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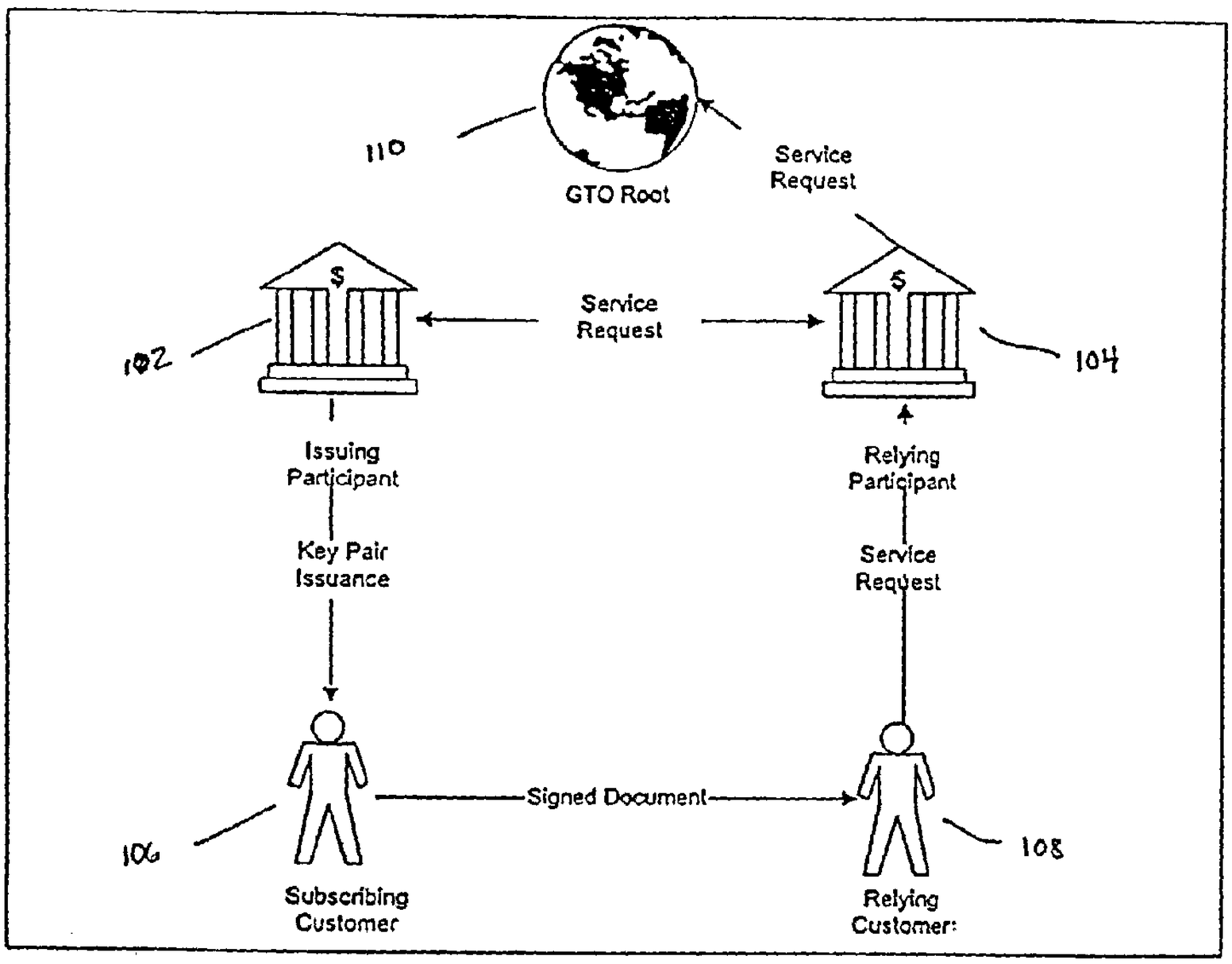
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(54) Titre : SYSTEME ET PROCEDE POUR SERVICES DE PAIEMENT DESTINES AU COMMERCE ELECTRONIQUE
(54) Title: SYSTEM AND METHOD FOR PROVIDING PAYMENT SERVICES IN ELECTRONIC COMMERCE



(57) Abrégé/Abstract:
A system and method are disclosed for providing a plurality of payment services to facilitate electronic commerce. In one embodiment, services are provided within the context of a four-corner trust model comprising a buyer (106) and a seller (108) that engage in an on-line transaction. The buyer is a customer of a first financial institution (102). The first financial institution acts as a certificate authority for the buyer and issues the seller a hardware token including a private key and a digital certificate signed by the first financial institution. The buyer uses its private key to sign payment instructions that are forwarded to the first or second financial institution (104) for execution. The message may be forwarded to the first financial institution indirectly via the seller and the second financial institution. Payment instruments supported by the present system may include a payment order, a payment obligation, a certified payment obligation, and conditional payments.

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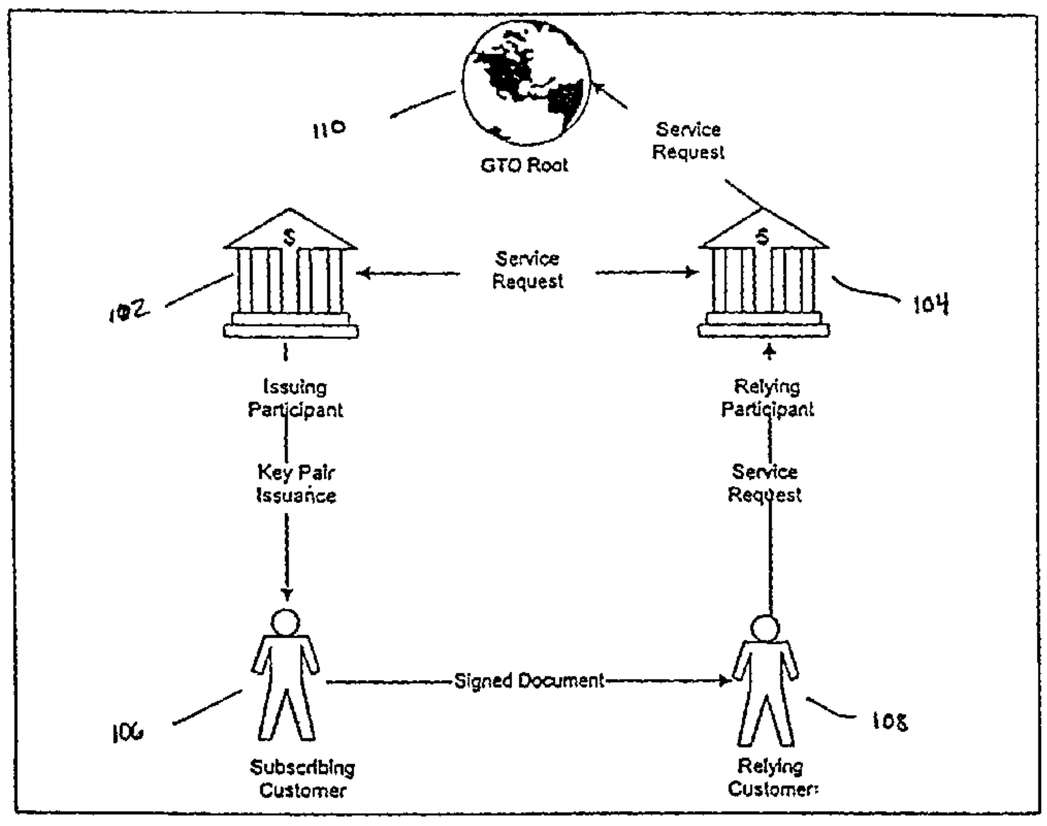
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(54) Title: SYSTEM AND METHOD FOR PROVIDING PAYMENT SERVICES IN ELECTRONIC COMMERCE



(57) Abstract: A system and method are disclosed for providing a plurality of payment services to facilitate electronic commerce. In one embodiment, services are provided within the context of a four-corner trust model comprising a buyer (106) and a seller (108) that engage in an on-line transaction. The buyer is a customer of a first financial institution (102). The first financial institution acts as a certificate authority for the buyer and issues the seller a hardware token including a private key and a digital certificate signed by the first financial institution. The buyer uses its private key to sign payment instructions that are forwarded to the first or second financial institution (104) for execution. The message may be forwarded to the first financial institution indirectly via the seller and the second financial institution. Payment instruments supported by the present system may include a payment order, a payment obligation, a certified payment obligation, and conditional payments.

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SYSTEM AND METHOD FOR PROVIDING PAYMENT SERVICES IN ELECTRONIC COMMERCE

This application claims priority from United States provisional patent application serial No. 60/155,841, filed September 24, 1999, entitled System and Process for Payment Services, which is hereby incorporated by reference.

Field of the Invention

The present invention relates generally to the field of facilitating electronic commerce by providing services via a public key infrastructure.

Background of the Invention

The world of electronic commerce has created new challenges to establishing relationships between contracting parties. One of those challenges springs from the fact that the parties to the transaction cannot see or hear each other, and cannot otherwise easily confirm each other's identity and authority to act.

One remedy for this problem is to provide each contracting party with a private key for signing transmitted messages. The signing party makes available an associated public key that decrypts messages signed with the party's private key, and thus enables a receiving party to confirm the identity of the sender.

But the sender's public key may not be known *a priori* to the recipient. In that event, the sender may transmit with its signed message a digital certificate issued by a certificate authority. The certificate is itself a signed electronic document (signed with the private key of the certificate authority) certifying that a particular public key is the public key of the sender.

In some cases, the recipient may be unfamiliar with the public key of the certificate authority or may not know whether the certificate is still valid. In that event, the recipient may wish to check the authenticity and validity of the certificate with an entity that it trusts. One known protocol for checking certificate status is the on-line certificate status protocol (OCSP).

Another challenge facing electronic commerce relates to payments and the establishment of payment systems. In some cases, purchasers pay for goods purchased over the Internet by transmitting a credit card number to a merchant. Security risks and other drawbacks associated with this practice make it undesirable even for business-to-consumer transactions, and unacceptable for most business-to-business ones.

Several electronic payment systems have also been proposed, including ones that employ digital certificates to authenticate the identity of a payor. These systems, however, do not provide the array of payment instruments required for modern electronic commerce, especially business-to-business electronic commerce, and often fail to provide an adequate infrastructure to securely and verifiably effect electronic payments.

Summary of the Invention

A system and method are disclosed for providing a plurality of payment services to facilitate electronic commerce. In a preferred embodiment, these services are provided within the context of a four-corner trust model. The four-corner model comprises a buyer, also referred to as the subscribing customer, and a seller, also referred to as the relying customer, who engage in an on-line transaction. The buyer is a customer of a first financial institution, referred to as an issuing participant. The issuing participant acts as a certificate authority for the buyer and issues the buyer a hardware token including a private key and a digital certificate signed by the issuing participant. The seller is a customer of a second financial institution, referred to as the relying participant. The relying participant acts as a certificate authority for the seller and issues the seller a hardware token including a private key and a digital certificate signed by the relying participant. The system also includes a root certificate authority that issues digital certificates to the issuing and relying participants.

One benefit of the four-corner model is that trust between a buyer and seller does not depend on each party using the same certifying authority to validate digital certificates, or identity, to each other. Rather, the buyer and seller each look, in the first instance, to their respective banks for such validations. In turn, the buyer's and seller's banks look to the root entity to provide the necessary bridge that enables them to confidently validate the identity of one party to another and the integrity of the messages they exchange.

The present system and method leverage this trust model to provide enhanced payment services to buyers and sellers. The four-corner trust model and pre-established banking relationships between the parties and their respective banks enable the parties to complete an on-line purchase or trade and simultaneously arrange for a secure, efficient and, optionally, guaranteed payment. Moreover, use in the present system of digitally signed payment instructions provides authentication, message integrity, non-repudiation, and confidentiality.

In a preferred embodiment, payment messaging in the present system proceeds from buyer to seller to seller's bank to buyer's bank. Thus, for example, a buyer may execute a payment instruction and forward it to the seller who in turn forwards it to the seller's bank for ultimate delivery to, and payment by, the buyer's bank.

The present system and method operate efficiently in part because parties have pre-established payment authorization, routing, and settlement instructions with their banks, which enable the parties to initiate an on-line payment that is simultaneous with the transaction, rather than through a separate, off-line step. Additional efficiencies are created through standardized payment processing procedures at the banks.

The present system and method provide numerous benefits to buyers. In particular, the present system and method provide a buyer with access to a variety of payment options to satisfy a seller's requirements. The buyer is also provided with improved timing and knowledge of cash flows. In addition, the present system and method enable a buyer to cover trade-inherent risks by using a conditional payment instrument. Moreover, the buyer enjoys efficient work flows, as payment and purchasing are bundled into one process. Interfacing of the present system and method with existing legacy systems also enables full electronic processing of the entire transaction.

The present system and method also provide numerous benefits to sellers. In particular, the present system and method provide a seller with the ability to offer payment terms tailored to valued clients. The seller also reduces his or her credit risk through the use of assured payments. In addition, the present system and method improve a seller's timing and knowledge of cash flows. Moreover, the seller enjoys efficient work flows, as payment and purchasing are bundled into one process. Also, if the seller is holding a payment obligation, it may ask its bank to discount the obligation, providing a source of financing to

the seller. Interfacing of the present system and method with existing legacy systems also enables full electronic processing of the entire transaction.

In a preferred embodiment, the present system and method facilitate a plurality of payment instruments. These include a payment order, a payment obligation, a certified payment obligation, and conditional payments. Each of these payment instruments is described in more detail below in the detailed description.

In a preferred embodiment, the present system facilitates the creation and transfer of negotiable electronic payment instruments. For example, the present system includes a payment obligation that may preferably be sold in the secondary market. Change in the holder of these obligations may preferably be performed through use of a holder registry service.

Brief Description of the Drawings

The above summary of the invention will be better understood when taken in conjunction with the following detailed description and accompanying drawings, in which:

Fig. 1 is a block diagram of a preferred embodiment of the four-corner model employed by the present system;

Fig. 2 is a block diagram depicting components preferably provided at entities in the four-corner model;

Fig. 3 is a composite block/flow diagram of a first payment scenario;

Fig. 4 is a composite block/flow diagram of a second payment scenario;

Fig. 5 is a composite block/flow diagram of a third payment scenario;

Fig. 6 is a diagram illustrating a preferred embodiment of the message flow for processing a payment order;

Fig. 7 is a diagram illustrating a preferred embodiment of the message flow for processing a payment obligation; and

Fig. 8 is a diagram illustrating a preferred embodiment of the message flow for processing payment conditions.

Detailed Description of the Preferred Embodiments

SYSTEM ARCHITECTURE AND TECHNICAL CHARACTERISTICS

The present disclosure relates to a system that allows financial institutions to securely provide payment services to their customers. In a preferred embodiment, these services may be provided within the context of a four-corner trust model. A preferred embodiment of the four-corner model employed by the present system is shown in Fig. 1.

As shown in Fig. 1, the four-corner model comprises a first institution 102 and a second institution 104. First institution 102 is referred to as the "issuing participant" because it is a participant in the present system and issues digital certificates to its customers, as described below. Second institution 104 is referred to as the "relying participant" because it is a participant in the present system and its customers rely on representations made by issuing participant 102 and issuing participant 102's customers, as described below. Participants 102, 104 are typically banks or other financial institutions.

Also shown in Fig. 1 are a first customer 106, and a second customer 108. First customer 106 and second customer 108 are preferably customers of issuing participant 102 and relying participant 104, respectively.

First customer 106 is sometimes referred to as the "subscribing customer" because it subscribes to services provided by participant 102. First customer 106 is also sometimes referred to as the "buyer" because that is the role it typically plays in transactions in the four-corner models.

Second customer 108 is sometimes referred to as the "relying customer" because it relies on representations made by both issuing participant 102 and subscribing customer 106. Second customer 108 is also sometimes referred to as the "seller" because that is the role it typically plays in transactions in the four-corner model. It should be recognized, however, that although the description below speaks primarily in terms of a buyer 106 and a seller 108, first customer 106 and second customer 108 may instead have different roles in a given transaction. For example, first customer 106 may be a borrower repaying a loan to second customer 108.

Also shown in Fig. 1 is a root entity 110. Root entity 110 is typically an organization that establishes and enforces a common set of operating rules for facilitating electronic

commerce and electronic communications. Root entity 110 may be owned jointly by a plurality of banks and/or other financial institutions that have agreed to adhere to these operating rules. One exemplary embodiment of such a root entity is described in copending application serial No. 09/502,450, filed February 11, 2000, entitled System and Method for Providing Certification-Related and Other Services, which is hereby incorporated by reference.

Fig. 2 is a block diagram depicting components preferably provided at each entity in the four-corner model. As shown in Fig. 2, participants 102, 104 and root entity 110 are each preferably provided with a transaction coordinator 202 that serves as a gateway for transmitting and receiving all inter-entity messages related to services provided by the present system. Transaction coordinators 202 provide a single interface to issuing participant 102's and relying participant 104's on-line services and implement safeguards necessary to ensure secure electronic communications between transaction coordinators 202 and other entities in the four-corner model. A preferred embodiment of a transaction coordinator 202 suitable for use in the present system is described in copending United States patent application Serial No. _____, filed on even date herewith, entitled System and Method for Certificate Validation and Other Services, which is hereby incorporated by reference.

Participants 102, 104 and root entity 110 are each further preferably provided with an OCSP responder 204 and hardware security module (HSM) 206. HSM 206 is adapted to sign messages and verify signatures on messages.

In addition, each participant 102, 104 and root entity 110 is further preferably provided with a billing data database 208 (connected to a bank billing application 210 in the case of participants 102, 104), a raw transaction log, 212, a customer data database 214, a risk manager 216 (connected to customer data database 214), and a hardware security module 218, each of which is connected to transaction coordinator 202.

As further shown in Fig. 2, relying customer 108 is preferably provided with a Web server 220 that is adapted to receive and transmit information via the Internet. Relying customer 108 is further preferably provided with a bank interface 222 for communicating with relying participant 104. One preferred embodiment of bank interface 222 (as well as additional components preferably provided at relying customer 108) is described in copending United States patent application Serial No. _____, filed on even date

herewith, entitled System and Method for Facilitating Access By Sellers to Certificate-Related and Other Services, which is hereby incorporated by reference. Relying customer 108 is preferably further provided with a hardware security module 230 for signing and verifying system messages.

As further shown in Fig. 2, subscribing customer 106 is preferably provided with a Web browser 224 for browsing the Internet, and a smart card 226 (and associated reader) for signing messages, as described below.

In a preferred embodiment, each system entity is provided with two digital certificates (and corresponding private keys) to facilitate authentication: An identity certificate (also referred to, in some cases, as a warranty certificate) and a utility certificate. In addition, in a preferred embodiment, each transaction coordinator 202 is preferably provided with its own identity certificate and utility certificate and associated private keys.

The identity private key is used to produce digital signatures that are required by root entity 110 as evidence of an entity's contractual commitment to the contents of an electronic transaction. A certificate chain is needed to support operations using this key. The status of the identity certificate may be obtained by authorized entities as described, for example, in copending United States patent application Serial No. _____, filed on even date herewith, entitled System and Method for Certificate Validation and Other Services, which is hereby incorporated be reference.

The utility private key is used to produce digital signatures that allow additional transactional security. Typically, utility certificates are used to support secure socket layer sessions, to sign S/MIME messages, and for other utility applications. A certificate chain is also needed to support operations using the utility key. The status of the utility certificate, however, may not be available to a requestor. Throughout this document, the term "certificate" refers to an identity certificate unless otherwise stated.

In a preferred embodiment, subscribing customer 106's digital certificates and associated private keys are provided to it by issuing participant 102. Issuing participant 102 preferably issues smart cards or other suitable instruments to subscribing customer 106 that include at least the private key associated with the subscribing customer's identity certificate. If desired, the smart card may also include the subscribing customer's identity certificate. Preferred specifications for the smart card, its manufacture, and contents are described in

copending United States provisional patent application Serial No._____, filed August 14, 2000, entitled Signing Interface Requirements, Smart Card Compliance Requirements, Warranty Service, Functional Requirements, and Additional Disclosure, which is hereby incorporated by reference.

In a preferred embodiment, the present system supports at least the following Internet transport protocols: Hyper Text Transport Protocol (HTTP), Multipurpose Internet Mail Extensions (MIME), Simple Mail Transport Protocol (SMTP), and Internet Inter-ORB Protocol (IIOP). In addition, the present system preferably supports at least the following Internet transport security protocols: Secure Sockets Layer (SSL), Secure/Multipurpose Internet Mail Extensions (S/MIME), Transport Layer Security (TLS), and Secure Internet Inter-ORB Protocol (S-IIOP).

In a preferred embodiment, payment instruments in the present system are encrypted to protect confidential financial information. Due to the confidential nature of the information exchanged between all parties strong encryption is preferred. The encryption should preferably be at the message-level, in addition to any transport-level encryption.

To enable automated processing, payment messages in the present system are preferably structured to optimize fast on-line processing with certificate management services provided by the present system (e.g., certificate validation) as well as with other systems such as legacy systems that are external to the present system. Integration with the present system may include a set of MIME-based messages. Integration with other systems may include EDIFACT, XML/ BizTalk and Enterprise Java Beans. These are preferred because they enable straightforward conversion into existing payment message formats.

Payment services messages in the present system are preferably signed by system entities using the private keys associated with their identity certificates. The payment services messages may be enveloped or referenced, or both, in the content of certificate management service messages.

Many of the payment messages described below require contributions from more than one party before the completed message is transmitted to the final recipient. Messages in the present system are therefore preferably structured to support signed additions to the contents while preserving non-repudiation for each signer and the final recipient.

At the very low end, a buyer 106 may typically employ a standard Internet browser such as Netscape Navigator™ or Internet Explorer™ along with some method to support applications related to the present system. Such methods may include a browser plug-in, the use of Java applets or some other technology. Technology options such as XML may also be used.

One potential implementation is to load an HTML page into browser 224 from a seller-side server containing the results of the negotiation of terms and conditions between buyer 106 and seller 108. Using a signed JAVA applet as part of the downloaded HTML page the information can be structured and digitally signed using smart card 226. The resulting message can then be forwarded to the server for further processing. An alternative implementation approach is the use of plug-ins or helper applications, which compose and sign the payment service messages. Preferred embodiments for these implementations are described in copending United States provisional patent application Serial No._____, filed August 14, 2000, entitled Signing Interface Requirements, Smart Card Compliance Requirements, Warranty Service, Functional Requirements, and Additional Disclosure, which is hereby incorporated by reference.

Besides this synchronous communication model, other models of information exchange between buyer 106 and seller 108 may be supported. For example, asynchronous e-mail exchange may be supported by the system.

Typically, the seller uses a standard HTTP web server (e.g., Apache) to serve HTML pages and runs an application server to provide specific business functionality to buyers, (e.g., a shopping system). Integrated with this application are other software components that facilitate access to system services including the validation and warranty services described, for example, in copending United States patent application Serial No. _____, filed on even date herewith, entitled System and Method for Certificate Validation and Other Services, which is hereby incorporated by reference, and the payment services described herein. In a preferred embodiment, this integration may be the active integration described in copending United States patent application Serial No. _____, filed on even date herewith, entitled System and Method for Facilitating Access By Sellers to Certificate-Related and Other Services, which is incorporated by reference. A seller 108's

decision about payment instruments to offer buyer 106 and the resulting terms of a purchase are an integral part of the seller's application.

As an example, seller 108's application may use the buyer 106's certificate to identify a customer and apply special terms and conditions to that customer. In addition, the use of the payment services might be dependent on the merchandise as well as a customer's history with seller 108. For example for an order above a specific limit seller 108 may only be willing to accept certified payment obligations provided by a bank. In contrast, below a certain threshold seller 108 may decide to accept payment orders. In addition, a seller may use third party services like a Dun and Bradstreet rating service to decide which payment instruments are acceptable for a given transaction.

Applications running at seller 108 are preferably adapted to sign messages, verify signatures on messages, and check the status of a certificate as described, for example, in copending United States patent application Serial No. _____, filed on even date herewith, entitled System and Method for Facilitating Access By Sellers to Certificate-Related and Other Services, which is incorporated herein by reference, and to provide the payment services described herein.

In addition to Web based implementations, server-to-server communication or an automated email-processing tool may also be employed at the seller's side.

Each participant in the present system may act as either a relying participant or an issuing participant depending on the situation. Thus, for example, in a case where a customer of a first participant is the buyer in a given transaction and a customer of a second participant is a seller in the same transaction, then the first participant is the issuing participant with respect to that transaction, and the second participant is the relying participant with respect to that transaction. Each participant preferably offers a number of services, including the following: acting as a certification authority for its customers (supporting issuance, renewal and revocation of certificates), providing validation and warranty services to its customers, responding to OCSP requests from other system participants (supporting certificate validation), and providing and supporting payment services for its customers (e.g., the payment services discussed herein).

In a preferred embodiment, transaction coordinator 202 is the primary interface to certificate based services provided by a participant. As described in copending United States

patent application Serial No. _____, filed on even date herewith, entitled System and Method for Certificate Validation and Other Services, which is incorporated herein by reference, transaction coordinator 202 facilitates system functions like message verification, logging, billing, and authorization to all certificate based services.

Each customer certificate is preferably linked to an end-user authorization system at issuing participant 102 and relying participant 104. The components of the authorization system may be determined by each participant, but typically include information on transaction types, amount limits, overrides and approvals permitted to each customer certificate. A preferred authorization approach is described in copending United States patent application serial No. _____, filed on even date herewith, entitled Authorization/ Credential Service and Authorization/Credential Service Proposal, which is incorporated herein by reference.

Each customer certificate is preferably linked to a payment template system at buyer's bank 102 and seller's bank 104. The payment template stores default payment instructions for buyer 106, seller 108, and seller's bank 104 that are used by buyer's bank 102 to execute payment authorization messages. The design of the payment authorization message may permit some of the instructions to be overridden by a duly authorized buyer or seller end-user.

