that would streamline the outsourced business processes within the sales cycle. Acknowledging the importance of the payment functionality as the conclusive link in the sales chain, NEC CI decided to outsource its payments processing to a dedicated external Payment Service Provider, and eventually approved Bibit.

Yahoo

Yahoo! Germany selected Bibit as its payment service provider for its German SMS service, in order to take advantage of the optimal, target group specific coverage of Bibit's payment methods, as well as the secure, simple and scalable connection of Bibit's payment server.

3.3.4   Product: Payment Service

http://www.bibit.com/payment.shtml

3.3.5   Description:

Bibit's Payment Service processes payments real-time over the Internet. While originally designed for e-commerce purposes, the service offering has developed into a 'plug & play' solution for handling multi-channel, multi-currency payments from beginning to end. Whatever the sales channels connected, all Bibit's clients' payments are processed over the same Internet infrastructure, in a largely identical way.
The Payment Service is offered in three models:

Bibit Select

The Bibit Select Service Model is Bibit's standard Service Model. Bibit Select is suitable for over 90% of all clients, who prefer to benefit from the full functionality of the Payment Service. In the Bibit Select Model, **the order details are collected in some way by the merchant**: by having the customer fill his basket on a Website, by the call center agent accepting the order, or by the booking center employee transmitting information from faxes, letters etc. into the booking system. Once the order is finalized, the merchant forwards Bibit a unique order code, the currency and the amount due. The customer, or the agent, is then redirected to the secure Bibit payment server to choose a payment method. From here, all steps are performed by Bibit: completing the payment details, processing the payment with the appropriate financial institution, collecting the funds from the acquirer, and settling the account with the merchant. Progress is communicated with the merchant, and the customer is redirected back to the merchant's site. **All payment details are securely stored by Bibit, relieving the merchant of the necessity to invest in costly security measures.**

Bibit Direct

Merchants who prefer to collect and store their customers' payment details on their own platform, e.g. to accommodate their regular clients in not having to enter their payment details on every shopping occasion, can use the Bibit Direct Service Model as an effective payment processing gateway. In this Model, after completing the order the merchant also collects the payment details, obviously in a secure way. The merchant then communicates these payment details on a per order basis with Bibit. Bibit processes the payment real-time with the appropriate financial institution.

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[50] http://www.bibit.com/clients.shtml

By this model, merchant incurs higher costs in installing appropriate security measures for storing payment details. Therefore, **the model only applies for merchants with established high transaction volumes (2.000+ per month).**

Bibit Batch

The Bibit Batch Service Model is identical to Bibit Direct, except for the fact that payments are not processed real-time. Instead, the merchant periodically provides Bibit with batch files of transactions, including payment details, e.g. on a daily basis. Bibit then processes these payments with the financial institutions and reports the payment results to the merchant.

3.3.6   *Payment Means/ Multi currency support:*

3.3.6.1   International

- Visa credit card with SSL

- Visa Electron

- Visa credit card with SET

- Eurocard/Mastercard credit card with SSL

- Eurocard/Mastercard credit card with SET

- American Express credit card with SSL

- Diners credit card with SSL

- JCB credit card with SSL

3.3.6.2   Domestic:

Austria –Paybox; **Belgium** -BBL Home'Pay, Off-line Bank Transfer ("Bankoverschrijving"); **Denmark** Dankort , Off-line Bank Transfer; **Finland** - Nordea Solo Payment , Off-line Bank Transfer ("Tilisiirto Giro"); **France** - Carte Bancaire / Carte Bleue, Off-line Bank Transfer, ("Virement Bancaire"), Cheque; **Germany** - ELV ("Elektronisches Lastschriftverfahren"), Deutsche Bank 24 , Dresdner Bank Internet Banking, Commerzbank OnlineBankingWeb, Paybox, Off-line Bank Authorization ("Lastschriftverfahren" / "Bankeinzug") , Off-line Bank Transfer ("Überweisung Inland") , Cheque), **Ireland** - Laser Card;

Italy - Off-line Bank Transfer ("Trasferimento Bancario" / "Trasferimento Bonifico"); **Luxembourg** - Off-line Bank Transfer; **Netherlands** - Rabobank Direct Betalen, ABN Amro e-Wallet, Maestro debit card with SET, WWWbon, Single Mandate for Direct Debit (signed or unsigned), ("Eenmalige Machtiging"), Signed Permanent Mandate for Direct Debit ("Doorlopende Machtiging") , Off-line bank transfer ("Overboeking"), Open Invoice ("Acceptgiro"), Cash On Delivery ("Onder Rembours");

Norway - Off-line Bank Transfer; **Spain** - Paybox , Off-line Bank Transfer ("Transferencia"), Cheque; **Sweden** - Nordea Solo ("E-Betalning"), Paybox, Off-line Bank Transfer ("Inbetalning" / "Girering"); **UK** – Switch, Solo, Paybox, smartcreds, Off-line Bank Transfer , Cheque ; **USA**- Discover (Novus Network);

3.3.6.3   Payment methods in preparation:

PayPal (international), Primeline (Netherlands), Comfort Card (Netherlands), Postbank E-go creditcard (Netherlands), Geldkarte (Germany) , Netpay (Austria) , Online paying Bank Austria (Austria) , Paiement CB sur Mobile (France) , Cetelem/Aurore (France), Föreningssparbanken (Sweden) , Östgötabanken (Sweden), Nordea Solo (Denmark) , Open Invoice (international), Off-line Bank Transfer (various countries), Cheque (Italy, Belgium, Luxembourg) , Permanent Direct Debit (various countries), Telemachtiging (direct debit "one off", various countries) , d2pay DBS Bank (Singapore) , Unibanking UOB (Singapore)

3.3.7   *How it works:*

The customer selects the products he wants to purchase and finalizes his order. The merchant then states the

final amount and all other relevant information in the invoice and presents it to the customer for his confirmation. By clicking a payment button the customer is redirected to the first payment screen. Here he is presented a list of available payment methods, with language and country of origin selections if so desired.

Bibit's longlist of payment methods ranges from conventional credit cards and several SET-based methods, to on- and off-line methods that are specific for the country where the customer lives, including direct debit, open invoicing, ELV, carte bancaire, smart cards, cash-on-delivery, etc. Upon connection with Bibit, from this longlist the merchant selects the payment methods he wants to offer his customers. The system allows for dynamic payment method presentation, which means that the merchant can define which payment methods should be presented in which situation. One standard criterium is country of origin: when a customer arrives on the first payment page, Bibit's server responds to the merchant's instruction to show only that country's payment methods, in the customer's preferred language. Other criteria may involve cost effectiveness, ticket size, or online methods for last minute bookings or speed deliveries.

Once the payment process begins, the customer can switch to another language by simply clicking the language selection button at the bottom of the screen. Bibit has installed a range of major languages for the customer to choose from to complete the payment process at his convenience.

The customer selects his preferred payment method and is guided through a number of payment screens. There he is invited to submit the payment details that Bibit needs to process the payment. Bibit has direct links to a large number of financial institutions throughout the world and can over the Internet authorise payments through an appropriate acquirer within seconds. Once the payment attempt is successfully concluded, both the customer and the merchant are automatically notified. The merchant can then start dispatching the order. If for some reason the payment attempt fails, the customer is redirected to the payment screen to choose an alternative payment method.

For every valid transaction made the money is transferred to a Bibit trust account. Bibit views incoming payments at the account and reconciles them against the original unique orders. The amounts collected are transferred to the merchants' regular bank accounts periodically, along with a detailed reconciliation report.

The next image pictures the process between customer, merchant, acquirer and Bibit.

Payment Process Flow
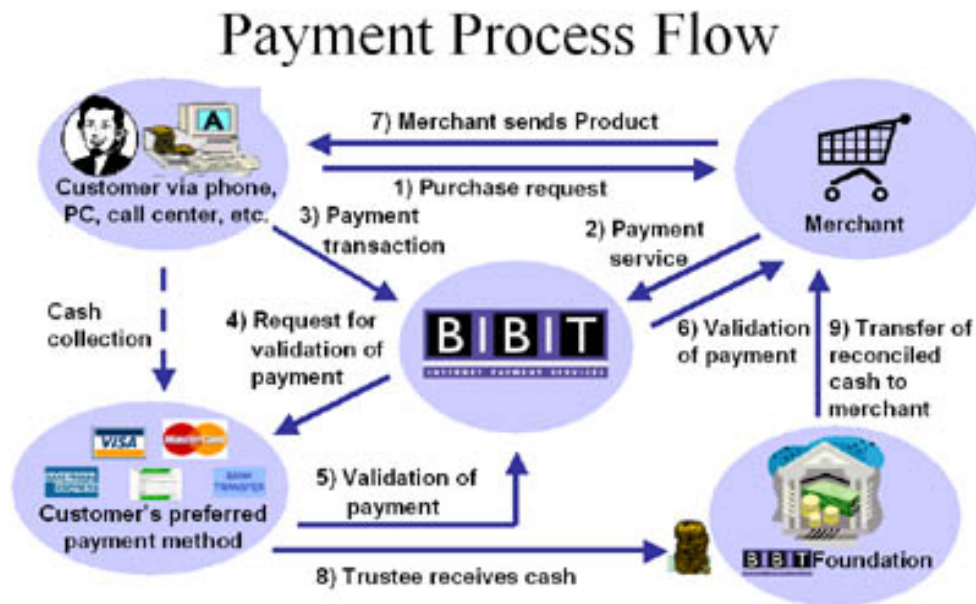
3.3.8   Level of use / Implementation in Europe:

By the prominent clients of the company, and its existing partnerships we can judge that Bibit is recognized as a leading payment provider over Internet in Europe. Further, the number of payment methods supported-international as well as country-specific, undoubtedly shows that the product has very strong potential for an European- wide implementation

3.3.9   Difficulty to use

For the Select Model, all payment details are securely stored by Bibit, relieving the merchant of the necessity to invest in costly security measures. Further, any difficulties in this model relate to the computer literacy of the merchant. For the Direct and Batch Model, however, merchant collects and stores his customers' payment details on their own platform and this involves installing appropriate security measures for storing payment details. Direct and Batch Model, therefore, require more sophisticated IT skills to install and support additional equipment/ software.

3.3.10   Security:

All connections are validated using digital certificate technology, and all communications are through SSL (Secure Socket Layer) encrypted channels. Logical protection, state of the art firewalls and encrypted databases allow Bibit to reliably store customer payment details on behalf of our merchants.

3.3.11   Performance:

Bibit's infrastructure's capacity allows for high transaction volumes. Thanks to its scalable design, further demand increases can be matched by adding servers to the existing infrastructure. The technical backbone features replicable, failsafe payment engines, delivering high performance.

3.3.12   Integration Issues

3.3.12.1   Integration with Commerce Service Providers

Long established relationships across the financial industry enable Bibit to support additional links and alternative routes to multiple acquirers, should an individual acquirer become unobtainable.

3.3.12.2   Integration with Diogene

Although the customer is redirected to Bibit's payment pages to execute his payment, for him this can be transparent, as the Bibit Payment Service can be branded as the shop of the merchant. The extent to which this is possible differs per Service Level.

3.3.13   Pricing:

Bibit pricing consists of three components (price level per 01.04.2002):

1. A fixed monthly subscription fee, depending on the Service Level merchants need:

   o   EUR 145 for Standard Service Level

   o   EUR 199 for Plus Service Level

2. A fee per transaction, tiered on the number of transactions merchants conduct monthly:

   o   EUR 0.50 for transactions 1 to 1000

   o   EUR 0.35 for transactions 1001 and up

   o   special   pricing   is   available   for   high   volume   merchants (> 10.000 transactions per month)

3. The commissions or fees imposed by the financial institutions.

Bibit normally does not charge any Set-up fee, i.e. even in the first year merchants' fixed cost consists of the subscription fee only. However, implementation services are available at an hourly rate;
This pricing is for the Payment Service only. Any additional services are priced separately.

