

A Quick Look at PAYMENTS ON THE INTERNET

**A White Paper prepared by EHPT
JANUARY 2000**



Preface

E-commerce is an innovative way of conducting business on the Internet and the attention that it receives in the press, in boardrooms and on public agendas stems more from its potential than from its current impact on economy. For instance, Forrester Research predicts that Internet buying will top \$3.2 trillion by 2003.

Although this pervasive “web shopping” model transfers the shopping experiences of the physical world to cyberspace, it does not take full advantage of the nature of the Internet and the tremendous potential it offers for creating new value chains, markets, distribution systems and pricing structures.

For example, with all the improvements in technology that we have experienced over the last 3 years, we can expect to see a rise in the purchase and leasing of digital goods such as software and music over the Internet. Without our realising it, a new Internet purchasing model has evolved. In addition, new forms of network services have emerged, such as IP telephony, cable and broadband, and, more importantly, WAP (Wireless Application Protocol) for mobile services.

As a result, pricing structures have and will continue to change dramatically in order to accommodate this massive change. For example, online gamers can now choose between a variety of pay-by-use options, paying either per level or per time spent.

But is there a payment infrastructure in use now that can cater to the needs of this new business model? Is there a payment method that can track and collect smaller value payments, as well as interact with diverse Internet-accessible devices, including mobile phones or PDAs?

This document reviews the different Internet payment systems currently available and their pitfalls, and the need for an alternative payment method that will better meet the ever increasing demands of the marketplace.



Online Payment Systems Currently Available

The Internet payment systems currently in use or under trial fit into two categories: account-based or token-based.

Account-based

Credit card payment systems are account-based, linking each user — whether a consumer or a content provider — to a specific account. Few account-based solutions in use today have sufficient security to prevent fraud. Consumers enter a credit card number and expiration date and this information is sent to the online merchant in an encrypted format. The encryption is done through a method called Secure Socket Layer (SSL). Whilst this method prevents anyone from intercepting the information directly on the Internet, it does not provide a safeguard against fraudulent use of credit card details. After all, online shopping involves practically zero physical interaction between merchant and consumer.

Fraudulent credit card use over the Internet is even more likely in purchases involving digital goods that can be downloaded almost immediately after purchase. With goods such as books or clothes, merchants require a delivery address; there is at least some chance of identifying credit card fraudsters.

To deal with security issues such as fraud, Visa and Mastercard developed The SET™ Specification, an open technical standard for the commerce industry to facilitate secure payment card transactions over the Internet. Digital Certificates create a trust chain throughout the transaction, verifying cardholder and merchant validity. It uses Public Key Infrastructure (PKI) encryption to protect transaction data, and requires software to reside on the cardholder's PC as well as the merchant's computer network. The identities of all parties are verified before a transaction takes place. To date, SET has not been extensively implemented, although major banks and credit card companies support it, and it is costly for merchants to implement it.

In addition to security issues, credit card sales are costly to the merchant as each payment transaction requires multiple participants, for example authorising agents and banks, all of which charge administrative fees per transaction. Most would therefore require a \$5-10 minimum purchase amount in order for a credit card transaction to be cost effective.

Another issue to consider is small value transactions. Existing bank and credit card systems are not designed to handle small values, which means that the cost for handling a small value is as expensive as that of a large value. For example, some credit card companies may charge 30 cents per credit card transaction regardless of value, which is expensive for both the merchant and the consumer.



Token-based

Token-based systems refer to “electronic cash” solutions such as “beenz” offered by beenz.com. These systems can handle micropayments down to fractions of a cent. However, current implementations require that the consumer exchange his money into some form of cyber currency which is stored in an electronic wallet on the consumer’s hard drive. The fund exchange requirement can be a barrier to deployment, and the use of an electronic wallet on a computer’s hard drive makes the cash less portable and more exposed to risks.

The Need for a New Payment Infrastructure

This section sets out the shortfalls of current Internet payment methods in a rapidly developing technological landscape.

Current Internet payment methods were developed to facilitate hassle-free shopping on the Internet. Whilst the vast majority of cyber shoppers access the Internet through their desktop PCs, there have been recent developments that allows users to access the Internet on other, more portable devices such as the mobile phone. A good example of such a development is Wireless Application Protocol (WAP), which allows mobile phone users to retrieve relevant information on their phones irrespective of where they are. And it may not be too long before the same capabilities are built into other portable devices such as personal digital assistants (PDA). With this development, the number of consumers with access to the Internet must surely increase exponentially.