In a preferred embodiment, each bank may, at its discretion, provide its customers with additional functionality. This additional functionality may include maintenance of limits for a buying company or provision of aggregated management information about the use of payment services by a specific customer.

In a preferred embodiment, the payment services disclosed herein use existing bank networks for actual payment. They may also use existing functionality already available at banks like a payment warehousing system for future dated payments. Some of the connections to these existing systems are preferably real-time and on-line. These systems may include: a real-time, on-line interface to a payment initiation system to create, warehouse, and release payment orders; a real-time, on-line interface to a payment risk system that monitors daylight and overnight limits; a real-time, on-line component for generating payment initiation acknowledgments; a real-time, on-line interface to system identity servers to process digital signatures and identity assurance; a real-time, on-line interface to an application authorization system; and a real-time, on-line interface to a

warehouse of payment order cancellation requests sent by a buyer 106 before buyer's bank 102 receives a payment order (payment revocation list).

PAYMENT INSTRUMENTS AND SCENARIOS

Payment instruments provided by the present system include a payment order, a payment obligation, a certified payment obligation, and conditional payments. A brief description of each payment instrument is now provided. Each payment instrument is described in more detail below.

Payment Order

A payment order (POr) is a revocable, unconditional electronic instruction from a buyer 106 requesting buyer's bank 102 to initiate a credit payment to seller 108 on a specific date for a specified amount. The payment order is typically used when the buyer and seller have an established business relationship.

Payment Obligation and Certified Payment Obligation

A payment obligation (POb) is an irrevocable, unconditional undertaking of a buyer 106 to pay a seller 108, or holder, of the obligation on a specific date for a specified amount at buyer's bank 102. It is evidence of debt of the buyer to the seller. Buyer 106 may request buyer's bank 102 to accept or certify the obligation to pay seller 108, in which case it becomes a certified payment obligation (Certified POb).

A payment obligation is typically used when seller 108 is unsure of buyer 106's intent to pay on time. A certified payment obligation is used when seller is unsure of buyer's ability to pay.

Conditional Payments

A conditional payment is a payment order or a payment obligation in favor of a named seller, payable at buyer's bank 102 upon presentation to buyer's bank 102 of specified electronic messages, signed by specified parties, to evidence fulfillment of pre-agreed conditions. Buyer 106 may request buyer's bank 102 to accept or certify the obligation to

pay seller 108, in which case it becomes a certified conditional payment obligation (Certified CPOb).

A conditional payment is used when either buyer 106 or seller 108, or both, agree that the payment will be effected only after certain provisions have been met. It is used to trigger the timing and occurrence of payment. A certified conditional payment obligation adds assurance that the payment will be effected once specified provisions have been met.

PAYMENT SCENARIOS AND MODELS

In a preferred embodiment, buyer 106, through various commercial and financial scenarios, can initiate payment orders and payment obligations. This is due to the ability of system 200 of Fig. 2 to identify parties at almost any stage of a commercial or financial transaction, which provides a great deal of flexibility as buyers initiate payments. The scenarios described below illustrate this flexibility.

Online payment initiation through seller payment server

In a first payment scenario, seller 108's payment server offers payment order or payment obligation options to buyer 106. As shown in Fig. 3, in this first scenario, buyer 106 creates a payment order or payment obligation instruction and authorizes seller 108 to forward the instruction to buyer's bank 102 through seller's bank 104. Buyer 106, seller 108, and optionally, seller's bank 104, supply information needed to initiate the payment or create the obligation. In a preferred embodiment, using the four corner transaction model, buyer's bank 102 initiates payment or creates an obligation based on buyer 106's signature.

Online debit authorization through seller payment server

In a second payment scenario, seller 108's payment server offers a direct debit option to buyer 106 as depicted in Fig. 4. As shown in Fig. 4, in this second scenario, buyer 106 authorizes seller 108 to forward to seller's bank 104 an instruction for direct debit from buyer 106's account. In a preferred embodiment, buyer 106 and seller 108 supply information needed to initiate the payment. Seller's bank 104 initiates direct debit, based on seller 108's signature. This is referred to as a direct debit transaction model. It should be noted that this scenario may not work if buyer 106 and seller 108 operate in different countries.

Payment initiation through buyer payment server.

In a third payment scenario, buyer 106's payment server sends a payment order or obligation instructions directly to buyer's bank 102 as depicted in Fig. 5. As shown in Fig. 5, in this third payment scenario, buyer 106 supplies information needed to initiate the payment or obligation. Buyer's bank 102 initiates payment or creates the obligation based on buyer 106's signature. This is referred to as a buyer to buyer's bank transaction model.

Legal Relationships Between System Entities

In a preferred embodiment, contractual agreements bind banks and their customers. In particular, the use of system services is preferably defined by a set of operating rules and one or more contracts derived from these rules that are binding on system entities, as described in more detail below.

In a preferred embodiment, operating procedures and rules for the payment services disclosed herein define the rights and responsibilities of the participants. The rules of various electronic payment associations (including those of foreign jurisdictions) may serve as a helpful guide when creating these rules. Moreover, those association rules might even impose certain requirements on the new rules. For example, special attention is preferably given to association rules regarding issues of reversal of transaction and finality of payment.

Alternatively, to the extent that the payment order or obligation cannot be reconciled with existing payment rules, or in the event that such rules need to be supplemented (outside their existing framework) to take account of the unique nature of on-line payment initiation, the various parties involved in a transaction may be bound by an additional set of rules imposed by root entity 110.

In a preferred embodiment, the operating rules for the present system incorporate the Uniform Rules for Electronic Trade and Settlement (URETS), once approved by the International Chamber of Commerce (ICC).

In a preferred embodiment, payment obligations and certified payment obligations in the present system are created and recorded entirely in book entry form. As in the case of the bill of exchange, the payment obligation or the certified payment obligation may preferably be sold in the secondary market. Change in the holder of these obligations may preferably be

performed through use of a holder registry service. Buyer's bank 102 is preferably made accountable for registering the correct holder of the obligation.

In a preferred embodiment, before payment services are used, buyer 106 and seller 108 each establish a relationship with their respective participants 102, 104. In a preferred embodiment, this includes the following steps:

- Each customer and its respective participant sign a contract defining their roles and responsibilities in connection with payment services. This contract is typically in addition to other contracts between the parties covering other aspects of their customer-bank relationship. On signing of the contract, the customer accepts the operating rules for the payment services.

- Each participant sets up the payment service for its respective customer. This may require a credit review process involving a number of bank departments. Establishing a payment guarantee account may take from hours to days and may be part of an existing credit relationship between the parties. It also preferably includes registration of the employees authorized to use payment services and establishing a line of credit for the customer. It also preferably encompasses set-up of standard settlement instructions for buyer 106 (e.g., account to be debited for each currency, payment system to be used). In addition, each bank may require additional set-up procedures dependent on the specific service the bank is offering its customers.

In a preferred embodiment, dispute resolution between system entities may be regulated by the operating rules, as described in copending United States patent application Serial No. 09/502,450, filed February 11, 2000, entitled System and Method for Providing Certification-Related and other Services, which is hereby incorporated by reference.

GENERAL DESCRIPTION OF PAYMENT SERVICES PRODUCTS

In a preferred embodiment, the combination of payment obligation, or revocability, and documentary conditions in the present system produce several instrument types that provide a range of payment instruments to meet the credit and risk management needs of business-to-business electronic commerce. These instrument types are summarized in the table below.

	Revocable	Whose Obligation	Negotiable	Payment on Condition	Recurring
PAYMENT ORDER					
Payment Order	Yes	Buyer	No	No	Yes
PAYMENT OBLIGATION					
Payment Obligation	No	Buyer	Yes	No	No
Certified Payment Obligation	No	Bank	Yes	No	No
CONDITIONAL PAYMENT					
Conditional Payment Order7	Yes	Buyer	No	Yes	No
Conditional Payment Obligation	No	Buyer	Yes	Yes	No
Certified Conditional Payment Obligation	No	Bank	Yes	Yes	No

Table 1

In a preferred embodiment, a payment order provides automated, on-line payment initiation to buyers and sellers conducting electronic commerce over the World Wide Web.

The payment order can be credit or debit. Debit can be originated by buyer 106 (thus serving as an authorization by the buyer), or it can be a collection (originated by seller 108, without authorization by the buyer; N.B. this may not be permitted in all countries).

Credit-enhanced payment services, where buyer's bank 102 is obligated to pay seller 108, may include a certified payment obligation. The certified payment obligation is preferably an unconditional undertaking of buyer's bank 102 to pay seller 108 for goods purchased.

In a preferred embodiment, a conditional payment order is similar to the payment order described above except that buyer's bank 102 does not release payment until it has received documents from seller 108 evidencing that seller 108 has shipped the goods that are the subject of the transaction. A certified conditional payment obligation is preferably an undertaking of buyer's bank 102 to pay seller 108, conditioned on seller 108 or a third party submitting documents specified in the documentary credit to buyer's bank 102 to evidence fulfillment of contractual obligations.

The present system and method employ a plurality of request messages and response messages to implement the above-identified payment instruments. Generally, these include:

1) Request Messages:

Acronym	**Description**
POr Inst	Payment Order Instruction
POb Inst	Payment Obligation Instruction
CPOr Inst	Conditional Payment Order Instruction
CPOb Inst	Conditional Payment Obligation Instruction
CePOb Inst	Certified Payment Obligation Instruction
CeCPOb Inst	Certified Conditional Payment Obligation Instruction
POr Cncl	Payment Order Cancellation
Cnd Adv	Condition Advice
Sts Inq	Status Inquiry

Table 2

2) Response Messages:

Acronym	Description
Srv Ack	Service Acknowledgement to request messages
Pay Conf	Confirmation of a Payment Execution
PObAcpt Conf	Confirmation of Payment Obligation Acceptance
CePObAcpt Conf	Confirmation of Certified Payment Obligation Acceptance
POr Cncl Conf	Confirmation of a Payment Order Cancellation
Cnd Update	An intermediate update in response to the condition advice message
Cnd Decl	Condition Declaration in response to the condition advice message
Sts Inq Resp	Status Inquiry Response

Table 3

It should be noted that the categorization of the above messages is general, and that a more specific categorization and functional description of these and other related messages may vary depending on how the system of the present invention is specifically implemented. A preferred implementation of system messages using Extensible Markup Language (XML) is described in detail below.

In a preferred embodiment, each message is structured to support signed additions to its contents and attachments (including one or more signatures/certificates to each addition) while preserving non-repudiation for each signing party and the final recipient. In addition, in a preferred embodiment, the system adheres to the following requirements:

1. Each request message, when received by the intended final party, returns a service acknowledgment (Srv Ack) message.

2. When a financial institution executes a payment, it sends a confirmation (Pay Conf) message of this action to the appropriate parties.

3. When a financial institution receives a payment obligation instruction, it sends a confirmation message (PObAcpt Conf) to the sender of the message indicating whether the obligation will or will not be carried out. A CePObAcpt Conf message is preferably sent in response to payment obligation messages that are requested to be certified.

4. When a financial institution receives a payment order cancellation message (POr Cncl), it responds with a message (POr Cncl Conf) confirming that this cancellation has been accepted or rejected.

5. When a third party service provider (TPSP) entity receives a condition advice message (Cnd Adv), it responds with a response message (Cnd Decl), when the condition has been met, or when it ascertains that the condition will never be met.

6. Payment instruction messages may be signed by multiple parties at buyer 106's organization.

7. All payment messages are signed by each relaying party.

8. Buyers 106 and sellers 108 use a bank's certificate to identify themselves in a payment message (except in the circumstance where the buyer and seller have the same bank, i.e., in the case of a three, rather than four, corner transaction).

Tables describing the content of each system message are provided below. In each table, the first column identifies the name of the message portion, the second column specifies whether, in a preferred embodiment, the message portion is mandatory, optional, or conditional (i.e., whether it is mandatory depends on the circumstances), the third column identifies the entity that provides the content for the message portion, and the fourth column contains additional comments concerning the message portion.

In a preferred embodiment, a payment order instruction comprises the following data:

Name	**Use**	**Content Provider**	**Comments**
Version	Mandatory	Buyer	To identify the version number.
Buyer Creation Date	Mandatory	Buyer	
Buyer Creation Time	Mandatory	Buyer	
Buyer Reference	Optional	Buyer	Buyer instruction reference
Related Transaction Reference	Optional	Buyer	Reference of underlying commercial or financial transaction
Payment Amount	Mandatory	Buyer	
Payment Currency	Mandatory	Buyer	Use ISO codes
Transaction Type	Mandatory	Buyer	Payment Order

Name	Use	Content Provider	Comments
Payment Type	Optional	Buyer	This is the payment type option for a specific payment method. Examples include CTX, CCD for US ACH payments.
Execution Date	Mandatory	Buyer	This is the date buyer's bank is requested to execute the transaction.
Fees	Mandatory	Buyer	Allowable values are: -All fees borne by buyer -All fees borne by seller -Each pays own fees
Buyer Identification	Mandatory	Buyer	Buyer certificate
Buyer's Account at Buyer's Bank	Optional	Buyer	Field used to override account data associated with buyer certificate.
Seller Identifier	Mandatory	Buyer	Seller certificate
Seller Creation Date	Mandatory	Seller	
Seller Creation Time	Mandatory	Seller	
Seller Reference	Optional	Seller	Seller instruction reference
Seller's Account at Seller Bank	Optional	Seller	Field used to override account data associated with seller certificate.
Seller's Payment Identifier	Optional	Seller	Used to identify a sub-account relationship with seller's bank for cash application (i.e., lockbox)
Seller's Bank 104 Creation Date	Mandatory	Seller's Bank	Must use trusted time server
Seller's Bank 104 Creation Time	Mandatory	Seller's Bank	Must use trusted time server

Name	Use	Content Provider	Comments
Seller's Bank 104 Reference	Mandatory	Seller's Bank	
Seller Bank Fee Amount	Conditional	Seller's Bank	Mandatory if all fees borne by buyer Fee currency is same as payment currency.
Seller's Bank 104 Correspondent Bank	Optional	Seller's Bank	Field used to override settlement instructions associated with relying participant certificate. Corresponds to S.W.I.F.T. field 54.

Table 4

In a preferred embodiment, a payment obligation instruction contains the data listed above for a payment order instruction with the exception of the changes listed in the table below:

Name	Use	Content Provider	Comments
Transaction Type	Mandatory	Buyer	Payment Order
Payment Obligation Party	Mandatory	Buyer	Allowable values are: Buyer or buyer's bank

Table 5

In a preferred embodiment, a certified payment obligation instruction contains the same data as that listed above for a payment order instruction.

In a preferred embodiment, (1) a conditional payment order instruction contains the data described above for a payment order instruction with the exception of the changes listed in the table below; (2) a conditional payment obligation instruction contains the data described above for a payment obligation instruction with the exception of the changes listed in the table below; and (3) a certified conditional payment obligation instruction contains the data described above for a certified payment obligation instruction with the exception of the changes listed in the table below:

Name	Use	Content Provider	Comments
Payment Execution Date/Term	Mandatory	Buyer	This is the date buyer's bank is requested to execute the transaction or a payment term e.g., "upon conditions met"; "30 days after conditions met".
Payment Conditions	Mandatory	Buyer	Fields for: TPSP Identifier; merchandise description; message details; confirmation by date; others

Table 6

In a preferred embodiment, payment conditions are selected from a collection of condition templates. In addition, each condition is preferably structured to allow an unambiguous true/false confirmation.

In a preferred embodiment, the TPSP may attach or append to the confirming message additional purchase details or electronic documents/files for information purposes which may or may not be required under the condition.

In a preferred embodiment, payment order cancellation messages (POr Cncl) may be signed by multiple parties at buyer 106's organization.

In a preferred embodiment, payment order cancellation messages contain the following data:

Name	Use	Content Provider	Comments
Buyer Reference	Optional	Buyer	Buyer instruction reference
Related Transaction Reference	Optional	Buyer	Reference of underlying commercial or financial transaction
Buyer Identification	Mandatory	Buyer	Buyer certificate

Payment Order Instruction Reference	Mandatory	Buyer	This is a unique identifier that relates to the specific payment order instruction that is to be canceled by this message.

Table 7

In a preferred embodiment, condition advice (Cnd Adv) messages are sent from a trusted service supplier (TSS) organization, a role which may be played by buyer's bank 102. These messages are used to set conditions which must be met in order to facilitate payment execution. In a preferred embodiment, all condition advice messages (Cnd Adv) are sent to the TPSP and the TPSP sends a service acknowledgment (Srv Ack) message in response to this message. In a preferred embodiment, the condition advice message contains the following data:

Name	**Use**	**Content Provider**	**Comments**
Version Number	Mandatory		To identify version number
TSS (Buyer's Bank) Identifier	Mandatory	TSS	Buyer's bank certificate
Message Creation Date	Mandatory	TSS	Must use trusted time server
Message Creation Time	Mandatory	TSS	Must use trusted time server
Payment Instruction Reference	Mandatory	From Payment Inst	To identify payment instruction reference.
Payment Condition Confirmation	Mandatory	From Payment Inst	Defaults when payment instruction reference entered. Fields can be structured for: Merchandise Description Message Details Confirmation Date Etc.

Additional Details Append Code	Optional	TSS	For use when additional file or details are to be attached for information purposes: Allowable values: Y N (Defaults to N)
Additional Details Area	Conditional	TSS	Mandatory if "Additional Details Append Code" is Y. Area where text can be pasted or where files can be attached.

Table 8

In a preferred embodiment, parties obtain information relating to specific transactions from other parties in the payment initiation system using status enquiry messages.

In a preferred embodiment, a response message is produced on receipt of any type of request message. Each response message preferably indicates whether it is returning a positive or negative response to the received request message.

In a preferred embodiment, service acknowledgment (Srv Ack) messages are sent in response to all request messages. The following messages are all preferably responded to with service acknowledgment (Srv Ack) messages:

- POr Inst (payment order instruction)
- POb Inst (payment obligation instruction)
- CPOr Inst (conditional payment order instruction)
- CPOb Inst (conditional payment obligation instruction)
- CePOb Inst (certified payment obligation instruction)
- CeCPOb Inst (certified conditional payment obligation instruction)
- POr Cncl (payment order cancellation)
- Cnd Adv (condition advice)
- Cnd Update (an intermediate update in response to the condition advice message)
- Cnd Decl (condition declaration in response to the condition advice message)

In a preferred embodiment, service acknowledgment (Srv Ack) messages are sent when the syntax, signature(s), certificate(s), and user authority contained within the message are verified by the final intended recipient. This final intended recipient may vary as a function of the payment scenario. For example, in the four-corner model, the intended final recipient of payment order/obligation request messages, is buyer's bank 102. In contrast, in the direct debit model, the intended final recipient of payment order/obligation request messages, is seller's bank 104. In a preferred embodiment, service acknowledgment (Srv Ack) messages are sent in response to any received payment instruction message within one minute from receipt by the final intended recipient of the payment instruction message.

In a preferred embodiment, the service acknowledgment (Srv Ack) message contains the data listed in the following table:

Name	**Use**	**Content Provider**	**Comments**
Version Number	Mandatory	Buyer's Bank (BB)/Seller's Bank (SB)	To identify the version number
Message Creation Date	Mandatory	BB / SB	Must use trusted time server
Message Creation Time	Mandatory	BB / SB	Must use trusted time server
Message Status	Mandatory	BB / SB	Allowable types: _ Positive _ Negative
Srv Ack Message Reference	Mandatory	BB / SB	
Original Request Message Reference	Conditional	Buyer / Seller	Mandatory if present in the original request message.
Seller Identifier	Mandatory	BB / SB	Seller certificate

Name	Use	Content Provider	Comments
Reason Code	Conditional	BB / SB	Mandatory if Message Status is negative acknowledgment.
Reason Text	Optional	BB / SB	Reason for negative Acknowledgement

Table 9

In a preferred embodiment, whenever an entity that is not the final intended recipient receives a service acknowledgment (Srv Ack) message the entity envelopes this information, adds its service acknowledgment (Srv Ack) information, and passes the message onto the final intended recipient. For example, when a seller's bank 104 receives a service acknowledgment (Srv Ack) from a buyer's bank 102 when operating in the four-corner model, it passes this service acknowledgment (Srv Ack) onto its seller 108.

In a preferred embodiment, this service acknowledgment (Srv Ack) message contains the data listed in the previous table, as well as the data listed in the following table:

Name	Use	Content Provider	Comments
Original Srv Ack Message Data From Buyer's Bank	Mandatory	Seller's Bank	Original signed Srv Ack message from buyer's bank enveloped within this Srv Ack message

Table 10

In a preferred embodiment, payment execution confirmation (Pay Conf) messages are sent when a financial institution has executed the payment process specified in the related payment instruction. The payment execution confirmation (Pay Conf) message is preferably sent to the appropriate recipients no later than by the end of the following business day. This payment execution confirmation (Pay Conf) message preferably contains the following data:

Name	Use	Content Provider	Comments
Version number	Mandatory	BB / SB	To identify the version number
Message Creation Date	Mandatory	BB / SB	Must use trusted time server
Message Creation Time	Mandatory	BB / SB	Must use trusted time server
Transaction Type	Mandatory	BB / SB	Allowable values: _ POr, CPOr _ POb, CPOb, CePOb, CeCPOb
Message Status	Mandatory	BB / SB	Allowable values: _ Positive _ Negative
Pay Conf Message Reference	Mandatory	BB / SB	Reference for this message
Payment Instruction Reference	Conditional	BB / SB	Mandatory, if present in the original payment instruction message.
Seller Identifier	Mandatory	BB / SB	Seller certificate
Effective Date	Conditional	BB / SB	Mandatory for a positive Message Status. (This is the date that the bank has originated the payment)
Reason Code	Conditional	BB / SB	Mandatory if Message Status is negative.
Reason Text	Conditional	BB / SB	Reason for negative Message Status
Bank's Holder Registry Transfer Fee Amount	Conditional	BB / SB	Mandatory for a positive Message Status. Fee currency is the same as payment currency.

Table 11

In a preferred embodiment, when an entity receives a payment execution confirmation (Pay Conf) message, the entity envelopes this information, adds its payment execution confirmation (Pay Conf) information, and passes the message onto the final intended recipient. For example, when a seller's bank 104 receives a payment execution confirmation (Pay Conf) from buyer's bank 102 when operating in the four-corner model, it passes this payment execution confirmation (Pay Conf) message onto seller 108.

In a preferred embodiment, this payment execution confirmation (Pay Conf) message contains the data listed in the above table as well as the following data:

Name	**Use**	**Content Provider**	**Comments**
Original Pay Conf Message Data from Buyer's Bank	Mandatory	Seller's Bank	Original signed Pay Conf message from buyer's bank enveloped within its (seller's bank) Pay Conf message

Table 12

In a preferred embodiment, payment obligation acceptance confirmation (POb Acpt Conf) messages are sent in response to a payment obligation request message by the close of the following working day. The payment obligation acceptance confirmation (POb Acpt Conf) message preferably contains the data listed below:

Name	**Use**	**Content Provider**	**Comments**
Version Number	Mandatory	BB / SB	To identify the version number
Message Creation Date	Mandatory	BB / SB	Must use trusted time server
Message Creation Time	Mandatory	BB / SB	Must use trusted time server
Message Status	Mandatory	BB / SB	Allowable types: _ Positive _ Negative

Name	Use	Content Provider	Comments
POb Acpt Conf Message Reference	Mandatory	BB / SB	
Original Payment Obligation (POb) Message Reference	Conditional	Buyer / Seller	Mandatory if present in the original request message.
Seller Identifier	Mandatory	BB / SB	Seller certificate
Reason Code	Conditional	BB / SB	Mandatory if Message Status is negative acknowledgment.
Reason Text	Optional	BB / SB	Reason for negative acknowledgment

Table 13

In a preferred embodiment, when an entity that is not the final intended recipient receives a payment obligation acceptance confirmation (POb Acpt Conf) message, the entity envelopes this information, adds its payment obligation acceptance confirmation (POb Acpt Conf) information, and passes the message onto the final intended recipient. For example, when a seller's bank 104 receives a payment obligation acceptance confirmation (POb Acpt Conf) from buyer's bank 102 when operating in the four-corner model, it passes this payment obligation acceptance confirmation (POb Acpt Conf) to its seller 108. This payment obligation acceptance confirmation (POb Acpt Conf) message preferably contains the data listed in the above table as well as the following data:

Name	Use	Content Provider	Comments
Original POb Acpt Conf Message Data from Buyer's Bank	Mandatory	Seller's Bank	Original signed Pay Conf message from buyer's bank enveloped within its (seller's bank) Pay Conf message

Table 14

In a preferred embodiment, certified payment obligation acceptance confirmation (CePOb Acpt Conf) messages are sent in response to a certified payment obligation request

message by the close of the following working day. The certified payment obligation acceptance confirmation (CePOb Acpt Conf) message preferably contains the data in Table 13.

In a preferred embodiment, payment order cancellation confirmation (POr Cncl Conf) messages are sent in response to a payment order cancellation instruction message (POr Cncl Inst), by the close of the following working day. The payment order cancellation confirmation (POr Cncl Conf) message preferably contains the following data:

Name	**Use**	**Content Provider**	**Comments**
Version Number	Mandatory	Buyer's Bank / Seller's Bank	To identify the version
Message Creation Date	Mandatory	Buyer's Bank / Seller's Bank	Must use trusted time server
Message Creation Time	Mandatory	Buyer's Bank / Seller's Bank	Must use trusted time server
Message Status	Mandatory	Buyer's Bank / Seller's Bank	Allowable types: _ Positive _ Negative
POb Acpt Conf Message Reference	Mandatory	Buyer's Bank / Seller's Bank	
Original Payment Obligation (POb) Message Reference	Conditional	Buyer / Seller	Mandatory if present in the original request message.
Seller Identifier	Mandatory	Buyer's Bank / Seller's Bank	Seller certificate
Reason Code	Conditional	Buyer's Bank / Seller's Bank	Mandatory if Message Status is negative acknowledgement.