3.3.14   Summary:

The distinctive advantage of Bibit Payment Services is that offers extremely high support of country-specific payment systems in Europe- local payment systems in 13 countries form EU plus Norway are supported. Also, all major international means of payment over Internet are accepted. In comparison to WorldPay monthly fees are higher, but costs per transaction are either equal or lower. Another beneficial feature of Bibit Payment Services is that in contrast to WorldPay, it offers not only online (real-time), but also offline payment processing. The tool is offered in 3 different models, two of which allow merchant to store customer's details locally- on their own platform. In this way regular clients of merchant don't have to enter their payment details on every shopping occasion. However, this kind of solution is more expensive /in terms of price, system resources and difficulty of use/ and is recommended for merchants with more than 2000 transactions per month.

3.4 EPay- Bulgaria

3.4.1   Vendor: DataMax

www.datamax.bg

Headquarters: Sofia-1612, BULGARIA,

The company is specialised in the design of integrated financial and economical information systems.

Main Products

- An Integrated Bank Information System - 1995

- A System For Payments With Bulgarian National Debit Cards Bearing The Logo Of BORICA - 1996

- A System For Remote Banking Services "HomeBanking" - 1997

- An Integrated System For Investment Funds and Brokerage Houses - 1998

- A System For Servicing Payments With Credit Cards AmericanExpress - 1998

- A System For Clearing and Settlement Of International Debit Cards Cirrus/Maestro and Credit Cards - Europay/MasterCard, licensed by Europay International - 1998

- A System For Servicing Merchants Who Accept Payments With Credit And Debit Cards VISA - 1999

- A System For Payments With Bulgarian National Debit and International Credit Cards via Internet - ePay.bg - 1999

3.4.2   Product: e-Pay

http://www.datamax.bg/redirect.cgi?lang=en&body=epay_description

3.4.3   Description:

E-pay is an Internet payment processing system that is developed by the Bulgarian company Datamax. E-Pay has been developed to enable:

- o *Cardholders of Bulgarian domestic debit cards* and *cardholders of international credit cards* to use their cards to pay for goods and services over Internet;

- o Merchants and service organizations in Bulgaria to accept payments for goods and services via Internet with Bulgarian domestic debit and/or international credit cards;

- o Establishment of a system that will offer mass consumers to pay for their obligations as telephone, gas, electricity, ISP, and other periodical bills, taxes, etc.

3.4.4   Level of Use/ Implementation in Europe

Currently, ePay is the sole Bulgarian electronic payment system that allows payments over Internet. As described, ePay supports also international credit cards as a payment means. Theoretically the system can be used outside Bulgaria, but in practise, it is only a domestic system. However, the current features of the system – its functionality, pricing, etc. could serve as a benchmark in the emerging Internet payment systems in South-eastern Europe.

3.4.5   Payment Means:

- o   Domestic debit cards;
- o   International Credit Cards – Visa, MasterCard

3.4.6   How it Works:

1.   The customer registers in the system by entering only once the information about his (her) bank card.

2.   The merchant registers in the system and gives information about the virtual POS terminal he (she) possesses.

3.   Each customer is supplied with his (her) own customer identification number (CID), and each merchant - his (her) own merchant identification number (MID). These two numbers are public and they are used to present the two parties to each other. These numbers can be announced freely to the clients and to the merchants.

4.   The two parties in order to participate in the system are supplied with their own user name and password. They are strongly private and secret and are kept by the client and the merchant.

5.   In the general case each of the parties can initiate a payment knowing the CID or MID of the other party.

6.   The main characteristic of the system is that the Merchant **never** gets specific information about the client or any data about his (her) bank card. The system gives to the merchant only the necessary information that a certain CID has made a payment in his (her) benefit. In the cases when the merchant is registered in the system that he (she) will deliver goods to the client's address, the merchant receives the delivery address, included in the payment information.

7.   The customer never re-enters his (her) card number. The cards are registered in the system only once. This information is kept encrypted on a server, which is not directly connected to Internet and is connected to the client's CID. When paying the customer orders the system to debit his (her) card in benefit of the merchant and chooses the card (if he (she) has registered several bank cards) by card user name, preliminary entered.

8.   The system sends a message to the Bulgarian National card operator BORICA with data about the merchant's virtual POS terminal, about the customer's card and the sum of the transaction. BORICA processes this information and returns the system an answer whether the payment has been made or refused (the reasons for the refuse are not specified). The system sends this information to the merchant and if the payment is successful the merchant delivers the good /service to the client.

9.   The merchants may always cancel a payment that has been made in their benefit in case of controversies concerning the delivery.

10. The system gives the two parties detailed inquiries for the made transactions, paid/refused deliveries, card limits, merchant's and client's capital move.

11. All payments with no exception are initiated only after **the customer's explicit confirmation**.

12. The merchants may send requests to the clients for the payment of a certain bill. The system also allows regular payments for mass consumers to be performed for merchants that offer goods and services, paid regularly. After receiving the request for payment nothing is made until the client confirms the request.

3.4.7   Integration Issues:

3.4.7.1   Integration with existing Systems

 The Merchant can choose a configuration of the connection to DataMax system:

- o The simplest and the cheapest configuration is the use of the basic payments functions offered by ePay.bg. To do this it is necessary only to have an Internet connection.

- o The merchant may have a WEB-page, in which source he has to include some simple HTML commands to connect to ePay.bg. To do this it is necessary to have an Internet connection and a Web-site.

- o The merchant may have a Web-server, in which through interactive means the client can view the virtual shop or to register in order to receive services via Internet. To do this it is necessary to develop a Web-server, a connection to database and encrypting of the information, exchanged with ePay.bg.

3.4.7.2   Integration with Dioegene

 E-Pay's integration with Diogene can be done in two ways. If there is a possibility to install additional software on the server, where the e-commerce site is hosted, a package for connection wit ePay.bg could be installed, which is provided free of charge by Datamax. If such a possibility does not exist, the integration occurs by a CGI script from a HTML page in the e-commerce site.

3.4.8   Pricing

 The price for registration and support of merchants regardless of the way they have chosen to connect to ePay.bg is as follows:

- o **Initial Registration Fee** – 100 DEM

- o **First alternative** for month subscription:

    50 DEM per month (or 500 DEM per year)

    + 1 % per transaction, but at least 0.20 DEM

- o **Second alternative** for month subscription:

    20 DEM per month (or 200 DEM per year)

    + 2 % per transaction, but at least 0.30 DEM

The prices do not include VAT.

3.4.9   Summary

 Although ePay is only a domestic Internet payment system, its current features -functionality, pricing, etc. could serve as a benchmark in the emerging Internet payment systems in South-Eastern Europe.

3.5 VeriSign

3.5.1   Vendor: VeriSign Corporation

 VeriSign, Inc. (Nasdaq:VRSN) is the leading provider of digital trust services that enable businesses and consumers to engage in commerce and communications with confidence. VeriSign's digital trust services create a trusted environment through four core offerings—Web presence services, security services, payment services, and telecommunications services—**powered by a global infrastructure that manages more than 6.5 billion communications and transactions a day.**

3.5.2   Partners/ Alliances:

An alliance with eBay[51]:

In order to increase security in its e-commerce activity, eBay entered into an alliance with VeriSign – the company specialized in authentication systems and widely presented in the business of internet-domains. With the help of VeriSign, the auction house eBay intends to ensure customers confidence.

3.5.3   Product: Payflow ProSM

http://www.verisign.com/products/payflow/

3.5.4   Description

Payflow Pro^{SM} is the payment solution for any merchant, who requires a payment processing solution with peak performance and complete customisability. Payflow Pro^{SM} enables payment processing through the Payflow Pro^{SM} client software. This software is a small SSL TCP/IP enabled messaging agent that controls communications between merchant's application and the Payflow Platform. Designed for scalability and reliability, Payflow Pro^{SM} creates a dedicated SSL TCP/IP level communication thread for each transaction between the client and the server. VeriSign's add-on service Payflow Fraud Screen enables merchants to evaluate the risk of an online transaction and, for additional monthly fee, the Premium Support option provides merchants with 24x7 toll-free telephone support.

3.5.5   Payment Means

Payflow Pro^{SM} allows merchant's Web site to support multiple payment instruments including:

- o   Credit cards;
- o   Purchase cards;
- o   Debit cards;
- o   Electronic checks.

3.5.6   Features:

Features:	Payflow Link	Payflow Pro
Credit/debit card	✔	✔
Electronic check * processing	✔	✔
Purchase card Level 2 & 3		✔
ACH service available *		✔
Payflow Fraud Screen protection available		✔
Manual transaction terminal	✔	✔
Transaction reporting & search tools	✔	✔
Customer stays on merchant's site		✔
Customer directed to secure VeriSign hosted form	✔	
Test environment available	✔	✔

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[51] http://www.heise.de/newsticker/data/anw-08.05.02-001/

Platform independent	✓
E-Mail receipts programmed into product	✓
Brandable forms included with product	✓
"TCP/IP" high performance solution	✓
HTTPS post based	✓
Activated by adding link to VeriSign server from merchants site	✓
Downloadable software	✓
Pre-integrated with shopping carts	✓ ✓
E-Mail support	✓ ✓
Toll-free telephone support 6am-6pm PST Monday-Friday	✓

3.5.7   Integration Issues

3.5.7.1   Integration with Commerce Service Providers/ Multiple Acquirer Integration

Payflow Pro^{SM} provides the merchant with back-end connectivity to all leading payment processing networks.

3.5.8   Performance:

<=1000 Transactions per month.

If a merchant is looking to process a higher volume of transactions, they must contact VeriSign sales team directly. VeriSign has designed additional service and support packages to fit such merchants' business needs.

3.5.9   Pricing:

Product	3.5.9.1.1.1.1.1 Product Overview	Setup Fee	Monthly Transactions	Monthly Fee
Payflow Link^{SM}	• Credit card (Level 1) and electronic check processing • E-Mail and Web support • <u>Full support description</u>	$179	Up to 500*	$19.95
Payflow Pro^{SM}	• Credit card and electronic check processing • Purchase card Levels 2 & 3 support (for supported processors) • Access to ACH services (priced separately and requires premium support) • Toll-free telephone support 6am-6pm PST M-F, excluding VeriSign holidays • <u>Full support description</u>	$249	Under 1,000*	$59.95
Payflow Fraud Screen**	• Risk management for online credit card purchases	N/A	$0.15 per transaction	$29.95

*   Additional   transactions   will   be   charged   at   10   cents   ($0.10)   per   transaction
** Must be purchased in conjunction with Payflow Pro

3.5.10   Summary:

VeriSign is one of the one of the US leading providers of digital trust services. VeriSign's digital trust services create a trusted environment powered by a global infrastructure that manages more than 6.5 billion communications and transactions a day. Moreover, VeriSign has recently acquired CyberCash Internet payments business. In the area of Internet payments, CyberCash had been one of the biggest CSP in US. Therefore, VeriSign e-commerce tools, although not widely presented in Europe, are worth considering as a valuable benchmark of functionality, performance, integration and pricing.

3.6   EPX

3.6.1   *Vendor* EPX

http://www.epx.com/service.asp

Electronic Payment Exchange (EPX) delivers to businesses comprehensive payment processing services, using Internet-based technology. *EPX enables acceptance of all major payment types, and all payment methods, offering customized solutions that fit each customer's processing needs including: credit card, purchase card, debit and electronic check payments;* through Internet, point of sale, call center, mail order and wireless channels; and across B2C and B2B platforms.

Unique to EPX, the company offers a single source for payment solutions, eliminating a need for businesses to establish multiple relationships with banks, front-end system providers, gateways, ISOs (Independent Sales Organizations) and back-end processing companies.

- In 1994, EPX became the first to process a credit card transaction over the Internet, and the first to process an electronic check transaction over the Internet.

- In 1994, EPX developed the first real-time online transaction reporting system for its clients

- In 1998, EPX became the first to offer electronic chargeback presentment online

- In 2000, EPX became the first to offer a wireless point-of-sale payment solution for a Palm™ Pilot.

- In 2001, EPX processed the first SafeDebit™ transaction. Developed by NYCE, SafeDebit is the first PIN-based debit card designed for the Internet

- In 2001, EPX became the first to accept SSL encrypted transactions directly through solid-state hardware devices, without HTML protocol

3.6.2   Description

EPX offers a real-time transaction component for multiple operating systems and programming languages. These components will build and encrypt the transaction data, *open the connection to EPX's real-time pay servers, submit the transaction in the required EPX XML format, and decrypt the response string*. Merchants just supply the transaction data in their application or executable! In-depth documentation is included for these components.