Another technological revolution that has put considerable pressure on present payment methods is the digitilisation of services. This includes software on a pay-for-use basis, online gaming, streaming media such as music or video, and the sale of information (articles, research papers, reports etc).

As a result of this shift in the form that goods can now be delivered in, charging models must change accordingly. For example, charges could accrue through the number of mouse clicks or the number of levels played.

With this change in the charging models for goods and services comes the need for a payment method that is able to handle smaller more frequent payments. Credit card or token based payments cannot satisfy this need adequately because of the sheer cost and administrative inconvenience involved.



Jalda™ — A New Internet Payment Method

Jalda is a new secure Internet payment method that has changed the face of Internet transactions. It is a non-proprietary, open system that enables Internet purchasing from stationary PCs, mobile phones or any other communications device with Internet access. Jalda was developed by EHPT and is offered as freeware. EHPT, a joint venture between Ericsson and Hewlett Packard, aims to make Jalda a de-facto standard.

Jalda allows for payments of any size, from micro payments to payments of larger sums, to be made anywhere and at any time, whether it's online or in the physical world. Jalda consists of a set of open system-based application programming interfaces (APIs). An API enables application developers to integrate the functions of a payment system into, for example, a web server or a local application such as software. When a payment transaction is initiated, the consumer signs an agreement outlining the relevant contractual terms, including cost, the service the consumer is buying, time, date etc. Once the agreement is signed and the Internet Payment Provider (PP) notified, the application sends "ticks" over the secure connection between the user application and the Internet payment server.

How Charges Accrue

Transactions are measured by "ticks", and charges are defined by the parameters set by the e-commerce content provider. For example, elapsed time, mouse clicks, number of data files, searches, levels etc. Each "tick" is assigned a monetary value according to the vendor's pricing structure.

Before a "tick" is registered by the server, an analysing process takes place. With the help of the database, the server determines who is paying and who is receiving the money, which product it refers to, the price, and which currency is being used. When the analysing process is completed, the server has all the charging data needed for payment to proceed. All charges are calculated on an aggregate and the customer receives a single invoice. Alternatively, the amount is deducted from the account as pre-paid. The Internet payment server features a database that contains information about prices and customer profile information. Foreign exchange information will be available in the near future.

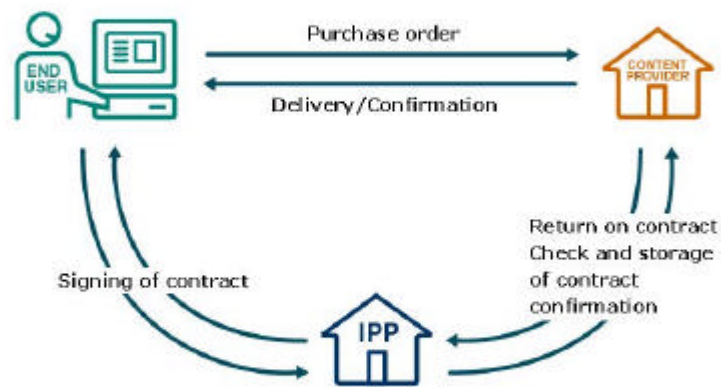
Security

For ordinarily non-secure networks such as the Internet, Jalda uses PKI, an encryption technique that uses digital certificates for authentication. Any information transferred over the API is protected from tampering, fraud and general abuse. Unlike passwords, which can be different on different sites, the same digital certificate with one personal identification number (PIN) or password can be used anywhere as proof of identity. Using digital certificates is easy with point-and-click interfaces and the technique is available with all standard browsers. Digital certificates are accessed through the PIN or password and can be stored on computer hard disks or smart cards.

Receipts and Tracking

Jalda also allows for receipts to be issued by the content provider directly to the consumer's account with the Payment Provider. This enables consumers to verify all purchases made on the Internet.

Basic overview of the Jalda architecture and functionality



Benefits of Jalda

Payment Providers

The Payment Provider maintains the payment server to deliver a secure, trustworthy payment service for consumers and content providers. The Payment Provider might be a bank, a credit card company, an ISP or a network operator (e.g., cable company, telecommunications provider or data communication network). With Jalda, the payment provider can offer value-added services over the Internet, such as billing customers in one invoice for all accumulated Internet transactions and purchases. These payment services can help Payment Providers attract new customers and retain existing customers for their primary businesses.