Name	Use	Content Provider	Comments
Reason Text	Optional	Buyer's Bank / Seller's Bank	Reason for positive/negative acknowledgement

Table 15

In a preferred embodiment, condition update (Cnd Update) messages may be sent in conjunction with condition advice messages. These messages are preferably sent from TPSP parties to provide updates on the progress that has been made in meeting the condition specified by the condition advice message.

In a preferred embodiment, condition declaration (Cnd Decl) messages are sent in response to a condition advice message by TPSP parties. Condition declaration (Cnd Decl) messages are preferably sent when either a condition outlined by an original condition advice (Cnd Adv) message has been met, or if the condition will never be met. For example, if a condition is that some goods will be shipped by a specific date, and the goods have yet to be shipped, and that specified date has passed, a negative response is sent.

The condition declaration (Cnd Decl) message preferably contains the following data:

Name	Use	Content Provider	Comments
Version Number	Mandatory		To identify version number
TPSP Identifier	Mandatory	TPSP	TPSP certificate
Message Creation Date	Mandatory	TPSP	Must use trusted time server
Message Creation Time	Mandatory	TPSP	Must use trusted time server
Payment Instruction Reference	Mandatory	From Payment Inst.	To identify payment instruction reference.

Name	Use	Content Provider	Comments
TSS Condition Declaration Request Message Reference	Mandatory	TSS	From the original condition declaration request message.
Payment Condition Confirmation	Mandatory	From Payment Inst	Defaults when Payment Instruction reference entered. Fields can be structured for: _ Merchandise Description _ Message Details _ Confirmation Date _ Etc.
Condition Confirmation Code	Conditional	TPSP	Code that represents the status of this condition declaration response message: If this field is not included then the "Condition Confirmation Details" field must contain information.
Condition Confirmation Details	Conditional	TPSP	Descriptions of the possible responses that the TPSP can respond with. If this field is not included then the "Condition Confirmation Code" field must contain information.

Name	Use	Content Provider	Comments
Additional Details Append Code	Optional	TPSP	For use when additional file or details are to be attached for information purposes: Allowable values: -Y -N (Defaults to N)
Additional Details Area	Conditional	TPSP	Mandatory if "Additional Details Append Code" is Y. Area where text can be pasted or where files can be attached.

Table 16

In a preferred embodiment, a status inquiry response message (Sts Inq Resp) contains a history of the transaction specified in the status inquiry request.

COMMUNICATION PROTOCOLS

In a preferred embodiment, the following protocols and formats are used in signing and formatting signed data:

1. XMLDSig (XML-Signature Syntax and Processing) – used for transaction coordinator and Merchant signing and formatting;
2. PKCS#7 – used for browser based signing of data elements;
3. S/MIMEv3 (Secure/Multipurpose Internet Mail Extensions version 3) – used for asynchronous communication between parties; and
4. SSLv3(Secure Socket Layer version 3.0) or TLSv1.0 (Transport Layer Security version 1.0) – used for synchronous messages.

More particularly, the following rules preferably set out the formats for exchanges and signatures between payment parties in a transaction using the system and method of the present invention:

- All synchronous exchanges preferably take place using the HTTP secured SSLv3.0 or

the TLSv1.0 Internet security protocol in accordance with the system rules described below.

- End Users may have no more sophisticated systems than browsers and mail clients that can sign in accepted formats. For example, the documents that are sent to buyer 106 and TPSP for acceptance may fall into this category. The browser is assumed to provide a PKCS#7 wrapped message. PKCS #7 is a cryptographic message syntax standard that describes general syntax for data that may have cryptography applied to it, such as digital signatures. The data that buyer 106 signs is indicated in the appropriate blocks, as indicated below.

-The standard system XML messaging described below is preferably used to communicate between parties, and so the seller 108, seller's bank 104, and buyer's bank 102 should be capable of creating and receiving such messages.

-Where buyer 106 and the TPSP also have server based systems that support the system messaging of the present invention, the banks or participants may use the XML DTDs provided below to support those organizations.

-Preferably all acknowledgements are encrypted using the S/MIMEv3 protocol. Where the acknowledgement is being sent to a buyer or TPSP with no known server support, the signature is part of the S/MIME standard and not the XMLDSig signature described below.

-Optionally, for ease of implementation, all asynchronous communications to buyers and to TPSPs may be sent as S/MIMEv3 messages with the signature of the financial institution issuing the asynchronous communication as part of the S/MIME standard.

-Asynchronous communications, however wrapped, preferably include the NIB (Network Information Block) application block and Response from the XML messaging described below, but not necessarily the CertBundle or Signature blocks where these are replicated in the asynchronous wrapping structure.

-Although, a system response message may be defined for TPSP to TSS communication, TPSP's may discharge conditions through a web interface. In the latter case, the TPSP will sign a message using a PKCS#7 signature to discharge the conditions.

DATA TYPE DEFINITIONS

In a preferred embodiment, system messages are structured using Extensible Markup Language (XML) with corresponding date type definitions whenever appropriate, in order not to restrict technical implementation and integration options. A preferred implementation of several data type definitions (DTDs) is described below.

The system requires that all payment specific messages be uniquely distinguishable as payment messages and also that message identifiers (tags) are non-ambiguously defined. With XML documents, the system of the present invention preferably meets these requirements by using XML Namespaces. XML namespaces provide a simple means for qualifying element and attribute names used in XML documents by associating them with namespaces identified by URI (Uniform Resource Identifier) references. Each payment top level XML document specifies the XML namespace in which the data elements occur. The XML document may, for example, reference the namespace as described in Table 17 as follows:

Payment Document Outline	Meaning
<?xml version="1.0" encoding="UTF-8"?>	Standard XML header
<!DOCTYPE PaymentRequest PUBLIC "-//EP/DTD Payment Request//EN" "[URI]">	Standard XML internal DTD with reference to external DTD comprising (a) XML public identifier and (b) URI defining location of DTD
<PaymentRequest xmlns=http://www.eleanorpayments.org/ep/>	xmlns [namespace] defines the location of the external DTD.
.....	Body of message
</PaymentRequest>	End of Message

Table 17

Payment Request DTD

The contents of the PaymentRequest DTD (Document Type Definition) in a preferred embodiment are given in Table 18 below (the PaymentRequest DTD may also import certain DTDs such as a ConditionSet and a CertificateStatusCheck, described below):

NIB	Network Information Block
Signature	XMLDSig Signature Block
CertBundle	Certificate Bundle Block
SystemPayRequest	Payment Request Transaction Block (see Table 19)
Request	(Optional Block)

Table 18

The system specifies a "Msggrpid" and a "MsgID" attribute in the NIB (Network Information Block) and requires that the value of this is specified to be unique for each message in the transaction. The Msggrpid is a unique ID that is common to all documents in any single exchange. Note that a number of exchanges may concern a single payment transaction. Each exchange (for instance the Payment Request – Service Acknowledgement exchange, or the Cancellation Request – Service Acknowledgement exchange) will have the same Msggrpid. Asynchronous communications are to be treated as atomic exchanges. The Msgid is used as a sequential counter for each document in an exchange. However, as exchanges may become complex, to ensure that the Msggrpid:Msgid combination can uniquely identify a document within an exchange, the role of the sender is preferably used in conjunction with a sequence number.

A preferred structure of the Msgid is: "xx:nn", where xx are the role identifiers and nn the sequence number for documents sent by that role in the current exchange. To enable a transaction coordinator to identify a system payment message, the HTTP content type should be specified appropriately.

The SystemPayRequest document may be used to specify the payment instruction messages described above and listed in Table 2, i.e. POr Inst, POb Inst, CPOr Inst, CPOb Inst, CePOB Inst, and CeCPOb Inst. The SystemPayRequest DTD in a preferred embodiment is described in Table 19 below:

Contains	**Relationship Description**
SystemHeader	Each request contains a single System Header which contains the Product and Message Type.
BuyerSignedData	The data signed by the buyer is contained in a single structure in the PayRequest.

BuyerSignatures	The BuyerSignatures block carries one or a number of BuyerSignature from the buyer to the buyer's bank.
SellerPrivateData	SellerPrivateData contains data elements provided exclusively by the Seller but only sent to the seller's bank. This may include requests for additional services.
SellerBankData	SellerBankData block contains data elements provided by the seller's bank to the buyer's bank. These include confirmed seller Account details and relevant correspondent bank details.

Table 19

The SystemHeader provides a unique transaction reference for all transactions, and with the Product attribute allows a specific payment product instruction message to be specified. The header is a component common to all messages and includes, in a preferred embodiment, the following attributes (Table 20):

Attribute	**Type**	**Presence**	**Description**	**Provided By**
Product	CDATA	#REQUIRED	xxP – Payment Order xxD – Direct Debit Instruction xxO – Payment Obligation xCO – Certified Payment Obligation CxP – Conditional Payment Order CxO – Conditional Payment Obligation CCO – Certified Conditional Payment Obligation	Requestor.

MessageType	NOTAT-ION	#REQUIRED	the message type may have the following structures: <Type> Request <Type> Response Query The Valid values for the PayRequest DTD are - Payment Request - Query	Requestor.

Table 20

In a preferred embodiment, the following validation rules in Table 21 apply to the SystemHeader attributes:

Attribute	**Validation Rule**	**Must Validate**	**May Validate**	**Error Code**
Product	Valid Product code and message type has been provided	Buyer's Bank	Seller's Bank	00EH01
	The originator is authorized to issue the message.	Buyer's Bank; Seller's Bank		00EH02
MessageType	Valid message type has been provided	Buyer's Bank		00EH03

Table 21

The BuyerSignedData DTD of the SystemPayRequest DTD includes in a preferred embodiment the following data blocks (Table 22):

Contains	**Relationship Description**

NegotiatedData	Contains data negotiated between the buyer and seller as part of the commercial transaction.
BuyerData	Contains data provided by the buyer.
SellerPublicData	Contains data provided by the seller and revealed to the buyer and the buyer's bank.
Obligation	Contains data relevant to the provision of an obligation.
ConditionSet	Contains any conditions which are to attach to the Payment Request.
BuyerSignatureDetails	Contains information about the buyer's signature(s) attached to the Payment Request.

Table 22

The NegotiatedData block carries data elements negotiated during the transaction and preferably has the following attributes (Table 23):

Attribute	**Type**	**Presence**	**Description**	**Provided By**
Amt	CDATA	#REQUIRED	The Amount of the Transaction.	Negotiated
CurCode	CDATA	#REQUIRED	The CurCode is the three letter currency code as defined in ISO 4217	Negotiated
ValueDate	CDATA	#IMPLIED	The ValueDate is the date on which the funds will be in the Seller's account.	Negotiated

ValueTerm	CDATA	#IMPLIED	The ValueTerm is provided only for conditional payments. The ValueTerm field contains the number of days after discharge of conditions on which funds will be in the Seller's Account. If a ValueTerm is provided, a ValueDate should not be provided.	Negotiated
Fees	NOTAT-ION	#IMPLIED	The fees field contains an indication of which organisation will be liable for fees associated with the transaction. If the field is not present, the fees are assumed to be borne by the buyer. Valid values are BUYER or SELLER.	Negotiated
RecurringPay-mentDuration	CDATA	#IMPLIED	*available for the Payment Order product only.* Contains an indication of the duration for a recurring payment.	Negotiated
RecurringPay-mentModel	CDATA	#IMPLIED	*available for the Payment Order product only.* Contains a code string that describes the recurring payment model that has been agreed.	Negotiated

Table 23

The following validation rules in Table 24 preferably apply to the NegotiatedData attributes:

Attribute	Validation Rule	Must Validate	May Validate	Error Code
Amt	The amount does not contain a zero, negative or non numeric value	Buyer's Bank		00ND01
	Amount does not exceed maximum for Payment Channel			00ND02
	Amount does not exceed buyer's Limit			00ND03
	Amount format valid for stated currency			00ND04
CurCode	CurCode is valid	Buyer's Bank		00ND05
	CurCode is supported by the institution			00ND06
ValueDate	Value Date is an valid format	Buyer's Bank	Seller's Bank	00ND07
	Value Date is not in the past	Buyer's Bank	Seller's Bank	00ND08
	Value Date can be met	Buyer's Bank	-	00ND09
	Value Date is within XX days of current working date (where XX is the maximum number of days that an institution will allow instructions in the future).	Buyer's Bank	-	00ND10

ValueTerm	The Value Term provided falls inside the parameters allowed by the financial institution.	Buyer's Bank		00ND11
Fees	Correct value provided.	Buyer's Bank, Seller's Bank		00ND12
RecurringPay-mentDuration	Valid Payment Duration Provided	Buyer's Bank (Seller's Bank for Direct Debit)		00ND13
RecurringPay-mentModel	Valid Payment Model Provided	Buyer's Bank (Seller's Bank for Direct Debit)		00ND14

Table 24

The BuyerData block (in the BuyerSignedData DTD) contains information provided by buyer 106 in the transaction and carries data elements negotiated during the transaction. The BuyerData block preferably contains contact data (e.g., in a contact sub-block) that provides details for any issues with the transaction. The BuyerData block has the following attributes in a preferred embodiment (Table 25):

Attribute	**Type**	**Presence**	**Description**	**Provided By**

BuyerReference	CDATA	#IMPLIED	The buyer can provide a reference which is used in each of the messages and acknowledgements that comprise the transaction.	Buyer
BuyerRelatedTrans-actionReference	CDATA	#IMPLIED	The buyer can further provide a related TransactionReference which can be used by internal systems to identify the transaction.	Buyer
BuyerAccount	CDATA	#IMPLIED	The Buyer account is identified as a single string – which will identify the institution and the account itself. It is recommended (but not required) that institutions look to use IBAN numbers for system payments.	Buyer
BuyerInstruction	CDATA	#IMPLIED	The BuyerInstruction field allows the buyer to include additional instructions to the buyer's bank for execution of the payment instruction.	Buyer

Priority	NOTAT-ION	#IMPLIED	The Priority field is used to override standing instructions between the buyer and the buyer's bank as to how the transaction is settled. If the priority flag is not provided in the document then the standing arrangement is assumed. Valid values are "URGENT" and "STANDARD". Interpretation should be agreed between buyer and buyer's bank.	Buyer
FXContract	CDATA	#IMPLIED	The FX Contract field allows the buyer to provide a reference to the FX Contract against which the payment will be made.	Buyer

Table 25

The following validation rules in Table 26 preferably apply to the BuyerData attributes:

Attribute	**Validation Rule**	**Must Validate**	**May Validate**	**Error Code**
BuyerReference	BuyerReference does not exceed allowed length for field.	Buyer's Bank		00BB01
BuyerRelatedTrans-actionReference	BuyerReference does not exceed allowed length for field.	Buyer's Bank		00BB02
BuyerAccount	BuyerAccount is a valid string	Buyer's Bank		00BB03

	BuyerAccount provided is assigned to certificate presented	Buyer's Bank		00BB04
	Bank Identifier is recognized	Buyer's Bank		00BB05
	Bank Identifier is provided	Buyer's Bank		00BB06
BuyerInstruction	BuyerInstruction exceeds allowed length for field.	Buyer's Bank		00BB07
Priority	Invalid format	Buyer's Bank		00BB08
FXContract	Valid format	Buyer's Bank		00BB09
	FX Contract has not expired			00BB10

Table 26

The SellerPublicData block (in the BuyerSignedData DTD) contains information provided by the seller 108 in the transaction and preferably contains contact details for any issues that arise with respect to the transaction. The SellerPublicData block, in a preferred embodiment, has the following attributes, listed in Table 27:

Attribute	**Type**	**Presence**	**Description**	**Provided By**

TransactionReference	CDATA	#REQUIRED	Unique reference generated by the seller in the four corner and direct debit models and by the buyer's bank in the buyer's bank model. Note that cancellations and status inquiries retain the TransactionReference of the original instruction. The buyer signs this and this prevents replay attacks of the Buyer signed data. Buyer's bank must check the uniqueness of the TransactionReference provided to prevent these attacks. DATE+SEQNO is the recommended format.	Seller in four corner model; Buyer's bank in buyer to buyer's bank model
SellerReference	CDATA	#IMPLIED	The seller can provide a reference for the transaction	Seller in Four Corner Model; Buyer in Buyer to Buyer Bank model

SellerAccount	CDATA	#IMPLIED	In a buyer to buyer's bank transaction,	Seller in four corner model; Buyer in Buyer to Buyer's Bank model
SellerRelated-TransactionRef-erence	CDATA	#IMPLIED	Contains a reference provided by the seller to a related transaction for reconciliation purposes within the seller's systems.	Seller in four corner model; Buyer in Buyer to Buyer's Bank model
PaymentDetails	CDATA	#IMPLIED	The PaymentDetails field provides a text description of the Transaction between the buyer and the seller (typically the product description from the Seller's Catalogue)/	Seller in four corner model Buyer in Buyer to Buyer Bank model
DebitScheme-Identifier	CDATA	#IMPLIED	The DebitSchemeIdentifier identifies the Direct Debit in direct debit transactions.	

Table 27

The following validation rules in Table 28 preferably apply to the SellerPublicData attributes:

Attribute	**Validation Rule**	**Must Validate**	**May Validate**	**Error Code**
SellerReference	Does not exceed maximum length	Buyer's Bank	Seller's Bank	00SP01

SellerAccount	SellerAccount is a valid string	Seller's Bank	Buyer's Bank	00SP02
	SellerAccount provided is assigned to certificate presented	Seller's Bank	Buyer's Bank	00SP03
	Bank Identifier is recognized	Seller's Bank	Buyer's Bank	00SP04
	Bank Identifier is provided	Seller's Bank	Buyer's Bank	00SP05
SellerRelatedTrans-actionReference	Does not exceed maximum length	Seller's Bank		00SP06
PaymentDetails	Does not exceed maximum length	Seller's Bank		00SP07
DirectDebitScheme-Identifier	Is a valid Identifier	Seller's Bank		00SP08

Table 28

The Obligation block (in the BuyerSignedData DTD) contains details of any obligation to be put in place as a result of the transaction. Note that if no obligation is to be undertaken, the block is included with ObligationType set to NONE. The Obligation block has the following attributes in a preferred embodiment (Table 29):

Attribute	**Type**	**Presence**	**Description**	**Provided By**
ObligationType	NOTATION	#REQUIRED	*Valid values are NONE, BUYER or BANK.* BUYER signifies a Payment Obligation. BANK signifies a Certified Payment Obligation is being requested.	Buyer in Buyer to Buyer Bank Model

ObligationEffective-Date	CDATA	#IMPLIED	The date on which the obligation is to come into effect. This is assumed to be immediately if the ObligationEffective Date is not included in the Obligation block.	Buyer in Buyer to Buyer's Bank Model

Table 29

The following validation rules preferably apply to the Obligation block attributes (Table 30):

Attribute	**Rule Reference**	**Validation Rule**	**Must Validate**	**May Validate**
ObligationType	00OB01	The value provided is valid.		
	00OB02	The NegotiatedData does not include recurring payment (Obligations preferably cannot be undertaken for recurring payments)	Buyer's Bank	Seller's Bank
ObligationEffective-Date	00OB03	The date is not in the past.	Buyer's Bank	Seller's Bank
	00OB04	The date is on or after the ValueDate.	Buyer's Bank	Seller's Bank
	00OB05	Date Format is Valid		

Table 30

The ConditionSet block (in the BuyerSignedData DTD) contains a description of the conditions that attach to a payment (this block corresponds to the Cnd Adv request message described above and listed in Table 2). The ConditionSet block is an imported element and used in a number of the Payment blocks in the system, as described elsewhere.

The BuyersSignatureDetails block (in the BuyerSignedData DTD) contains signatures created by actors in the buying organization. Approval cycles may require a number of signatures to be provided against any given instruction, as described in more detail below. The BuyersSignatureDetails block can contain one or more BuyerSignatureDetail blocks. A BuyerSignatureDetail block contains the information about a signature created by buyer 106, preferably as in Table 31 as follows:

Attribute	Type	Presence	Description	Provided By
Sequence	NMTOKEN	#REQUIRED	The sequence number of the signature within the transaction. The sequence starts at 1 and increases for each subsequent signature included in the BuyerSignatures Block.	Buyer System or Other System Supporting Dual Signatures
ReasonFor-Signature	CDATA	#IMPLIED	A text description of the reason for signature.	Buyer

SignedPrev-iousSignature	NOTATION	#IMPLIED	Indicates whether additional signatures have signed over BuyerSignature elements with lower sequence numbers. If not present, value is assumed to be false (by default)	Buyer
TimeStamp	CDATA	#IMPLIED	Reflects time signature made	Buyer

Table 31

The following validation rules preferably apply to the BuyersSignatureDetails attributes (Table 32):

Attribute	**Validation Rule**	**Must Validate**	**May Validate**	**Error Code**
Sequence	Format is valid	Buyer's Bank		00BE01
	The sequence is incremental across BuyerSignature blocks in the BuyerSignatures entity	Buyer's Bank		00BE02
ReasonForSig-nature	Format is valid		Buyer's Bank	00BE03
SignedPrevious-Signature	Format is valid	Buyer's Bank		00BE04

Table 32

The SystemPayRequest DTD also includes a BuyersSignatures block that contains the signatures created by actors in the buying organization. Approval cycles may require a

number of signatures to be provided against any given instruction. In a preferred embodiment, the BuyersSignatures block includes the following block in Table 33:

Contains	**Relationship Description**
PCDATA	The signature is included in the BuyerSignature element as PCDATA. Note that this element holds only the signature and not the entire PKCS#7 structure.

Table 33

The following validation rules, in Table 34, preferably apply to the BuyersSignature block:

Attribute	**Validation Rule**	**Must Validate**	**May Validate**	**Error Code**
Signature (as PCDATA)	The Buyer's Signature is invalid.	Buyer's Bank		
	The Buyer's Signatures do not have the prerequisite level of authority.	Buyer's Bank		

Table 34

The BuyersSignature block also preferably contains the following attribute in Table 35:

Attribute	Type	Presence	Description	Provided By
Sequence	NMTOKEN	#REQUIRED	The sequence number of the signature within the transaction. The sequence starts at 1 and increases for each subsequent signature included in the BuyerSignatures block.	Buyer System or Other System Supporting Dual Signatures

Table 35

The validation rules in Table 36 apply to the Sequence attribute in a preferred embodiment:

Attribute	Validation Rule	Must Validate	May Validate	Error Code
Sequence	Format is valid	Buyer's Bank		
	The sequence is incremental across BuyerSignature blocks in the BuyerSignatures entity	Buyer's Bank		

Table 36

The SellerPrivateData block of the SystemPayRequest DTD contains private data that is passed from seller 108 to seller's bank 104. The SellerPrivateData block is removed by seller's bank 104 and not included in the datablocks passed to buyer's bank 102. It contains the following attributes in a preferred embodiment (Table 37):

Attribute	Type	Presence	Description	Provided By

SellerAccount	CDATA	#IMPLIED	The seller's account details can be carried in the SellerPublicData or SellerPrivateData blocks or appended to the payment instruction by the seller's bank in the SellerBankData block. Preferably, financial institutions use IBAN numbers to identify bank and accounts.	Only the seller can provide the SellerAccount in this field.
SellerInstruction	CDATA	#IMPLIED	A private instruction that can be provided by the seller to the seller's bank for processing.	Seller

Table 37

The following validation rules in Table 38 preferably apply to the SellerPrivateData attributes:

Attribute	**Rule Reference**	**Validation Rule**	**Must Validate**	**May Validate**
SellerAccount	00SD01	SellerAccount is an invalid string	Seller's Bank	
	00SD02	SellerAccount provided is not assigned to certificate presented	Seller's Bank	
	00SD03	Bank Identifier not recognized	Seller's Bank	
	00SD04	Bank Identifier not provided	Seller's Bank	
SellerInstruction	00SD05	Format is valid	Seller's Bank	

Table 38

The SellerBankData block of the SystemPayRequest DTD carries information from seller's bank 104 to buyers bank 102 in the transaction. Seller's bank 104 can provide relevant contact details in the contact block (described below) if required. In a preferred embodiment, the SellerBankData block contains the attributes in Table 39:

Attribute	Type	Presence	Description	Provided By
SellerBankReference	CDATA	#REQUIRED	The seller's bank must provide a unique reference for the Transaction.	Seller's Bank
SellerCorrespondent-Bank	CDATA	#REQUIRED	The seller's bank must provide a correct correspondent banking relationship based on the currency of the transaction.	Seller's Bank
SellerAccount	CDATA	#REQUIRED	The Seller's Bank must attach the correct account details for the transaction to the document in this field. This is the field used by the buyer's bank in the four corner model.	Seller's Bank

SellerBankUndertak-ing	CDATA	#REQUIRED	A text string reserved for representations that the seller's bank will make to the buyer's bank. One example would be that the seller has assented to the cancellation of an "irrevocable" obligation to pay.	Seller's Bank
SellerBankFeeAmt	CDATA	#REQUIRED	Mandatory if all fees are borne by the buyer. Note that the currency is the same as the currency of the payment.	

Table 39

The following validation rules preferably apply to the SellerBankData attributes (Table 40):

Attribute	**Validation Rule**	**Must Validate**	**May Validate**	**Error Code**
SellerBankReference	Format is Valid	Buyer's Bank		00SB01
SellerCorrespondent-Bank	Format is a Valid SWIFT BIC	Buyer's Bank		00SB02
SellerAccount	SellerAccount is a valid string	Buyer's Bank		00SB03
	Bank Identifier is recognized	Buyer's Bank		00SB04

	Bank Identifier is provided	Buyer's Bank		00SB05
SellerBankUndertak-ing	Format is Valid	Buyer's Bank		00SB06
SellerBankFeeAmt	The fee is a valid amount.	Buyer's Bank		00SB07

Table 40

Payment Response

The contents of the PaymentResponse DTD, in a preferred embodiment, are given in Table 41 below (the PaymentResponse DTD may also import certain DTDs such as a CertificateStatusCheck and a Contact element):

NIB	Network Information Block
Signature	XMLDSig Signature Block
CertBundle	Certificate Bundle Block
SystemPayResponse	Payment Response Block (see Table 42)
Response	Response block must be included with any response containing signed certificate of the organization making the response.