These components are available for the following systems and languages.

Windows versions:
C++ DLL
Visual Basic DLL

Unix version:
C++

Platform independent:

JAVA

3.6.3 Level of Use/ European Implementation:

Not represented in Europe.

3.6.4 Payment Means

EPX enables acceptance of all major payment types, and all payment methods, offering customized solutions that fit each client's processing needs including:

- o Credit card;

- o Purchase card;

- o Debit and electronic check payments

3.6.5 How it works

1. **The Merchant:** The merchant receives a call from their customer and processes a real time ACH or Credit Card transaction via the web page

2. **Transmission**: The web page sends the transaction, via the Internet, to EPX.

3. **The EPX Process:** The Firewall receives the transaction and performs Load Balancing, sending the incoming transaction to the appropriate Payment Server.

4. **The Payment Server:** The Payment Server makes sure the transmission and the data are valid; if the data is valid then it determines whether it is an ACH or a Credit Card transaction.

5. **Credit Card Transaction:** The data in a valid Credit Card transaction is sent to VISA, via an X.25 line, for an approval. VISA sends the status back to us on the same line.

6. **Response to Merchant**: All merchant transactions received by EPX (an invalid transaction, an ACH transaction, or a Credit Card transaction) generate a response from EPX.

7. **ACH Transaction**

   The data in a valid ACH transaction is logged into the message queue and the message queue writes it into the database.

   Credit Card Transaction

   The data in a valid Credit Card transaction (regardless of approval status) is logged into the message queue and the message queue writes it into the database.

3.6.6 Integration Issues

EPX provides merchants the ability to write their own interfaces to our software. This enables them to create an application to fit their needs and to send both real-time and batch transactions that meet thier own specs. It doesn't matter what language or what platform merchants use – they must simply connect to EPX through the internet.

EPX has developed a detailed Programmer's Management Guide that covers credit cards and ACH real time and batch processing, encryption standards and methods, sample requests and responses, unicode examples, FAQs, account check digit algorithms, code examples and more.

3.6.7   Download: N/A

3.6.8   Summary:

Although EPX is not presented in Europe, it is included in this survey as another benchmarking example of the first US company to process a credit card transaction over the Internet, the first to process an electronic check transaction over the Internet, and the first to offer electronic chargeback presentment online. Unfortunately not detailed information is provided about the solution offered by EPX – for example how exactly integration with existing systems occurs, what is the performance of EPX server, how is security ensured. No information can also be found about pricing.

3.7 Mondex

3.7.1 Vendor: Mondex International

http://www.mondex.com/

Mondex International (MXI) is a global provider of e-payment solutions through its principal products Mondex electronic cash and Interactive Loyalty, both residing on the multi-application operating system MULTOS. These products bring major benefits to companies and individuals wanting to transact via the internet, digital TV and mobile phones, as well as in the physical world.

Since its inception in July 1996, MXI has developed a wide range of products and services around the Mondex electronic cash scheme, helping to realise the enormous opportunities, which our technologies present in markets around the world.

3.7.2   Product: Mondex electronic cash

3.7.3   Description:

Mondex is an electronic cash system that provides a direct electronic equivalent of cash, bringing convincing benefits to consumers and merchants transacting in the virtual world.

Mondex operates on a smart card - a plastic card that looks like an ordinary debit or credit card, which stores information on a microchip. It is simple to use, replicating exactly the workings of physical cash online and is accessible to everyone, including the youth market and those without bank accounts.

The e-cash facility enables instant transfer of value between merchants and customers (or between consumers) and doesn't require bank authorisation. It also allows users to make secure online purchases without giving any personal details.

The microchip contains a 'purse' in which Mondex value is held electronically. The purse is divided into five separate pockets, allowing up *to five different currencies* to be held on the card at any one time. The microchip also contains Mondex security programmes that protect transactions between one Mondex card and another.

3.7.4   Level of Use/ Implementation in Europe

The payment system offered by Mondex is characteristic of adoption of e-money not only in US, but also in Europe. It is for this reason that the company is given as an example in several significant European papers dedicated to contemporary e-payment systems. In addition, Mondex is represented in Europe. The company has developed a widespread electronic payment system in France.

In France alone[52], the system has the following characteristics:

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[52] (Data as of October 1999, Source: EU Committee for Banking Standards, "Overview of

Payment Means:

> · Purse only
>
> · Purse + Debit/Credit
>
> · Combination of several applications (purse, debit or credit, access control - local and remote, id, loyalty...)

Currency of Payment

> - Single currency - EURO
> - Multi currency - Available

Purse types

> - Reloadable
> - Both Linked and not linked to account

Supports also: Anonymity of payment, Purse-to-purse transfer

Mondex partners and trials can be found in all continents[53]. Regarding Europe, the developments took place in France, Norway, the UK and Ireland. In France Banque Federative du Credit Mutuel launched a community pilot in Strasbourg, France. It is claimed to have issued more than 100.000 cards and to have more than 1.000 merchants accepting them. In Norway a pilot of a player card (and a payer card) has started with "the intention [is] to provide all of Norway's 1.8 million lottery players with the new card in 2001" . The aim is ambitious: "The new card - with approval from the Norwegian Government - will make it possible to offer new games over the Internet via PCs, mobile phones and Digital TV. The same card can be used for both playing the games and buying products at the lottery commissioners' shops. It will also make it possible to shop with electronic cash via TVs, Internet and other digital channels" (Mondex Int.). In the United Kingdom Mondex is most visible in some Campus applications, namely the NatWest University Card at Exeter University (1998), HSBC Bank's University Card at the University of York (1996), the Aston University 'Smart Campus Card' (1997), and the University of Nottingham (with NatWest). In Ireland (Dublin) a multi-application Mondex smart card, called Citrus was launched in the Blanchardstown Shopping Centre (2000). The focus is on a loyalty scheme.

In the French pilot in Strasbourg, 150,000 cards have been issued and 1700 POS terminals (few of them at unattended POS). According to Mondex, there is an average load 60% higher than Moneo.

o   34 Euro are loaded per month and card

o   per merchant on average ca. 34 Euro are remitted per day

o   at the moment the Mondex card can be loaded at about 20 ATMs in the city (out of a total of a couple of 100's)

The Comdex USA application in Las Vegas is not very active and can be neglected.

3.7.5   Multi-currency Support:

Up to five different currencies can be held on the card at any one time.

3.7.6   Merchants' Benefits:

Efficiency: Mondex makes card payments quick and easy. Customer identification and payment authorisation are no longer required, and payments are exact with no change needed. This results in faster transactions and shorter queues.

Adaptability: Mondex meets the needs of retailers of all sizes. They only need a Mondex compatible terminal, either integrated with existing equipment or an inexpensive stand-alone version. Also, the pocket sized Mondex 'wallet' can itself be used as a hand held point-of-sale terminal, suitable for use in a taxi or on a market stall.

Problem Solving: Fewer 'physical cash' transactions result in reduced handling costs. With Mondex, cash

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European Electronic Purse Products", Issued: March 2000)

[53] http://www.jrc.es/cfapp/invent/details.cfm?uID=64

can be locked electronically and banked several times a day. This results in greater efficiency, security and generally improved interest earnings.

Compatibility: Mondex recognises the importance of compatibility between payment systems, thus enabling retailers to use a single terminal for all card products. Consequently Mondex keeps pace with the industry standards, ensuring a 'single footprint' at the point of sale.

Lower Costs: Mondex does not require large initial investment by retailers. Minimal staff training is required, and the only equipment needed is a Mondex compatible point-of-sale terminal.

3.7.7   Consumers' Benefits

Security: Above all, Mondex is a safe way to carry money. A lock function, available on the card or within a Mondex device, enables the cardholder to prevent unauthorised access. The code is chosen by the cardholder, and it can be changed at any time.

Convenience: Mondex offers cardholders a quick and easy method of payment. There is no need to fumble for change or search for a pen, no need to wait for authorisation, no need even to go to a bank or ATM.

International: Conceived from the outset as a global system, Mondex can readily be used by cardholders when they are travelling or transferring money to other countries. Mondex is the only electronic cash system which operates the same way all over the world.

Flexibility: Mondex cash can be used for purchases of any size, from a chocolate bar to a suit of clothes. Technically there is no upper limit to the amount of cash which could be held in and transferred from the Mondex card, but there will be limits set within each country.

Control: With Mondex, the cardholder can only spend what is on the card, so there is no risk of going into debt. The 'purse' keeps an up-to-the-minute record of the amounts and places of expenditure.

3.7.8   Summary:

The distinctive feature of Mondex is that offers en electronic payment system, which is closest to the real money. Mondex offers P2P functionality or the possibility of directly re-spending received e-money balances. No clearing on a central level, or a bank checking is required. The key advantage of Mondex is its security: hardware security and security of value transferring process. The hardware security lies in the fact that funds can not exist on any other place or at any other form than the Mondex card. When a transfer between two Mondex cards is performed, both cards verify each other and the transfer is completed subsequently, which means that funds can not exist on two cards simultaneously.

4. E-commerce Tools Hosted at Merchant

4.1 Intershop

4.1.1   *Vendor:* INTERSHOP COMMUNICATIONS AG

www.intershop.de
www.intershop.com

Stock Indexes: Nasdaq - ISHP, Neuer Markt- ISH

Headquarters: Intershop Tower, D-07740 Jena, Germany

Offices:
     : Berlin, Boston, Chicago, Dubai, Hamburg, Helsinki, Hong Kong, Ilmenau, Jena, Copenhagen, London, Oslo, Paris, San Francisco, Stockholm, Stuttgart, Tokyo

Employees: 624 (as of March, 2002)

    Intershop is an established provider of complete e-commerce software solutions for global enterprises. Intershop solutions offer unique opportunities for enterprises to strengthen relationships with customers and partners while improving business efficiencies and reducing costs related to buy-side and sell-side commerce processes.
    Founded in 1992, Intershop has a long tradition of driving innovation in e-commerce.

4.1.2   *Partners/ Alliances:*[54]

Deutsche Telekom, HP Consulting

4.1.3   *Clients:*

Compaq[55]
    Intershop has helped Compaq increase revenue by empowering more than 3,000 resellers with localized control of their Web presence and global access to inventory.
Intershop store design templates allow Compaq resellers to gain a professional, commerce-enabled Web presence. A single e-commerce platform allows resellers to quickly and easily localize their site and load custom catalogues.

4.1.4   *Product: Intershop Enfinity*

http://www.intershop.com/index.htm?callname=www/products/enfinity/index.htm

4.1.5   *Description:*

    The foundation of Intershop solutions is Enfinity, an industry-leading e-commerce platform. Intershop Enfinity is built from the ground up to take advantage of new e-business technologies, and to provide a flexible, feature-rich sell-side enterprise solution. Enfinity supports new business models, such as mobile commerce, silent commerce (machine- to- machine transactions) and selling indirectly through channels, affiliate sites, or

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[54] http://www.intershop.com/index.htm?callname=www/company/partners/our_partners/implementation_partners
55 http://www.intershop.com/index.htm?callname=www/company/customers/compaq_case_study

marketplaces.

Enfinity is easily extendable with Enfinity MultiSite and Enfinity Content Management, as well as feature-rich business components and robust third-party solutions. The result is a complete and fully integrated set of solutions.

Main technical components of Enfinity are the Enfinity Transactivity Server (eTS) maintaining the Transaction of all users on the eCommerce platform, and the Enfinity Catalog Server (eCS) acting as the container for all products and services later on processed in an order/basket. The Enfinity Content Management (eCMS) extends the hole platform with a state of the art CMS system supporting various channels as there are web, mobile devices, *.pdf and MMS services. The whole infrastructure is utilizing J2EE and XML techniques. An extendable cartridge framework (Payment API) allows the project specific adoption to the local payment gateways or the use of proven third party cartridges for payment functionality.

4.1.6   Technological Description of the product/solution

The main components of Enfinity, as shown in the Figure, are: the Enfinity Management Center (eMC), the Enfinity Catalog Server (eCS), the Enfinity Transactivity Server (eTS), the Enfinity Application Server (eAS), Java 2 Enterprise Edition (J2EE), and the relational Database.