Content Providers

Content providers are the Internet merchants who provide electronic or physical goods and services such as:

- entertainment (music, video)
- gambling
- web shops
- consumer-to-consumer (auctions)
- IP telephony
- theatre tickets
- mobile services
- software
- financial services
- transport and travel
- home automation

The content provider on the other hand would benefit from the ability to concentrate on their core business, leaving the complicated issues of billing to the Payment Provider. They can also charge for any parameter, create new business models and distributed channels, and reach newer and larger market segments through the cost-savings from the storage and distribution of customer data.

Billing

With Jaldia, it is the Payment Provider and not the content provider that bills customers. This in turn offer both Payment Providers and content providers the following advantages:

- the cost a highly advanced payment system is shared by a number of content providers
- the Payment Providers aggregates small value purchases (micropayments) across several vendors, allowing individual vendors to sell goods and services for fractions of a cent
- enables content providers to collect money worldwide

Consumers

The benefits to the consumers are manifold. The following are just some of the potential advantages:

- All purchases and payments are user-friendly and secure
- With more people gaining access to the Internet, whether via PCs or mobile phones, content providers will be forced to improve the quality of their products and services to stave off competition
- As the Internet itself slowly becomes the medium of choice for cyber shoppers and content providers, there will be a wide variety of goods and services for consumers to choose from.



Some examples on how Jalda is being used today

The following examples will provide better insight into the benefits of Jalda from the perspectives of a Payment Provider and two content providers.

(1) Payment Provider - Telia

Situation:

Telia is Sweden's largest telecom operator, providing data, voice, Internet, Intranet, extranet services to about 5 million residential, business and public sector subscribers. It also functions as an Internet Service Provider (ISP).

Telia now also supports digital services such as online gaming, entertainment and Internet shopping.

Solution:

Telia chose Jalda because

- (a) it has the capabilities to charge for any service, including micropayments, application or goods
- (b) Jalda can use A-number verification for secure and easy identification of the user
- (c) Jalda is easily integrated with Telia's existing systems

Mikael Gunnarsson, manager for Business Development of Telia's Financial Services, said, "During the last couple of years, we have worked to find a payment system that in a safe and easy way allows the handling of Internet transaction. Jalda is the payment method that satisfies our needs."

(2) Content Provider - JetWeb

Situation:

JetWeb is one of only two Internet travel agencies in Sweden that is fully IATA (International Air Transport Association) licensed. Its target customers are students and young people under the age of 26. They offer affordable flight tickets, with maximum flexibility.

In order to make their services even more accessible to their target customers, JetWeb required a payment method that would enable their customers to purchase tickets over the Internet, whether they accessed it via a PC or mobile phone, without the need for a credit card.

Solution:

Jalda suits JetWeb perfectly as the payment method only requires the customer to open an account with their IPP. For young people and students without access to credit cards, this does not preclude



them from purchasing tickets over the Internet. Further, as more and more young people now have mobile phones with Internet access, purchasing tickets over the Internet has never been easier.

(3) Content Provider: Online entertainment – DayDream Software

Situation:

Daydream Software AB, develops interactive entertainment, innovative technologies and services which are experienced, distributed and paid for via the Internet and other digital media. Daydream's products are used by all age groups throughout the global market. One of Daydream's coming releases is the online game, Clusterball™. The game is designed to be played on stand-alone computers, over local networks or the Internet.

In order to offer Clusterball enthusiasts a range of online payment and playing options, Daydream chose to embed Jalda functionality into the game software.

Solution:

The various payment options offered include paying-per-session played, and pre-paid options.

Clusterball will only be sold on the Internet where gamesters have the option of paying in different ways. After downloading the game for free, gamesters then pay per play or per level. Plus, gamesters can play the game with other Clusterball enthusiasts, whether local or international.

Jalda functionality also acts a quality control mechanism because gamesters have now become discerning consumers and this has pushed developers to design high quality games software.

For more information: www.clusterball.com



About EHPT

EHPT delivers convergent software applications to telecom operators and service providers world-wide. Our applications feature open architecture that ensures multi-vendor compatibility in wireline, wireless and IP networks. EHPT is owned jointly by Ericsson and Hewlett-Packard. With more than 1,000 employees in strategically located offices we ensure global coverage and local presence.

For more information on Jalda and EHPT:

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