Table 41

The SystemPayResponse DTD, in a preferred embodiment, is described in Table 42 below.

Contains	**Relationship Description**
SystemHeader	Each request contains a single system header which contains the product and message type for the document.
References	The References block contains the references being used by the various parties in the commercial transaction. The reference block includes the TransactionReference.
ChallengeAck	The ChallengeAck contains the positive or negative response to a PayChallenge.

ServiceAck	The ServiceAck contains a negative or positive response based on the validation of the signing certificate, any carried certificate, the authority attached to that certificate and the validation of the syntax of the message against the DTD.
PayInstAck	The PayInstAck contains a positive or negative response if transaction details pass/fail validation prior to submission to the clearing and settlement network.
ObligationConf	ObligationConf contains a positive or negative acknowledgement to a request to create a payment obligation, whether bank certified or an obligation by a buyer.
PayConf	PayConf contains a positive or negative response based on the successful execution of the payment instruction. The PayConf block can be used (a) by the buyer's bank to inform the buyer and the seller's bank of the success or failure of the transaction execution (b) the buyer's bank to inform the buyer and the seller's bank of failures notified by the clearing and settlement and (c) the seller's bank to inform the seller that the payment has completed.
ConditionSetUpConf	The ConditionSetUpConf contains a positive or negative response to a request to place conditions on a payment transaction.
CancellationConf	The CancellationConf contains a positive or negative response to a request to cancel a transaction.
RelatedAcknowledge-ment	The RelatedAcknowledgement block is used to carry acknowedgements from other organizations involved in the commercial transaction.

Table 42

As indicated, the SystemHeader provides a unique transaction reference for all transactions and is a component common to all messages. The attributes of the SystemHeader are given in Table 20 and the associated validation rules in Table 21 in a preferred embodiment.

The References DTD of the SystemPayResponse DTD preferably includes the

following attributes (Table 43):

Attribute	Type	Presence	Description	Provided By
TransactionReference	CDATA	#REQUIRED	Unique system reference generated by the seller in the four corner and direct debit models and by the buyer's bank in the buyer's bank model. Note that cancellations and status inquiries retain the Transaction-Reference of the original payment instruction.	From Original Request
BuyerBankReference	CDATA	#IMPLIED	The reference provided by the buyer's bank. It is preferable that the buyer's bank uses the seller bank	Buyer's Bank
SellerBankReference	CDATA	#IMPLIED	Must be provided in all four corner and direct debit acknowledgements. Not available in the buyer to buyer bank model.	From Original Request
BuyerReference	CDATA	#IMPLIED	The reference provided by the buyer in the original request.	From Original Request
SellerReference	CDATA	#IMPLIED	The reference provided by the seller in the original request.	From Original Request

BuyerRelatedTrans-actionReference	CDATA	#IMPLIED	The reference to a related transaction provided by the Buyer in the original request.	From Original Request
SellerRelatedTrans-actionReference	CDATA	#IMPLIED	The reference to a related transaction provided by the Seller in the original request.	From Original Request

Table 43

The following validation rules, in Table 44, preferably apply to the References attributes:

Attribute	**Validation Rule**	**Must Validate**	**May Validate**	**Error Code**
TransactionReference	The Transaction Reference can be reconciled.			00RE01
BuyerBankReference	The BuyerBank Reference can be reconciled.			00RE02
SellerBankReference	The SellerBank Reference can be reconciled.			00RE03
BuyerReference	The BuyerReference can be reconciled			00RE04
SellerReference	The SellerReference can be reconciled			00RE05
BuyerRelatedTrans-actionReference	The BuyerRelatedTransaction-Reference can be reconciled			00RE06
SellerRelatedTransacti onReference	The SellerRelatedTransaction-Reference can be reconciled			00RE07

Table 44

The ChallengeAck DTD is returned in response to a ChallengeRequest. The

ChallengeRequest is optionally used by institutions to validate the identity of a corresponding institution before passing payment details to that institution. The ChallengeAck is successful if the acknowledging institution (a) can positively authenticate the identity of the sender and (b) supports the product being requested. contact information can be included by the responding financial institution within the ChallengeAck. ChallengeAck, in a preferred embodiment, includes the following attributes (Table 45):

Attribute	**Type**	**Presence**	**Description**
Status	CDATA	#REQUIRED	The status of the acknowledgement. The Status is either SUCCESS or FAIL.
ReasonCode	CDATA	#REQUIRED	Where STATUS is FAIL, a ReasonCode and associated ReasonText must be provided. (See Table 47.)
ReasonText	CDATA	#REQUIRED	Text associated with the ReasonCode above. (See Table 47.)

Table 45

The validation rules in Table 46 preferably apply to the ChallengeAck attributes:

Attribute	**Validation Rule**	**Must Validate**	**May Validate**	**Error Code**
Status	Status is a valid value	Seller's Bank		
ReasonCode	A valid reason code is provided	Seller's Bank		
ReasonText	A valid reason text is provided	Seller's Bank		

Table 46

The following reason codes (Table 47) may be used with ChallengeAck:

Status	ReasonCode	ReasonText
SUCCESS	OOCH00	Product Supported and Requesting Institution Authenticated
FAIL	00EH04	Product not supported by institution
FAIL	00CH01	Failed to authenticate requesting party

Table 47

The ServiceAck DTD (corresponding to the Srv Ack response message in Table 3 above) may include contact information by the responding financial institution within the ServiceAck. It preferably has the following attributes in Table 48:

Attribute	**Type**	**Presence**	**Description**
Status	CDATA	#REQUIRED	The status of the acknowledgement. The Status is either SUCCESS or FAIL.
CustomerService-Reference	CDATA	#REQUIRED	The field that the institution generating the ServiceAck requires be used in CustomerService inquiries. Valid values are TransactionReference, BuyerBankReference, SellerBankReference, BuyerReference, SellerReference
ReasonCode	CDATA	#REQUIRED	Where STATUS is FAIL, a ReasonCode and associated ReasonText must be provided. (See Table 50.)
ReasonText	CDATA	#REQUIRED	Text associated with the ReasonCode above. (See Table 50.)

Table 48

5

The following validation rules (Table 49) apply to the ServiceAck attributes:

Attribute	**Validation Rule**	**Must Validate**	**May Validate**	**Error Code**
Status	Status has valid format			
CustomerServiceRef-erence	Format is Valid			
ReasonCode	Reason Code is valid – (See Table 50.)			
ReasonText	Reason text is correct.			

Table 49

In a preferred embodiment, the following Reason Codes are used with ServiceAck (Table 50):

Status	ReasonCode	ReasonText
SUCCESS	00PR14	Valid Request
FAIL	00PR01	Seller's Bank Certificate is Invalid
FAIL	00PR02	Seller's Bank Signature is Invalid
FAIL	00PR03	Seller's Bank is not Authorized to Request Service
FAIL	00PR04	Buyer's Bank Certificate is Invalid
FAIL	00PR05	Buyer's Bank Signature is Invalid
FAIL	00PR06	Buyer Mandate has Incorrect Authorization
FAIL	00PR07	Request has Incorrect Syntax
FAIL	00PR11	Seller's Certificate is Invalid
FAIL	00PR12	Seller's Signature is Invalid
FAIL	00PR13	Seller's is not Authorized to Request Service

Table 50

The PayInstAck DTD is a positive or negative acknowledgement sent as a result of the validation of transaction information in bank payment systems. PayInstAck preferably contains the NegotiatedData block to confirm the data that is being processed by buyer's bank 102 (seller's bank 104 in the direct debit transaction model) for processing. The NegotiatedData block includes the attributes listed above in Table 23. In the context of SystemPayResponse, the following validation rules, listed in Table 51, preferably apply to the attributes in the NegotiatedData block:

Attribute	**Validation Rule**	**Must Validate**	**May Validate**	**Error Code**
Amt	Corresponds to Request	Buyer, Seller	Seller's Bank	
CurCode	Corresponds to Request	Buyer, Seller	Seller's Bank	

ValueDate	Corresponds to Request	Buyer, Seller	Seller's Bank	
ValueTerm	Corresponds to Request	Buyer, Seller	Seller's Bank	
Fees	Corresponds to Request	Buyer, Seller	Seller's Bank	
RecurringPayment-Duration	Corresponds to Request	Buyer, Seller	Seller's Bank	
RecurringPayment-Model	Corresponds to Request	Buyer, Seller	Seller's Bank	

Table 51

PayInstAck preferably includes the following attributes in Table 52:

Attribute	**Type**	**Presence**	**Description**
Status	CDATA	#REQUIRED	The status of the acknowledgement. The Status is either SUCCESS or FAIL.
ReasonCode	CDATA	#REQUIRED	Where STATUS is FAIL, a ReasonCode and associated ReasonText must be provided. (See Table 54.)
ReasonText	CDATA	#REQUIRED	Text associated with the ReasonCode above (See Table 54.)

Table 52

5

The following validation rules preferably apply to the PayInstAck attributes (Table 53):

Attribute	**Validation Rule**	**Must Validate**	**May Validate**	**Error Code**
Status	Format is valid	Seller, Buyer		
ReasonCode	Valid ReasonCode (See Table 54).	Seller, Buyer		

ReasonText	Valid ReasonText (See Table 54).	Seller, Buyer		

Table 53

The Reason Codes in Table 54 are used, in a preferred embodiment, with PayInstAck:

Status	ReasonCode	ReasonText
FAIL	*00ND01*	Contains a zero, negative or non numeric value
FAIL	*00ND02*	Amount exceeds maximum for Payment Channel
FAIL	*00ND03*	Amount exceeds Buyer's Limit
FAIL	*00ND04*	Amount format invalid for stated currency
FAIL	*00ND05*	CurCode is not valid
FAIL	*00ND06*	CurCode is not supported by the institution
FAIL	*00ND07*	Value Date is an invalid format
FAIL	*00ND08*	Value Date is the past
FAIL	*00ND09*	Value Date cannot be met
FAIL	*00ND10*	Value Date is not within XX days of current working date (where XX is the maximum number of days that an institution will allow instructions in the future).
FAIL	*00ND11*	The Value Term provided falls outside the parameters allowed by the financial institution.
FAIL	*00ND12*	Incorrect value provided.
FAIL	*00ND13*	Invalid Payment Duration Provided
FAIL	*00ND14*	Invalid Payment Model Provided
FAIL	*00BB01*	Buyer Reference does not exceed allowed length for field.
FAIL	*00BB02*	Buyer Reference does not exceed allowed length for field.
FAIL	*00BB03*	BuyerAccount is an invalid string
FAIL	*00BB04*	BuyerAccount provided is not assigned to certificate presented
FAIL	*00BB05*	Bank Identifier not recognized
FAIL	*00BB06*	Bank Identifier not provided
FAIL	*00BB07*	BuyerInstruction does not exceed allowed length for field.
FAIL	*00BB08*	Invalid format

FAIL	*00BB09*	Invalid format
FAIL	*00BB10*	FX Contract has expired
FAIL	*00SP01*	Does not exceed maximum length
FAIL	*00SP02*	SellerAccount is an invalid string
FAIL	*00SP03*	SellerAccount provided is not assigned to certificate presented
FAIL	*00SP04*	Bank Identifier not recognized
FAIL	*00SP05*	Bank Identifier not provided
FAIL	*00SP06*	SellerRelatedTransactionReference does not exceed maximum length
FAIL	*00SP07*	PaymentDetails does not exceed maximum length
FAIL	*00SP08*	DirectDebitSchemeIdentifier is a valid Identifier.
FAIL	*00OB01*	ObligationType: The value provided is invalid.
FAIL	*00OB02*	The NegotiatedData includes recurring payment instructions. (Obligations cannot be undertaken for recurring payments)
FAIL	*00OB03*	The Obligation date is not in the past.
FAIL	*00OB04*	The Obligation date is on or after the ValueDate.
FAIL	*00OB05*	Invalid Obligation Date Format
FAIL	*00BE01*	Sequence Format is valid
FAIL	*00BE02*	The sequence is incremental across BuyerSignature blocks in the BuyerSignatures entity
FAIL	*00BE03*	ReasonForSignature Format is valid
FAIL	*00BE04*	SignedPreviousSignature Format is valid
FAIL	*00BI01*	Sequence Format is valid
FAIL	*00BI02*	The sequence is incremental across BuyerSignature blocks in the BuyerSignatures entity
FAIL	*00SD01*	SellerAccount is an invalid string
FAIL	*00SD02*	SellerAccount provided is not assigned to certificate presented
FAIL	*00SD03*	Bank Identifier not recognized
FAIL	*00SD04*	Bank Identifier not provided
FAIL	*00SD05*	Seller Instruction Format is invalid

FAIL	*00SB01*	SellerBank Reference Format is invalid
FAIL	*00SB02*	SellerCorrespondentBank Format is an invalid SWIFT BIC
FAIL	*00SB03*	SellerAccount is an invalid string
FAIL	*00SB04*	SellerAccount Bank Identifier not recognized
FAIL	*00SB05*	SellerAccount Bank Identifier not provided
FAIL	*00SB06*	SellerBankUndertaking Format is Valid
FAIL	*00SB07*	The fee is a valid amount.

Table 54

The PayConf DTD is sent by the bank executing the payment to customers and correspondent banks and may be used by both the buyer's bank 102 and seller's bank 104 to inform correspondent banks of: the success or failure in execution of a system payment instruction, failure resulting from processing by the clearing and settlement network, and successful receipt of payment by the beneficiary's bank. The ReasonCode and ReasonText for successful PayConf qualify the successful event. PayConf includes the following attributes in a preferred embodiment (Table 55):

Attribute	**Type**	**Presence**	**Description**	**Provided By**
Status	CDATA	#REQUIRED	The status of the payment	Buyer's Bank/ Seller's Bank
PaymentEffective-Date	CDATA	#REQUIRED	The date on which payment will be executed.	Buyer's Bank/ Seller's Bank
RegistryTransfer-FeeAmount	CDATA	#IMPLIED	The transfer fee.	Buyer's Bank/ Seller's Bank
ReasonCode	CDATA	#REQUIRED	Where STATUS is FAIL, a ReasonCode and associated ReasonText are provided. (See Table 57.)	Buyer's Bank/ Seller's Bank

ReasonText	CDATA	#REQUIRED	Text associated with the ReasonCode above. (See Table 57.)	Buyer's Bank/ Seller's Bank

Table 55

The following validation rules in Table 56 preferably apply to the PayConf attributes:

Attribute	**Validation Rule**	**Must Validate**	**May Validate**	**Error Code**
Status	Format is valid			
PaymentEffectiveDate	Format is valid			
ReasonCode	Format is valid			
ReasonText	Format is valid			

Table 56

5

The following Reason Codes are preferably used with PayConf (Table 57):

Status	**ReasonCode**	**ReasonText**
SUCCESS	00PR00	Payment Executed
FAIL	00PR08	Payment Rejected By Payment Network
SUCCESS	00PR09	Payment Received
FAIL	00PR10	Payment Execution Failed

Table 57

The ObligationConf DTD block confirms the success or failure of a request for an

10 obligation. An ObligationConf is only returned when a (Conditional) Payment Obligation or (Conditional) Certified Payment Obligation is requested. This block, depending on the SystemHeader, corresponds to the PObAcpt Conf or the CePOb Acpt Conf response messages listed in Table 3 above. ObligationConf preferably has the following attributes, listed in Table 58:

Attribute	**Type**	**Presence**	**Description**

Status	CDATA	#REQUIRED	The status of the acknowledgement. The Status is either SUCCESS or FAIL.
ObligationType	CDATA	#REQUIRED	The type of obligation requested (and issued if Status is SUCCESS)
ObligationEffect-iveDate	CDATA	#REQUIRED	The date on which the obligation was created (if Status is SUCCESS).
ReasonCode	CDATA	#REQUIRED	Where STATUS is FAIL, a ReasonCode and associated ReasonText must be provided. (See Table 60.)
ReasonText	CDATA	#REQUIRED	Text associated with the ReasonCode above. (See Table 60.)

Table 58

The following validation rules in Table 59 preferably apply to the ObligationConf attributes:

Attribute	**Validation Rule**	**Must Validate**	**May Validate**	**Error Code**
Status	Format is valid	Seller		
ObligationType	Value is Valid	Seller		
ObligationEffectiveDate	Format is Valid	Seller		
	Corresponds to Request	Seller		
ReasonCode	Reason Code is Valid (See Table 60.)	Seller		
ReasonText	Reason Text is Valid (See Table 60.)	Seller		

Table 59

The following Reason Codes (in Table 60) are also preferably used with ObligationConf:

Status	ReasonCode	ReasonText

SUCCESS	00OB00	Obligation In Place
FAIL	00OB01	ObligationType: The value provided is invalid.
FAIL	00OB02	The NegotiatedData includes recurring payment instructions. (Obligations cannot be undertaken for recurring payments)
FAIL	00OB03	The Obligation date is not in the past.
FAIL	00OB04	The Obligation date is on or after the ValueDate.
FAIL	00OB05	Invalid Obligation Date Format
FAIL	00OB06	(Certified Obligation Only) Insufficient Credit

Table 60

The CancellationConf DTD block provides negative or positive confirmation of a cancellation request. This block may be used to implement the Por Cncl Conf response message describe above. In a preferred embodiment, CancellationConf has the attributes listed in Table 61:

Attribute	**Type**	**Presence**	**Description**
Status	CDATA	#REQUIRED	The status of the acknowledgement. The Status is either SUCCESS or FAIL.
CancellationEffective-Date	CDATA	#REQUIRED	The date on which the transaction was cancelled.
ReasonCode	CDATA	#REQUIRED	Where STATUS is FAIL, a ReasonCode and associated ReasonText must be provided. (See Table 63.)
ReasonText	CDATA	#REQUIRED	Text associated with the ReasonCode above. (See Table 63.)

Table 61

The following validation rules (Table 62) preferably apply to the CancellationConf attributes:

Attribute	Validation Rule	Must Validate	May Validate	Error Code
Status	Value is valid			
CancellationEffective-Date	Format is valid			
	Cancellation date is before value date			
ReasonCode	Reason Code is Valid (See Table 63.)			
ReasonText	Reason Text is Valid (See Table 63.)			

Table 62

The following Reason Codes (Table 63) are also preferably used with CancellationConf:

Status	ReasonCode	ReasonText
SUCCESS	00CR00	Transaction Cancelled
FAIL	00CR01	Failed to Identify Transaction
FAIL	00CR02	Payment Has Been Already Executed
FAIL	00CR03	Payment Obligation – Requires Assent of Seller
FAIL	00CR04	Payment Has Already Been Cancelled

Table 63

The ConditionSetUpConf DTD block provides negative or positive confirmation of a request to set up conditions against payment. ConditionSetUpConf corresponds to the above described Cnd Update response messages listed in Table 3. The response indicates only that the conditions now exist within the domain of a TSS. All other communications about conditions use the document defined in the PayCondition DTD (described below). ConditionConf preferably includes the following attributes, listed in Table 64:

Attribute	Type	Presence	Description

Status	CDATA	#REQUIRED	The status of the acknowledgement. The Status is either SUCCESS or FAIL.
ReasonCode	CDATA	#REQUIRED	Where STATUS is FAIL, a ReasonCode and associated ReasonText must be provided. (See Table 66.)
ReasonText	CDATA	#REQUIRED	Text associated with the ReasonCode above. (See Table 66.)

Table 64

The following validation rules preferably apply to the ConditionConf attributes included in the element (Table 65):

Attribute	**Validation Rule**	**Must Validate**	**May Validate**	**Error Code**
Status	Value is valid			
ReasonCode	Reason Code is Valid (See Table 66.)			
ReasonText	Reason Text is Valid (See Table 66.)			

Table 65

The following Reason Codes, in Table 66, are preferably used with ConditionConf:

Status	ReasonCode	ReasonText
FAIL	00CS01	ConditionCode not Valid
FAIL	00CS02	Invalid TPSP Contact Details
FAIL	00CS03	Expiry Date in the Past
FAIL	00CS04	Associated Obligation Not Accepted

Table 66

A RelatedAcknowledgement DTD element may optionally be used to support and carry other acknowledgements related to a transaction. For example, it may be used in seller bank 104-to-seller 108 communication to carry the acknowledgement provided by buyer's bank 102 to seller's bank 104. The RelatedAcknowledgement has three standardized

attributes that allow for identification, decoding and interpretation of the contents. In a preferred embodiment, those attributes, listed in Table 67, are as follows:

Attribute	Type	Presence	Description
Name	CDATA	#IMPLIED	Optional
Content	NMTOK-EN	#REQU-IRED	This identifies how the acknowledgement is wrapped. Prefreable valid values for the Content attribute are as follows: o PCDATA. The content of the RelatedAcknow-ledgement element can be treated as PCDATA (e.g., by default) with no further processing. o MIME. The content of the RelatedAcknowledge-ment element is a complete MIME item. Processing should include looking for MIME headers inside the RelatedAcknowledgement Element. o MIME:mimetype. The content of the Related-Acknowledgement element is MIME content, with the following header "Content-Type: mimetype". (Although it is possible to have MIME:mimetype with the Transform attribute set to NONE, it is generally more likely to have the Transform attribute set to BASE64. If Transform is set to NONE, then the entire content must conform to PCDATA, and in that case some characters must be encoded either as the XML default entities or as numeric character entities.) o XML. The content of the RelatedAcknowledge-ment element can be treated as an XML document. Entities and CDATA sections, or Transform set to BASE64, must be used to ensure that the Related-Acknowledgement element contents are legitimate PCDATA.

Transform	(NONE| BASE64)	#REQUIR ED	This identifies the transformation that has been done to the data before it was placed in the content. Valid values are: o NONE. The PCDATA content of the RelatedAcknowldgement element is the correct representation of the data. Note that entity expansion must occur first (i.e. replacement of & and) before the data is examined. CDATA sections may legitimately occur in a RelatedAcknowledgement element where the Transform attribute is set to NONE. o BASE64. The PCDATA content of the RelatedAcknowledgement element represents a BASE64 encoding of the actual content.

Table 67

Suitable validation rules may be implemented for the RelatedAcknowledgement attributes, as appropriate.

Payment Condition

The PaymentCondition document is used to pass information about the status of conditions between parties involved in a transaction (the Cnd Decl response message described above and listed in Table 3 corresponds to a PaymentCondition document). Note that the document is only used when conditions have been successfully created in the TSS. The PaymentCondition document is preferably used:

1. By the TSS to inform the TPSP that conditions have been created that require to be discharged.
2. By the TPSP to inform the TSS that a change has been made to the status of conditions assigned for discharge.
3. By the TSS to inform buyer's bank 102 that a change has been made to the status of the

conditions attached to a payment made by buyer 106 (note that buyer's bank 102 may operate, i.e. may act as, the TSS).

4. By the TSS to inform (if required) buyer 106 or seller's bank 104 that a change has been made to the status of the conditions.
5. By seller's bank 104 to inform seller 108 that a change has been made to the status of the conditions.

The contents of the PaymentCondition DTD are preferably given in Table 68 below:

NIB	Network Information Block
Signature	XMLDSig Signature Block
CertBundle	Certificate Bundle Block
SystemPayCondition	PayCondition Transaction Block (see Table 69
Response	Response Block (This block must be included with any response containing signed certificate of the organization making the reponse.)

Table 68

The SystemPayCondition DTD contains, in a preferred embodiment, the following elements or blocks (as indicated in Table 69):

Contains	**Relationship Description**
SystemHeader	Contain product type and message type information for the transaction in progress.
References	Contains references to the commercial transaction being used by those parties involved in the transaction.
ConditionSet	Contains information about the conditions being processed.

Table 69

The attributes of the SystemHeader, in a preferred embodiment, for conditional payment products are included in Table 20 above. The preferable associated validation rules are also provided in Table 21 above and, for a conditional payment, also preferably include the validation rule in Table 70 for the Product attribute:

Attribute	Validation Rule	Must Validate	May Validate	Error Code
Product	The product code is for a conditional product.			00EH05

Table 70

The References block is used to identify the commercial payment transaction to which the conditions are attached. The attributes and associated validation rules for the Reference block in a preferred embodiment are provided above in Tables 43 and 44 respectively.

The ConditionSet block contains a description of the conditions that attach to a payment. The ConditionSet block is an imported element and, as indicated, is used in a number of the system payment blocks. A preferred description of this block is given in more detail below.

As also indicated above, the Contact block contains contact details that may be used to provide contact information for the parties involved in a transaction. The Contact block is preferably an imported element and also used in a number of the system payment blocks that import it (as described above and also including ConditionSet). The Contact data element in a preferred embodiment is also described in more detail below.

Payment Cancellation

The PaymentCancellation document is used to request the cancellation of a payment. The POr Cncl request message described above and listed in Table 2 is implemented in a PaymentCancellation document. Generally, "irrevocable" payments – where a buyer or bank obligation has been undertaken – can only be cancelled with the assent of seller 108. In a preferred embodiment, the contents of the PaymentCancellation DTD are defined in Table 71:

NIB	Network Information Block
Signature	XMLDSig Signature Block
CertBundle	Certificate Bundle Block
SystemPayCancellation	Payment Cancellation Block. (See Table 72.)
Request	Request Block

Table 71

The SystemPayCancellation DTD preferably contains the following blocks, listed in Table 72:

Contains	**Relationship Description**
SystemHeader	The System Header contains information about the product type and message type.
CancBuyerSignedData	The CancBuyerSignedData contains data signed by the Buyer to authorize cancellation.
BuyerSignatures	The BuyerSignatures block contains the signature(s) authorizing cancellation of the payment.

Table 72

The SystemHeader block is a component common to all messages, as indicated above. Tables 20 and 21 above provide the attributes and validation rules of this block according to a preferred embodiment. In addition, in the context of payment cancellation, for the MessageType, valid values in the request structure are: Cancellation Request and Query.