Figure 1: Enfinity main software components.
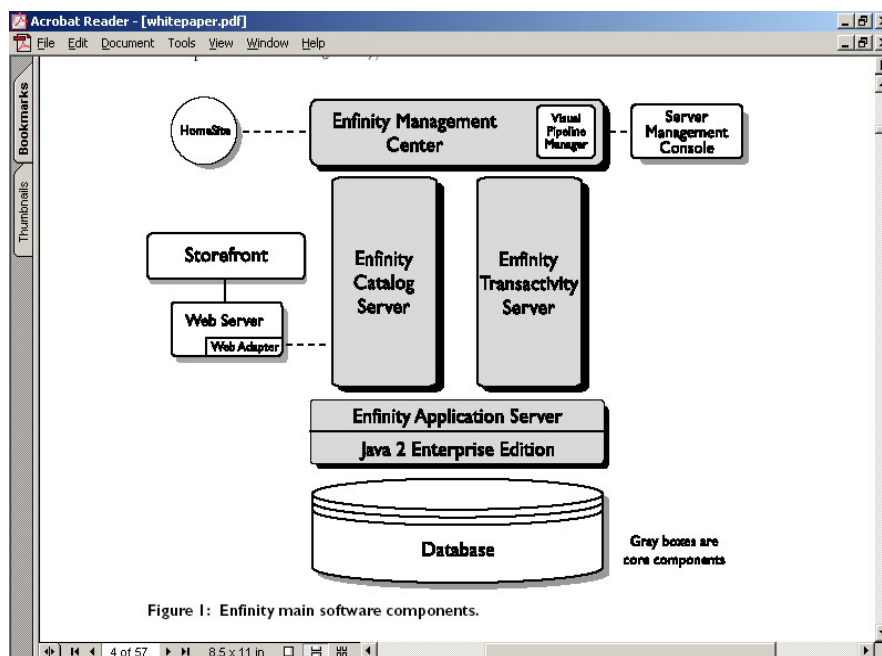
At the heart of Enfinity are the Transactivity and Catalog servers. These components run the storefront. Both servers have been developed using the Java 2 Enterprise Edition (J2EE) as their foundation and take advantage of special features of J2EE, such as Servlet and JSP.

Enfinity provides a separate server and business rules for the catalog and for transactions. The eCS is responsible for the catalog and product-related information, while the eTS handles transactions such as orders and baskets. In other words, the "static" information normally in the database or file system and referenced frequently, but not changed often, is handled by the Catalog Server (this data is normally updated in batches on a periodic basis). On the other hand, the "dynamic" data generated by a client shopping request, such as order processing, is handled by the Transactivity Server (this data is continually updated, for example, through client transaction). The separation of catalog and transaction allows for greater flexibility and better distribution of buyer requests. For example, multiple Catalog Servers can be used with a single Transactivity Server to allow for load balancing and faster browsing of store products. Merchants can even use a different catalog or transaction server with the Enfinity servers.

An Enfinity installation can have multiple Transactivity and Catalog servers running, some for development, others for running the online site. A typical configuration, called "simple staging," includes at least one offline and one live eTS and eCS, plus an additional staging eCS. The offline servers, in an offline cluster,

are used mainly by the eMC administrator and developers for testing and batch updates. The live servers are the server in a production cluster intended for external use. The staging server is used as a transition server for updating new catalogue data to the live eCS. An eMC user can transfer updates from the offline eCS to the staging eCS and then switch the staging eCS with the live eCS. Enfinity makes sure that this switch happens quickly and without any loss of data.

The main protocols used by Enfinity are Hyper Text Transfer Protocol (HTTP), Secure Sockets Layer (SSL), Internet Inter-ORB Protocol (IIOP), Lightweight Directory Access Protocol (LDAP), OCI (Oracle Call Interface) as the native database protocol and Simple Mail Transfer Protocol (SMTP). All of these protocols run on top of TCP/IP (Transmission Control Protocol/Internet Protocol), which is the foundation protocol of Internet communication.

4.1.7   Level of use / Implementation in Europe:

Intershop is a German company and has many offices in Europe. Further, since a number of prominent European and world companies – Deutsche Bank, Samsonite, BMW, Sony, AOL/Time Warner, are customers of the B2C solution of Enfinity we consider that Enfinity is widely implemented in Europe.

4.1.8   Payment Means/ Multi currency support:

Depends on how the merchant decides to develop their e-commerce solution. Complete globalisation support for multiple languages and currencies

4.1.9   Level of use / Implementation in Europe:

Since a number of prominent European and world companies – Deutsche Bank, Samsonite, BMW, Sony, AOL/Time Warner, are customers of the B2C solution of Enfinity we consider that Enfinity is widely implemented in Europe.

4.1.10   Difficulty to use

The deployment and use of this product requires advanced IT skills. It involves installation and support of additional software – at least database (Oracle is recommended) and web-server (Apache is recommended). Depending on the amount of transactions and the level of the intended e-commerce solution, one or two IT specialists must be employed to support the smooth running of the product

4.1.11   Security:

Security is guaranteed through the use of HTTPS and SSL protocols.

HTTPS is the HTTP protocol wrapped in SSL. SSL is a security protocol originally defined by Netscape to protect the data transferred over the Internet. The SSL protocol runs above TCP/IP and below other top protocols such as HTTP. The client, usually a browser, and the server, usually an HTTP server, establish a secured connection by exchanging a certificate and a session key encrypted with the public key of the server that is also encrypted with a private key. Technically, SSL is defined as a symmetric encryption (session key) nested within a public-key encryption, authenticated through the use of certificates. With Enfinity, merchants can require any Web server request to use HTTPS. However, using SSL has a negative effect on system performance.

4.1.12   Performance:

Enfinity supports load balancing and high availability through the installation of multiple Web adapters, eTSs, and eCSs. Multiple instances of key system components provide for scaling and performance improvement as well as fail over and high availability.

Enfinity servers use cached session objects created for the users, and, in this way, improve performance and guarantee consistent data.

Further, Enfinity uses Jikes, the Java compiler developed by IBM, because of its superior performance.

4.1.13   Flexibility:

4.1.13.1 Towards Merchant:

Enfinity can adapt to a variety of different business requirements for small or large enterprises that are growing or diversifying. Enfinity offers support for virtually all commerce models and is easily extendable with Enfinity Content Management and Enfinity MultiSite, as well as feature-rich business components and robust third-party solutions.

Open, flexible architecture including advanced developer tool kits for extending existing functionality

4.1.14   Integration Issues

4.1.14.1 Integration with Legacy Systems and Software Developer Tools

Seamless, component-based integration with back-office and legacy systems, such as ERP, CRM, financials, logistics and production Complete developer support including integration with industry-leading developer tools such as Borland JBuilder and Rational Rose any other e-commerce vendors.

4.1.15   Hardware/ Software Requirements[56]

4.1.15.1 The Enfinity Management Center (eMC) Client Requires:

- o   Processor: Pentium processor

- o   RAM: 64 MB

- o   Hard Drive: 100 MB space available

- o   Operating System: Windows 2000 Professional with SP 1 or SP 2 (or NT 4.0 Server or Workstation with SP 5 or SP 6a)

4.1.15.2   Home Site Requires:

- o   Processor: Pentium processor

- o   RAM: 16 MB

- o   Hard drive: 40 MB space available

- o   Operating System: Windows 2000 Professional with SP 1 or SP 2 (or NT 4.0 Server or Workstation with SP 5 or SP 6a)

4.1.15.3 The Enfinity 2.2 Core Components require:

The Enfinity 2.2 Core Components run on **Windows NT, Windows 2000** (minimum: Pentium III 500 MHz, RAM: 512 MB, and 1.5- 2 GB Hard Drive available), **Solaris** (minimum: Processor UltraSPARC, RAM: 1 GB, and 2 GB Hard Drive available), **HP-UX (**minimum: Processor: PA-RISC 8500, RAM: 1 GB, Hard Drive: 3,5 GB space available (incl. Oracle Server)/

The Enfinity 2.2 Core Components integrate with Oracle Database only (versions depending on the Operating System).

4.1.16   Pricing:

Depending on the specific requirements license costs are **in the range of 100.000-500.000 Euro**

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[56] http://www.intershop.de/index.htm?callname=www/services/support/resources/info/enfinity22

4.1.17   *Summary:*

Enfinity's implementation in Europe is very high. Complete globalisation support for multiple languages and currencies is provided. The means of payment depend on how the merchant decides to develop their e-commerce solution. At least, through this product, the merchants develop their e-commerce solution on their own with more or less programming effort. In terms of technical architecture, the separation of catalogue and transaction allows for greater flexibility and better distribution of buyer requests. The product is relatively flexible towards system requirements: it runs on Sun, HP, and Windows, operating systems. However, the product integrates with Oracle database only, whereas the web server needed depends on the operating system. The product is offered at very high price: 100.000- 500. 000 EUR, depending on the specific requirements of the merchant.

4.2 Altamedius

4.2.1   *Vendor:* Altamedius

Head Office: 27-29 Lower Rathmines Road, Dublin 6, Ireland
Branches:

Altamedius is an Irish company that aims to facilitate with its software solutions the partnership of trading entities. Altamedius offers an innovative range of secure multi-channel electronic payment solutions to the world's financial institutions and Commerce Service Providers.

4.2.2   *Partners/ Alliances:*

Hewlett Packard dspp partner[57]
BEA, IBM, Sun Microsystems, Oracle, Nuance, Baltimore, Intershop[58]

4.2.3   *Clients:*

HypoVereinsBank, Germany

21 January, 2002: Under an agreement[59] between HypoVereinsBank (HVB) and Altamedius, Altamedius will supply its modular payment intermediation platform to the HVB Group, empowering the bank to launch a suite of next generation payment services over Internet and mobile channels. The HVB Group Payment Solution is a central strand of HVB Group's e-business offensive. By introducing this solution, HVB Group is demonstrating its commitment to e-payment market leadership and to bringing continued value to its customers. The key focus for the Altamedius deployment will be to enable easy and reliable payments for on-line digital content. Up To 8 Million HVB Group Customers are expected to benefit from Altamedius's Internet And Mobile Payment System.

Vodafone, Ireland

12 October 2001 – On Business News[60]: An agreement between Eircell Vodafone and Altamedius has been concluded under which Altamedius will provide micro payment services to Eircell Vodafone's 1.6 million customer base. The new services will facilitate the purchase of small value goods and services by customers through the Internet, via WEB, WAP, IVR and vending machines. All transactions will be carried out in a secure and controlled environment and will allow users to purchase items such as cinema and concert tickets, CDs,

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57 http://h21007.www2.hp.com/dspp/mop/mopPartnerDetails_IDX/1,1357,3633,00.html
58 http://www.altamedius.com/partners/partners_list.html
[59] http://www.itsecurity.com/tecsnews/jan2002/jan255.htm
60 http://www.onbusiness.ie/2001/1210/eircell.html

books and games without the need for a credit or debit card.

Bank of Ireland

Artic CurrencyOne™ is used by Bank of Ireland as the first Irish Internet Payments service[61]. The Artic CurrencyOne™ product suite provides functionally rich payment applications, supporting consumer and business payments, for deployment across multiple channels, including both Internet and mobile phone channel

4.2.4 Product: iContm

http://www.altamedius.com/products/index.html

4.2.5 Description:

iCon[tm] is a powerful carrier-class platform for secure payment intermediation. It contains the depth and breadth of payment processing capabilities one would expect from a bank-grade system. Featuring a modular design, *it provides the complete business solution for management of secure commerce exchange and eliminates the need for change to installed infrastructure or merchant systems*. iCon[tm] is optimised for digital goods and services. For the merchant, it uniquely offers a "zero integration", business focused solution for the dynamic pricing, controlled release and partner settlement for premium content and services. For the consumer, it enables the origination of secure payments any time, anywhere, in a wireless or web environment, using alternative and traditional methods of payment.

4.2.6 Payment Means/ Multi currency support:

Full multi-currency support is provided.

Alternative payment methods such as micro payment e-purse are supported; support is provided for conventional methods such as credit card, debit card and bank account.

4.2.7 How it works:

1. Physical goods purchase: Customer selects goods into basket and "checks out".

Digital goods purchase: Customer requests digital content or service. If requested item is "free-of-charge", the request is passed to the content server for immediate content release.