The CancBuyerSignedData block preferably includes the following elements (Table 73):

Contains	**Relationship Description**
References	References for the payment transaction which is being requested to be cancelled.
CancellationData	Additional instructions provided by the buyer to the buyer's bank.

BuyerSignatureDetails	Information about the buyer's signature(s) authorizing cancellation.

Table 73

The References block contains references to the transaction that is being requested to be cancelled. The attributes and associated validation rules for the Reference block in a preferred embodiment are provided above in Tables 43 and 44 respectively. The CancellationData block contains additional data provided by buyer 106 and relayed to buyer's bank 102 regarding the cancellation. Preferably, this block has attributes and associated validation rules for carrying out cancellation instructions.

The BuyersSignatures block (in the CancBuyerSignedData block) contains signatures created by actors in the buying organization authorizing the cancellation of the transaction. Approval cycles may require a number of signatures to be provided against any given instruction. The BuyersSignatureDetails block can contain one or more BuyerSignatureDetail blocks. A BuyerSignatureDetail block contains the information about a signature created by buyer 106, and, in a preferred embodiment, its attributes are given in Table 31 and associated validation rules in Table 32. As also indicated above, a related BuyersSignature block (included in the SystemPayCancellation DTD) preferably contains a PCDATA block in which the signature is included in the BuyerSignature element as PCDATA (see Table 33). The attribute and associated validation rules for that block are given in Tables 34 – 36 for a preferred embodiment.

Payment Challenge

A Payment Challenge document allows a financial institution that requires proof of identity of a third party financial institution prior to exchanging application data to establish the identity of that institution and confirm that the payment product is supported. The response to a PaymentChallenge is a PayResponse with a ChallengeAck included. The PaymentChallenge DTD has the following elements in a preferred embodiment (Table 74):

NIB	Network Information Block
Signature	XMLDSig Signature Block
CertBundle	Certificate Bundle Block

SystemPayChallenge	Payment Challenge Block
Request	Request Block

Table 74

Condition Set

The ConditionsSet element DTD is used in a number of transactions to carry information about the conditions which can attach to payments. The ConditionSet DTD preferably contains the following elements, listed in Table 75:

Contains	**Relationship Description**
Condition	The condition block contains a description of each of the conditions within the transaction.
Contact	These are variously as follows: buyer/seller to bank - Contact details of TPSP where a single TPSP is being used to discharge conditions TSS to TPSP - Contact details of the TSS. TPSP to TSS – Contact details of the TPSP for further communication.

Table 75

ConditionSet preferably has the following attributes, listed in Table 76:

Attribute	**Type**	**Presence**	**Description**	**Provided By**
Transaction-Description	CDATA	#REQUIRED	A text description of the commercial transaction being undertaken.	Seller

Status	CDATA	#REQUIRED	The Status of the Condition Set: **Requested** The status when the conditions are created – before registration with a TSS. **Incomplete** Conditions which are registered with a TSS and remain to be discharged. **Discharged** Conditions which have been discharged by a TPSP **Expired** Conditions which have expired. Condition Sets which contain conditions which have expired. **Cancelled** Conditions which attach to a payment that has been cancelled.	

Table 76

Suitable validation rules may be applied to the ConditionSet attributes.

The Condition block may contain a Contact block. If conditions within a payment are to be discharged by different TPSPs, then contact information is preferably appended against each condition rather than against the ConditionSet. Preferably, this element is only present when buyer 106 or seller 108 informs a financial institution of the conditions in the PayRequest document. The Condition block has the following attributes in a preferred embodiment (Table 77):

Attribute	Type	Presence	Description
ConditionRef-erenceNumber	CDATA	#REQUIRED	A unique numeric string that identified the condition within the condition set.
ConditionCode	CDATA	#REQUIRED	A code for the standard system condition as defined by the system
Condition-Description	CDATA	#REQUIRED	A description of the standard system condition as defined by the system
XMLlang	CDATA	#REQUIRED	The ISO Code for the language used to describe a condition.
ConditionStatus	CDATA	#REQUIRED	The Status of the Condition Set: **Requested** The status when the conditions are created – before registration with a TSS. **Incomplete** Conditions which are registered with a TSS and remain to be discharged. **Discharged** Conditions which have been discharged by a TPSP **Expired** Conditions which have expired. Condition Sets which contain conditions which have expired. **Cancelled** Conditions which attach to a payment which has been cancelled.
ConditionStatus-Description	CDATA	#IMPLIED	A text description that accompanies the status information.
ConditionTrans-actionDescrip-tion	CDATA	#IMPLIED	A description of the transaction as required to sign off the condition.

ConditionExpiry Date	CDATA	#IMPLIED	The expiry date for the condition. If reached, the condition expires and cannot be discharged – payment will not be made.

Table 77

The following validation rules, listed in Table 78, preferably apply to the Condition block attributes:

Attribute	**Validation Rule**	**Must Validate**	**May Validate**	**Error Code**
ConditionRef-erenceNumber	ConditionReference in unique			00CT01
ConditionCode	ConditionCode is a valid system payment condition code			00CT02
ConditionDe-scription	ConditionDescription is a valid system payment condition description			00CT03
XMLlang	The language is a valid ISO code.			00CT04
ConditionStatus	The Condition Status is a valid status.			00CT05
ConditionTrans-actionDescrip-tion	The ConditionTransactionDescription is invalid			00CT06
ConditionExpiry Date	The ConditionExpiryDate has not expired	Buyer's Bank		00CT07

Table 78

The system may define conditions to be used with the payment products.

Another element that may be used in connection with payment conditions is PackagedContent. The PackagedContent element supports the concept of an embedded data stream, transformed to both protect it against misinterpretation by transporting systems and to ensure XML compatibility. It may be used within the system to allow the TPSP to provide supporting documentation when discharging conditions. The documentation, carried as

PCData, is preferably forwarded to the seller once all conditions have been discharged. The PackagedContent data stream preferably has three standardized attributes that allow for identification, decoding and interpretation of the contents, and these attributes are preferably defined as follows in Table 79 below:

Attribute	Type	Presence	Description
Name	CDATA	#IMPLIED	Optional. Distinguishes between multiple occurrences of Packaged Content Elements. For example: <ABCD> <PackagedContent Name='FirstPiece'> snroasdfnas934k </PackagedContent> <PackagedContent Name='SecondPiece'> dvdsjnl5poidsdsflkjnw45 </PackagedContent> </ABCD> The name attribute may be omitted, for example if there is only one PackagedContent element.

Content	NMTOKEN	#REQUIRED	This identifies what type of data is contained within the Content attribute of the Packaged-Content element. The valid values for the Content attribute are as follows: o PCDATA. The content of the Packaged-Content element can be treated as PCDATA (e.g., by default) with no further processing. o MIME. The content of the PackagedContent element is a complete MIME item. Processing should include looking for MIME headers inside the PackagedContent Element. O MIME:mimetype. The content of the PackagedContent element is MIME content, with the following header "Content-Type: mimetype". Although it is possible to have MIME:mimetype with the Transform attribute set to NONE, it is more likely to have the Transform attribute set to BASE64. Note that if Transform is NONE is used, then the entire content should still conform to PCDATA. Some characters will need to be encoded either as the XML default entities, or as numeric character entities. O XML. The content of the PackagedContent element can be treated as an XML document. Entities and CDATA sections, or Transform set to BASE64, must be used to ensure that the Packaged Content Element contents are legitimate PCDATA.

Transform	(NONE| BASE64)	#REQUIRED	This identifies the transformation that has been done to the data before it was placed in the content. Valid values are: o NONE. The PCDATA content of the PackagedContent element is the correct representation of the data. Note that entity expansion must occur first (i.e. replacement of & and) before the data is examined. CDATA sections may legitimately occur in a PackagedContent element where the Transform attribute is set to NONE. o BASE64. The PCDATA content of the Packaged Content Element represents a BASE64 encoding of the actual content.

Table 79

Again, suitable validation rules may be applied to the PackagedContent attributes.

Contact

The Contact DTD is used in a number of document definitions and so is preferably defined in a separate DTD for re-use. The structure contains generic contact data, connected with the element that it is being used in conjunction with. Generally, this data contains the names and contact details of one or more individuals dealing with any given transaction. Thus, the Contact block may have the following attributes (the descriptions of which are self-explanatory in Table 80):

Attribute	**Type**	**Presence**
OrganizationName	CDATA	#IMPLIED
OrganizationUnitName	CDATA	#IMPLIED
Address1	CDATA	#IMPLIED
Address2	CDATA	#IMPLIED
Address3	CDATA	#IMPLIED
Address4	CDATA	#IMPLIED

Table 80

Suitable validation rules may be applied to the Contact attributes, as appropriate. The ContactData block may also include the following attributes (again, for these attributes, the descriptions in Table 81 are self-explanatory):

Attribute	Type	Presence
ContactName	CDATA	#IMPLIED
ContactTitle	CDATA	#IMPLIED
Telephone	CDATA	#IMPLIED
Fax	CDATA	#IMPLIED
Email	CDATA	#IMPLIED
PreferredLanguage	CDATA	#IMPLIED

Table 81

Validation rules are also applied to these attributes, as appropriate.

Field Lengths and Formats

Table 82 summarizes the field lengths and formats for many of the payment system data fields in a preferred embodiment:

Field Description	Content Definition
TransactionReference	35 alphanumeric
Product	3 alphanumeric
MessageType	20 alphanumeric
SellerBankReference	30 alphanumeric
BuyerBankReference	30 alphanumeric
BuyerReference	35 alphanumeric
SellerReference	35 alphanumeric
BuyerRelatedTransactionReference	35 alphanumeric
SellerRelatedTransactionReference	35 alphanumeric
Rejection Code	6 alphanumeric (ssxxnn)

Rejection Reason	35 alphanumeric
BuyerAccount	30 numeric
BuyerInstruction	4*35 alphanumeric
SellerAccount	30 numeric
SellerInstruction	4*35 alphanumeric
PaymentDetails	4*35 alphanumeric
DirectDebitSchemeIdentifier	35 alphanumeric
Amt	17 digits plus a decimal point (Where no decimal point is specified, it may be assumed that the decimal place is right justified, i.e. the amount is expressed in units of the currency in question)
CurCode	3 alphabetic – ISO 4217
ValueDate	8 numeric [YYYYMMDD]
ValueTerm	3 numeric
OrganisationalName	35 alphanumeric
OrganisationalUnit	35 alphanumeric
Address1	35 alphanumeric
Address2	35 alphanumeric
Address3	35 alphanumeric
Address 4	35 alphanumeric
ContactName	35 alphanumeric
ContactTitle	35 alphanumeric
Telephone	35 alphanumeric
Fax	35 alphanumeric
Email	35 alphanumeric
PreferredLanguage	35 alphanumeric
ObligationType	Values ‘buyer’ or ‘bank’
ObligationEffectiveDate	8 numeric [YYYYMMDD]
PaymentDetails	4*35 alphanumeric

ConditionSetTransactionDescription	4*35 alphanumeric
ConditionReferenceNumber	3 numeric
ConditionCode	6 alphanumeric
ConditionDescription	4*35 alphanumeric
ConditionStatusDescription	4*35 alphanumeric
ConditionTransactionDescription	4*35 alphanumeric
Sequence (BuyerSignature)	3 numeric
ReasonForSignature	4*35 alphanumeric
SignedPreviousSignature	Values 'true' or 'false'
SellerCorrespondentBank	8 alphanumberic
SellerBankUndertaking	4*35 alphanumeric
CustomerServiceReference	Values 'SellerBankReference', 'BuyerBankReference', 'TransactionReference', 'BuyerReference' or 'SellerReference'
PaymentEffectiveDate	8 numeric [YYYYMMDD]
CancellationEffectiveDate	8 numeric [YYYYMMDD]
CancellationInstruction	4*35 alphanumeric

Table 82

Error Codes and Error Texts

Reason Codes may be used within the payment system to provide more detail as to the reason for success or failure of any particular event. A preferred structure of the reason code is ssbbnn, where

ss = the identifier of the scheme who owns the error code (e.g. 00),

bb = indicates the DTD block within the scheme, and

nn = number of the error.

The following bb block codes in Table 83 may, for example, be used with respect to the DTDs given above:

BB	BuyerData
BD	BuyerSignatureDetails

BE	BuyerSignatureDetail
BI	BuyerSignature
BS	BuyerSignatures
BA	BuyerSignedData
CA	CancellationData
CB	CancBuyerSignedData
CC	CancellationConf
CD	ContactData
CH	ChallengeRequest
CO	Contact
CR	CancellationRequest
CS	ConditionSet
CT	Condition
CU	ConditionSetUpConf
EH	System Header
ND	NegotiatedData
OB	Obligation
OC	ObligationConf
PC	PayConf
PI	PayInstAck
PR	PayRequest
RA	RelatedAcknowledgement
RE	References
SA	ServiceAck
SB	SellerBankData
SD	SellerPrivateData
SP	SellerPublicData

Table 83

Table 84 below also summarizes a set of preferred Reason Codes.

Code	**Description**
00EH01	Invalid Product Code
00EH02	The Originator is Not Authorized to Use Product
00EH03	Invalid MessageType Provided
00EH04	Product Not Supported By Institution
00EH05	Product code not for a conditional product.
00ND01	Contains a zero, negative or non numeric value
00ND02	Amount exceeds maximum for Payment Channel
00ND03	Amount exceeds Buyer's Limit
00ND04	Amount format invalid for stated currency
00ND05	CurCode is not valid
00ND06	CurCode is not supported by the institution
00ND07	Value Date is an invalid format
00ND08	Value Date is the past
00ND09	Value Date cannot be met
00ND10	Value Date is not within XX days of current working date (where XX is the maximum number of days that an institution will allow instructions in the future).
00ND11	The Value Term provided falls outside the parameters allowed by the financial institution.
00ND12	Incorrect value provided.
00ND13	Invalid Payment Duration Provided
00ND14	Invalid Payment Model Provided
00BB01	Buyer Reference does not exceed allowed length for field.
00BB02	Buyer Reference does not exceed allowed length for field.
00BB03	BuyerAccount is an invalid string
00BB04	BuyerAccount provided is not assigned to certificate presented
00BB05	Bank Identifier not recognized
00BB06	Bank Identifier not provided
00BB07	BuyerInstruction does not exceed allowed length for field.

00BB08	Invalid format
00BB09	Invalid format
00BB10	FX Contract has expired
00SP01	Does not exceed maximum length
00SP02	SellerAccount is an invalid string
00SP03	SellerAccount provided is not assigned to certificate presented
00SP04	Bank Identifier not recognized
00SP05	Bank Identifier not provided
00SP06	SellerRelatedTransactionReference does not exceed maximum length
00SP07	PaymentDetails does not exceed maximum length
00SP08	DirectDebitSchemeIdentifier is a valid Identifier.
00OB00	Obligation Request Successful
00OB01	ObligationType: The value provided is invalid.
00OB02	The NegotiatedData includes recurring payment instructions. (Obligations cannot be undertaken for recurring payments)
00OB03	The Obligation date is not in the past.
00OB04	The Obligation date is on or after the ValueDate.
00OB05	Invalid Obligation Date Format
00OB06	(Certified Obligation Only) Insufficient Credit
00BE01	Sequence Format is valid
00BE02	The sequence is incremental across BuyerSignature blocks in the BuyerSignatures entity
00BE03	ReasonForSignature Format is valid
00BE04	SignedPreviousSignature Format is valid
00BI01	The Buyer's Signature is invalid.
00BI02	The Buyer's Signatures do not have the prerequisite level of authority.
00BI03	Sequence Format is valid
00BI02	The sequence is incremental across BuyerSignature blocks in the BuyerSignatures entity
00SD01	SellerAccount is an invalid string

00SD02	SellerAccount provided is not assigned to certificate presented
00SD03	Bank Identifier not recognized
00SD04	Bank Identifier not provided
00SD05	Seller Instruction Format is invalid
00SB01	SellerBank Reference Format is invalid
00SB02	SellerCorrespondentBank Format is a invalid SWIFT BIC
00SB03	SellerAccount is an invalid string
00SB04	SellerAccount Bank Identifier not recognized
00SB05	SellerAccount Bank Identifier not provided
00SB06	SellerBankUndertaking Format is Valid
00SB07	The fee is a valid amount.
00RE01	The Transaction Reference cannot be reconciled.
00RE02	The BuyerBank Reference cannot be reconciled.
00RE03	The SellerBank Reference cannot be reconciled.
00RE04	The BuyerReference cannot be reconciled
00RE05	The SellerReference cannot be reconciled
00RE06	The BuyerRelatedTransactionReference cannot be reconciled
00RE07	The SellerRelatedTransactionReference cannot be reconciled
OOCH00	Product Supported and Requesting Institution Authenticated
00CH01	Failed to Authenticate Requesting Party
00PR00	Payment Executed
00PR01	Seller's Bank Certificate is Invalid
00PR02	Seller's Bank Signature is Invalid
00PR03	Seller's Bank is not Authorized to Request Service
00PR04	Buyer's Bank Certificate is Invalid
00PR05	Buyer's Bank Signature is Invalid
00PR06	Buyer Mandate has Incorrect Authorization
00PR07	Request has Incorrect Syntax
00PR08	Payment Rejected By Payment Network
00PR09	Payment Received

00PR10	Payment Execution Failed
00PR11	Seller's Certificate is Invalid
00PR12	Seller's Signature is Invalid
00PR13	Seller's is not Authorized to Request Service
00PR14	Valid Request
00CR00	Transaction Cancelled
00CR01	Failed to Identify Transaction
00CR02	Payment Has Been Already Executed
00CR03	Payment Obligation – Requires Assent of Seller
00CR04	Payment Has Already Been Cancelled
00CS01	ConditionCode not Valid
00CS02	Invalid TPSP Contact Details
00CS03	Expiry Date in the Past
00CS04	Associated Obligation Not Accepted
00CT01	ConditionReference is not unique
00CT02	ConditionCode is an invalid payments Condition Code
00CT03	ConditionDescription is an invalid payments Condition Description
00CT04	The language is not valid ISO code.
00CT05	The Condition Status is invalid.
00CT06	The ConditionTransactionDescription is invalid
00CT07	The ConditionExpiryDate has expired

Table 84

Preferred general message flows for particular payment processes, and typical transaction steps exemplifying those message flows in different transaction models, are now described in connection with Figs. 6-8.

PAYMENT ORDER MESSAGE FLOW

A preferred general message flow for processing a payment order is shown in Fig. 6.

Before the first message in the process, buyer 106 and seller 108 identify each other through their respective certificates and agree on the purchase and sales agreement. Buyer 106 agrees to pay for the transaction with a payment order from buyer 106 to buyer's bank 102.

Buyer 106 then reviews the payment order for acceptability, completes the buyer's section in the payment order instruction (see Table 4 above), and signs the payment order instruction. Then, as shown in message 1 of Fig. 6, buyer 106 forwards the payment order instruction to seller 108.

Seller 108 reviews the received payment order instruction for acceptability, completes the seller's section of the payment order instruction (see Table 4 above), and signs the amended payment order instruction. Then, as shown in message 2 of Fig. 6, seller 108 forwards the payment order instruction to seller's bank 104.

Seller's bank 104 reviews the payment order instruction for acceptability, verifies the seller's certificate, completes its section of the order (see Table 4 above), and signs the amended payment order instruction. Then, as shown in message 3 of Fig. 6, seller's bank 104 forwards the payment order instruction to buyer's bank 102.

Buyer's bank 102 reviews the payment order instruction for acceptability and verifies the message syntax, the validity of the certificate and signature, and the authority of the signer. Buyer's bank 102 then creates a service acknowledgment message (see Table 9 above) with the results of these checks, and signs and sends the service acknowledgment to seller's bank 104 as shown in message 4 of Fig. 6.

Seller's bank 104 reviews the service acknowledgment, amends it with its details if necessary, and signs the amended message. The message is then sent to seller 108, as shown in message 5 of Fig. 6.

Seller 108 reviews the service acknowledgment, amends it with its details if necessary, and signs it. The amended service acknowledgment is then sent to buyer 106 as shown in message 6 of Fig. 6.

When the payment execution date/time specified in the payment order instruction is reached, the payment order instruction is executed, preferably utilizing the banks' existing payment infrastructure.

Buyer's bank 102 creates a confirmation of a payment execution (see Table 11 above) to signify that the payment order has been executed. Buyer's bank 102 then signs and sends

this message to seller's bank 104 as shown in message 7 of Fig. 6. The confirmation of a payment execution indicates whether the payment order has been executed successfully or not. The confirmation of a payment execution message is preferably sent no later than the close of the following business day.

Seller's bank 104 reviews the confirmation of a payment execution, amends the confirmation of a payment execution with its details if necessary, signs the amended message, and sends it to seller 108 as shown in message 8 of Fig. 6.

Buyer's bank 102 creates a confirmation of a payment execution to indicate whether this payment order has been executed successfully or not. Buyer's bank 102 then signs this message and sends it to the buyer as shown in message 9 of Fig. 6. If payment execution fails, a more detailed description of the reasons is sent to the buyer than would have been sent to seller 108 and seller's bank 104. At a minimum, the confirmation of a payment execution message is preferably sent no later than the close of the following business day.

In a preferred embodiment, if buyer's bank 102 has not yet sent a confirmation of a payment execution message stating that the payment order has been executed and passed into the bank's payment infrastructure, then buyer 106 has the ability to cancel the payment order. To cancel a payment order, buyer 106 creates a payment order cancellation (see Table 7 above). The buyer signs the payment order cancellation and sends it to buyer's bank 102 as shown in message 10 of Fig. 6.

In a preferred embodiment, because revocation of a payment request by buyer 106 is permitted, the payment service preferably stores revocation requests even if a corresponding payment request has not been obtained. This permits a delayed payment request, which already has been revoked, to be identified and prevented from execution.

Buyer's bank 102 reviews the payment order cancellation for acceptability and verifies the message syntax, the validity of the certificate and signature, and the authority of the signer. Buyer's bank 102 then creates a service acknowledgment message (see Table 9 above) with the results of these checks. Buyer's bank 102 then signs and sends the service acknowledgment to buyer 106 as shown in message 11 of Fig. 6.

Buyer's bank 102 creates a confirmation of a payment order cancellation (see Table 15 above) to signify that the payment order cancellation request has been accepted. Buyer's bank 102 then signs and sends the confirmation of a payment order cancellation to buyer 106

as shown in message 12 of Fig. 6. The confirmation of a payment order cancellation should preferably be sent no later than the close of the following business day.

Buyer's bank 102 creates a confirmation of a payment order cancellation to signify that the payment order cancellation request has been accepted. Buyer's bank 102 signs and sends the confirmation of a payment order cancellation to seller's bank 104 as shown in message 13 of Fig. 6. The confirmation of a payment order cancellation message should preferably be sent no later than the close of the following business day.

The payment order may be presented in the three models described above: in the four corner model; as an instruction from the buyer to a buyer's bank; or as a direct debit style instruction that is placed by the seller's bank into the clearing and settlement system.

Payment Order Transaction in the Four Corner Model

A typical payment order transaction in the four corner model occurs as follows.

1. Buyer 106 and seller 108 interact through the seller's online systems.
2. At the point of purchase, the seller software presents the payment form for completion by buyer 106.
3. Buyer 106 signs the BuyerSignedData blocks. The block includes the BuyerData block, the SellerPublicData block, the NegotiatedData block and BuyerSignatureDetail block. For a payment order, the BuyerSignedData block may also include an Obligation block with the ObligationType set to NONE.

   Note that the buyer role (internally or through facilities provided through seller 108's systems) may require a number of signatures to authorize payment. Subsequent signatures may sign the only the data blocks set out above or additionally sign the BuyerSignature blocks already created.
4. Optionally, seller 108 can check the signature of buyer 106 contained in a PKCS#7 package from the buyer. This step may be optional, since there is generally a requirement for buyer's bank 102 to check the signature of buyer 106 before processing the buyer's mandate.
5. Seller 108 appends SellerPrivateData where appropriate, signs the message and sends the signed message to seller's bank 104.
6. Seller's bank 104 checks seller 108's signature, the status of seller 108's certificate, and

the authority and rights assigned to seller 108's certificate. If these checks fail, seller's bank 104 sends a negative service acknowledgement to seller 108

7. If seller 108 has provided account details in either the SellerPublicData or SellerPrivateData blocks, seller's bank 104 validates these account details. Seller's bank 104 may append account details to the message in the SellerbankData block. Seller's bank 104 may also append a correspondent bank code based on the currency of the transaction. Seller's bank 104 removes the SellerPrivateData block from the message.

8. Seller's bank 104 may optionally choose to initiate a challenge-response transaction with buyer's bank 102 dependent on the seller's bank 104's own risk model. If so, seller's bank 104 signs a message that consists of the PayChallenge that contains the SystemHeader and includes seller's bank 104's credentials timestamped and validated by the root.

Buyer's bank 102 then checks the credentials of seller's bank 104, checks that it can process the payment product being requested, and signs a response to seller 108 that includes the validated credentials of buyer's bank 102.

Seller's bank 104 validates the credentials presented by buyer's bank 102. If validation fails, seller's bank 104 sends a service acknowledgement to seller 108 advising of the failure.

9. Seller's bank 104 signs the message and sends it to buyer's bank 102.

10. Buyer's bank 102 checks buyer 106's signature, the status of buyer 106's certificate, and the authority and rights assigned to the buyer's certificate. For payment requests with more than one signature, buyer's bank 102 must ensure that the request contains the correct authority.

If these checks fail, buyer's bank 102 sends a negative service acknowledgement to seller's bank 104. If these checks are successful, buyer's bank 102 sends a positive service acknowledgement including an indication of which reference should be used for customer service issues.

Seller's bank 104 re-signs the service acknowledgement and sends it to seller 108. All acknowledgements include a freshness proof of the acknowledging organization's signing certificate.

11. Buyer's bank 102 also validates account related details. Note that this validation can take

place synchronously. If the validation fails, buyer's bank 102 sends a negative PayInstAck. Where account related details are validated synchronously, the PayInstAck may be returned in the same document as the service acknowledgement.

12. On execution of the payment, buyer's bank 102 may send a PayConf to buyer 106 and to seller's bank 104 advising that execution has taken place. A negative PayConf may be produced where the clearing and settlement system fails to process the payment transaction successfully. Seller's bank 104 may send a PayConf to confirm that funds have been successfully received from buyer's bank 102.

Cancellation of a Payment Order Using the Four Corner Model

For revocable payment orders, the payment can be cancelled using a four corner model. Buyer's bank 102 should inform buyer 106 asynchronously as to the success of the cancellation request. A typical cancellation of a payment order in this type of transaction occurs as follows.

1. Buyer 106 and seller 108 arrange cancellation through seller's systems.
2. At the point of purchase, seller 108 presents the cancellation form for completion by buyer 106.
3. Buyer 106 signs the CancBuyerSignedData block. Note that the buyer role (internally or through facilities provided through seller's systems) may require a number of signatures to cancel payment. Subsequent signatures may sign the data blocks set out above and optionally sign previous BuyerSignature blocks.
4. Optionally, seller can check the signature of buyer 106.
5. Seller 108 sends the signed document to seller's bank 104.
6. Seller's bank 104 checks seller 108's signature, the status of seller 108's certificate, and the authority and rights assigned to seller 108's certificate. If these checks fail, seller's bank 104 sends a negative Service Acknowledgement to seller 108.
7. Seller's bank 104 may optionally choose to initiate a challenge-response transaction with buyer's bank 102 dependent on seller's banks own risk model. Seller's bank 104 will sign a message that consists of the PayChallenge which contains the SystemHeader and will include seller's bank 104's credentials timestamped and validated by the root. Buyer's bank 102 will check the credentials of seller's bank 104, check that it can process

the payment product being requested and sign a response to seller 108 that includes the validated credentials of buyer's bank 102.

Seller's bank 104 will validate the credentials presented by buyer's bank 102. If validation fails, seller's bank 104 will send a Service Acknowledgement to seller advising of the failure.

8. Seller's bank 104 signs the cancellation message and sends it to buyer's bank 102.

9. Buyer's bank 102 checks buyer 106's signature, the status of buyer 106's certificate, and the authority and rights assigned to buyer 106's certificate. For payment requests with more than one signature, buyer's bank 102 ensures that the CancellationRequest contains the correct authority.

If these checks fail, buyer's bank 102 sends a negative Service Acknowledgement to seller's bank 104. If these checks are successful, buyer's bank 102 sends a positive Service Acknowledgement including an indication of which reference should be used for customer service issues.

Seller's bank 104 re-signs the service acknowledgement and sends it to seller 108. All acknowledgements include a freshness proof of the acknowledging organizations signing certificate.

10. Buyer's bank 102 will then process the Cancellation Request. Buyer's bank 102 may send a positive CancellationConf to seller's bank 104 and to buyer 106 if the cancellation is successfully executed. If the cancellation cannot be executed a negative CancellationConf will be generated. Where the Cancellation Request can be processed synchronously, the CancellationConf can be provided with the Service Acknowledgement.

Payment Order Transaction in the Buyer to Buyer's bank Model

Buyer to buyer's bank transactions ensure that the payment products can be delivered in procurement and other buyer technologies. A typical buyer to buyer bank transaction for a payment order occurs as follows.

1. Buyer 106 and seller 108 interact through seller's online systems.
2. Buyer 106 places the payment order directly with buyer's bank 102.
3. Buyer 106 signs buyerSignedData blocks. The block includes buyerData block,

sellerPublicData block, the NegotiatedData block and BuyerSignatureDetail block. For a payment order buyerSignedData block will also include an Obligation block with the ObligationType set to NONE.

Note that the buyer role (internally or through facilities provided through seller's systems) may require a number of signatures to authorize payment. Subsequent signatures may sign the only the data blocks set out above or additionally sign buyerSignature blocks already created.

4. Buyer 106 signs the document and sends it to buyer's bank 102.
5. Buyer's bank 102 checks buyer 106's signature, the status of buyer 106's certificate, and the authority and rights assigned to buyer 106's certificate. For payment requests with more than one signature, buyer's bank 102 must ensure that the request contains the correct authority.

   If these checks fail, buyer's bank 102 sends a negative Service Acknowledgement to buyer. If these checks are successful, buyer's bank 102 will send a positive Service Acknowledgement including an indication of which reference should be used for customer service issues.
6. Buyer's bank 102 validates account related details. Note that this validation can take place synchronously. If the validation fails, buyer's bank 102 will send a negative PayInstAck. Where account related details are validated synchronously, the PayInstAck may be returned in the same document as the Service Acknowledgement.
7. On execution of the payment, buyer's bank 102 may send a PayConf to buyer 106 advising that payment has taken place. A negative PayConf may be produced where the clearing and settlement system fails to process the payment transaction successfully.

Cancellation of a Payment Order Using the Buyer to Buyer's Bank Model

For revocable payment orders, the payment can be cancelled using the buyer to buyer's bank model. The following describes a typical payment order cancellation through this model.

1. Buyer 106 through its own internal systems or through the systems of its financial institutions looks to cancel a payment order.
2. Buyer 106 signs the SystemHeader and References blocks. Note that the buyer role may

require a number of signatures to cancel payment. Subsequent signatures may sign the data blocks set out above and optionally sign previous BuyerSignature blocks.

3. Buyer 106 sends it to buyer's bank 102.
4. Buyer's bank 102 checks buyer 106's signature, the status of buyer 106's certificate, and the authority and rights assigned to buyer 106's certificate. For payment requests with more than one signature, buyer's bank 102 must ensure that the CancellationRequest contains the correct authority.

If these checks fail, buyer's bank 102 sends a negative Service Acknowledgement to buyer. If these checks are successful, buyer's bank 102 will send a positive Service Acknowledgement including an indication of which reference should be used for customer service issues.

5. Buyer's bank 102 will then process the Cancellation Request. Buyer's bank 102 may send a positive CancellationConf to buyer 106 if the cancellation is successfully executed. If the cancellation cannot be executed a negative CancellationConf will be generated. Where the Cancellation Request can be processed synchronously, the CancellationConf can be provided with the Service Acknowledgement.

Payment Order Transaction in the Direct Debit Model

Use of the direct debit model in the present invention allows payment products to be used in conjunction with clearing and settlement networks that allow direct debit style payments. This type of transaction may be used in accordance with the rules of individual clearing houses. A typical payment order transaction using the direct debit model occurs as follows.

1. Buyer 106 and seller 108 interact through seller's online service. The commercial transaction is to be settled through a direct debit style network with the instruction being placed into the clearing and settlement system by seller's bank 104.
2. Buyer 106 signs buyerSignedData block which contains BuyerData, SellerPublicData and Negotiated Data which constitute the mandate authorizing seller to debit buyer's account.
3. Seller 108 optionally checks buyer 106's signature. Although this is recommended, this is not mandatory. It is preferable that buyer's bank 102 checks buyer 106's signature prior to authorizing a debit from buyer 106's account.
4. Seller 108 appends to buyerSignedData sellerPrivateData block as required and signs and

sends to seller's bank 104.

5. Seller's bank 104 checks the signature of seller, the syntax of the message and the authority of seller 108. If any of these checks fail, seller's bank 104 sends a negative ServiceAck to seller 108.
6. Seller's bank 104 signs and sends to buyer's signed mandate to buyer's bank 102. Note that seller's bank 104 can optionally initiate a system challenge-response if required to positively validate the identity of the corresponding institution prior to submitting application data.

   Buyer's bank 102 checks the signature(s) of buyer 106, the syntax of the message and the authority of buyer 106. If any of these checks fail, buyer's bank 102 sends a negative ServiceAck to seller's bank 104 who includes this as a RelatedAcknowledgement in a ServiceAck to seller. Buyer's bank 102 authorizes debiting of buyer 106's account on confirmation of buyer's mandate.
7. On receiving a positive SvrAck, seller's bank 104 creates the payment [debit] instruction in the appropriate back end payment system. A positive SvrAck is passed to seller 108.
8. On executing the payment instruction, seller's bank 104 can optionally inform seller 108 and buyer's bank 102 that the debit instruction has been executed.
9. On receiving funds in seller 108's account, seller's bank 104 can optionally send a Payment Confirmation to seller 108 and to buyer's bank 102 advising of the receipt of funds.

Cancellation of a Payment Order Using the Direct Debit Model

Depending on the rules of the Direct Debit network and/or policy of member banks, Direct Debit instructions may also be cancelled in a two party (buyer to buyer's bank and seller to seller's bank) or four party model. The following describes a typical cancellation in the four party model.

1. Buyer 106 and seller 108 arrange cancellation through seller 108's systems.
2. At the point of purchase, seller 108 presents the cancellation form for completion by buyer 106.
3. Buyer 106 signs the CancBuyerSignedData block which includes the reference information of the commercial transaction to be cancelled. Note that the buyer role

(internally or through facilities provided through seller's systems) may require a number of signatures to cancel payment. Subsequent signatures may sign the data blocks set out above and optionally sign previous BuyerSignature blocks.

4. Optionally, seller 108 can check the signature of buyer 106.
5. Seller 108sends the signed document to seller's bank 104.
6. Seller's bank 104 checks seller 108's signature, the status of seller 108's certificate, and the authority and rights assigned to seller 108's certificate. If these checks fail, seller's bank 104 sends a negative Service Acknowledgement to seller 108.
7. If the scheme rules require seller's bank 104 to check the validity of buyer 106's signature before cancelling the payment, seller's bank 104 initiates Step 8 otherwise seller's bank cancels the payment and optionally advises buyer's bank 102 and seller with a Cancellation Confirmation.
8. Seller's bank 104 signs the cancellation message and sends it to buyer's bank 102.
9. Buyer's bank 102 checks buyer 106's signature, the status of buyer106 's certificate, and the authority and rights assigned to buyer 106's certificate. For payment requests with more than one signature, buyer's bank must ensure that the CancellationRequest contains the correct authority.

If these checks fail, buyer's bank 102 sends a negative Service Acknowledgement to seller's bank 104. If these checks are successful, buyer's bank 102 will send a positive Service Acknowledgement including an indication of which reference should be used for customer service issues. Seller 108 will then cancel payment. Note that the response to the Cancellation Request from buyer's bank 102 in this instance is a ServiceAck. It is seller's bank 104 which initiates the CancellationConf.

Seller's bank 104 re-signs the service acknowledgement and sends it to seller 108. All acknowledgements include a freshness proof of the acknowledging organizations signing certificate.

PAYMENT OBLIGATION MESSAGE FLOW

A preferred general message flow for processing a payment obligation is shown in Fig. 7. Before the first message in the process, buyer 106 and seller 108 identify each other through their respective certificates and agree on the purchase and sales agreement. Buyer

106 then agrees to pay for the transaction with a payment obligation (see Tables 4 and 5 above) from buyer 106 to buyer's bank 102.

Buyer 106 accepts the payment method, reviews the payment obligation instruction for acceptability, completes the buyer section of the payment obligation instruction, and then signs the payment obligation instruction. The payment obligation instruction is then sent to seller 108 as shown in message 1 of Fig. 7.

Seller 108 reviews the payment obligation instruction for acceptability, completes its section of the order (see Tables 4 and 5 above), signs the amended message, and sends it to seller's bank 104 as shown in message 2 of Fig. 7.

Seller's bank 104 reviews the payment obligation instruction for acceptability, verifies seller's certificate, completes its section of the order (see Tables 4 and 5 above), and signs the amended message. The message is then sent to buyer's bank 102 as shown in message 3 of Fig. 7.

Buyer's bank 102 reviews the payment obligation instruction for acceptability and verifies the message syntax, the validity of certificate and signature, and the authority of the signer. Buyer's bank 102 then creates a service acknowledgment message (see Table 9 above) with the results of these checks. Buyer's bank 102 then signs and sends the service acknowledgment to seller's bank 104 as shown in message 4 of Fig. 7.

Seller's bank 104 reviews the service acknowledgment, amends it with its details if necessary, and signs the amended message. The amended service acknowledgment message is then sent to seller 108 as shown in message 5 of Fig. 7.

Seller reviews the service acknowledgment, amends it with details if necessary, and signs the amended message. The amended service acknowledgment is then sent to buyer 106 as shown in message 6 of Fig. 7.

Buyer's bank 102 creates a payment obligation acceptance confirmation message (see Table 13 above) to signify whether the payment obligation has been accepted. Buyer's bank 102 then signs the payment obligation acceptance confirmation and sends it to seller's bank 104 as shown in message 7 of Fig. 7.

Seller's bank 104 reviews the payment obligation acceptance confirmation, amends with its details if necessary, signs the amended message, and sends it to seller 108 as shown in message 8 of Fig. 7.

Buyer's bank 102 reviews the confirmation of a payment execution, amends it with its details if necessary, signs the amended message, and sends it to seller 108 as shown in message 9 of Fig. 7.

When the date and time specified in the payment obligation instruction has been reached, the payment obligation is executed, preferably utilizing the bank's existing payment infrastructure.

Buyer's bank 102 creates confirmation of a payment execution (see Fig. 11 above) to signify that the payment obligation has been executed. Buyer's bank 102 then signs this message and sends it to seller's bank 104, as shown in message 10 of Fig. 7. The confirmation of a payment execution indicates whether this payment obligation has been executed successfully or not. At a minimum, the confirmation of a payment execution message should preferably be sent no later than the close of the following business day.

Seller's bank 104 reviews the confirmation of a payment execution, amends the confirmation of a payment execution information with its details, signs the amended message, and sends it to seller 108 as shown in message 11 of Fig. 7.

Buyer's bank 102 creates a confirmation of a payment execution message to signify that the payment order has been executed. Buyer's bank 102 then signs this message and sends it to buyer 106 as shown in message 12 of Fig. 7. The confirmation of a payment execution indicates whether this payment obligation has been executed successfully or not. If the payment execution has failed, a more detailed description of the reasons is sent to buyer 106than would have been sent to seller's bank 104 and to seller 108. At a minimum, the confirmation of a payment execution message is preferably sent no later than the close of the following business day.

Payment Obligation Transaction in the Four Corner Model

A payment obligation may be used in either the four corner or buyer to buyer's bank model. A typical payment obligation transaction in the four corner model occurs as follows.

1. Buyer 106 and seller 108 interact through seller's online systems.
2. At the point of purchase, seller software presents the payment form for completion by buyer 106.
3. Buyer 106 signs buyerSignedData blocks. The block includes buyerData block,

sellerPublicData block, the NegotiatedData block and BuyerSignatureDetail block. For a Payment Obligation buyerSignedData block will also include an Obligation block with the ObligationType set to BUYER.

Note that the buyer role (internally or through facilities provided through seller's systems) may require a number of signatures to authorize payment. Subsequent signatures may sign the only the data blocks set out above or additionally sign buyerSignature blocks already created. Optionally, seller 108 can check the signature of buyer 106. It is generally a requirement that in processing payment, buyer's bank 102 validates the certificate of buyer 106.

4. Seller 108 appends SellerPrivateData where appropriate, signs the message and sends the signed message to seller's bank 104.
5. Seller's bank 104 checks seller 108's signature, the status of seller 108's certificate, and the authority and rights assigned to seller 108's certificate. If these checks fail, seller's bank 104 sends a negative Service Acknowledgement to seller 108.
6. If seller 108 has provided account details in either sellerPublicData or SellerPrivateData blocks, seller's bank 104 will validate these account details. Seller's bank 104 will append account details to the message in sellerbankData block. Seller's bank 104 will also append a correspondent bank code based on the currency of the transaction. Seller's bank 104 removes sellerPrivateData block from the message.
7. Seller's bank 104 may optionally choose to initiate a challenge-response transaction with buyer's bank 102 dependent on seller's bank 104's own risk model. Seller's bank 104 will sign a message that consists of the PayChallenge which contains the SystemHeader and will include seller's bank credentials timestamped and validated by the root.

   Buyer's bank 102 will check the credentials of seller's bank 104, check that it can process the payment product being requested and sign a response to seller 108 that includes the validated credentials of buyer's bank 102.

   Seller's bank 104 will validate the credentials presented by buyer's bank 102. If validation fails, seller's bank 104 will send a Service Acknowledgement to seller 108 advising of the failure.
8. Seller's bank 104 signs the message and sends it to buyer's bank 102.
9. Buyer's bank 102 checks buyer 106's signature, the status of buyer 106's certificate, and

the authority and rights assigned to buyer 106's certificate. For payment requests with more than one signature, buyer's bank 102 must ensure that the request contains the correct authority.

If these checks fail, buyer's bank 102 sends a negative Service Acknowledgement to seller's bank 104. If these checks are successful, buyer's bank 102 will send a positive Service Acknowledgement including an indication of which reference should be used for customer service issues.

Seller's bank 104 re-signs the service acknowledgement and sends it to seller 108. All acknowledgements include a freshness proof of the acknowledging organizations signing certificate.

10. Buyer's bank 102 validates account related details. Note that this validation can take place synchronously. If the validation fails, buyer's bank 102 will send a negative PayInstAck. Where account related details are validated synchronously, the PayInstAck may be returned in the same document as the Service Acknowledgement.

11. On execution of the payment, buyer's bank 102 may send a PayConf to buyer 106 and to seller's bank 104 advising that execution has taken place. A negative PayConf may be produced where the clearing and settlement system fails to process the payment transaction successfully. Seller's bank 104 may send a PayConf to confirm that funds have been successfully received from buyer's bank 102.

Cancellation of a Payment Obligation Using the Four Corner Model

For payment obligations, the payment can be cancelled using the following four corner model process or an out of band process that includes positive assent to the cancellation by seller.

1. Buyer 106 and seller 108 arrange cancellation through seller's systems.
2. At the point of purchase, seller 108 presents the cancellation form for completion by buyer 106.
3. Buyer 106 signs the CancBuyerSignedData block. Note that the buyer role (internally or through facilities provided through seller's systems) may require a number of signatures to cancel payment. Subsequent signatures may sign the data blocks set out above and optionally sign previous BuyerSignature blocks.

4. Optionally, seller 108 can check the signature of buyer 106.
5. Seller 108 sends the signed document to seller's bank 104.
6. Seller's bank 104 checks seller 108's signature, the status of seller 108's certificate, and the authority and rights assigned to seller 108's certificate. If these checks fail, seller's bank 104 sends a negative Service Acknowledgement to seller 108.
7. Seller's bank 104 may optionally choose to initiate a challenge-response transaction with buyer's bank dependent on seller's bank 104's own risk model. If so, seller's bank 104 will sign a message that consists of the PayChallenge that contains the SystemHeader and will include seller's bank 104's credentials timestamped and validated by the root.
Buyer's bank 102 will check the credentials of seller's bank 104, check that it can process the payment product being requested and sign a response to seller 108 that includes the validated credentials of buyer's bank 102.
Seller's bank 104 will validate the credentials presented by buyer's bank 102. If validation fails, seller's bank 104 will send a Service Acknowledgement to seller advising of the failure.
8. Seller's bank 104 signs the cancellation message and sends it to buyer's bank 102.
9. Buyer's bank 102 checks buyer 106's signature, the status of buyer 106's certificate, and the authority and rights assigned to buyer 106's certificate. For Payment Requests with more than one signature, buyer's bank 102 must ensure that the CancellationRequest contains the correct authority.
If these checks fail, buyer's bank 102 sends a negative Service Acknowledgement to seller's bank. If these checks are successful, buyer's bank 102 will send a positive Service Acknowledgement including an indication of which reference should be used for customer service issues.
Seller's bank 104 re-signs the service acknowledgement and sends it to seller 108. All acknowledgements include a freshness proof of the acknowledging organizations signing certificate.
10. Buyer's bank 102 will then process the Cancellation Request. Buyer's bank 102 may send a positive CancellationConf to seller's bank 104 and to buyer 106 if the cancellation is successfully executed. If the cancellation cannot be executed a negative CancellationConf will be generated. Where the Cancellation Request can be processed

synchronously, the CancellationConf can be provided with the Service Acknowledgement. If the transaction cannot be identified, a negative Cancellation Request document will be generated

Payment Obligation Transaction in the Buyer to Buyer's Bank Model

A typical payment obligation transaction in the buyer to buyer's bank model occurs as follows.

1. Buyer 106 and seller 108 interact through seller's online systems.
2. Buyer 106 requests the payment obligation directly with buyer's bank 102.
3. Buyer 106 signs buyerSignedData block. Buyer 106 will complete sellerPublicData including provision of seller 108's account details and indicating that buyer 106 is undertaking an obligation to seller 108 to pay that can only be revoked with the agreement of seller 108. For a payment obligation, the ObligationType attribute of the Obligation block is set to BUYER.

Note that the buyer role may require a number of signatures to authorize payment. Subsequent signatures may sign the only the data blocks set out above or additionally sign buyerSignature blocks already created.

4. Buyer 106 signs the document and sends it to buyer's bank.
5. Buyer's bank 102 checks buyer 106's signature, the status of buyer 106's certificate, and the authority and rights assigned to buyer 106's certificate. For payment obligation requests with more than one signature, buyer's bank 102 must ensure that the request contains the correct authority.

If these checks fail, buyer's bank 102 sends a negative Service Acknowledgement to buyer 106. If these checks are successful, buyer's bank 102 will send a positive Service Acknowledgement including an indication of which reference should be used for customer service issues.

For payment obligations, buyer's bank 102 will include an ObligationConf Block with the ServiceAck that indicates buyer 106 has undertaken that obligation.

6. Buyer's bank 102 validates account related details. Note that this validation can take place synchronously. If the validation fails, buyer's bank 102 will send a negative PayInstAck. Where account related details are validated synchronously, the PayInstAck

may be returned in the same document as the Service Acknowledgement.

7. On execution of the payment, buyer's bank 102 may send a PayConf to buyer 106and advising that payment has taken place. A negative PayConf may be produced where the clearing and settlement system fails to process the payment transaction successfully.

Payment obligations generally cannot be cancelled using the buyer to buyer's bank model.

CERTIFIED PAYMENT OBLIGATION MESSAGE FLOW

In a preferred embodiment, the certified payment obligation product may employ the same general message flow as shown in Fig. 7 except that a CePOb Inst message is substituted for POb Inst and a CePOb Acpt Conf message is substituted for POb Acpt Conf.

Certified Payment Obligation Transaction in the Four Corner Model

In the four corner model, a certified payment obligation transaction typically occurs as follows.

1. Buyer 106 and seller 108 interact through seller's online systems.
2. At the point of purchase, seller software presents the payment form for completion by buyer. This includes the requirement that a Certified Payment Obligation be put in place with seller.
3. Buyer 106 signs buyerSignedData block. Note that the buyer role (internally or through facilities provided through seller's systems) may require a number of signatures to authorize payment. For a Certified Payment Obligation, the ObligationType attribute of the Obligation block is set to BANK.
4. Optionally, seller 108 can check the signature of buyer 106. It is generally a strong requirement that in processing payment buyer's bank 102 validates the certificate of buyer 106.
5. Seller 108 appends SellerPrivateData where appropriate, signs the message and sends the signed message to seller's bank 104.
6. Seller's bank 104 checks seller 108's signature, the status of seller 108's certificate, and the authority and rights assigned to seller 108's certificate. If these checks fail, seller's bank 104 sends a negative Service Acknowledgement to seller 108.

7. If seller 108 has provided account details in either sellerPublicData or SellerPrivateData blocks, seller's bank 104 will validate these account details. Seller's bank 104 will append account details to the message in sellerbankData block. Seller's bank 104 will also append a correspondent bank code based on the currency of the transaction. Seller's bank 104 removes sellerPrivateData block from the message.
8. Seller's bank 104 may optionally choose to initiate a challenge-response transaction with buyer's bank dependent on seller's banks own risk model. If so, seller's bank 104 will sign a message that consists of the PayChallenge which contains the SystemHeader and will include seller's bank 104's credentials timestamped and validated by the root.
Buyer's bank 102 will check the credentials of seller's bank 104, check that it can process the payment product being requested and sign a response to seller that includes the validated credentials of buyer's bank 102.
Seller's bank 104 will validate the credentials presented by buyer's bank 102. If validation fails, seller's bank 104 will send a Service Acknowledgement to seller 108 advising of the failure.
9. Seller's bank 104 signs the message and sends it to buyer's bank 102.
10. Buyer's bank 102 checks buyer 106's signature, the status of buyer 106's certificate, and the authority and rights assigned to buyer 106's certificate. For payment requests with more than one signature, buyer's bank must ensure that the request contains the correct authority.
If these checks fail, buyer's bank 102 sends a negative Service Acknowledgement to seller's bank 104. If these checks are successful, buyer's bank 102 will send a positive Service Acknowledgement including an indication of which reference should be used for customer service issues.
Seller's bank 104 re-signs the service acknowledgement and sends it to seller 108. All acknowledgements include a freshness proof of the acknowledging organizations signing certificate.
11. Buyer's bank 102 validates account related details. Note that this validation can take place synchronously. If the validation fails, buyer's bank 102 will send a negative PayInstAck. Where account related details are validated synchronously, the PayInstAck may be returned in the same document as the Service Acknowledgement.

12. Buyer's bank 102 will check the check the limit currently assigned against the card/corporate in line with internal risk policy. If buyer's bank 102 accepts the liability and certifies an obligation, a positive ObligationConf is sent from buyer's bank 102 to seller's bank 104. If buyer's bank 102 does not agree to the obligation, a negative Obligation Conf response is sent from buyer's bank 102 to seller's bank 104. The response should be sent by the end of the next working day and can be sent synchronously with the ServiceAck where a financial institutions systems support synchronous acceptance of such risks.
13. On execution of the payment, buyer's bank 102 may send a PayConf to buyer 106 and to seller's bank 104 advising that execution has taken place. A negative PayConf may be produced where the clearing and settlement system fails to process the payment transaction successfully. Seller's bank 104 may send a PayConf to confirm that funds have been successfully received from buyer's bank 102.