2. Physical goods purchase: Customer is transparently redirected to payment intermediary for payment approval.

Digital goods purchase: If a chargeable item is requested, customer is passed to the payment intermediary for payment approval.

3. Physical goods purchase: Customer is authenticated, payment and shipping preferences are selected, payment is authorized as appropriate to selected payment preference.

Digital goods purchase: Customer is authenticated, terms of issue are agreed, payment method is selected, payment is authorized as appropriate to selected payment preference.

4. Physical goods purchase: Payment approval and fulfilment details are returned to merchant.

Digital goods purchase: Payment approval is returned to merchant.

5. Physical goods purchase: Goods are now ready for dispatch.

Digital goods purchase: Content is ready for immediate release to customer.

An integrated history of customer and merchant activity is provided to facilitate registration, activation, query handling and dispute resolution. The option exists to automatically originate "cases" in an enterprise customer management system (CRM) to streamline subsequent customer contact.

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61 http://www.iia.ie/members_list/altamedius_profile.html

4.2.8   Level of use / Implementation in Europe:

The prominent partners of the company, its big clients and the numerous press releases suggests that the company has strong positions in Europe, and particularly that iCon^{tm} is widely implemented in Europe.

4.2.9   Difficulty to use

The deployment and use of this product requires advanced IT skills. It involves installation and support of additional software – at least database and web-server. Depending on the amount of transactions and the level of the intended e-commerce solution, one or two IT specialists must be employed to support the smooth running of the product

4.2.10   Security:

A layered authentication model is used to dynamically align security controls with the transaction value and risk profile – options include PIN, MS-ISDN and PIN, UserID and Password, PKI/ wPKI. Authentication controls are applied to all parties to a transaction.

4.2.11   Performance:

No information can be found about performance.

4.2.12   Flexibility:

4.2.12.1 Towards Customer:

• merchant provisioning with comprehensive, business-focused, rules-based pricing models supporting multiple rating methods.

• support for business-to-consumer, business-to-business and person-to-person transactions.

• robust billing, settlement, customer care and service management capabilities.

• support for heterogeneous customer and merchant technology environments.

• differential pricing by delivery channel (reflecting underlying economics), dynamic pricing rules (eg discounting) and multiple metering methods must be supported.

4.2.13   Integration Issues

4.2.13.1 Integration with Commerce Service Providers

Bilateral commerce exchanges with partner networks, that mirror established roaming agreements, are easily supported through extensions to our base model.

4.2.13.2 Integration with Diogene

Should not be a problem, since an "integration with legacy infrastructure is easy", as interface adaptors provide for streamlined integration with enterprise applications such as billing and CRM.

4.2.13.3 Integration with Other Wallets

An open, XML described API is provided to facilitate integration with third party wallets.

4.2.14   Hardware/ Software Requirements

4.2.14.1 System Requirements

Application Server

EJB Application Server with support for HP, IBM and BEA

Operating System

HP-UX, Sun Solaris™, Microsoft Windows NT® Server™

Database

Oracle, Microsoft SQL Server, My SQL

4.2.15   Pricing:

No information available

4.2.16   Summary:

Widely distributed in Europe, iCon^tm provides easy integration with existing systems, and hence must integrate easy with Diogene. It eliminates the need for change to installed infrastructure or merchant systems. Besides traditional methods of payment, alternative payment methods such as micro payment e-purse are supported, and payment can be done in a wireless or web environment. The product is quite flexible towards system requirements, as it runs on HP-UX, Sun Solaris™, Microsoft Windows NT® Server™ operating systems and uses either Oracle Database, or Microsoft SQL server. Details on technical realization of the product as well as on performance and pricing could not be found on the company's web site.

4.3 OASIS Technology

4.3.1   Vendor: OASIS Technology Ltd.

Headquarters: 90 Sheppard Avenue East, Suite 100 Toronto, Ontario, Canada

Offices: Kuala Lumpur, Malaysia; Miami, Florida and London, England,

4.3.2   Partners:

- **Compaq**
- **Diebold**
- **Giesecke & Devrient**

  (G&D)
- **HP**
- **IBM**
- **iPlanet**
- **NCR**

- **Oracle**

- **SUN**

- **Sybase**

- **VCHEQ**

- **Visa International**

4.3.3   Clients:

- **ABN AMRO**

- **American Express**

- **Bank Of Bermuda**

- **BKM**

- **Carte Bleue**

- **Citibank**

- **Credicard/Redecard Brazil**

- **DBS Bank**

- **Diners**

- **Europay**

- **MasterCard**

- **Petro-Canada**

- **Visa International**

4.3.4   *Product:* IST/Switch

http://www.oasis-technology.com/products/istswitch.html

4.3.5   *Description:*

   IST/Switch is an end-to-end software solution for businesses that manage m-Commerce*, Internet and real-world payments across the entire payment lifecycle* — merchants, issuers, acquirers, processors, payment gateways, and card associations. IST/Switch enables customers *to integrate all of their payments on a single platform without altering their existing infrastructure,* and provides a flexible, scalable software solution that seamlessly ridges real-world, virtual and ireless payment channels.

   Oasis IST/Switch is *a complete e-payment processing system that handles every type of e-payment transaction across both private networks and the Internet.* All payment-processing systems are consolidated on a single infrastructure designed for maximum flexibility, high reliability, fault tolerance, security, scalability and interoperability with a wide range of platforms. IST/Switch transforms the way organizations build and deliver e-payment systems by providing customisable, off-the-shelf, high performance e-payment transaction processing features that customers need for both traditional and Internet delivery channels.

4.3.6   *Level of Use/ Implementation in Europe*

   The product/solution is not widely implemented in Europe – Oasis is a Canadian company and its clients are mainly from North America.

4.3.7   Payment Means:

The full range of Visa interchange standards

Acquirer Front Office:

o   Real-world POS and virtual SSL payment gateways: Acquiring institutions have the flexibility to process their mCommerce, Internet and traditional merchant ePayments from a single infrastructure that supports multiple channels

o   IST/eMerchant Gateway: Enables merchants to quickly set up online operations with a built-in payment engine, and provides seamless connection to IST/Switch for batch settlement

o   ATM Subsystem: Supports a wide variety of transactions and authorization messages, and provides ATM grouping according to multiple requirements, including business logic, functionality, and regional requirements

o   ATM Subsystem: External interfaces to Diebold, NDC+, Triton, and white label ATMs; Batch and online network interfaces for Visa, MasterCard and Europay

Issuer Front Office

o   **Internet Adapter :** Internet Banking component provides flexible, PKI-based security via SSL or secure smart card; features off-the-shelf customizable templates to add new transactions and services. Internet Adapter provides flexible Internet gateway for any front-end payment processing application, and flexible message translation to bridge real world and Internet payment processing.

o   **Routing:** Multiple host connections: Visa, Europay, MasterCard, and proprietary hosts; routing fully configurable based on business requirements (stand-in authorization or passthrough)

o   **Negative and Positive Stand-in Authorization:** Negative authorization supports hot card verification, expiry date checking, and limits checking based on BIN level; positive authorization based on the balance file; positive or negative stand-in authorization during failed communication

o   **Cardholder Authorization and Verification:** Flexible cardholder authorization services based on card/account limits and capabilities, or transaction type by cardholder group or at host level

4.3.8   Summary:

   IST/Switch offers large possibilities as it is intended mainly for acquirers and issuers – i.e – banks, and hence must be a solid, reliable, high-performance solution (otherwise it wouldn't have been intended for such financial institutions). On the other hand, it goes far beyond the requirements of Diogene's Transaction Manager. Unfortunately just the details that should prove the *IST/Switch* applicability to financial institutions are not provided - technical description, performance, etc.

4.3.9   Product: IST/eMerchant

http://www.oasis-technology.com/products/emerchant_1.html

4.3.10   Description:

   IST/eMerchant is a virtual solution that enables merchants to bridge their real-world payment processing infrastructure to the Internet with a wide range of secure retail transaction processing capabilities. Merchants can set up online storefronts and use a plug-in interface for commerce servers to handle their own payments through easy-to-configure adapters. Financial institutions and processors use IST/eMerchant to manage capture and authorization processing operations for multiple merchants. IST/eMerchant connects seamlessly with IST/Switch and logs batch files for settlement, processing Internet transactions in a fast, reliable and secure real-time environment.

Intended Customers

- Real-world Merchants
- Internet Merchants
- Merchant Acquirers
- Processors
- Payment Gateways

4.3.11   Technical description:

As a business that depends on payment processing revenues, merchant needs to support all of their products and services through a multi-channel architecture that supports any device and any network in the mobile, Internet and real worlds. With an open, extensible multi-channel architecture based on Oasis payment software components, merchants are equipped with an infrastructure that provides:

• an integrated backbone that meets all of merchant's payment processing requirements across the entire payment chain

• a single view of merchant's customers across every touch point, for more personalized service and improved customer relationship management (CRM)

• seamless integration with back-end and legacy systems to ensure easy access to existing customer data and core information systems

Java-based GUI interface enables:

o Convenient viewing/editing of batch records

o Creation of new transaction batch

4.3.12   Level of Use/ Implementation in Europe

The product/solution is not widely implemented in Europe - Oasis is a Canadian company and its clients are mainly from North America.

4.3.13   Payment Means:

Complete support for online authorization and multiple capture modes

4.3.14   How it Works?

Virtual POS solution enables merchants to set-up online storefronts with built-in payment engine. IST/ eMerchant component connects seamlessly with IST/Switch and logs batch files for settlement. The product processes the following transaction types:

- Purchase/Void
- Return/Refund/Void
- Batch Administration/Details

eMerchant provides capture services flexibility at the merchant and at the customer:

- at merchant: Host Capture — payments authorized and submitted for settlement automatically on batch close
- at customer: Terminal Capture — online authorization, logging and transmission to the acquirer for batch closure
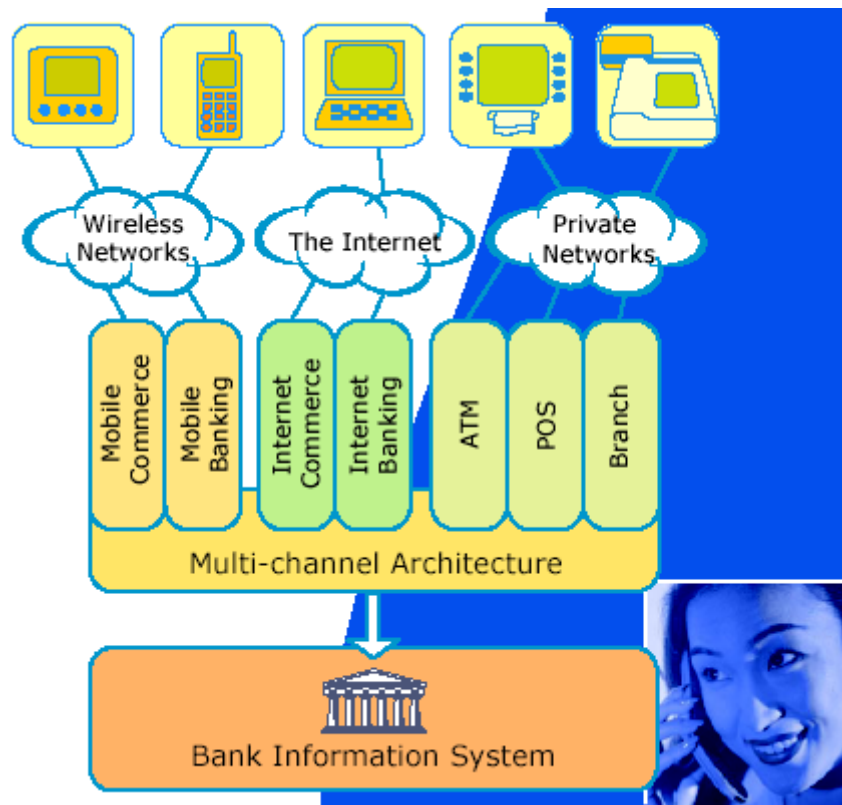
e-Commerce payment processing is carried out on same machine or remotely via private or public network in distributed regional or global environments. A hierarchical interface is set-up:

- Merchant — identifies merchant ID and name

- Store — identifies store ID and name

- Terminal — identifies terminal and selected capture mode

- Batch — identifies batch status and transaction summary for various types

- Transaction — provides individual transaction details

4.3.15   Integration Issues

4.3.15.1 Integration with Legacy Systems:

Off-the-shelf interfaces with major merchant content servers:

- Microsoft Site Server Commerce Edition

- IBM Net Commerce (Planned Future Support)

4.3.15.2 Integration with Diogene:

Easily configurable to suit local or global business needs without altering existing infrastructure

4.3.16   Flexibility:

4.3.16.1 Towards Customer Requirements

EMerchant is easily configurable to suit local or global business needs without altering existing infrastructure.

4.3.17   Hardware/Software Requirements:

4.3.17.1 System Requirements

Operating System

o   IBM AIX

o   SUN Solaris

o   HP-UX

o   Tru64 UNIX

o   RedHat Linux

Database

o   Oracle

o   Informix

o   Sybase

o   DB2

Communications Protocol

o   TCP/IP

o   X.25

o   Asynch

o   SNA LU0, LU2, LU6.2

o   3780

o   TC500

4.3.18   Summary:

eMerchant component connects seamlessly with IST/Switch. The product is very flexible towards system requirements: it runs on the biggest number of operating systems and is compatible with the biggest number of databases of all products surveyed. However, it does not run on any version of Windows. eMerchant provides off-the-shelf interfaces with major merchant content servers, such as Microsoft Site Server Commerce Edition and IBM Net Commerce (Planned Future Support). eMerchant is not widely implemented in Europe – in fact Oasis is a Canadian company and its clients are mainly from North America.

4.4 CyberSource Corporation

4.4.1   Product: CyberSource Payment Manager

http://www.cybersource.com/resources/collateral/pdf/PB_PM51302.pdf

4.4.2   *Vendor:* CyberSource Corporation

http://www.cybersource.com

Headquarters: Mountain View, California

Offices: Japan, UK, various locations in the US.

CyberSource Corporation is a leading provider of risk management and electronic payment solutions for enterprise businesses. CyberSource solutions are specially designed for multiple sales channels, such as Web and call centre/IVR, and *include professional services to assist customers with the design, integration, and optimisation of enterprise-wide commerce transaction systems*. CyberSource serves over 3,000 businesses, including over half of the Dow Jones Industrial companies.

4.4.3   Description:

CyberSource Payment Manager (CPM), an in-house payment solution, *provides a robust, enterprise-wide transaction processing platform* that gives an organization control, scalability and power. *CPM operates behind the scenes to process electronic payments through built-in connections with third-party processors,* all in seamless integration with front-end, financial management, and customer relationship management systems. From a single, uniform and universal architecture, it is designed to:

- Streamline operations by tunnelling payments that originate across multiple channels through a single payment server.

- Accept multiple payment types and authorize transactions in real-time, while the buyer is still connected.

- Select payment forms, business applications, processors, and data collection methods that best meet merchants' business needs.

4.4.4   Level of use/ European Implementation

The company is represented in Europe through its office in the UK, but it is generally an American Company and does its business mainly in the United States. Therefore, we expect that a broader European implementation of the product could be possible, but may require more efforts in case a need of technical support or consultations arises.

4.4.5   Payment Means:

Payment Manager enables enterprises to offer customers a number of convenient payment types such as:
- Credit cards
- Debit cards
- Purchasing cards (level I, II & III)
- Private label cards
- Electronic checks

4.4.6   How it works:

1. Customer places an order.

2. The order information is securely transferred to Payment Manager.

3. Payment Manager receives the order information, formats the transaction authorization request appropriately and routes the request to the processor.

4. The processor routes the transaction to the appropriate card association, which in turn routes the transaction to the customer's card issuing bank for authorization.

5. The issuing bank returns an authorization approval or decline.

6. That approval or decline is routed back to the merchant and the merchant can act appropriately.

4.4.7 Performance

4.4.7.1 Throughput:

The end-to-end multi-threaded architecture integrates payment transactions originating concurrently from multiple channels and keeps transactions moving at a rate *of up to 50,000 transactions per hour on a single server*. And when business activity demands more, additional servers can be added to the network to act as one payment system.

4.4.7.2 Reliability:

Designed with numerous high availability and reliability features, one Payment Manager server can operate in tandem with other Payment Manager servers. In addition, each new software module is subjected to rigorous quality assurance testing and certification in our sophisticated performance lab. In the event of database outage, recovery processes ensure completion of in-flight transactions and audit trails. The database establishes a complete record of each step of every transaction – authorized or declined– to satisfy even the fussiest auditors.

4.4.8 Security:

Payment Manager supports secure sockets layer (SSL) to encrypt transmissions during transport between the originating channel and Payment Manager. Enterprises may also choose to encrypt card numbers and account numbers stored in the transaction database.

This means that if an organization's firewalls or other forms of security are breached, either internally or externally, no card or account information is available.

4.4.9 Integration Issues

4.4.9.1 Integration with Existing Systems

For seamless and easy integration to front end applications, *Cyber Source has developed built-in integrations with* leading commerce storefront applications, enterprise resource planning (ERP) packages, customer relationship management (CRM) solutions, and interactive voice response (IVR) systems such as:

- Microsoft Great Plains
- IBM WebSphere
- Microsoft Commerce Server
- SAP
- Siebel

4.4.9.2 Integration with Diogene

In addition to built-in integrations, Payment Manager's highly flexible, open API allows customized integration *to almost any front-end legacy system* utilizing the following API core libraries:

- ActiveX/VB
- C/C++
- Java
- Batch Interface

4.4.10   Flexibility:

4.4.10.1 Towards integration:

Highly flexible integration to almost any front-end legacy system utilizing the above mentioned API core libraries:

4.4.10.2 Towards end-customers:

Customers can chose to pay in a number of convenient payment types such as, Credit cards. Debit cards, Purchasing cards (level I, II & III) (see Means of Payment)

4.4.11   Hardware/ Software Requirements

CyberSource requires Server and Administration machine.

The Server can run on:

- Unix (minimum one 256 MHz processor, minimum 128 Mbytes RA, hard disk drive with at least 1 Gigabyte available space) with Oracle 8.1.7 database or Sybase 11.x

- Windows with SQL 7, SQL2000 or Oracle 8.1.7 database (minimum 128 Mbytes RAM, hard disk drive with at least 1 Gigabyte uncompressed space, WinNT Server 4.0 Service Pack 6a or Win2000 Service Pack 1 or Win2000 Advanced Service Pack 1)

The Administration machine requires Intel Pentium II processor (400 MHZ), 128 MB RAM, 9 GB uncompressed hard disk space, WinNT Server 4.0 Service Pack 6a or Win2000 Service Pack 1 or Win2000 Advance Service Pack 1.

4.4.12   Network Environment

CyberSource recommends that each enterprise consider peak and sustained transaction volume factors, in addition to the configuration of a corporate database management system (DBMS) in determining how payment server hardware and software are configured. A separate server to house the transaction database is also recommended.

Payment Manager must sit on a TCP/IP network and becomes a node on that existing network. If the enterprise has implemented Internet access, Payment Manager must reside behind the corporate firewall.

4.4.13   Geographic Considerations

Since the Payment Manager sits on a corporate wide area network, transaction processing is not geographically bound. Payments from throughout the enterprise, external and internal, can be routed through one or multiple Payment Manager servers and posted to the enterprise transaction database.

4.4.14   Prices: N/A

4.4.15   Download Trial/Demo

Available on request at: http://www.cybersource.com/solutions/evaluate.xml after providing some information about the company, which intends to trial the demo version, and registering with CyberSource.

4.5 ORACLE

4.5.1 Product: iStore

http://www.oracle.com/appsnet/products/ecom/docs/istore.html
http://oracle.com/applications/customermgmt/ecommerce/index.html?istore.html

4.5.2 Vendor: Oracle

4.5.3 Description:

Oracle iStore allows merchants to efficiently build, deploy, manage, and personalize powerful and scaleable Internet storefronts, serving consumers (B2C) and businesses (B2B), globally.

Oracle iStore utilizes multilingual and multi-currency capabilities to provide a compelling and personalized shopping experience to customers in global markets. iStore offers the flexibility to configure the Web store to accept multiple payment types such as credit cards, purchase orders and invoices in order to accommodate customer needs. With easy setup and deployment, iStore enables companies to react quickly to changing sales, marketing and service opportunities.

Oracle iStore collects customer data and synchronizes it with the rest of the enterprise data, ensuring a true 360-degree customer view from a unified customer model across integrated marketing, sales and service channels. With seamless integration to other Oracle E-Business Suite applications, iStore provides a complete E-Commerce solution that supports the entire customer life cycle.

4.5.4 Payment Means and Local Currencies Support

Multi-Currency, Multi-lingual, Multi-org and Multi-Store Globalization Support iStore enables merchants to deploy global storefronts including different languages, currencies and set of books. This allows merchants to conduct business globally and effectively cater to localized preferences and business practices. Merchants can display country specific specialty stores and allow their customers to pick the store they wish to view. Templates, multimedia components, alerts, and pricing can be specified for each specialty store and language combination. Each global store can also have its own product selection, UI and process flows. Additionally a merchant can set up rules pertaining to what countries they can bill to and ship to.

4.5.5 Can Be Standalone[62]? – Yes

Oracle iStore can be licensed standalone. The standalone license includes limited usage of all Oracle ERP and CRM Applications necessary to implement the online storefront. For example, use of the Oracle Inventory module to setup items is covered under the license. However, if merchants want to extend the storefront functionality by leveraging functionality from the other applications, then they need to license those applications separately. For example, if a merchant wants to define complex pricing strategies for his/her storefront, then they would need to license Oracle Advanced Pricing separately.

4.5.6 Performance:

iStore leverages Oracle's robust, scalable and high-performance Internet technology. Merchants can accelerate the performance of iStore using Oracle9iAS Web Cache, which comes pre-integrated with iStore. Additionally, iStore provides configurable cache management and flushing.

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[62] http://www.oracle.com/appsnet/products/ecom/docs/istore.html - FAQ

4.5.7   Flexibility:

4.5.7.1   Flexible Check out

iStore allows merchants to choose and customize the store checkout process in order to provide customers with a unique shopping experience. Merchants can choose from the following check out options to make available to customers for their B-to-B or B-to-C store: configurable buy-button behavior, single or multiple product add to a shopping cart, shopping lists for repeat purchase items, saved and shared shopping carts for purchases which involve multiple people and/or approval and express checkout.

4.5.7.2   Flexible Targeting to Potential Customers

Merchants can create price adjustments and offer them to target customer segments. Price adjustments can include discount rules based on quantity, time of purchase, and customer pricing agreements. Discounts can also be based on promotions, coupons and deals. iStore leverages Oracle's Advanced Pricing functionality to offer customers personalized prices that best suits their budget and preferences.

4.5.7.3   Integration Issues

Oracle iStore is fully integrated with the entire Oracle E-Business suite. This makes Oracle iStore a comprehensive solution for any Internet storefront. The key integration points are with the following modules: Quoting, iPayment, iSupport, Marketing Online, Order Management, Configurator, Advanced Pricing, Contracts, Inventory, Interaction Center and Accounts Receivables.

4.5.8   Implementation in Europe:

As Oracle is an international company, the product could be widely implemented in Europe.

4.5.9   Summary

As this is a tool for creating e-commerce sites almost without programming efforts, its key advantages fall into the category "easy and efficient". Offering easy setup and deployment, iStore enables companies to react quickly to changing sales, marketing and service opportunities. It features multilingual and multi-currency capabilities. iStore offers the flexibility to configure the Web store to accept multiple payment types such as credit cards, purchase orders and invoices. Merchants can create price adjustments and offer them to target customer segments. Additional advantages are self-registration and self-administration capabilities- site managers can define roles and permissions to control user access to the store. A major disadvantage is that the product is fully integrated only with Oracle E-Business suite, and no other back-end integration is provided.