Cancellation of a Certified Payment Obligation Using the Four Corner Model

For Certified Payment Obligations, the payment can be cancelled using the following four corner model process or an out of band process that includes positive assent to the cancellation by seller.

1. Buyer 106 and seller 108 arrange cancellation through seller's systems.
2. At the point of purchase, seller 108 presents the cancellation form for completion by buyer 106.
3. Buyer 106 signs the CancBuyerSignedData blocks. Note that the buyer role (internally or through facilities provided through seller's systems) may require a number of signatures to cancel payment. Subsequent signatures may sign the data blocks set out above and optionally sign previous BuyerSignature blocks.
4. Optionally, seller 108 can check the signature of buyer 106.
5. Seller 108 sends the signed document to seller's bank 104.
6. Seller's bank 104 checks seller 108's signature, the status of seller 108's certificate, and the authority and rights assigned to seller 108's certificate. If these checks fail, seller's bank 104 sends a negative Service Acknowledgement to seller 108.
7. Seller's bank 104 may optionally choose to initiate a challenge-response transaction with

buyer's bank 102 dependent on seller's bank 104's own risk model. Seller's bank 104 will sign a message that consists of the PayChallenge which contains the SystemHeader and will include seller's bank 104's credentials timestamped and validated by the root. Buyer's bank 102 will check the credentials of seller's bank 104 and check that it can process the payment product being requested. Seller's bank 104 will validate the credentials presented by buyer's bank 102. If validation fails, seller's bank 104 will send a Service Acknowledgement to seller 108 advising of the failure.

8. Seller's bank 104 signs the cancellation message and sends it to buyer's bank 102.
9. Buyer's bank 102 checks buyer 106's signature, the status of buyer 106's certificate, and the authority and rights assigned to buyer 106's certificate. For payment requests with more than one signature, buyer's bank 102 must ensure that the CancellationRequest contains the correct authority.

   If these checks fail, buyer's bank 102 sends a negative Service Acknowledgement to seller's bank 104. If these checks are successful, buyer's bank 102 will send a positive Service Acknowledgement including an indication of which reference should be used for customer service issues.

   Seller's bank 104 re-signs the service acknowledgement and sends it to seller 108. All acknowledgements include a freshness proof of the acknowledging organizations signing certificate.
10. Buyer's bank 102 will then process the Cancellation Request. Buyer's bank 102 may send a positive CancellationConf to seller's bank 104 and to buyer 106 if the cancellation is successfully executed. If the cancellation cannot be executed a negative CancellationConf will be generated. Where the Cancellation Request can be processed synchronously, the CancellationConf can be provided with the Service Acknowledgement. If the transaction cannot be identified, a negative Cancellation Request document will be generated.

Certified Payment Obligation Transaction in the Buyer to Buyer's bank Model

In the buyer to buyer's bank model, a certified payment obligation transaction typically occurs as follows.

1. Buyer 106 and seller 108 interact through seller's online systems.

2. Buyer 106 requests the payment obligation directly with buyer's bank 102.
3. Buyer 106 signs buyerSignedData blocks. Buyer 106 will complete sellerPublicData including provision of seller 108's account details and indicating that buyer 106 is undertaking an obligation to seller 108 to pay that can only be revoked with the agreement of seller 108. For certified payment obligations, the ObligationType attribute in the Obligation element is set to the value BANK.

Note that the buyer role may require a number of signatures to authorize payment. Subsequent signatures may sign the only the data blocks set out above or additionally sign buyerSignature blocks already created.

4. Buyer 106 signs the document and sends it to buyer's bank 102.
5. Buyer's bank 102 checks buyer 106's signature, the status of buyer 106's certificate, and the authority and rights assigned to buyer 106's certificate. For payment obligation requests with more than one signature, buyer's bank 102 must ensure that the request contains the correct authority.

If these checks fail, buyer's bank 102 sends a negative Service Acknowledgement to buyer 106. If these checks are successful, buyer's bank 102 will send a positive Service Acknowledgement including an indication of which reference should be used for customer service issues.

For payment obligations, buyer's bank 102 will provide an ObligationConf Block that indicates buyer 106 has undertaken that obligation. Where an institution can synchronously process the obligation request, the ObligationConf may be included with the ServiceAck. The ObligationConf should again be provided no later than at the end of the next working day to the day on which the request was made.

6. Buyer's bank 102 validates account related details. Note that this validation can take place synchronously. If the validation fails, buyer's bank 102 will send a negative PayInstAck. Where account related details are validated synchronously, the PayInstAck may be returned in the same document as the Service Acknowledgement.
7. On execution of the payment, buyer's bank 102 may send a PayConf to buyer 106 and advising that payment has taken place. A negative PayConf may be produced where the clearing and settlement system fails to process the payment transaction successfully.

Certified Payment Obligations generally cannot be cancelled using the buyer to

buyer's bank model.

CONDITIONAL PAYMENTS

As indicated, conditions may be attached to all three payment products described above to form three conditional payment products.

Management of Conditions in Conditional Payments

Ground rules may be applied in the present invention to govern the relationship between the creation and management of conditions and obligations. In a preferred embodiment, the following ground rules for the use of conditions with payment instructions apply:

1. All conditions will initially be defined by a payments group and published centrally. A preferred set of condition codes and descriptions are described above.
2. The conditions are managed by a Trusted Service Supplier (TSS).
3. The Third Party Service Provider will discharge the condition - signing a statement with a system token that the condition has been met. Once the conditions which attach to a payment have been discharged, the instruction will be executed.
4. The conditions may be offered by seller 108 or entered by buyer 106.
5. The condition has two parts: the generic statement of the condition (as defined by the system) and details that pertain to the particular transaction.
6. Each condition within a payment must be assigned a Third Party Service Provider – an authority who will sign to confirm that the condition has been discharged. The authority may be a corporate entity, a group within that entity, or an individual. TSPS organizations preferably implement appropriate control on the authority to sign. The TPSP should be identified by at least an email address.
7. Condition management remains independent of the transaction.
8. Validation of TPSP certificate must be included in processing the response from the TPSP. The TPSP may have been issued with a certificate by a third party institution.
9. The TPSP should be able to perform a certificate status check on the certificate presented by the financial institution with his institution.
10. Attachments can be attached by the TPSP when discharging the condition. This

should not be processed by buyer bank 102 but included in the acknowledgement to buyer 106's system. All attachments are forwarded once all conditions which apply to a payment ("the condition set") have been discharged.

11. The payment-condition relationship is a one-to-many relationship. One payment may have a number of conditions that must be met before payment is executed. Conditions do not apply to more than a single payment.

12. The rules for cancellation of conditional payment products follow the rules for cancellation of the non-conditional products. The condition management system should be informed if a conditional payment is cancelled. The TPSP will receive a message from the financial institution indicating that the conditions have been cancelled.

Lifecycle of Conditions in Conditional Payments

Preferably, the lifecycle of the conditions is determined as follows:

1. The conditions that attach to a payment are agreed between buyer 106 and seller 108 as part of the payment negotiation. The status of each condition and the condition set prior to acceptance into the condition management system (TSS) is: **Requested**.
2. In the four corner model, the conditions are signed by buyer 106 and resigned by seller 108. In the buyer to buyer's bank model, buyer 106 provides details of the conditions that apply to seller 108.
3. Seller's bank 104 logs the conditions locally before processing the document.
4. The conditions that attach to a payment are lodged in the Condition Management System at buyer's bank 102.
5. A ConditionSetUpConf document is generated and sent to seller's bank 104 (or to buyer 106 in the buyer to buyer's bank model) confirming that the conditions exist in the Condition Management System (TSS). The Status of the conditions is: **Incomplete**.
6. The Condition Management System informs the Third Party Service Provider (TPSP) that the conditions attached to the payment exist.
7. The TPSP may send an update message to the Condition Management System to update the status of any one of the conditions attached to the payment of which the

TPSP is assigned signoff. The PayCondition document is used to inform all parties in the transaction of a change in status of the condition.

8. The status of any condition attached to a payment, once signed off, is: **Discharged**. Once all conditions have been discharged, the ConditionSet has the status Discharged.
9. Any attachments assigned to a condition on discharge by a TPSP should not be forwarded to seller 108 until all conditions have been discharged and the payment instruction released.
10. Each condition has an expiry date. Where a condition expires, the ConditionSet cannot be discharged and should be marked as: **Expired**. A PayCondition document should be sent to the participants in the transaction to inform them that the condition has expired.
11. Where a conditional payment is cancelled, all conditions that attach to a payment are marked as cancelled. The TPSP should be informed using a PayCondition document with all Status fields set to: **Cancelled**.

Rules Governing Conditions in Conditional Payments

In addition, the following rules preferably govern the processing of conditional obligations in the present invention:

1. Obligations should be accepted even if conditions are attached.
2. Conditions should not be registered until the obligation has been registered successfully. Where an obligation is refused, a negative ConditionSetUpConf should be sent to buyer 106 (in the buyer to buyer's bank model) or to seller's bank 104 (in the four corner model).
3. The ownership of an obligation cannot be transferred until the conditions have been discharged.
4. If the conditions expire or are cancelled, the Obligation Management function must be informed to release the limit reserved against that conditional payment.

CONDITIONAL PAYMENT ORDER MESSAGE FLOW

In a preferred embodiment, much of the message flow for the conditional payment order product is the same as for the payment order product described above except that a

CPOr Inst is substituted for a POr Inst in message 1 of Fig. 6. Additional processes, however, are added to subject execution of the payment order to occurrence of a condition. Conditions are preferably set by a TSS and must be met by one or more TPSPs before payment is made. One embodiment of these additional processes is shown in Fig. 8.

The condition details may be supplied to the TSS by buyer's bank 102. In this case, the TSS may inform buyer's bank 102 when a condition has been met so that buyer's bank 102 may respond accordingly. Alternatively, buyer's bank 102 may act as the TSS.

Turning to Fig. 8, the trusted service supplier creates a condition advice message (see Table 8 above) which specifies a condition that must be met by the third party service provider before a payment can be executed. The trusted service supplier then signs the condition advice message and sends it to the third party service provider as shown in message 1 of Fig. 8.

The third party service supplier reviews the condition advice for acceptability, verifies the message syntax, the validity of certificate and signature, and authority of the signer. The third party service supplier then creates a service acknowledgment message with the results of these checks. The third party service provider then signs the service acknowledgment and sends it to the trusted service supplier as shown in message 2 of Fig. 8.

The third party service provider creates a condition update message to inform the trusted service supplier of a completed step in the condition fulfillment process. The third party service provider signs the message and sends it to the trusted service supplier as shown in message 3 of Fig. 8. It should be noted that multiple update messages may be sent for each condition.

The trusted service supplier reviews the condition update message for acceptability, verifies the message syntax, the validity of the certificate and the signature, and the authority of the signer. The trusted service supplier then creates a service acknowledgment (see Table 9 above) with the results of these checks. The trusted service supplier then signs and sends the service acknowledgment to the third party service supplier as shown in message 4 of Fig. 8.

The third party service provider creates a condition declaration message (see Table 16 above) in order to inform the trusted service supplier of a fulfillment of the condition process.

This message may be either positive or negative. The third party service provider signs the message and sends it to the trusted service supplier as shown in message 5 of Fig. 8.

The trusted service supplier reviews the conditional declaration message for acceptability, and verifies the message syntax, the validity of the certificate and signature, and the authority of the signer. The trusted service supplier then creates a service acknowledgment message (see Table 9 above) with the results of these checks. The trusted service supplier signs the service acknowledgment and sends it to the third party service provider as shown in message 6 of Fig. 8.

CONDITIONAL PAYMENT OBLIGATION MESSAGE FLOW

In a preferred embodiment, much of the message flow for the conditional payment obligation product is the same as for the payment obligation described above except that a CPOb Inst is substituted for a POb Inst in message 1 of Fig. 7. Additional processes, however, are added to subject execution of the payment obligation to occurrence of a condition. Conditions are preferably set by the trusted service supplier and must be met by one or more third party service providers before payment is made. In a preferred embodiment, the condition process may be the same as that described above in connection with Fig. 8.

CERTIFIED CONDITIONAL PAYMENT OBLIGATION MESSAGE FLOW

In a preferred embodiment, the certified conditional payment obligation product may employ the same message flow outlined in connection with the conditional payment obligation above (with the additional condition process included), except that a CePOb Inst message is substituted for CPOb Inst and a CePOb Acpt Conf message is substituted for CPOb Acpt Conf.

As described in detail above, message formats preferably adhere to open standards to ensure compatibility across national boundaries due to the global nature of the payments system. For example, the use of multi-byte character sets in order to accommodate different languages is preferred.

Also preferably, payment transactions are date and time stamped by each of the parties involved in the payment system. In a preferred embodiment, time stamps are based on Universal Time Code (U.T.C.) format, and produced by a third party trusted time server.

In a preferred embodiment, all payment related messages are secured through the use of certificates issued from trusted certification authorities. In a preferred embodiment, these certificates are used to digitally sign messages, providing message authentication, integrity, and non-repudiation.

In a preferred embodiment, the confidentiality of all information exchanged between parties in the payments system is maintained and that information is protected from unauthorized access. Encryption of at least 128-bit strength is preferably employed, using SSLv3 / TLS.

In a preferred embodiment, the present payments system provides comprehensive error handling which preferably covers the following areas: message related errors including but not limited to message syntax, message signature verification/authentication, message data such as incorrect bank identification codes, and payment authorization; message specific errors including but not limited to failing to meet set conditions; and payment systems infrastructure errors including but not limited to transmission problems and time-out problems.

In a preferred embodiment, all payment initiation messages are idempotent. For example, when a payment order instruction is sent and no service acknowledgment is received within a specified time limit, the payment order instruction may be sent again, without the intended recipient of this message acting upon this request message twice.

Also, while the system of the present invention preferably includes the automatic processing of acknowledgements as described, participants may also choose to provide acknowledgements through many channels, such as: traditional cash management systems; web-based banking services; voice, fax and other telephony services; or SMS, WAP and other mobile services.

While the invention has been described in connection with specific embodiments, it is evident that numerous alternatives, modifications, and variations will be apparent to those skilled in the art in light of the foregoing description.

WHAT IS CLAIMED IS:

1. A method of providing payment services in a four-corner model, the four-corner model comprising a plurality of entities including a root entity, a first participant, a second participant, a first customer, and a second customer, the first customer being a customer of the first participant, the second customer being a customer of the second participant, each entity being provided with a digital certificate and an associated private key, the method comprising:

the first customer completing a buyer's portion of a payment instruction, the payment instruction specifying a payment date;

the first customer signing the payment instruction with its private key;

the first customer transmitting the payment instruction to the second customer;

the second customer completing a seller's portion of the payment instruction;

the second customer signing the payment instruction with its private key;

the second customer transmitting the payment instruction to the second participant;

the second participant completing a second participant portion of the payment instruction;

the second participant signing the payment instruction with its private key;

the second participant transmitting the payment instruction to the first participant;

the first participant executing the payment instruction on the payment date.

2. The method of claim 1, wherein the payment instruction is a payment order instruction.

3. The method of claim 1, wherein the payment instruction is a payment obligation instruction.

4. The method of claim 1, wherein the payment instruction is a conditional payment order instruction.

5. The method of claim 1, wherein the payment instruction is a conditional payment obligation instruction.

6. The method of claim 1, wherein the payment instruction is a certified payment obligation instruction.

7. The method of claim 1, wherein the payment instruction is a certified conditional payment obligation instruction.

8. The method of claim 1 wherein the first customer executes a contract with the first participant defining roles and responsibilities in connection with payment services.

9. The method of claim 1 wherein the second customer executes a contract with the second participant defining roles and responsibilities in connection with payment services.

10. A method of providing payment services, the method comprising:

providing a buyer with a plurality of payment instruments, each payment instrument having associated therewith a payment instruction;

the buyer choosing one of the payment instruments;

the buyer completing at least a first portion of the payment instruction message associated with the payment instrument chosen by the buyer, the payment instruction message specifying a payment date;

the first customer signing the payment instruction message with a private key corresponding to a digital certificate of the buyer;

the signed payment instrument being received by a bank;

the bank executing the payment instruction on the payment date.

11. The method of claim 10, wherein the selected payment instrument is a payment order.

12. The method of claim 10, wherein the selected payment instrument is a payment obligation.

13. The method of claim 10, wherein the selected payment instrument is a conditional payment order.

14. The method of claim 10, wherein the selected payment instrument is a conditional payment obligation.

15. The method of claim 10, wherein the selected payment instrument is a certified payment obligation.

16. The method of claim 10, wherein the selected payment instrument is a certified conditional payment obligation.

17. The method of claim 10, wherein the payment instrument is negotiable.

18. A method of providing payment services in a buyer to participant model, the model comprising a plurality of entities including a participant and a customer, the customer being a customer of the participant, each entity being provided with a digital certificate and an associated private key, the method comprising:

the first customer completing a buyer's portion of a payment instruction, the payment instruction specifying a payment date;

the first customer signing the payment instruction with its private key;

the first customer transmitting the payment instruction to the participant

the participant completing a participant portion of the payment instruction;

the participant signing the payment instruction with its private key;

the participant executing the payment instruction on the payment date.

19. A method of providing payment services in a direct debit model, the direct-debit model comprising a plurality of entities including a participant, a first customer, and a

second customer, the second customer being a customer of the participant, each entity being provided with a digital certificate and an associated private key, the method comprising:

the first customer completing a buyer's portion of a payment instruction, the payment instruction specifying a payment date;

the first customer signing the payment instruction with its private key;

the first customer transmitting the payment instruction to the second customer;

the second customer completing a seller's portion of the payment instruction;

the second customer signing the payment instruction with its private key;

the second customer transmitting the payment instruction to the participant;

the participant completing a participant portion of the payment instruction;

the participant signing the payment instruction with its private key;

the participant executing the payment instruction on the payment date.

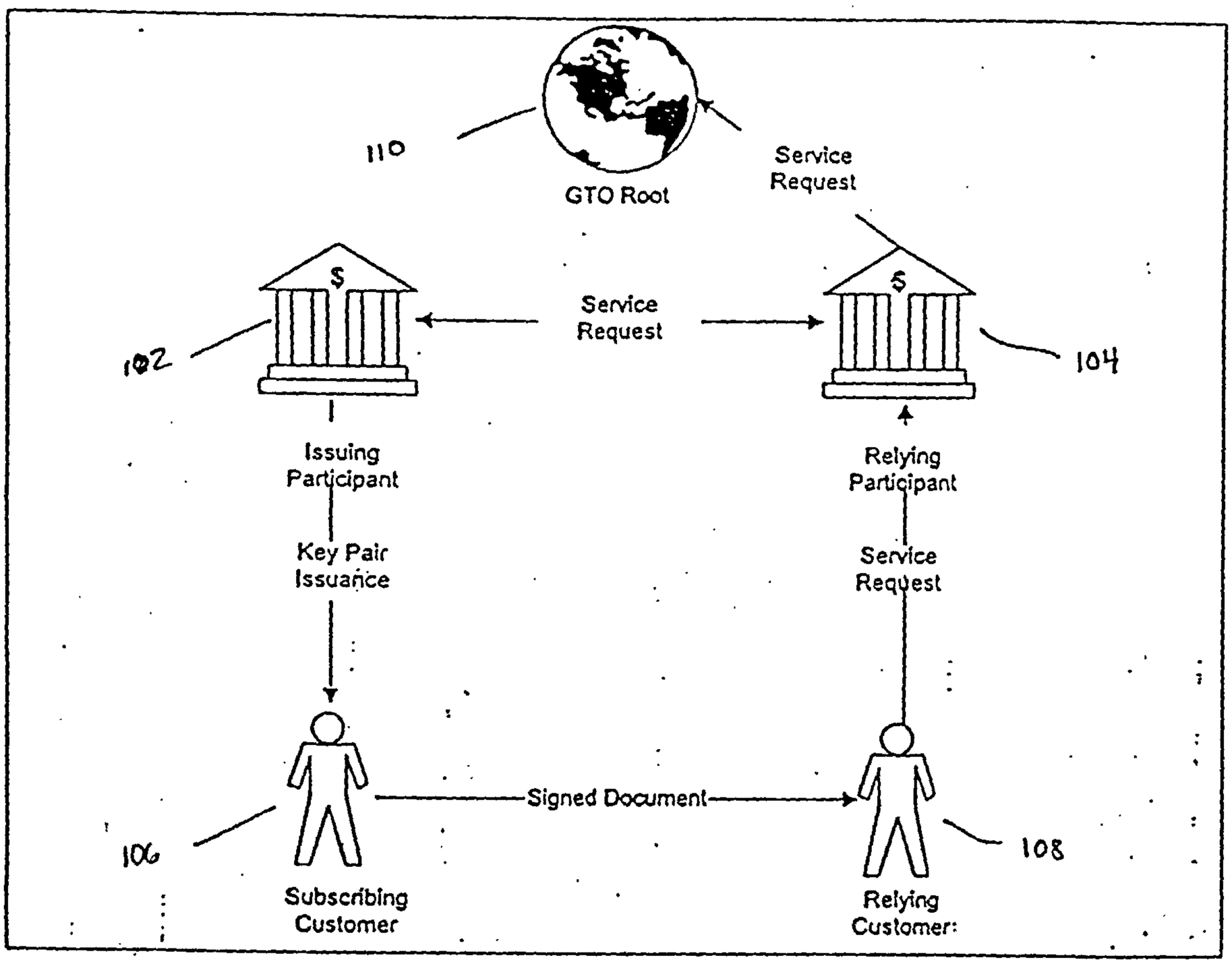

110
GTO Root
Service Request
$
$
Service Request
102
104
Issuing Participant
Relying Participant
Key Pair Issuance
Service Request
Signed Document
106
108
Subscribing Customer
Relying Customer

FIG. 1

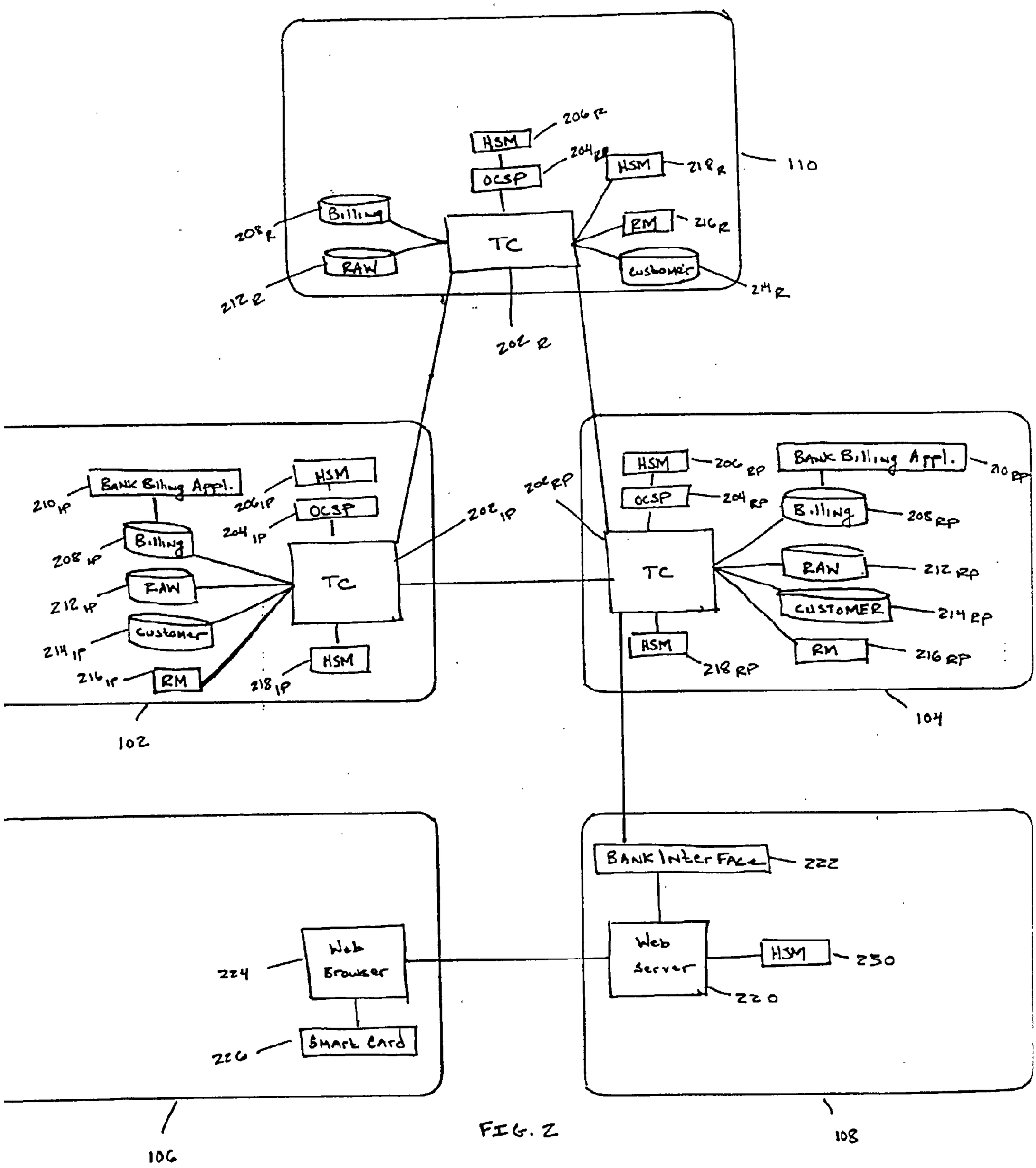

HSM
206R
OCSP
204R
HSM
218R
110
Billing
208R
RAM
216R
TC
RAW
CUSTOMER
212R
214R
202R
BANK Billing Appl.
210IP
HSM
206IP
OCSP
204IP
202IP
Billing
208IP
RAW
212IP
CUSTOMER
214IP
RM
216IP
HSM
218IP
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HSM
206RP
202RP
BANK Billing Appl.
210RP
OCSP
204RP
Billing
208RP
TC
RAW
212RP
CUSTOMER
214RP
RM
216RP
ASM
218RP
104
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222
Web Browser
224
Web Server
HSM
230
220
SMART CARD
226
106
108