4.5.10   Vendor: ORACLE

4.5.11 Product: iPayment

http://www.oracle.com/appsnet/products/ecom/docs/ipayment.html

4.5.12   Description:

Oracle iPayment is designed to payment-enable merchant's e-commerce business. iPayment's risk management capabilities, transaction routing features, and flexible architecture give businesses the ability to accept every major payment option - securely, with less implementation effort, and at a lower overall cost. Oracle **iPayment gives e-commerce application owners flexible electronic payment options** so that they may quickly and easily add, remove, or reconfigure payment methods or change business rules associated with payment processing.

4.5.13   Technological Description of the product/solution
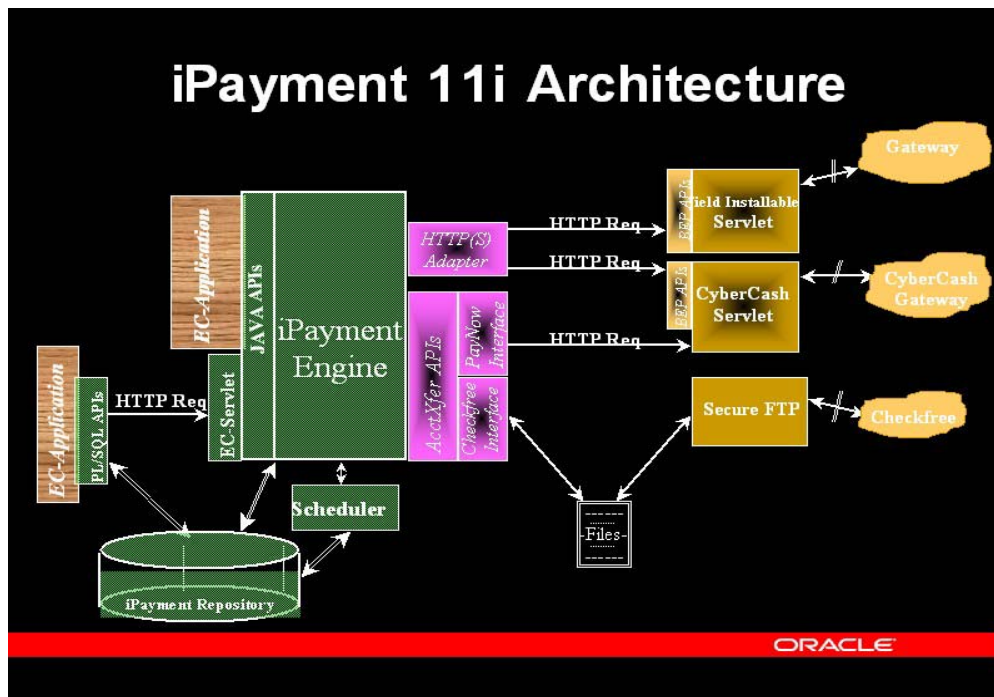
4.5.14   Level of use/ implementation in Europe

As Oracle is an international company, the product **could be widely implemented in Europe**

4.5.15   Payment Means

Oracle iPayment currently supports credit cards, electronic funds transfers and purchase cards (level 2). Other payment methods such as various financing methods are soon to be supported.

- o   Credit Card

- o   Purchase Card

     –Level I

     –Level II

- o   Bank Transfers

Businesses may also want alternate forms of payment to reduce the fees associated with credit cards percentage transaction fees. For merchants, accepting payments other than credit cards makes financial sense in other ways too. The cost of processing electronic funds transfers (EFT) is much lower than with credit cards. Merchants also receive funds faster with EFT than with traditional paper checks.

4.5.16   How It Works

Oracle iPayment supports multiple payment processing systems operating simultaneously and provides a powerful intelligent routing system that gives businesses and merchants full control over transaction processing. Payments are routed to multiple payment processing systems based on flexible business rules defined by the merchant. For example, Oracle iPayment provides flexibility by routing payment transactions based on the type of transaction. Oracle iPayment has the ability to processes payment requests in real-time or offline. A Scheduler is provided to enable e-commerce applications to process payments in an offline mode. When the e-commerce application makes a payment request, the payment information will be stored in Oracle iPayment and picked up by the Scheduler so that the payment gets settled by the due (settlement) date.

Payment processing is based on:

- o   Rule priority, which allows incorporating business rules and procedures;

- o   Transaction amount and payment method, which controls relationships with payment systems;

    Currency of payment

4.5.17   Security

- o   Support for SSL 3.0

- o   Authorized administration

- o   Web Server authentication

- o   Encrypted credit card numbers

- o   Encrypted user names and passwords

4.5.18   Flexibility

4.5.18.1 Towards merchant

Oracle iPayment gives e-commerce application owners flexible electronic payment options so that they may quickly and easily add, remove, or reconfigure payment methods or change business rules associated with payment processing.

4.5.19   Integration Issues

4.5.19.1 Integration with Existing Systems / Integration with Dioegene

With its flexible architecture, Oracle iPayment can be used with any type of application. Oracle iPayment provides a single payment solution for the enterprise. Oracle iPayment plugs into the Oracle HTTP Server (powered by Apache) and communicates with other e-commerce applications or business-to-business ordering systems. This product can be used by any e-commerce or traditional application that requires payment processing services, an important advantage since current payment technologies - from credit card transactions, to bank account transfers, to other payment methods - each have their own APIs, usually requiring a separate integration effort with the commerce application. Oracle iPayment can be integrated with virtually any application or payment processing system or service, regardless of the language it was developed in or the platform it is deployed on as long as the application is capable of issuing Java or PL/SQL database calls.
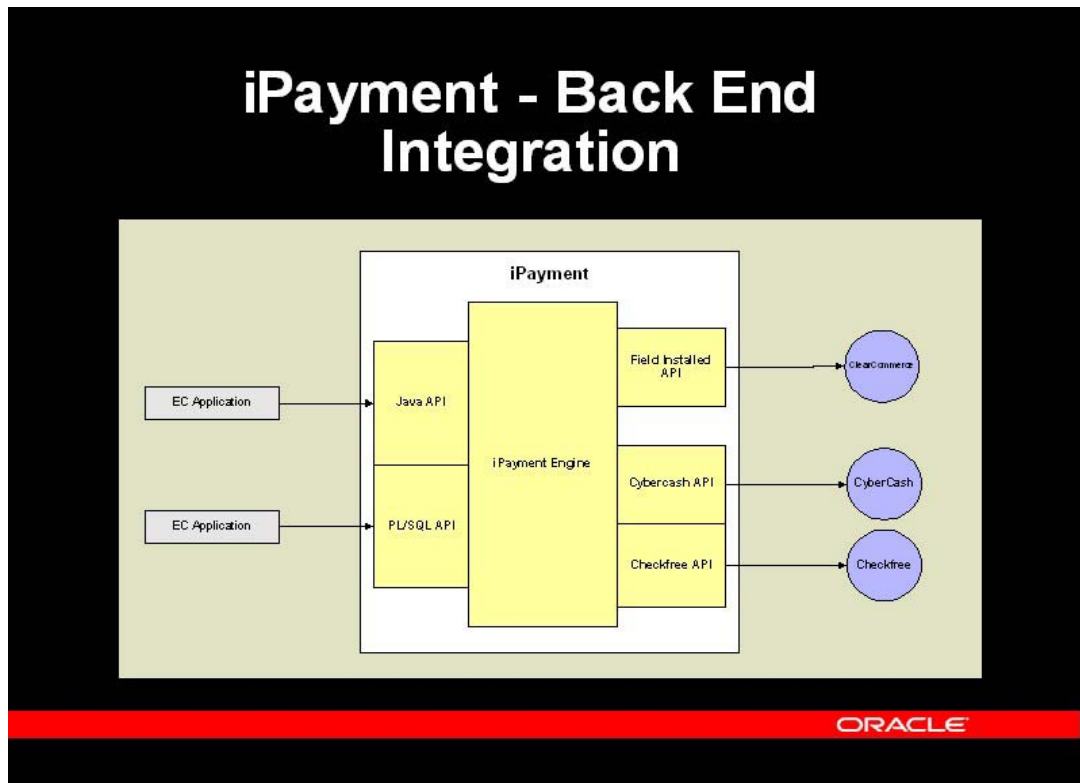
4.5.19.2 Integration with Commerce Service Providers

Oracle iPayment supports out of the box integration with leading third party back-end payment systems.

iPayment is pre-integrated with CheckFree[63] for its bank transfer functionality.

Verisign[64] now offers integration to Oracle iPayment out of the box. iPayment's CyberCash[65] interface will continue to be supported by both iPayment and Verisign for all existing CyberCash customers.

iPayment offers a public set of APIs for credit cards and EFT that other payment systems can integrate with. These APIs have extensible fields that can be used in a custom implementation with payment systems that require a certain format of APIs. The extensibility can be particularly useful for international implementations of iPayment.

4.5.20   Summary

This product is obviously a kind of extension to an existing e-commerce application, already installed at the merchant's place as it *"gives e-commerce application owners flexible electronic payment options"* This product is very flexible- towards back-up integration, iPayment can be used with any type of application. Towards end-users, merchants may quickly and easily add, remove, or reconfigure payment methods or change business rules associated with payment processing. However, although pre-integrated with two leading US payment systems, the product is not pre-integrated with any European payment system.

4.6 SUN

4.6.1   *Product:* BillerXPert[66]

4.6.2   *Description:*

Sun[tm] ONE BillerXpert (formerly iPlanet BillerXpert) *is a comprehensive Internet bill presentment and payment (IBPP) solution* that allows an enterprise to provide customer convenience, build customer loyalty, manage customer relationships, and generate new revenue opportunities.

Sun ONE BillerXpert includes Sun ONE Application Server, Sun ONE Directory Server, and Sun ONE Web Server. It provides high performance, scalability, high availability, and integration with enterprise applications and systems. And by leveraging the Sun ONE Application Server, enterprises can easily incorporate Enterprise JavaBeans [tm] components to encapsulate customized business logic.

4.6.3   *Payment Means/ Multi Currency Support*

o   Allows for payments by credit card or check from multiple accounts.

o   Provides end users with the flexibility to schedule payments in advance, make partial payments, or set up automatic payments.

4.6.4   *Security:*

Provides real-time authorization to keep users updated on the status of their transaction. Provides secure transaction processing via SSL encryption.

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63 CheckFree Corporation is a leading provider of financial electronic commerce services. Through its operating subsidiaries, CheckFree designs, develops and markets services that enable more than 6.3 million consumers to receive and pay bills over the Internet or electronically through a variety of bill aggregation points.
http://www.checkfree.com/about/1,5867,3,00.html

64 VeriSign, Inc. (Nasdaq:VRSN) is a leading provider of digital trust services. VeriSign's digital trust services create a trusted environment that manages more than 6.5 billion communications and transactions a day.
http://corporate.verisign.com/

65 CyberCash's Internet payments business was recently acquired by VeriSign, the leading provider of digital trust services.

66 http://wwws.sun.com/software/products/billerxpert/ds_billerxpert.html

4.6.5   Performance:

The Sun ONE BillerXpert software supports a high volume of concurrent users through optimised performance features – including support for advanced connection caching and pooling, results caching, data streaming, and a fully multithreaded, multiprocessing architecture. Scalability features include dynamic load-balancing and point-and-click application partitioning, enabling applications to scale dynamically to support thousands of concurrent users.

Provides four-tiered, fully distributed deployment architecture to help ensure that there is no single point of failure. The high-performance features of Sun ONE Directory Server and Sun ONE Application Server help enable scalability to millions of users.

Features an advanced, proven load-balancing system based on fine-grained application statistics. Incorporates cluster fail-over capabilities to help ensure that the application continues to function in the event of a server failure.

- Offers dynamic application enhancement, enabling upgrading of the application without shutting down the system.

4.6.6   Flexibility

4.6.6.1   Towards Customer Requirements:

Helps reduce time to market with pre-built application templates for the telecommunications, financial services, cable television, and utility industries. Allows for customisation of presentation templates and business rules. Comes with fully documented SDK and APIs.

Allows remote administration from any desktop using a lightweight HTML-based interface. Stores application configuration and user information in a central directory. Uses a modular system design to allow application components to run on multiple systems, such as a cluster configuration for enhanced high availability, scalability, and security.

4.6.7   How it Works

Bill personalization and notification

- o Uses pre-built templates to customize bill layout and branding.

- o Presents multiple levels of information, from bill summaries to line item detail. Users can view past and present statements to determine spending trends.

- o Lets users easily find critical information across present and past statements with parametric search capability.

- o Permits e-mail notification of new bills, overdue payments, or special offers.

Customer enrolment and registration

- o Provides log-in and registration templates that collect customer profile information, including name, address, account number, and preferred payment type. Templates can be customized to collect additional information about customers, such as hobbies and occupation.

- o Provides real-time enrolment and activation to allow end users instant access to their bills following registration.

- o Allows users to manage and update account information, minimizing support calls. Includes reporting tools for tracking and analysing membership activity.

- o Leverages Open Financial Exchange for customer enrolment and membership capabilities.

4.6.8   Integration Issues:

4.6.8.1   Integration with existing systems

Extracts data from existing billing systems for presentation over the Internet. Integrates with multiple data formats, including print streams, ASCII text, and XML. Manages the loading process via a browser interface or scriptable command line utility.

4.6.8.2   Integration with Commerce Service Providers/ other Payment Intermediaries

Includes Open Payment Interface (OPI) to enable integration with additional payment types and existing systems, as well as optional integration with Signio payment service.

4.6.9   Hardware/Software Requirements:

Platform and Operating System:

o   Sun SPARC[tm] processor-based system Solaris[tm] Operating Environment, 8 or 2.6

System Requirements:

o   Memory Requirement: 512-Mbytes RAM (minimum)

o   Disk Space: 3-Gbytes available hard disk space

o   Sun ONE Infrastructure: iPlanet Application Server 6.0 SP2, iPlanet Directory Server 4.12, iPlanet Web Server Enterprise Edition 4.1 SP7

Database: Oracle 8.1.6

4.6.10   Summary:

A distinctive feature of Sun's eXpert is that it offers dynamic application enhancement, enabling upgrading of the application without shutting down the system. Also, it allows remote administration from any desktop using a lightweight HTML-based interface. Another advantage of the product is its high performance- it supports a high volume of concurrent users. Expert's architecture is fully multithreaded and multiprocessing. A shortage of Biller eXpert is that as a Sun invention, it is oriented entirely towards Sun's software- it runs only on Sun Solaris operating system and requires only application servers within Sun ONE Infrastructure. Further, Biller eXpert uses only Oracle database.

4.7 IBM

4.7.1   Product: *Web Sphere Payment Manager*

http://www2.ibmlink.ibm.com/cgi-bin/master?xh=aNTyNkREdplqsX1USenGnN9332&request=announcements&parms=H%5f200%2d401&xhi=usa%2emain&xfr=N

NOTE: Currently not offered as a separate product, but instead as a module within together with Web Sphere Commerce

4.7.2   *Vendor:* IBM

4.7.3   *Description:*

The best customers for Payment Manager are medium, large, and enterprise businesses that need planning, consulting, implementation services, management, and customisation to integrate payments into business processes:

- Payment processing integrated into business applications such as accounting, inventory management, and shipping (ERP candidate)

- Customer Relationship Management — Customer Call Centers — where customer orders for goods or services are placed and payments are initiated

The Web Sphere Payment Manager Version 2.2 program helps empower merchants and service providers to:

· Securely manage Internet payments

Integrate payments into business processes and software such as online catalogs and accounting packages

· Manage credit card, debit card, stored value smart cards, and emerging Internet payment methods

Web Sphere Payment Manager (WPM) manages Internet payment transactions for e-commerce. It includes:

- o   Multi-payment framework application

- o   Secure electronic transaction (SET) cassette

- o   WebSphere Application Server

- o   Database

- o   DB2® UDB Version 7.1 for use with WPM (Payment Manager also works with Microsoft SQL Server and Oracle databases (versions higher than Oracle 7.3.3))

- o   IBM HTTP Server

WebSphere Payment Manager offers payment hosting capabilities for Internet service providers (ISPs), commerce service providers (CSPs), application service providers (ASPs), banks and financial institutions. IBM provides a high-performance, scalable and secure end-to-end e-commerce solution.

- Receives and processes payments on the Internet

- Works with existing credit card processors and emerging payment methods

- Offers easy installation, configuration, and operation

- Integrates with existing business processes or applications

- Enables payment hosting service for multiple businesses

- Delivers security for access control, data integrity, and operations

- Works with industry-leading databases on multiple operating systems

4.7.4   *Payment Means:*

- Works with existing credit card processors and emerging payment methods

- Offers easy installation, configuration, and operation

- Integrates with existing business processes or applications

- Simplicity to install and deploy new payment types (cassettes) after product installation

4.7.5 Performance:

Optionally, the IBM 4758 Cryptographic Coprocessor can be used for added security and performance.

4.7.6 Security:

WebSphere Payment Manager uses the security and auditability features of the host hardware and software on which it operates.

The security functions of Payment Manager depend on the underlying hardware and software as well as the payment mechanism used.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

4.7.7 Product Positioning

The primary customers for WebSphere Payment Manager are:

- Banks
- Financial Institutions
- ISPs
- Commerce Service Providers
- Others that offer payment service to e-commerce merchants

These customers will benefit from this product because it helps in:

- Retaining and growing their business customer base
- Deriving greater value from their Gateway investment
- Adding a new merchant online quickly and easily
- Minimizing support needed for operations

4.7.8 Integration with Diogene:

Integrates with existing business processes or applications

4.7.9 Flexibility:

4.7.9.1 Towards installation /Operation Systems

Operates on Windows NT , Windows 2000, AIX, and Solaris

4.7.9.2 Towards integration with existing programs:

- o Integrates payments into business processes and software such as online catalogues and accounting packages
- o Simplicity to install and deploy new payment types (cassettes) after product installation

4.7.9.3 Towards the merchant during product exploitation:

Ease of adding, modifying, removing, and provisioning remote merchants

4.7.9.4 Towards end-users of e-commerce site:

Simplicity to install and deploy new payment types (cassettes) after product installation

4.7.10   How it works

No examples

4.7.11   Hardware/ Software Requirements:

o   Operates on Windows NT™, Windows™ 2000, AIX®, and Solaris

o   Operates with industry databases: DB2 Universal Database® (UDB), Microsoft™ SQL Server, and Oracle

4.7.11.1 Hardware requirements

Hardware requirements will vary depending on the expected transaction rate and number of stores supported.

4.7.12   Implementation in Europe:

Strong

4.7.13   Pricing:

The following prices are for US only and may vary according to the retailer:

Web Sphere Payment Manager *for Multiplatforms*

Part Description	Number	OTC(2)
Version 2.2 -- English and NLV	20P4409	$15,000
Cassette for CyberCash for	20P4418	$300
Multiplatforms Version 2.2		
Program Package --		
English and NLV		
Additional Processor	20P4412	$15,000
Additional Merchant Number	20P4413	$175
Additional Processor for	20P4420	$300
Cassette for CyberCash		
Version 2.2 -- English and NLV Electronic Delivery for AIX	CR6KSML	$15,000
Version 2.2 -- English and NLV Electronic Delivery for Solaris	CR6KWML	$15,000
Version 2.2 -- English and NLV Electronic Delivery for Windows	CR6SVML	$15,000
Cassette for CyberCash for Multiplatforms	CR6WDML	$300
Version 2.2		
Program Package --		
English and NLV		

Electronic Delivery

4.7.14   Download at:

http: /www-3.ibm.com/software/webservers/commerce/paymentmanager/download.html

4.7.15   Summary

The product works with existing credit card processors and emerging payment methods, but it is not evident exactly which those card processors are or whether country-specific payment methods could be supported. Payment Manager offers easy installation, configuration, and operation. It   integrates with existing business processes or applications and hence must integrate with Diogene. Payment Manager is quite flexible towards system requirements – it runs on Windows NT, Windows 2000, AIX, and Solaris operating systems, and uses DB2 Universal Database® (UDB), or Microsoft™ SQL Server, or Oracle Databases. A major drawback is that it is currently not offered as a separate product, but instead is together with IBM Commerce Server. Therefore, its price of about 16 000 USD should not be considered final.

5. Conclusion

After careful analysis of the Diogene's E-Commerce Transaction Manager requirements and the relevant commercial solutions able to be exploited by this Transaction Manger, presented in detail in D5.1, and bearing in mind the following main classification criteria:

1.   Level of Use (Degree of implementation in Europe)

2.   Payment Means supported (especially micro-payments as will be the case with Diogene)

3.   Price (about or below EUR 50 000for all or most of the Diogene's exploitation period)

we came to the conclusion that *of all 15 alternative solutions we described,* the following can be recommended as the most closely matching the specified criteria:

1. "Bibit Select " developed by Bibit Payment Services, The Netherlands - WINNER

with the following two runners-up:

2. "ALLCASH Unified Transaction Platform" developed by ALLCASH GmbH, Germany

3. "IconTM " developed by Altamedius, Ireland

Whereas "Bibit Select" and "ALLCASH Unified Transaction Platform" are E-commerce tools hosted at intermediary, "IconTM" is one hosted at merchant. An e-commerce tool hosted at merchant has an important feature that the customer keeps physically all customer data, including data concerning the payment transaction, at their place (at their disposal), whereas this is not always the case with e-commerce tools hosted at intermediary. So, e-commerce tool hosted at merchant gives them more flexibility in designing and implementing a web-based environment that can be more easily changed or extended once it has been launched. On the other hand, an e-commerce tool hosted at merchant would require more resources in terms of skilled IT specialists and additional software (i.e. database, different types of servers, etc.) to support the solution, as the customer must himself provide integration with the acquirer and actually take care for the smooth running of the system. From this viewpoint, an e-commerce tool hosted at intermediary is a much better alternative.

As described, "Bibit Select" is an e-commerce tool **hosted at intermediary.** We have chosen such tool, because **the drawbacks of the alternative solution: an e-commerce tool hosted at merchant, outweigh its advantages in terms of the requirements of a project such as Diogene.**

5.1 Level of Use/ Implementation in Europe:

"Bibit" is widely implemented in Europe: In July 2001, over 1000 merchants had signed up the Bibit service. About 50% of them are based in NL and Belgium, the rest is spread over other EU countries (plus USA)

with an emphasis on Germany and Scandinavia[67]. Over the full year 2002, the value of payments processed through Bibit will approximate Euro 1 billion. Deloitte & Touche Accountancy & Consultancy ranked Bibit as the fastest growing technology company in the Netherlands in September 2002. The Bibit services have international deployment, allowing cross-border payment.

Given the information about the level of use and implementation in Europe of Bibit services, we conclude that Bibit is both more widely represented in Europe and more widely used.

5.2 Payment Means supported

Bibit is specialized in international Internet payments, allowing the consumer to pay a foreign Internet retailer using a payment method which is customary in his/her own country. The consumer is thus able to pay in his/her own currency using a familiar method, while the retailer is paid in his/her own currency. Bibit is a payment intermediary aggregating **over 60 payment systems in its portfolio**, and facilitating merchants and users to choose among available internet payment systems. The payment methods include, among others, **bank transfers, credit card and debit card based payments (e.g. SSL, SET), e-purses (e.g. Mondex and Proton), mobile payments like Paybox, WAP payments, P2P payments like PayPal and EBPP, Micropayments.**

Given the information about the payment means that Bibit supports, we conclude that Bibit:

o **is more flexible in terms of the number of payment systems supported both international and local**

o **is more specialized in international Internet payments.**

5.3 Price

Bibit pricing consists of three components (price level per 01.04.2002):

1. A fixed monthly subscription fee, depending on the Service Level merchants need:

o EUR 145 for Standard Service Level

o EUR 199 for Plus Service Level

2. A fee per transaction, tiered on the number of transactions merchants conduct monthly:

o EUR 0.50 for transactions 1 to 1000

o EUR 0.35 for transactions 1001 and up

o special pricing is available for high volume merchants
(> 10.000 transactions per month)

3. The commissions or fees imposed by the financial institutions.

Bibit normally does not charge any Set-up fee, i.e. even in the first year merchants' fixed cost consists of the subscription fee only. However, implementation services are available at an hourly rate.

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[67] E-Payment System Observatory: http://epso.jrc.es/

6. Appendix: Summary Table

The summary table is given in a separate MS World file called "AppendixD5-v1.1.doc", which is an indispensable part of the .zip file of Deliverable 5.1.