FIG. 2

Figure 3

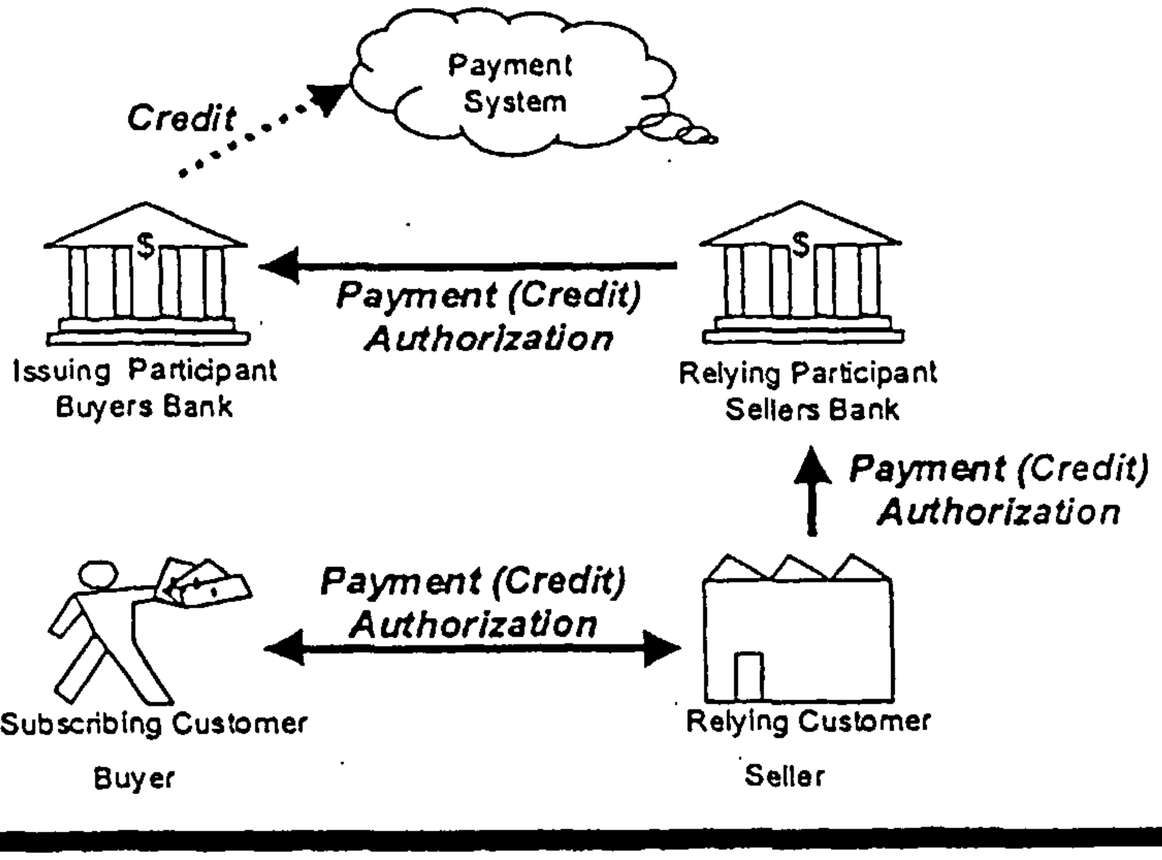


Figure 4

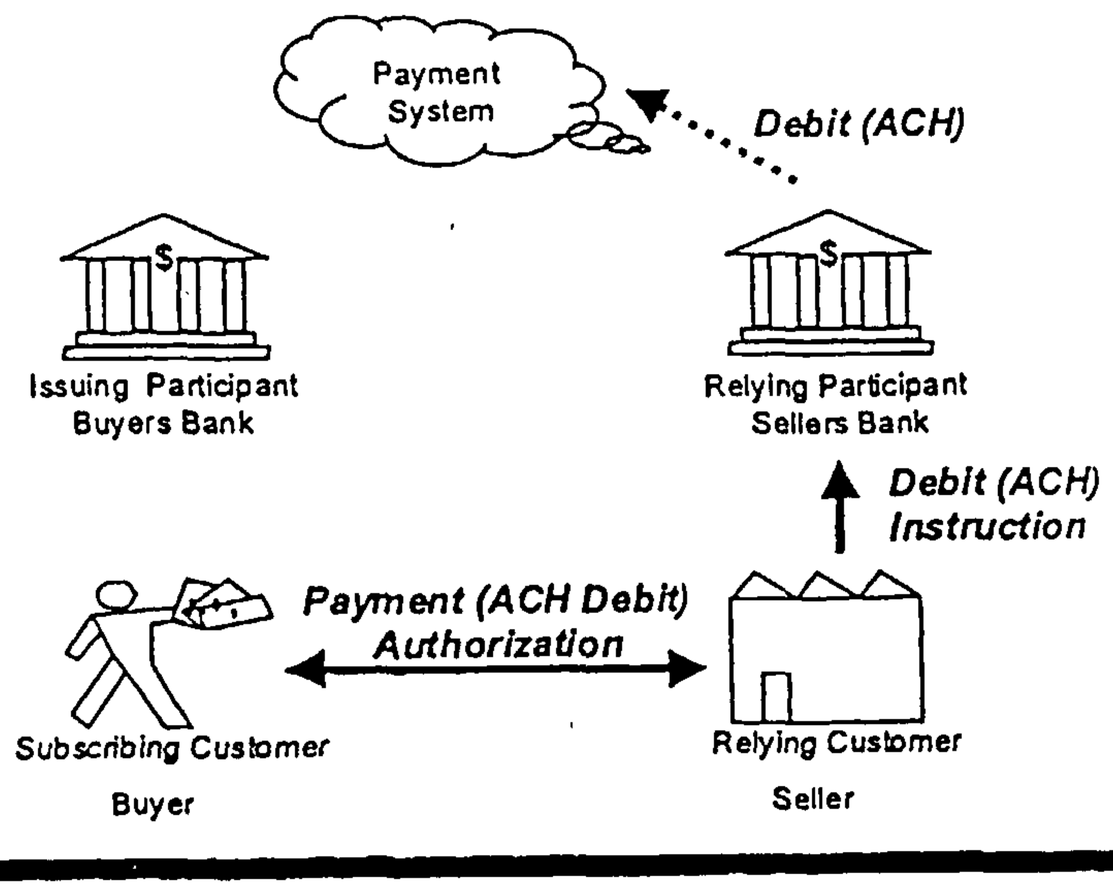


Figure 5

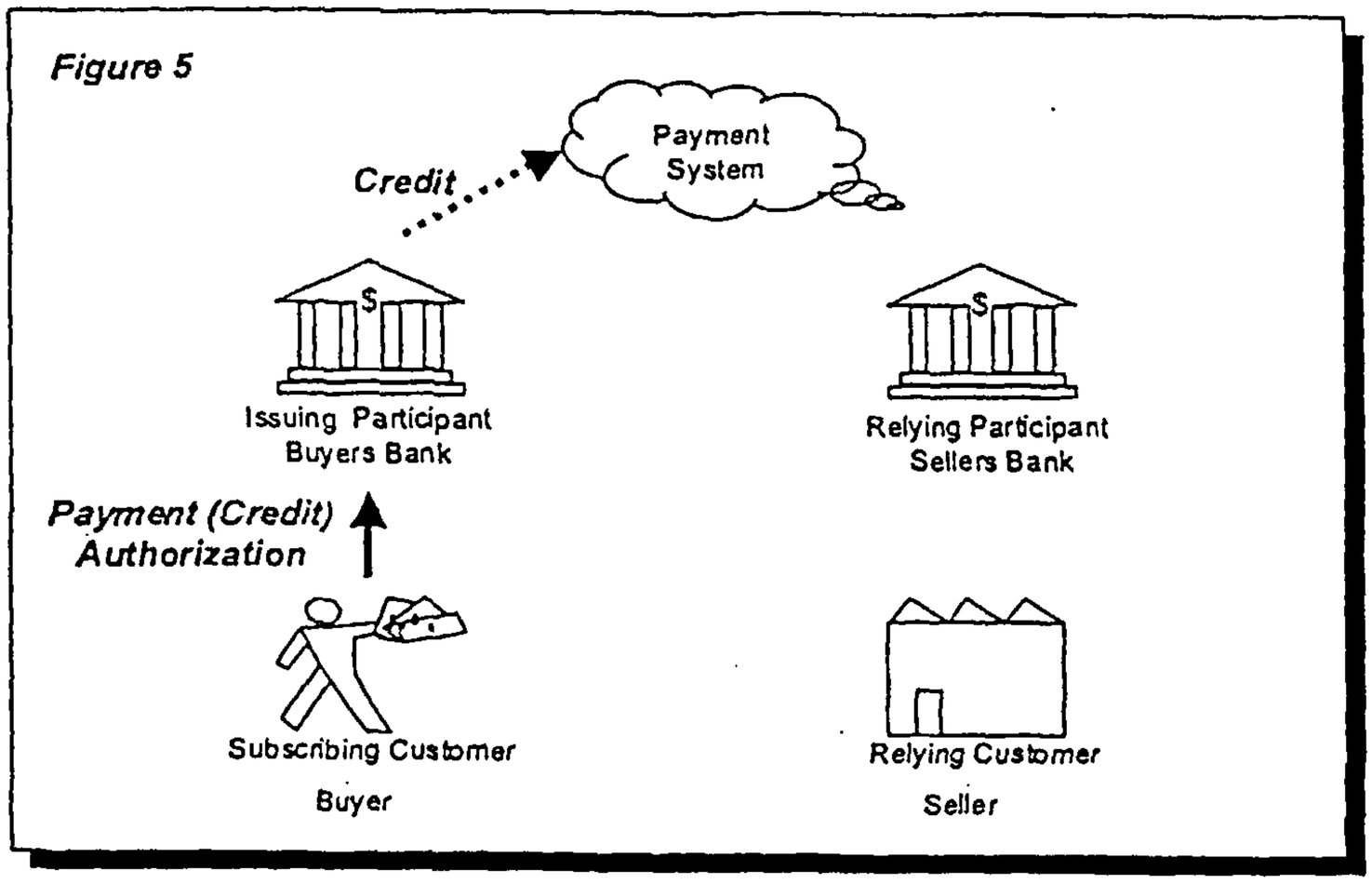
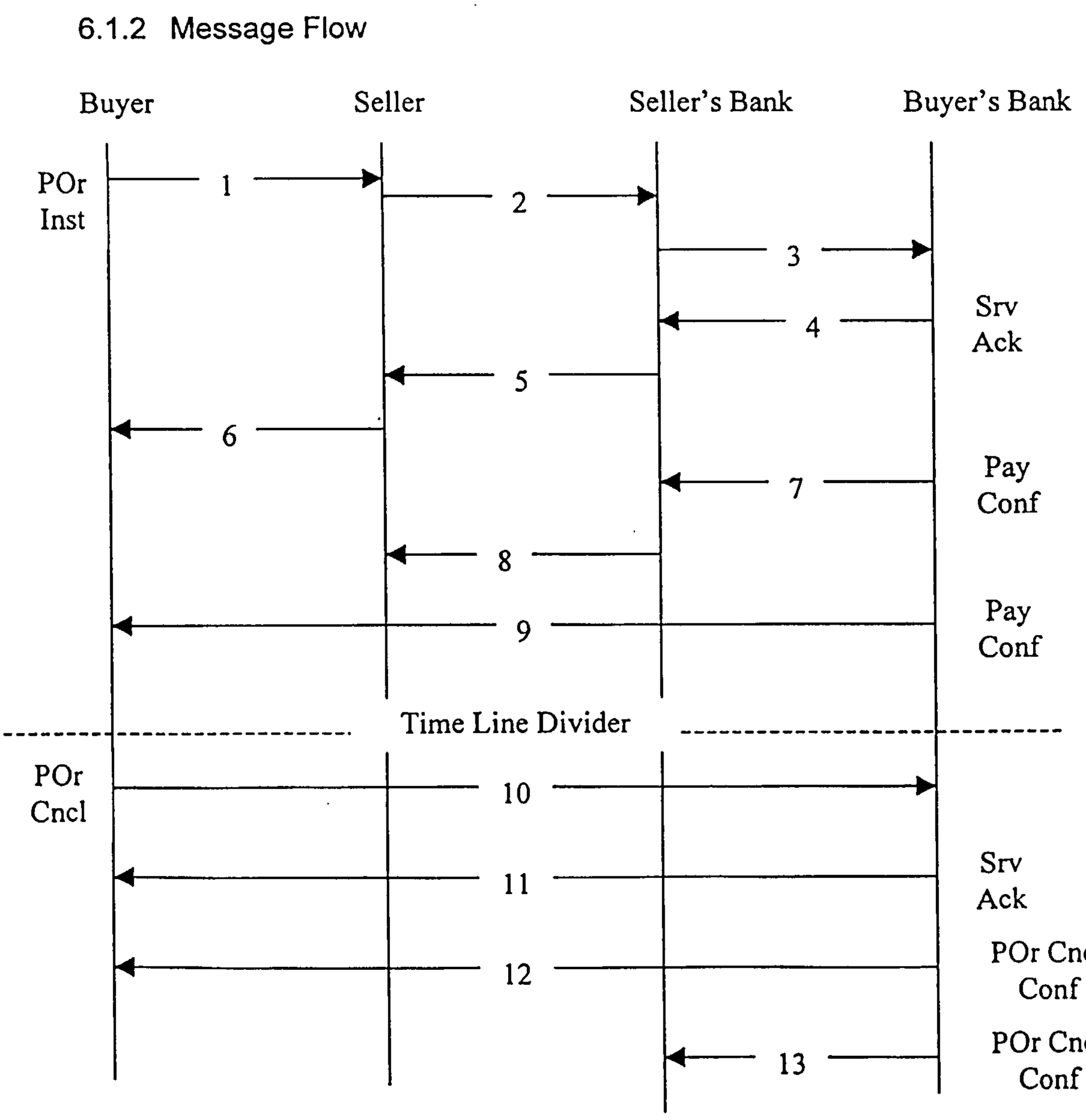

Credit
Payment System
$
$
Issuing Participant
Buyers Bank
Relying Participant
Sellers Bank
Payment (Credit)
Authorization
Subscribing Customer
Buyer
Relying Customer
Seller

Fig. 6


6.1.2 Message Flow
Buyer
Seller
Seller's Bank
Buyer's Bank
POr Inst
1
2
3
4
Srv Ack
5
6
7
Pay Conf
8
9
Pay Conf
Time Line Divider
POr Cncl
10
11
Srv Ack
12
POr Cncl Conf
13
POr Cncl Conf

6.2.2 Message Flow

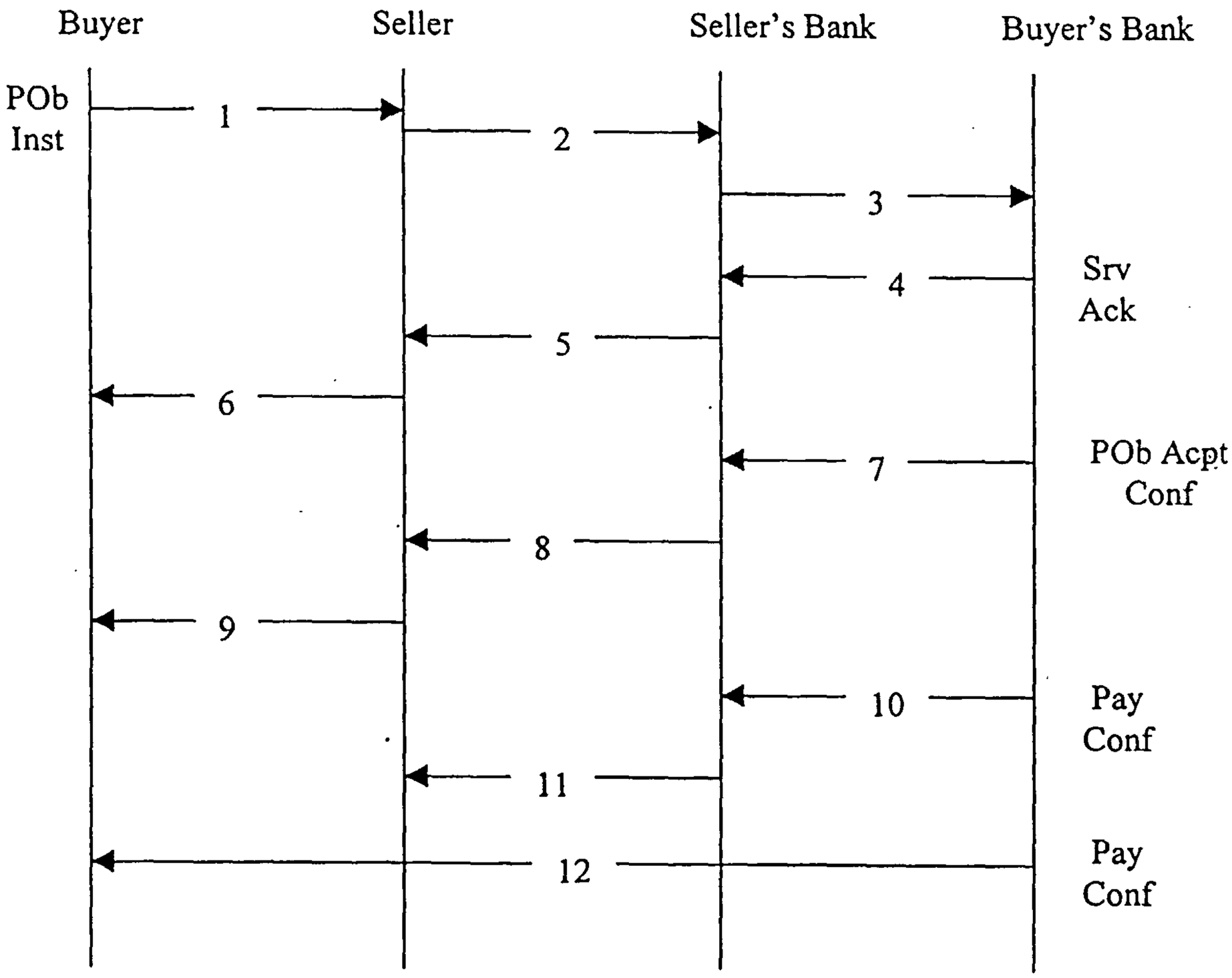
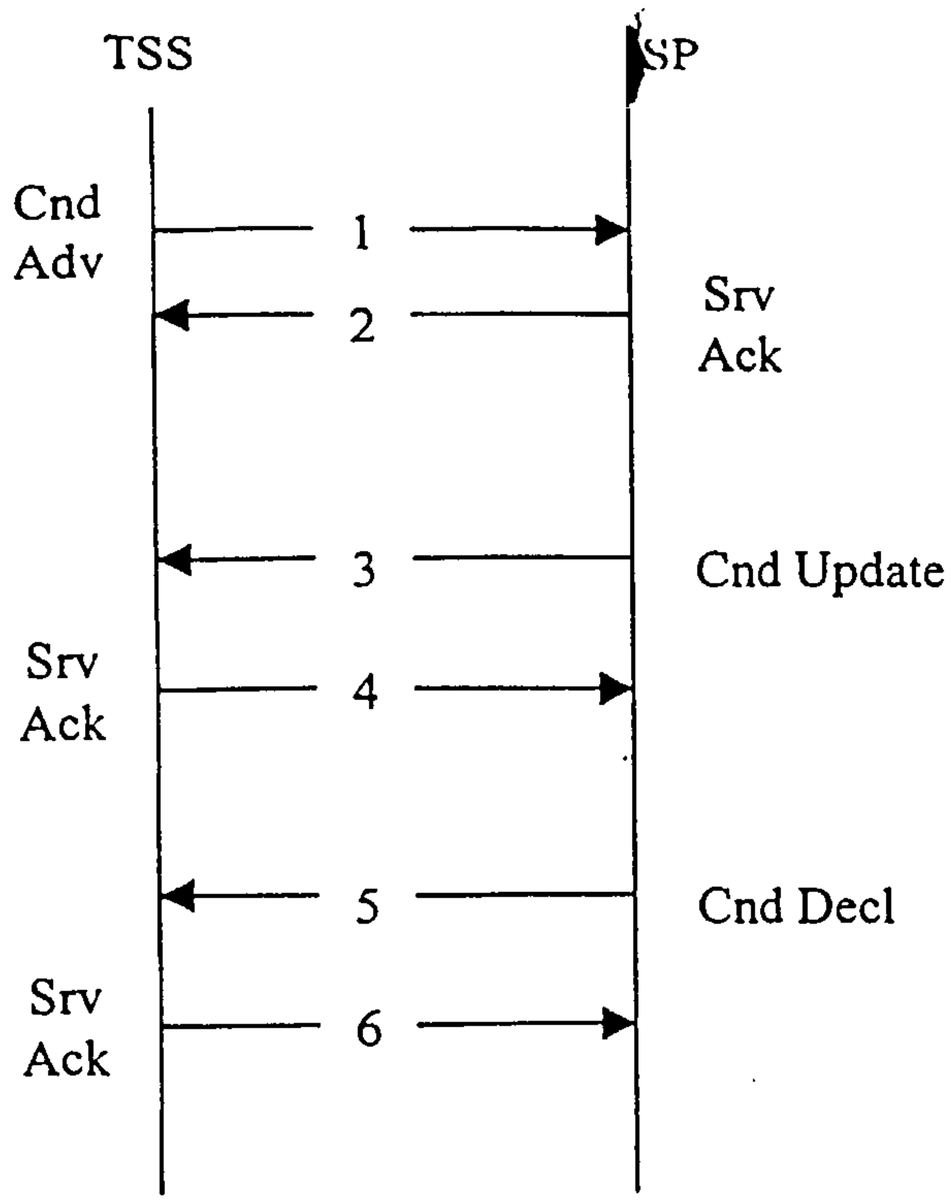
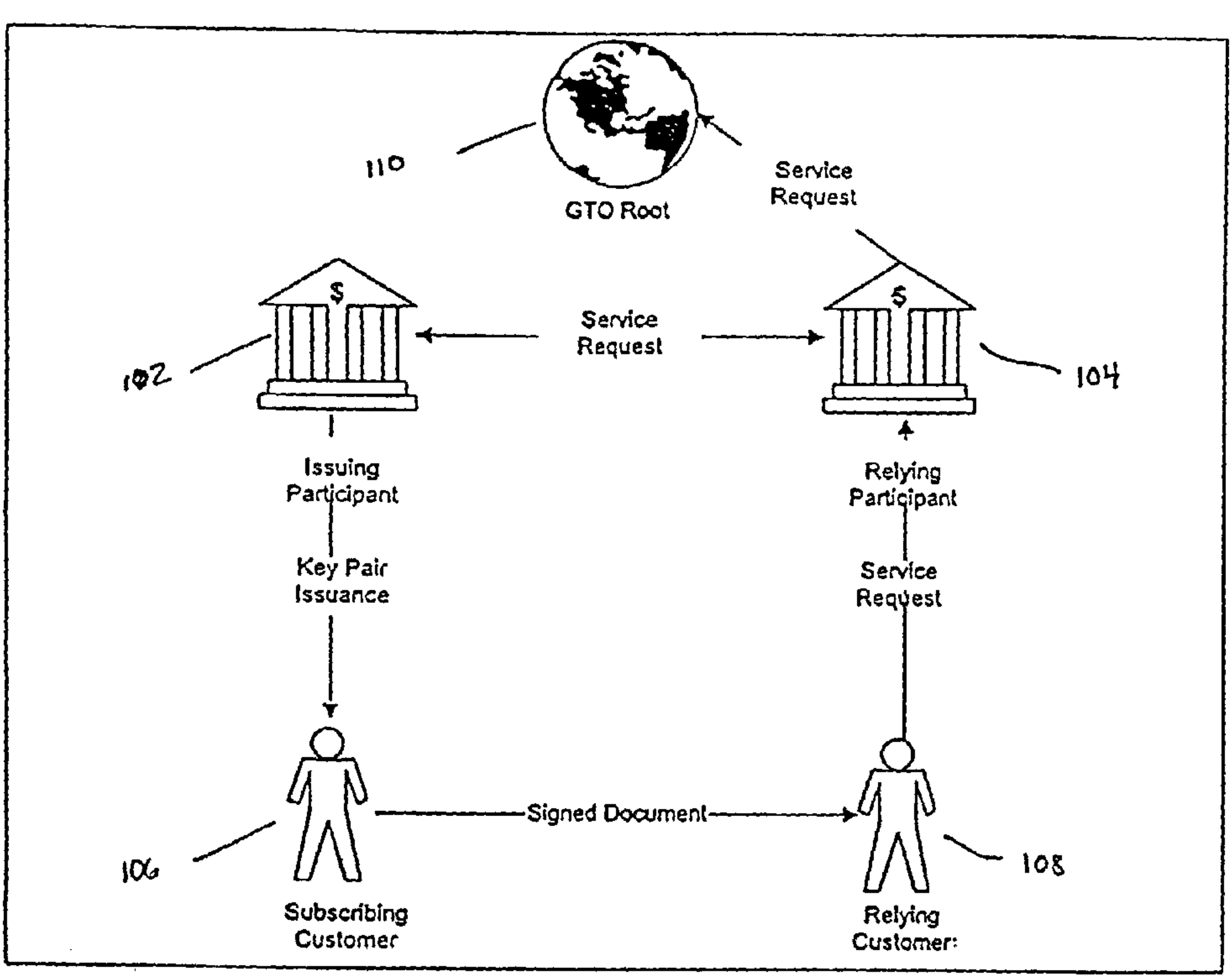


Fig. 7



There may be multiple update messages from the TPSP to the TSS

Fig. 8


110
GTO Root
Service Request
102
Service Request
104
Issuing Participant
Relying Participant
Key Pair Issuance
Service Request
Signed Document
106
108
Subscribing Customer
Relying Customer: