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(54) Title: PROVIDING PAYMENT SOFTWARE APPLICATIONS AS ENTERPRISE SERVICES

(57) Abstract:



WO 2007/112950 A2

PROVIDING PAYMENT SOFTWARE APPLICATION AS ENTERPRISE SERVICES

BACKGROUND

This specification relates to data processing systems implemented on computers, and
5 more particular to data processing systems providing services in the nature of web services.

Enterprise software systems are generally large and complex. Such systems can
require many different components, distributed across many different hardware platforms,
possibly in several different geographical locations. Thus, the architecture of a large software
application, i.e., what its components are and how they fit together, is an important aspect of
10 its design for a successful implementation.

Web services are one technology for making the functionality of software applications
available to other software, including other applications. A web service is a standard-based
way of encapsulating the functionality of an application that other applications can locate and
access. A service-oriented architecture is a distributed software model within which all
15 functionality is defined as independent web services. Within a service-oriented architecture,
web services can be used in defined sequences according to the business logic to form
applications that enable business processes.

SUMMARY

This specification describes a services architecture design that provides enterprise
20 services having payment functionality at the level of an enterprise application. Enterprise
services are web services that have an enterprise-level business value.

In its various aspects, the invention can be embodied in systems, methods, and
computer program products. For example, a system in one embodiment implements a
services architecture design that provides enterprise services having payment functionality at
25 the level of an enterprise application. The design includes a set of service operations, process
components, and optionally deployment units. Suitable business objects are also described.

The subject matter described in this specification can be implemented to realize one
or more of the following advantages. Effective use is made of process components as units
of software reuse, to provide a design that can be implemented reliably in a cost effective

way. Effective use is made of deployment units, each of which is deployable on a separate computer hardware platform independent of every other deployment unit, to provide a scalable design. Service interfaces of the process components define a pair-wise interaction between pairs of process components that are in different deployment units in a scalable way.

5 Details of one or more implementations of the subject matter described in this specification are set forth in the accompanying drawings and in the description below. Further features, aspects, and advantages of the subject matter will become apparent from the description, the drawings, and the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

10 FIGS. 1A, 1B, 1C and 1D collectively illustrate a high-level view of a software architectural design and implementation of a suite enterprise software services having payment functionality.

 FIGS. 2A and 2B are block diagrams collectively showing an expense and reimbursement management process component.

15 FIG. 3 is a block diagram showing a cash management process component.

 FIGS. 4A, 4B, 4C, 4D, 4E and 4F are block diagrams collectively showing a payment processing process component.

 FIGS. 5A, 5B, 5C, 5D and 5E are block diagrams collectively showing a due item processing process component.

20 FIG. 6 is a block diagram showing a financial market data management process component.

 Like reference numbers and designations in the various drawings indicate like elements.

DETAILED DESCRIPTION

25 FIGS. 1A, 1B, 1C and 1D collectively illustrate a high-level view of a software architectural design and of an application software implementation that provides a suite of enterprise service operations, which can be organized into interfaces, having payment application functionality. The software corresponding to FIGS. 1A, 1B and 1C in one implementation is for deployment in an application layer of an application server, while the

software corresponding to FIG. 1D is for deployment in a foundation layer, which will be described below.

The elements of the architecture include the business object, the process component, the service operation (or simply, the operation), the service interface, the message, and the deployment unit. The elements can also include process agents and reuse service components. These will be generally described below.

In one implementation, the software is implemented to be deployed on an application platform that includes a foundation layer that contains all fundamental entities that can be used from multiple deployment units. These entities can be process components, business objects or reuse service components. A reuse service component is a piece of software that is reused in different transactions. A reuse service component is used by its defined interfaces, which can be, e.g., local APIs (Application Programming Interfaces) or service interfaces.

The architectural design is a specification of a computer software application, and elements of the architectural design can be implemented to realize a software application that implements enterprise application service interfaces. The elements of the architecture are at times described in this specification as being contained or included in other elements; for example, a process component is described as being contained in a deployment unit. It should be understood, however, that such operational inclusion can be realized in a variety of ways and is not limited to a physical inclusion of the entirety of one element in another.

The architectural elements include the business object. A business object is a representation of a type of a uniquely identifiable business entity (an object instance) described by a structural model. Processes operate on business objects.

A business object represents a specific view on some well-defined business content. A business object represents content, and instances of business objects include content, which a typical business user would expect and understand with little explanation. Whether an object as a type or an instance of an object is intended by the term is generally clear from the context, so the distinction will be made explicitly only when necessary. Properly implemented, business objects are implemented free of redundancies.

Business objects are further categorized as business process objects and master data objects. A master data object is an object that encapsulates master data (i.e., data that is valid

for a period of time). A business process object, which is the kind of business object generally found in a process component, is an object that encapsulates transactional data (i.e., data that is valid for a point in time). A mass data run object is an application object that executes an algorithm for a particular mass data run. An instance of a mass data run object contains a particular set of selections and parameters. A mass data run object implements an algorithm that modifies, manages, and/or processes a large amount of data in multiple transactions, possibly but not necessarily with parallel processing. A dependent object is a business object used as a reuse part in another business object. A dependent object represents a concept that cannot stand by itself from a business point of view. Instances of dependent objects only occur in the context of a non-dependent business object. A transformed object is a transformation of multiple business objects for a well-defined purpose. It transforms the structure of multiple business objects into a common structure. A transformed object does not have its own persistency.

The architectural elements also include the process component. A process component is a software package that realizes a business process and generally exposes its functionality as services. The functionality contains business transactions. A process component contains one or more semantically related business objects. Any business object belongs to no more than one process component.

Process components are modular and context-independent. That they are context-independent means that a process component is not specific to any specific application and is reusable. The process component is the smallest (most granular) element of reuse in the architecture.

The architectural elements also include the operation. An operation belongs to exactly one process component. A process component generally has multiple operations. Operations can be synchronous or asynchronous, corresponding to synchronous or asynchronous process agents, which will be described below. An operation is the smallest, separately-callable function, described by a set of data types used as input, output, and fault parameters, or some combination of them serving as a signature. For convenience in supporting use of the operations supported by a system implementing elements of the design,

such a system can optionally include a repository of service descriptions that includes a standards-based description of each of the supported service operations.

The architectural elements also include the service interface, which may be referred to simply as an interface. An interface is a named group of operations. Each operation belongs to exactly one interface. An interface belongs to exactly one process component. A process component might contain multiple interfaces. In one implementation, an interface contains only inbound or outbound operations, but not a mixture of both. One interface can contain both synchronous and asynchronous operations. All operations of the same type (either inbound or outbound) which belong to the same message choreography will preferably belong to the same interface. Thus, generally, all outbound operations to the same other process component are in one interface.

The architectural elements also include the message. Operations transmit and receive messages. Any convenient messaging infrastructure can be used. A message is information conveyed from one process component instance to another, with the expectation that activity will ensue. An operation can use multiple message types for inbound, outbound, or error messages. When two process components are in different deployment units, invocation of an operation of one process component by the other process component is accomplished by an operation on the other process component sending a message to the first process component.

The architectural elements also include the process agent. Process agents do business processing that involves the sending or receiving of messages. Each operation will generally have at least one associated process agent. A process agent can be associated with one or more operations. Process agents can be either inbound or outbound, and either synchronous or asynchronous.

Asynchronous outbound process agents are called after a business object changes, e.g., after a create, update, or delete of a business object instance.

Synchronous outbound process agents are generally triggered directly by a business object.

An output process agent will generally perform some processing of the data of the business object instance whose change triggered the event. An outbound agent triggers subsequent business process steps by sending messages using well-defined outbound services

to another process component, which generally will be in another deployment unit, or to an external system. An outbound process agent is linked to the one business object that triggers the agent, but it is sent not to another business object but rather to another process component. Thus, the outbound process agent can be implemented without knowledge of the exact business object design of the recipient process component.

Inbound process agents are called after a message has been received. Inbound process agents are used for the inbound part of a message-based communication. An inbound process agent starts the execution of the business process step requested in a message by creating or updating one or multiple business object instances. An inbound process agent is not the agent of a business object but of its process component. An inbound process agent can act on multiple business objects in a process component.

Synchronous agents are used when a process component requires a more or less immediate response from another process component, and is waiting for that response to continue its work.

Operations and process components are described in this specification in terms of process agents. However, in alternative implementations, process components and operations can be implemented without use of agents using other conventional techniques to perform the functions described in this specification.

The architectural elements also include the deployment unit. A deployment unit includes one or more process components and, optionally, one or more business objects, that are deployed together on a single computer system platform. Conversely, separate deployment units can be deployed on separate physical computing systems. For this reason, a deployment unit boundary defines the limits of an application-defined transaction, i.e., a set of actions that have the ACID properties of atomicity, consistency, isolation, and durability. To make use of database manager facilities, the architecture requires that all operations of such a transaction be performed on one physical database; as a consequence, the processes of such a transaction must be performed by the process components of one instance of one deployment unit.

The process components of one deployment unit interact with those of another deployment unit using messages passed through one or more data communication networks

or other suitable communication channels. Thus, a deployment unit deployed on a platform belonging one business can interact with a deployment unit software entity deployed on a separate platform belonging to a different and unrelated business, allowing for business-to-business communication. More than one instance of a given deployment unit can execute at the same time, on the same computing system or on separate physical computing systems. This arrangement allows the functionality offered by a deployment unit to be scaled to meet demand by creating as many instances as needed.

Since interaction between deployment units is through service operations, a deployment unit can be replaced by other another deployment unit as long as the new deployment unit supports the operations depended upon by other deployment units. Thus, while deployment units can depend on the external interfaces of process components in other deployment units, deployment units are not dependent on process component interactions (i.e., interactions between process components involving their respective business objects, operations, interfaces, and messages) within other deployment units. Similarly, process components that interact with other process components or external systems only through messages, e.g., as sent and received by operations, can also be replaced as long as the replacement supports the operations of the original.

Interactions between process components that occur only within a deployment unit are not constrained to using service operations. These can be implemented in any convenient fashion.

In contrast to a deployment unit, the foundation layer does not define a limit for application-defined transactions. Deployment units communicate directly with entities in the foundation layer, which communication is typically not message based. The foundation layer is active in every system instance on which the application is deployed. Business objects in the foundation layer will generally be master data objects. In addition, the foundation layer will include some business process objects that are used by multiple deployment units. Master data objects and business process objects that should be specific to a deployment unit are preferably assigned to their respective deployment unit.

FIGS. 1A, 1B, 1C and 1D collectively illustrate a high-level view of a software architectural design and implementation of a suite enterprise software services having payment functionality.

As shown in FIG. 1A, an Expense and Reimbursement Management deployment unit 102 includes: an Expense and Reimbursement Management process component 104, an Expense Arrangement business object 106, and an Expense Report business object 108.

Additionally, a Due Item Management deployment unit 110 includes: a Due Item Processing process component 112, a Due Payment business object 114, a Dunning business object 116, a Debt Guarantee business object 118, a Factoring business object 120, a Withholding Tax Declaration business object 122, a Due Payment Run business object 123, a Due Clearing business object 124, a Dunning Run business object 125, a European Community Sales List Report business object 126, a Trade Receivables Payables Register business object 128, a Tax Receivables Payables Register business object 130, a Product Tax Declaration business object 132, and a Trade Receivables Payables Account master data object 134.

As shown in FIG. 1C, the implementation a Payment deployment unit 136 includes a Payment Processing process component 138 and a Cash Management process component 140.

The Payment Processing process component 138 includes fifteen business objects: a Payment Allocation business object 142, a Cash Payment business object 144, a Cash Transfer business object 146, a Payment Order business object 148, a Clearing House Payment Order business object 150, a Bill of Exchange Submission business object 152, a Payment Advice business object 154, a Bank Payment Order business object 156, an Outgoing Check business object 158, a Bill of Exchange Payable business object 160, a Check Deposit business object 162, a Payment Card Payment Settlement Run business object 163, a Payment Register business object 164, a Payment Media Run business object 165, a Bill of Exchange Receivable business object 166, an Incoming Check business object 168, and a Bank Statement business object 170.

The Payment Processing process component 138 also includes five master data objects: a House Bank Account master data object 172, a Cash Storage master data object

174, a Check Storage master data object 176, a Clearing House Account master data object 178, and a Bill of Exchange Book master data object 180.

The Cash Management process component 140 includes a Liquidity Forecast business object 182 and an Expected Liquidity Item business object 184.

5 As shown in FIG. 1D, a Financial Market Data Management process component 190 in the foundation layer may also be used. The Financial Market Data Management process component 190 includes an Exchange Rate master data object 192 and a Bank Directory Entry master data object 194.

10 The Exchange Rate master data object 192 is the relative value of two different currencies for a particular time span. The Exchange Rate master data object 192 may be used to convert from one currency to another. Exchange rates can be specified by exchange rate. The Bank Directory Entry master data object 194 represents a bank master data.

The Financial Market Data Management process component 190 integrates all data and activities concerning Financial Market Data, provided by generally accepted agencies. 15 Financial Market data may include bank directory entries and exchange rates. The process component 190 allows maintenance of the data manually or retrieval of the data from a generally accepted agency.

FIGS. 2A and 2B are block diagrams collectively showing the Expense and Reimbursement Management process component 104 (FIG. 1A). For convenience in 20 describing this process component, a number of other process components are shown in the figures; these other process components are not part of the process component being described. These other process components are a Personnel Administration process component 202, a Project Processing process component 204, the Due Item Processing process component 112, and an Accounting process component 206. These other process 25 components are used to represent software external to the process component in describing its interactions with the external software; however, while the external software can be implemented as such process components, this is not required.

A Maintain Expense Arrangement operation 210 can send an expense arrangement notification using a Maintain Expense Arrangement based on Personnel Change 30 asynchronous inbound process agent 212 to update the Expense Arrangement business object

106. For example, the operation 210 can send an expense arrangement to update the Expense Arrangement business object 106 if input is received from the Personnel Administration process component 202. The Maintain Expense Arrangement operation 210 is included in a Personnel Administration In interface 214.

5 The Expense Arrangement business object 106 and the Expense Report business object 108 can receive updated information and send the update into other components to perform further operations. As shown in FIGS. 2A and 2B, multiple outbound process agents can receive information from the Expense Arrangement business object 106 and the Expense Report business object 108.

10 A Synchronous Request Project Task Availability Information from ACBD to Project Processing synchronous outbound process agent 216 can invoke a Request Project Task Availability Information operation 218. For example, the outbound process agent 216 can send a notification of an expense that applies to an existing project. The notification can be sent to the Project Processing process component 204. The Request Project Task Availability
15 Information operation 218 is included in a Project Task Availability Out interface 220.

 A Notify of Settlement Result from Expense Report to Due Item Processing asynchronous outbound process agent 224 can invoke a Notify of Settlement Result operation 226. For example, the outbound process agent 224 can send a notification of a settlement based on an expense report for updating due item processing. The notification can be sent to
20 the Due Item Processing process component 112. Similarly, the outbound process agent 224 can invoke a Notify of Settlement Result Cancellation operation 228. For example, the outbound process agent 224 can send a notification to cancel a settlement based on an expense report previously sent to due item processing. The notification can be sent to the
25 Due Item Processing process component 112. The Notify of Settlement Result operation 226 and the Notify of Settlement Result Cancellation operation 228 are included in a Receivables Payables Out interface 230.

 A Notify of Settlement Result from Expense Report to Accounting asynchronous outbound process agent 232 can invoke a Notify of Settlement Result operation 234. For example, the outbound process agent 232 can send a notification of a settlement result for
30 accounting. The notification can be sent to the Accounting process component 206.

Similarly, the outbound process agent 232 can invoke a Notify of Settlement Result Cancellation operation 236. For example, the outbound process agent 232 can send a notification to cancel a settlement result in accounting. The notification can be sent to the Accounting process component 206. The Notify of Settlement Result operation 234 and the
5 Notify of Settlement Result Cancellation operation 236 are included in an Expense Accounting Out interface 238.

FIG. 3A is a block diagram showing the Cash Management process component 140 (FIG. 1C). For convenience in describing this process component, another process component is shown in the figure; this other process component is not part of the process
10 component being described. This other process component is the Due Item Processing process component 112. This other process component is used to represent software external to the process component in describing its interactions with the external software; however, while the external software can be implemented as such process components, this is not required.

15 The Liquidity Forecast business object 182 can receive updated information and send the update into other components to perform further operations. As shown in FIG. 3, outbound process agents can receive information from the Liquidity Forecast business object 182.

A Synchronous Query Liquidity Status from Liquidity Forecast to Due Item
20 Processing synchronous outbound process agent 312 can invoke a Query Liquidity Status operation 314. For example, the outbound process agent 312 can synchronize liquidity forecast status information to other process components, such as the Due Item Processing process component 112. The Query Liquidity Status operation 314 is included in a Liquidity Status Out interface 316.

25 FIGS. 4A, 4B, 4C, 4D, 4E and 4F are block diagrams collectively showing the Payment Processing process component 138 (FIG. 1C). For convenience in describing this process component, a number of other process components are shown in the figures; these other process components are not part of the process component being described. These other process components are the Due Item Processing process component 112, a Payment
30 Processing at Business Partner process component 401, a Bank Statement Creation at Bank

process component 402, a Lock Box File Creation at Provider process component 403, a Customer Invoice Processing process component 404, the Accounting process component 206, a Settlement Processing at Clearing House process component 407, and a Payment Order Processing at House Bank process component 408. These other process components
5 are used to represent software external to the process component in describing its interactions with the external software; however, while the external software can be implemented as such process components, this is not required.

A Create Payment Reservation operation 411 (FIG. 4A) can send a payment reservation creation request using a Synchronous Maintain Payment Reservation synchronous
10 inbound process agent 412 to update the Payment Order business object 148. For example, the operation 411 can send a payment reservation creation request to update the Payment Order business object 148 if input is received from the Due Item Processing process component 112. Similarly, a Cancel Payment Reservation operation 413 can send a payment reservation cancellation request, also using the Synchronous Maintain Payment Reservation
15 synchronous inbound process agent 412 to update the Payment Order business object 148. For example, the operation 413 can send a payment reservation cancellation request to update the Payment Order business object 148 if input is received from the Due Item Processing process component 112. Similarly, a Synchronous Change Payment Reservation operation 414 can send a payment reservation synchronize change request, also using the Synchronous
20 Maintain Payment Reservation synchronous inbound process agent 412 to update the Payment Order business object 148. For example, the operation 414 can send a payment request synchronize change notification to update the Payment Order business object 148 if input is received from the Due Item Processing process component 112. Similarly, a Change Payment Reservation operation 415 can send a payment reservation change request, also
25 using the Synchronous Maintain Payment Reservation synchronous inbound process agent 412 to update the Payment Order business object 148. For example, the operation 415 can send a payment reservation change request to update the Payment Order business object 148 if input is received from the Due Item Processing process component 112. The Create Payment Reservation operation 411, the Cancel Payment Reservation operation 413, the

Synchronous Change Payment Reservation operation 414, and the Change Payment Reservation operation 415 are included in a Payment Request In interface 416.

A Create Payment Order operation 417 can send a payment order creation request using a Maintain Payment Order asynchronous inbound process agent 418 to update the Payment Order business object 148. For example, the operation 417 can send a payment order creation request to update the Payment Order business object 148 if input is received from the Due Item Processing process component 112. A Cancel Payment Order operation 419 can send a payment order cancellation request, also using the Maintain Payment Order asynchronous inbound process agent 418 to update the Payment Order business object 148. For example, the operation 419 can send a payment order cancellation request to update the Payment Order business object 148 if input is received from the Due Item Processing process component 112. The Create Payment Order operation 417 and the Cancel Payment Order operation 419 are included in a Payment Request In interface 420.

The Payment Order business object 148 can receive updated information and send the update into other components to perform further operations. As shown in FIGS. 4A, 4B and 4D, multiple outbound process agents can receive information from the Payment Order business object 148.

A Confirm Payment Request from Payment Order to Due Item Processing asynchronous outbound process agent 421 can invoke a Confirm Payment Request operation 422 (FIG. 4B). For example, the outbound process agent 421 can send a notification of a confirmed payment. The notification can be sent to the Payment Processing at Business Partner process component 401. The Confirm Payment Request operation 422 is included in a Payment Request Out interface 423.

A Notify of Payment from Payment Order to Business Partner asynchronous outbound process agent 424 can invoke a Notify of Payment operation 425. For example, the outbound process agent 424 can send a notification of a payment. The notification can be sent to the Payment Processing at Business Partner process component 401. The Notify of Payment operation 425 is included in an Outgoing Payment Advicing Out interface 426.

A Notify of Payment from Payment Order to Accounting asynchronous outbound process agent 427 can invoke a Notify of Payment operation 428 (FIG. 4D). For example,

the outbound process agent 427 can send a notification of a payment. The notification can be sent to the Accounting process component 206. The Notify of Payment from Payment Order to Accounting asynchronous outbound process agent 427 can also invoke a Notify of Payment Cancellation operation 429. For example, the outbound process agent 427 can send a notification of a payment cancellation. The notification can be sent to the Accounting process component 206. The Notify of Payment operation 428 and the Notify of Payment Cancellation operation 429 are included in a Payment Accounting Out interface 430.

A Change Payment Allocation based on Clearing Request Confirmation operation 431 can send a payment allocation change request using a Change Payment Allocation based on Clearing Request Confirmation asynchronous inbound process agent 432 to update the Payment Allocation business object 142. For example, the operation 431 can send a payment allocation change request to update the Payment Allocation business object 142 if input is received from the Due Item Processing process component 112. The Change Payment Allocation based on Clearing Request Confirmation operation 431 is included in a Clearing In interface 433.

The Payment Allocation business object 142 can receive updated information and send the update into other components to perform further operations. As shown in FIGS. 4A, 4B and 4D, multiple outbound process agents can receive information from the Payment Allocation business object 142.

A Request Clearing Maintenance from Payment Allocation to Due Item Processing asynchronous outbound process agent 434 can invoke a Request Clearing operation 435 (FIG. 4B). For example, the outbound process agent 434 can send a notification of a clearing request based on a payment allocation. The notification can be sent to the Due Item Processing process component 112. The Request Clearing Maintenance from Payment Allocation to Due Item Processing asynchronous outbound process agent 434 can also invoke a Request Clearing Cancellation operation 436. For example, the outbound process agent 434 can send a notification of a clearing request cancellation based on a payment allocation. The notification can be sent to the Due Item Processing process component 112. The Request Clearing operation 435 and the Request Clearing Cancellation operation 436 are included in a Clearing Out interface 437.

A Notify of Payment from Payment Allocation to Accounting asynchronous outbound process agent 438 can invoke the Notify of Payment operation 428. For example, the outbound process agent 438 can send a notification of a payment to accounting. The notification can be sent to the Accounting process component 206. The Notify of Payment
5 from Payment Allocation to Accounting asynchronous outbound process agent 438 can also invoke the Notify of Payment Cancellation operation 429. For example, the outbound process agent 438 can send a notification of a payment cancellation to accounting. The notification can be sent to the Accounting process component 206.

The implementation of the Payment Processing process component 138 is further
10 supported by the Payment Register business object 164, although no operations or process agents involving the business object 164 are explicitly shown in FIG. 4A.

A Create Bank Statement operation 440 (FIG. 4C) can send a bank statement creation request using a Maintain Bank Statement asynchronous inbound process agent 441 to update the Bank Statement business object 170. For example, the operation 440 can send a bank
15 statement creation request to update the Bank Statement business object 170 if input is received from the Bank Statement Creation at Bank process component 402. The Create Bank Statement operation 440 is included in a Bank Statement Processing In interface 442.

The Bank Statement business object 170 can receive updated information and send the update into other components to perform further operations. As shown in FIGS. 4C and
20 4D, multiple outbound process agents can receive information from the Bank Statement business object 170.

A Notify of Payment from Bank Statement to Accounting asynchronous outbound process agent 443 can invoke the Notify of Payment operation 428 (FIG. 4D). For example, the outbound process agent 443 can send a notification of a payment to accounting. The
25 notification can be sent to the Accounting process component 206. The Notify of Payment from Bank Statement to Accounting asynchronous outbound process agent 443 can also invoke the Notify of Payment Cancellation operation 429. For example, the outbound process agent 443 can send a notification of a payment cancellation to accounting. The notification can be sent to the Accounting process component 206. The Notify of Payment

operation 428 and the Notify of Payment Cancellation operation 429 are included in the Payment Accounting Out interface 430.

A Create Payment Advice operation 444 can send a request to create a payment advice using a Maintain Payment Advice asynchronous inbound process agent 445 to update the Payment Advice business object 154. For example, the operation 444 can send a request to create a payment advice to update the Payment Advice business object 154 if input is received from the Payment Processing at Business Partner process component 401. The Create Payment Advice operation 444 is included in an Incoming Payment Advicing In interface 446.

A Process Lock Box operation 447 can send a request to process a lock box using a Process Lock Box asynchronous inbound process agent 448 to update the Incoming Check business object 168. For example, the operation 447 can send a request to process a lock box to update the Incoming Check business object 168 if input is received from the Lock Box File Creation at Provider process component 403. The Process Lock Box operation 447 is included in a Lock Box Processing In interface 449.

The Incoming Check business object 168 can receive updated information and send the update into other components to perform further operations. As shown in FIGS. 4C and 4D, multiple outbound process agents can receive information from the Incoming Check business object 168.

A Notify of Payment from Incoming Check to Accounting asynchronous outbound process agent 450 can invoke the Notify of Payment operation 428 (FIG. 4D). For example, the outbound process agent 450 can send a notification of a payment to accounting. The notification can be sent to the Accounting process component 206. The Notify of Payment from Incoming Check to Accounting asynchronous outbound process agent 450 can also invoke the Notify of Payment Cancellation operation 429. For example, the outbound process agent 450 can send a notification of a payment cancellation to accounting. The notification can be sent to the Accounting process component 206. The Notify of Payment operation 428 and the Notify of Payment Cancellation operation 429 are included in the Payment Accounting Out interface 430.

A Create Cash Payment operation 451 can send a cash payment creation request using a Maintain Cash Payment asynchronous inbound process agent 452 to update the Cash Payment business object 144. For example, the operation 451 can send a cash payment creation request to update the Cash Payment business object 144 if input is received from the Customer Invoice Processing process component 404 or the Due Item Processing process component 112. A Cancel Cash Payment operation 453 can send a cash payment cancellation request, also using the Maintain Cash Payment asynchronous inbound process agent 452 to update the Cash Payment business object 144. For example, the operation 453 can send a cash payment cancellation request to update the Cash Payment business object 144 if input is received from the Customer Invoice Processing process component 404 or the Due Item Processing process component 112. The Create Cash Payment operation 451 and the Cancel Cash Payment operation 453 are included in a Cash Payment In interface 454.

The Cash Payment business object 144 can receive updated information and send the update into other components to perform further operations. As shown in FIGS. 4C and 4D, multiple outbound process agents can receive information from the Cash Payment business object 144.

A Notify of Payment from Cash Payment to Accounting asynchronous outbound process agent 455 can invoke the Notify of Payment operation 428 (FIG. 4D). For example, the outbound process agent 455 can send a notification of a payment to accounting. The notification can be sent to the Accounting process component 206. The Notify of Payment from Cash Payment to Accounting asynchronous outbound process agent 455 can also invoke the Notify of Payment Cancellation operation 429. For example, the outbound process agent 455 can send a notification of a payment cancellation to accounting. The notification can be sent to the Accounting process component 206. The Notify of Payment operation 428 and the Notify of Payment Cancellation operation 429 are included in the Payment Accounting Out interface 430.

The Bill of Exchange Receivable business object 166 can receive updated information and send the update into other components to perform further operations. As shown in FIG. 4D, multiple outbound process agents can receive information from the Bill of Exchange Receivable business object 166.

A Notify of Payment from Bill of Exchange Receivable to Accounting asynchronous outbound process agent 463 can invoke the Notify of Payment operation 428. For example, the outbound process agent 463 can send notification of a bill of exchange receivable. The notification can be sent to the Accounting process component 206. The Notify of Payment
5 from Bill of Exchange Receivable to Accounting asynchronous outbound process agent 463 can also invoke the Notify of Payment Cancellation operation 429. For example, the outbound process agent 463 can send cancellation notification for a bill of exchange receivable. The notification can be sent to the Accounting process component 206. The Notify of Payment operation 428 and the Notify of Payment Cancellation operation 429 are
10 included in the Payment Accounting Out interface 430.

A Change Clearing House Payment Order based on Credit Card Settlement Confirmation operation 466 (FIG. 4E) can send a notification of a credit card settlement using a Change Clearing House Payment Order based on Credit Card Settlement Confirmation asynchronous inbound process agent 467 to update the Clearing House
15 Payment Order business object 150. For example, the operation 466 can send notification of a credit card settlement to update the Clearing House Payment Order business object 150 if input is received from the Settlement Processing at Clearing House process component 407. The Change Clearing House Payment Order based on Credit Card Settlement Confirmation operation 466 is included in a Credit Card Settling In interface 468.

20 The Clearing House Payment Order business object 150 can receive updated information and send the update into other components to perform further operations. As shown in FIGS. 4D and 4E, multiple outbound process agents can receive information from the Clearing House Payment Order business object 150.

A Notify of Payment from Credit Card Settlement to Accounting asynchronous
25 outbound process agent 469 can invoke the Notify of Payment operation 428 (FIG. 4D). For example, the outbound process agent 469 can send a notification of a credit card payment. The notification can be sent to the Accounting process component 206. The Notify of Payment from Credit Card Settlement to Accounting asynchronous outbound process agent 469 can also invoke the Notify of Payment Cancellation operation 429. For example, the

outbound process agent 469 can send a cancellation notification of a credit card payment. The notification can be sent to the Accounting process component 206.

A Request Credit Card Settlement from Clearing House Payment Order to Clearing House asynchronous outbound process agent 470 can invoke a Request Credit Card Settlement operation 471. For example, the outbound process agent 470 can send a notification of a credit card payment. The notification can be sent to the Settlement Processing at Clearing House process component 407. The Request Credit Card Settlement operation 471 is included in a Credit Card Settling Out interface 472.

The Check Deposit business object 162 can receive updated information and send the update into other components to perform further operations. As shown in FIGS. 4D and 4E, multiple outbound process agents can receive information from the Check Deposit business object 162.

A Notify of Payment from Check Deposit to Accounting asynchronous outbound process agent 473 can invoke the Notify of Payment operation 428 (FIG. 4D). For example, the outbound process agent 473 can send a notification of check deposit. The notification can be sent to the Accounting process component 206. The Notify of Payment from Check Deposit to Accounting asynchronous outbound process agent 473 can also invoke the Notify of Payment Cancellation operation 429. For example, the outbound process agent 473 can send a cancellation notification of a check deposit. The notification can be sent to the Accounting process component 206.

A Request Check Deposit from House Bank asynchronous outbound process agent 474 can invoke a Request Check Deposit operation 475. For example, the outbound process agent 474 can send a notification of a check deposit. The notification can be sent to the Payment Order Processing at House Bank process component 408. The Request Check Deposit operation 475 is included in a Check Depositing Out interface 476.

The Bill of Exchange Submission business object 152 can receive updated information and send the update into other components to perform further operations. As shown in FIGS. 4D and 4E, multiple outbound process agents can receive information from the Bill of Exchange Submission business object 152.

A Notify of Payment from Bill of Exchange Submission to Accounting asynchronous outbound process agent 477 can invoke the Notify of Payment operation 428. For example, the outbound process agent 477 can send a notification of a bill of exchange submission. The notification can be sent to the Accounting process component 206. The Notify of Payment
5 from Bill of Exchange Submission to Accounting asynchronous outbound process agent 477 can also invoke the Notify of Payment Cancellation operation 429. For example, the outbound process agent 477 can send a cancellation notification of a bill of exchange submission. The notification can be sent to the Accounting process component 206.

A Request Bill of Exchange Submission to House Bank asynchronous outbound
10 process agent 478 can invoke a Request Bill of Exchange Submission operation 479. For example, the outbound process agent 478 can send a notification of a bill of exchange submission. The notification can be sent to the Payment Order Processing at House Bank process component 408. The Request Bill of Exchange Submission operation 479 is included in a Bill of Exchange Submitting Out interface 480.

15 The Bank Payment Order business object 156 (FIG. 4F) can receive updated information and send the update into other components to perform further operations. As shown in FIG. 4F, multiple outbound process agents can receive information from the Bank Payment Order business object 156.

A Request Payment Order from Bank Payment Order to House Bank asynchronous
20 outbound process agent 485 can invoke a Request Payment Order operation 486. For example, the outbound process agent 485 can send a notification of a bank payment order. The notification can be sent to the Payment Order Processing at House Bank process component 408. A Request File Based Payment Order from Bank Payment Order to House Bank asynchronous outbound process agent 482 can invoke a Request File Based Payment
25 Order operation 492. For example, the outbound process agent 482 can send a request for a file based payment order. The notification can be sent to the Payment Order Processing at House Bank process component 408. The Request Payment Order operation 486 and the Request File Based Payment Order operation 492 are included in a Payment Ordering Out interface 487.

The Bill of Exchange Payable business object 160 can receive updated information and send the update into other components to perform further operations. As shown in FIG. 4F, multiple outbound process agents can receive information from the Bill of Exchange Payable business object 160.

5 A Request Payment Order from Bill of Exchange Payable to House Bank asynchronous outbound process agent 488 can invoke the Request Payment Order operation 486. For example, the outbound process agent 488 can send a notification of the bill of exchange payable. The notification can be sent to the Payment Order Processing at House Bank process component 408. A Request File Based Payment Order from Bill of Exchange
10 Payable to House Bank asynchronous outbound process agent 483 can invoke a Request File Based Payment Order operation 492. For example, the outbound process agent 483 can send a request for a file based payment order. The notification can be sent to the Payment Order Processing at House Bank process component 408.

15 The Bill of Exchange Receivable business object 166 can receive updated information and send the update into other components to perform further operations. As shown in FIG. 4F, multiple outbound process agents can receive information from the Bill of Exchange Receivable business object 166.

20 A Request Payment Order from Bill of Exchange Receivable to House Bank asynchronous outbound process agent 489 can invoke the Request Payment Order operation 486. For example, the outbound process agent 489 can send a notification of a bill of exchange receivable. The notification can be sent to the Payment Order Processing at House Bank process component 408. A Request File Based Payment Order from Bill of Exchange
25 Receivable to House Bank asynchronous outbound process agent 484 can invoke a Request File Based Payment Order operation 492. For example, the outbound process agent 484 can send a request for a file based payment order. The notification can be sent to the Payment
Order Processing at House Bank process component 408.

30 The Outgoing Check business object 158 can receive updated information and send the update into other components to perform further operations. As shown in FIG. 4F, multiple outbound process agents can receive information from the Outgoing Check business object 158.

A Request Payment Order from Outgoing Check to House Bank asynchronous outbound process agent 493 can invoke the Request Payment Order operation 486. For example, the outbound process agent 493 can send a notification of an outgoing check. The notification can be sent to the Payment Order Processing at House Bank process component 408. A Request File Based Payment Order from Outgoing Check to House Bank asynchronous outbound process agent 490 can invoke a Request File Based Payment Order operation 492. For example, the outbound process agent 490 can send a request for a file based payment order. The notification can be sent to the Payment Order Processing at House Bank process component 408.

FIGS. 5A, 5B, 5C, 5D, and 5E are block diagrams collectively showing the Due Item Processing process component 112 (FIG. 1B). For convenience in describing this process component, a number of other process components are shown in the figures; these other process components are not part of the process component being described. These other process components are a Credit Management process component 502, a Supplier Invoice Processing process component 508, a Customer Invoice Processing process component 510, the Expense and Reimbursement Management process component 102, the Cash Management process component 140, the Payment Processing process component 138, a Processing of European Community Sales List Report at Tax Authority process component 584, a Processing of Product Tax Declaration at Tax Authority process component 512, the Accounting process component 206, and the Payment Processing process component 138. These other process components are used to represent software external to the process component in describing its interactions with the external software; however, while the external software can be implemented as such process components, this is not required.

A Create Receivables Payables operation 517 can send a receivables or payables creation request using a Maintain Trade and Tax Receivables Payables asynchronous inbound process agent 518 to update three business objects: the Trade Receivables Payables Register business object 128, the Tax Receivables Payables Register business object 130, and the Due Clearing business object 124 (FIG. 5D). For example, the operation 517 can send a receivables or payables creation request to update to the business objects 128, 130 and 124 if input is received from any of several process components: the Supplier Invoice Processing

process component 508, the Customer Invoice Processing process component 510, or the Expense and Reimbursement Management process component 102.

Similarly, a Cancel Receivables Payables operation 519 can send a receivables or payables cancellation request, also using the Maintain Trade and Tax Receivables Payables asynchronous inbound process agent 518 to update three business objects: the Trade Receivables Payables Register business object 128, the Tax Receivables Payables Register business object 130, and the Due Clearing business object 124. For example, the operation 519 can send a receivables or payables cancellation request to update the business objects 128, 130 and 124 if input is received from any of several process components: the Supplier Invoice Processing process component 508, the Customer Invoice Processing process component 510, or the Expense and Reimbursement Management process component 102.

The Create Receivables Payables operation 517 and the Cancel Receivables Payables operation 519 are included in a Receivables Payables In interface 520.

A Get Liquidity Status operation 521 can send a liquidity status query using a Synchronous Get Liquidity Status from Due Item Processing synchronous inbound process agent 522 to query the Trade Receivables Payables Register business object 128 and the Tax Receivables Payables Register business object 130. For example, the operation 521 can send a liquidity status query to the business objects 128 and 130 if input is received from the Cash Management process component 140. The Get Liquidity Status operation 521 is included in a Liquidity Status In interface 523.

The Trade Receivables Payables Register business object 128 can receive updated information and send the update into other components to perform further operations. As shown in FIGS. 5A and 5B, multiple outbound process agents can receive information from the Trade Receivables Payables Register business object 128.

A Notify of European Community Sales List Report to Tax Authority asynchronous outbound process agent 581 can invoke a Notify of European Community Sales List Report operation 582. For example, the outbound process agent 581 can send a notification of a European community sales list report. The notification can be sent to the Processing of European Community Sales List Report at Tax Authority process component 584. The

Notify of European Community Sales List Report operation 582 is included in a European Community Sales List Report Out interface 583.

A Create Clearing operation 534 can send a create clearing request using a Maintain Clearing asynchronous inbound process agent 535 to update the Product Tax Declaration business object 132 and the Due Payment business object 104 (FIG. 5E). For example, the operation 534 can send a create clearing request to update the Product Tax Declaration business object 132 and the Due Payment business object 104 if input is received from the Payment Processing process component 138. A Cancel Clearing operation 536 can send a cancel clearing request, also using the Maintain Clearing asynchronous inbound process agent 535 to update the Product Tax Declaration business object 132 and the Due Payment business object 104. For example, the operation 536 can send a cancel clearing request to update the Product Tax Declaration business object 132 and the Due Payment business object 104 if input is received from the Payment Processing process component 138. The Create Clearing operation 534 and the Cancel Clearing operation 536 are included in a Clearing In interface 537.

A Change Payment based on Payment Request Confirmation operation 538 (FIG. 5E) can send a payment change request using a Change Due Payment based on Payment Request Confirmation asynchronous inbound process agent 539 to update the Due Payment business object 114. For example, the operation 538 can send a payment change request to update the Due Payment business object 114 if input is received from the Payment Processing process component 138. The Change Payment based on Payment Request Confirmation operation 538 is included in a Payment Request In interface 540.

The Product Tax Declaration business object 132 can receive updated information and send the update into other components to perform further operations. As shown in FIGS. 5C, 5D and 5E, multiple outbound process agents can receive information from the Product Tax Declaration business object 132.

A Notify of Product Tax Declaration to Authority asynchronous outbound process agent 585 can invoke a Notify of Product Tax Declaration operation 541. For example, the outbound process agent 585 can send a notification of a product tax declaration. The notification can be sent to the Processing of Product Tax Declaration at Tax Authority

process component 512. The Notify of Product Tax Declaration operation 541 is included in a Product Tax Declaration Out interface 542.

A Request Payment from Product Tax Declaration to Payment Processing asynchronous outbound process agent 543 can invoke a Request Payment Cancellation operation 545 (FIG. 5E). For example, the outbound process agent 543 can send a notification of a payment cancellation request. The notification can be sent to the Payment Processing process component 138. The Request Payment Cancellation operation 545 is included in a Payment Request Out interface 546.

A Confirm Clearing from Product Tax Declaration to Payment Processing asynchronous outbound process agent 547 can invoke a Confirm Clearing operation 548 (FIG. 5E). For example, the outbound process agent 547 can send a notification of clearing confirmation based on a product tax declaration. The notification can be sent to the Payment Processing process component 138. The Confirm Clearing operation 548 is included in a Clearing Out interface 549.

A Notify of Payment from Product Tax Declaration to Accounting asynchronous outbound process agent 551 can invoke a Notify of Payment operation 552 (FIG. 5D). For example, the outbound process agent 551 can send a notification of a payment. The notification can be sent to the Accounting process component 206. The Notify of Payment from Product Tax Declaration to Accounting asynchronous outbound process agent 551 can also invoke a Notify of Payment Cancellation operation 553. For example, the outbound process agent 551 can send a notification of a cancelled payment. The notification can be sent to the Accounting process component 206. The Notify of Payment operation 552 and the Notify of Payment Cancellation operation 553 are included in a Payment Accounting Out interface 554.

The Due Clearing business object 124 can receive updated information and send the update into other components to perform further operations. As shown in FIG. 5D, multiple outbound process agents can receive information from the Due Clearing business object 124.

A Notify of Dunning Invoice to Accounting asynchronous outbound process agent 556 can invoke a Notify of Dunning Invoice operation 557. For example, the outbound process agent 556 can send a notification of a dunning invoice. The notification can be sent

to the Accounting process component 206. The Notify of Dunning Invoice to Accounting asynchronous outbound process agent 556 can also invoke a Notify of Dunning Invoice Cancellation operation 560. For example, the outbound process agent 556 can send a cancellation notification of a dunning invoice. The notification can be sent to the Accounting process component 206. The Notify of Dunning Invoice operation 557 and the Notify of Dunning Invoice Cancellation operation 560 are included in a Dunning Invoice Accounting Out interface 559.

A Notify of Payment from Due Clearing to Accounting asynchronous outbound process agent 562 can invoke the Notify of Payment operation 552. For example, the outbound process agent 562 can send a notification of a cleared payment. The notification can be sent to the Accounting process component 206. The Notify of Payment from Due Clearing to Accounting asynchronous outbound process agent 562 can also invoke the Notify of Payment Cancellation operation 553. For example, the outbound process agent 562 can send a notification of a cancelled payment. The notification can be sent to the Accounting process component 206.

The Due Payment business object 114 can receive updated information and send the update into other components to perform further operations. As shown in FIGS. 5D and 5E, multiple outbound process agents can receive information from the Due Payment business object 114.

A Notify of Payment from Due Payment to Accounting asynchronous outbound process agent 567 can invoke the Notify of Payment operation 552. For example, the outbound process agent 567 can send a notification of a payment received in due processing. The notification can be sent to the Accounting process component 206. The Notify of Payment from Due Payment to Accounting asynchronous outbound process agent 567 can also invoke the Notify of Payment Cancellation operation 553. For example, the outbound process agent 562 can send a notification of a cancelled payment. The notification can be sent to the Accounting process component 206.

A Request Payment from Due Payment to Payment Processing asynchronous outbound process agent 569 can invoke a Request Payment operation 570. For example, the outbound process agent 569 can send a request for a payment. The notification can be sent to

the Payment Processing process component 138. The Request Payment from Due Payment to Payment Processing asynchronous outbound process agent 569 can also invoke the Request Payment Cancellation operation 545. For example, the outbound process agent 569 can send a notification of a payment cancellation request. The notification can be sent to the Payment Processing process component 138. The Request Payment operation 570 and the Request Payment Cancellation operation 545 are included in the Payment Request Out interface 546.

A Confirm Clearing from Due Payment to Payment Processing asynchronous outbound process agent 571 can invoke the Confirm Clearing operation 548. For example, the outbound process agent 571 can send a notification of a payment that cleared to due payment. The notification can be sent to the Payment Processing process component 138. The Confirm Clearing operation 548 is included in the Clearing Out interface 549.

A Notify of Cash Payment from Due Payment to Payment Processing asynchronous outbound process agent 593 can invoke the Notify of Cash Payment operation 594. For example, the outbound process agent 593 can send a notification of a cash payment that cleared to due payment. The notification can be sent to the Payment Processing process component 138. The Notify of Cash Payment from Due Payment to Payment Processing asynchronous outbound process agent 593 can also invoke the Request Cash Payment Cancellation operation 595. For example, the outbound process agent 593 can send a request to cancel a cash payment. The request can be sent to the Payment Processing process component 138. The Notify of Cash Payment operation 594 and the Request Cash Payment Cancellation operation 595 are included in the Cash Payment Out interface 596.

A Synchronous Request Payment Reservation from Due Payment to Payment Processing synchronous outbound process agent 575 can invoke a Request Payment Information and Provisional Payment Reservation operation 576. For example, the outbound process agent 575 can send a request for payment information and a provisional payment reservation. The request can be sent to the Payment Processing process component 138.

The Synchronous Request Payment Reservation from Due Payment to Payment Processing synchronous outbound process agent 575 can also invoke a Notify of Provisional Payment Reservation Deletion operation 577. For example, the outbound process agent 575

can send a notification of a provisional payment reservation deletion. The notification can be sent to the Payment Processing process component 138.

The Synchronous Request Payment Reservation from Due Payment to Payment Processing synchronous outbound process agent 575 can also invoke a Request Payment Information and Provisional Payment Reservation Change operation 578. For example, the
5 outbound process agent 575 can send a request for payment information and a provisional payment reservation change. The request can be sent to the Payment Processing process component 138.

The Synchronous Request Payment Reservation from Due Payment to Payment
10 Processing synchronous outbound process agent 575 can also invoke a Notify of Provisional Payment Reservation Change Deletion operation 579. For example, the outbound process agent 575 can send a notification of a provisional payment reservation change deletion. The notification can be sent to the Payment Processing process component 138.

The Request Payment Information and Provisional Payment Reservation operation
15 576, the Notify of Provisional Payment Reservation Deletion operation 577, the Request Payment Information and Provisional Payment Reservation Change operation 578, and the Notify of Provisional Payment Reservation Change Deletion operation 579 are included in a Payment Request Out interface 580.

The implementation of the Due Item Processing process component 112 is further
20 supported by several business objects, although no operations or process agents involving the business object 164 are explicitly shown in FIG. 5B. These business objects are the Withholding Tax Declaration business object 122 and the Trade Receivables Payables Account business object 134.

FIG. 6 is a block diagram showing the Financial Market Data Management process
25 component 190. The process component is included in the foundation layer. As shown, a Bank Directory Entry master data object 194 can receive updated information and send the update into other components to perform further operations. As shown in FIG. 6, multiple outbound process agents can receive information from the Bank Directory Entry master data object 194.

A Maintain Bank Directory Entry operation 614 can send a bank directory entry request using a Maintain Bank Directory Entry asynchronous inbound process agent 616 to update the Bank Directory Entry business object 604. For example, the operation 614 can send a bank directory entry request to update the Bank Directory Entry business object 604 if input is received from the External Bank Directory Management process component 602. The Maintain Bank Directory Entry operation 614 is included in a Bank Directory Transmission In interface 620.

A Request Bank Directory Transmission asynchronous outbound process agent 622 can invoke a Request Bank Directory Transmission operation 624. For example, the outbound process agent 622 can send a notification of an entry that was made in the bank. The notification can be sent to the External Bank Directory Management process component 602. The Request Bank Directory Transmission operation 624 is included in a Bank Directory Transmission Requesting Out interface 626.

The subject matter described in this specification and all of the functional operations described in this specification can be implemented in digital electronic circuitry, or in computer software, firmware, or hardware, including the structural means disclosed in this specification and structural equivalents thereof, or in combinations of them. The subject matter described in this specification can be implemented as one or more computer program products, i.e., one or more computer programs tangibly embodied in an information carrier, e.g., in a machine-readable storage device or in a propagated signal, for execution by, or to control the operation of, data processing apparatus, e.g., a programmable processor, a computer, or multiple computers. A computer program (also known as a program, software, software application, or code) can be written in any form of programming language, including compiled or interpreted languages, and it can be deployed in any form, including as a stand-alone program or as a module, component, subroutine, or other unit suitable for use in a computing environment. A computer program does not necessarily correspond to a file. A program can be stored in a portion of a file that holds other programs or data, in a single file dedicated to the program in question, or in multiple coordinated files (e.g., files that store one or more modules, sub-programs, or portions of code). A computer program can be deployed

to be executed on one computer or on multiple computers at one site or distributed across multiple sites and interconnected by a communication network.

The processes and logic flows described in this specification can be performed by one or more programmable processors executing one or more computer programs to perform functions by operating on input data and generating output. The processes and logic flows can also be performed by, and apparatus can also be implemented as, special purpose logic circuitry, *e.g.*, an FPGA (field programmable gate array) or an ASIC (application-specific integrated circuit).

Processors suitable for the execution of a computer program include, by way of example, both general and special purpose microprocessors, and any one or more processors of any kind of digital computer. Generally, a processor will receive instructions and data from a read-only memory or a random access memory or both. The essential elements of a computer are a processor for executing instructions and one or more memory devices for storing instructions and data. Generally, a computer will also include, or be operatively coupled to receive data from or transfer data to, or both, one or more mass storage devices for storing data, *e.g.*, magnetic, magneto-optical disks, or optical disks. Information carriers suitable for embodying computer program instructions and data include all forms of non-volatile memory, including by way of example semiconductor memory devices, *e.g.*, EPROM, EEPROM, and flash memory devices; magnetic disks, *e.g.*, internal hard disks or removable disks; magneto-optical disks; and CD-ROM and DVD-ROM disks. The processor and the memory can be supplemented by, or incorporated in, special purpose logic circuitry.

To provide for interaction with a user, the subject matter described in this specification can be implemented on a computer having a display device, *e.g.*, a CRT (cathode ray tube) or LCD (liquid crystal display) monitor, for displaying information to the user and a keyboard and a pointing device, *e.g.*, a mouse or a trackball, by which the user can provide input to the computer. Other kinds of devices can be used to provide for interaction with a user as well; for example, feedback provided to the user can be any form of sensory feedback, *e.g.*, visual feedback, auditory feedback, or tactile feedback; and input from the user can be received in any form, including acoustic, speech, or tactile input.

The subject matter described in this specification can be implemented in a computing system that includes a back-end component (*e.g.*, a data server), a middleware component (*e.g.*, an application server), or a front-end component (*e.g.*, a client computer having a graphical user interface or a Web browser through which a user can interact with an implementation of the subject matter described herein), or any combination of such back-end, middleware, and front-end components. The components of the system can be interconnected by any form or medium of digital data communication, *e.g.*, a communication network. Examples of communication networks include a local area network ("LAN") and a wide area network ("WAN"), *e.g.*, the Internet.

The computing system can include clients and servers. A client and server are generally remote from each other and typically interact through a communication network. The relationship of client and server arises by virtue of computer programs running on the respective computers and having a client-server relationship to each other.

While this specification contains many specifics, these should not be construed as limitations on the scope of the invention or of what may be claimed, but rather as an exemplification of preferred embodiments of the invention. Certain features that are described in this specification in the context of separate embodiments, may also be provided in combination in a single embodiment. Conversely, various features that are described in the context of a single embodiment may also be provided in multiple embodiments separately or in any suitable subcombination. Moreover, although features may be described above as acting in certain combinations and even initially claimed as such, one or more features from a claimed combination can in some cases be excised from the combination, and the claimed combination may be directed to a subcombination or variation of a subcombination.

The subject matter has been described in terms of particular variations, but other variations can be implemented and are within the scope of the following claims. For example, the actions recited in the claims can be performed in a different order and still achieve desirable results. As one example, the processes depicted in the accompanying figures do not necessarily require the particular order shown, or sequential order, to achieve desirable results. In certain implementations, multitasking and parallel processing may be advantageous. Other variations are within the scope of the following claims.

CLAIMS

1. A system comprising:

a computer system comprising one or more hardware platforms for executing computer software; and

5 computer software deployed on the computer system, the computer software implementing a plurality of service operations, the service operations comprising:

a notify of settlement result operation operable to send a notification of a settlement result;

10 a notify of settlement result cancellation operation operable to send a notification to cancel a settlement result;

a create receivables payables operation operable to send a notification to create a receivable or payable;

a cancel receivables payables operation operable to send a notification to cancel a receivable or payable;

15 a notify of European community sales list report operation operable to send a European community sales list report;

a notify of product tax declaration operation operable to send a notification about a product tax declaration;

20 a maintain bank directory entry operation, the operation operable to request to maintain a bank directory entry; and

a request bank directory transmission operation, the operation requesting a bank directory transmission.

2. The system of claim 1, wherein the service operations further comprise:

a confirm payment request operation operable to send a confirmation notification to confirm a payment request;

a notify of payment request operation operable to send a notification of payment;

5 a create bank statement operation operable to create a bank statement;

a create payment advice operation operable to create a payment advice;

a process lock box operation operable to processing a lock box;

a create cash payment operation operable to create a cash payment notification;

10 a cancel cash payment operation operable to send a notification to cancel a cash payment;

a notify of payment operation operable to send a notification of payment;

a notify of payment cancellation operation operable to send a notification of cancellation of payment;

15 a request credit card settlement operation operable to send a notification to request a credit card settlement;

a request check deposit operation operable to send a notification request for a check deposit;

a request payment order operation operable to send a notification request for a payment order;

20 a request file based payment order operation operable to send a notification request for a file based payment order;

a notify of settlement result operation operable to send a notification of a settlement result based on an expense report;

25 a notify of settlement result cancellation operation operable to send a notification to cancel a settlement result based on an expense report previously sent;

a request project task availability information operation operable to send a notification of an expense that applies to an existing project;

a query liquidity status operation operable to query liquidity status;

30 a create payment reservation operation operable to send a payment reservation creation request;

a cancel payment reservation operation operable to send a payment reservation cancellation request;

a synchronous change payment reservation operation operable to send a payment reservation synchronize change request;

5 a change payment reservation operation operable to send a payment reservation change request;

a create payment order operation operable to send a payment order creation request;

a cancel payment order operation operable to send a payment order cancellation request to update the payment order business object;

10 a request clearing operation operable to send a notification of a clearing request;

a request clearing cancellation operation operable to send a notification to cancel a clearing request;

a change clearing house payment order based on credit card settlement confirmation operation operable to send a notification to change a clearing house payment;

15 a get liquidity status operation operable to send a notification to get liquidity status;

a create clearing operation operable to send a notification to create a clearing;

a cancel clearing operation operable to send a notification to cancel a clearing;

a request payment operation operable to send a notification to request a payment;

20 a request payment cancellation operation operable to send a notification to cancel a payment request;

a request payment information and provisional payment reservation operation operable to send a notification to request provisional payment information;

a maintain expense arrangement operation operable to send a notification to update an expense arrangement;

25 a request project task availability information operation operable to request availability;

a notify of provisional payment reservation deletion operation operable to send a notification of deletion of a provisional payment reservation; and

30 a notify of provisional payment reservation change deletion operation operable to send a notification to change a provisional payment deletion operation.

3. The system of claim 1 or 2, wherein the service operations are grouped into service interfaces, the service interfaces comprising:

a personnel administration in interface that includes the maintain expense arrangement service operation;

5 a receivables payables out interface that includes the notify of settlement result and the notify of settlement result cancellation service operations;

an expense accounting out interface that includes the notify of settlement result and the notify of settlement result cancellation service operations;

10 a project task availability out interface that includes the request project task availability information service operation;

a liquidity status out interface that includes the query liquidity status service operation;

a bank directory transmission in interface that includes the maintain bank directory entry service operation;

15 a bank directory transmission requesting out interface that includes the request bank directory transmission service operation;

a payment request in interface that includes the create payment order, the cancel payment order, the create payment reservation, the cancel payment reservation, the synchronous change payment reservation and the change payment reservation service operations;

20 a payment request out interface that includes the confirm payment request, the notify of payment, the request payment information and provisional payment reservation, the notify of provisional payment reservation deletion, the request payment information and provisional payment reservation change, and the notify of provisional payment reservation change deletion service operations;

a clearing in interface that includes the change payment allocation based on clearing request confirmation, the cancel clearing, and the create clearing service operations;

a clearing out interface that includes the request clearing, the confirm clearing, and the request clearing cancellation service operations;

30 an outgoing payment advising out interface that includes the notify of payment

service operation;

a bank statement processing in interface that includes the create bank statement service operation;

an incoming payment advising in interface that includes the create payment advice service operation;

a lockbox processing in interface that includes the process lock box service operation;

a cash payment in interface that includes the create cash payment and the cancel cash payment service operations;

a credit card settling in interface that includes the change clearing house payment order based on credit card settlement confirmation service operations;

a payment ordering out interface that includes the request payment order and the request file based payment order service operation;

a payment accounting out interface that includes the notify of payment and the notify of payment cancellation service operations;

a credit card settling out interface that includes the request credit card settlement service operation;

a check depositing out interface that includes the request check deposit service operation;

a bill of exchange submitting out interface that includes the request bill of exchange submission service operation;

a receivables payables in interface that includes the cancel receivables payables and the create receivables payables service operations;

a liquidity status in interface that includes the get liquidity status service operation;

a European community sales list report out interface that includes the notify of European community sales list report service operation;

a product tax declaration out interface that includes the notify of product tax declaration service operation; and

a payment request in interface that includes the change payment based on payment request confirmation service operation.

4. The system of any one of claims 1 to 3, wherein:

the computer software implementing the notify of settlement result, the notify of settlement result cancellation, the request project task availability information, the maintain expense arrangement, the notify of settlement result, and the notify of settlement result cancellation operations is deployed on a first hardware platform; and

the computer software implementing the get payment behavior summary, the notify of European community sales list report, the notify of product tax declaration, the get liquidity status, the notify of payment, the notify of payment cancellation, the notify of cash payment, the request cash payment cancellation, the cancel clearing, the create clearing, the confirm clearing, the notify of European Community sales list report, the change payment based on payment request confirmation, the notify of provisional payment reservation change deletion, the notify of provisional payment reservation deletion, the request payment, the request payment cancellation, the request payment information and provisional payment reservation, the request payment information and provisional payment reservation change, the notify of dunning invoice, the notify of dunning invoice cancellation, the cancel receivables payables, and the create receivables payables operations is deployed on a second hardware platform; and

the computer software implementing the request payment order, the request file based payment order, the request check deposit, the confirm payment request, the change clearing house payment order based on settlement confirmation, the cancel payment order, the cancel payment reservation, the change payment reservation, the create payment order, the create payment reservation, the sync change payment reservation, the notify of payment, the request payment card payment settling, the change payment allocation based on clearing request confirmation, the notify of payment, the notify of payment cancellation, the notify of cash payment, the request cash payment cancellation, the request clearing, the request clearing cancellation, the create payment advice, the create bank statement, the process lock box, the cancel cash payment, the create cash payment, the request bill of exchange submission, and the query liquidity status operations is deployed on a third hardware platform.

5. The system of claim 4, wherein each of the first through the third hardware platforms are distinct and separate from each other.

6. The system of any one of claims 1 to 3, wherein:

the computer software implementing the notify of settlement result, the notify of settlement result cancellation, the request project task availability information, the maintain expense arrangement, the notify of settlement result, and the notify of settlement result cancellation operations is deployable on a first hardware platform; and

the computer software implementing the get payment behavior summary, the notify of European community sales list report, the notify of product tax declaration, the get liquidity status, the notify of payment, the notify of payment cancellation, the notify of cash payment, the request cash payment cancellation, the cancel clearing, the create clearing, the confirm clearing, the notify of European Community sales list report, the change payment based on payment request confirmation, the notify of provisional payment reservation change deletion, the notify of provisional payment reservation deletion, the request payment, the request payment cancellation, the request payment information and provisional payment reservation, the request payment information and provisional payment reservation change, the notify of dunning invoice, the notify of dunning invoice cancellation, the cancel receivables payables, and the create receivables payables operations is deployable on a second hardware platform; and

the computer software implementing the request payment order, the request file based payment order, the request check deposit, the confirm payment request, the change clearing house payment order based on settlement confirmation, the cancel payment order, the cancel payment reservation, the change payment reservation, the create payment order, the create payment reservation, the sync change payment reservation, the notify of payment, the request payment card payment settling, the change payment allocation based on clearing request confirmation, the notify of payment, the notify of payment cancellation, the notify of cash payment, the request cash payment cancellation, the request clearing, the request clearing cancellation, the create payment advice, the create bank statement, the process lock box, the cancel cash payment, the create cash payment, the request bill of exchange submission, and the query liquidity status operations is deployable on a third hardware platform and

the first through the third hardware platforms being distinct and separate from each other.

7. The system of any one of claims 1 to 6, wherein the computer software deployed on the computer system comprises:

a plurality of process components, each of the process components being a package of software deployed and executing on the computer system and implementing a respective and distinct business process, the plurality of process components including:

an expense and reimbursement management process component used to expense and reimburse;

a due item processing process component used to manage all payables and receivables from service and supply and corresponding sales and withholding

a payment processing process component used to handle all incoming and outgoing payments and represent the main data base for the liquidity status; and

a cash management process component used to used for the analysis and the management of the actual and future flow of money; and wherein:

the expense and reimbursement management process component implements the notify of settlement result, the notify of settlement result cancellation, the request availability check, the maintain expense arrangement, the request validity check, the notify of settlement result, and the notify of settlement result cancellation service operations;

the due item processing process component implements the get payment behavior summary, the notify of dunning invoice, the notify of dunning invoice cancellation, the notify of European community sales list report, the notify of product tax declaration, the get liquidity status, the notify of payment, the notify of payment cancellation, the notify of cash payment, the request cash payment cancellation, the cancel clearing, the create clearing, the confirm clearing, the change payment based on payment request confirmation, the notify of provisional payment reservation change deletion, the notify of provisional payment reservation deletion, the request payment, the request payment cancellation, the request payment information and provisional payment reservation, the request payment information and provisional payment reservation change, the cancel receivables payables, and the create receivables payables service operations;

the payment processing process component implements the request payment order, the request file based payment order, the request check deposit, the confirm payment request,

the change clearing house payment order based on credit card settlement confirmation, the cancel payment order, the cancel payment reservation, the change payment reservation, the create payment order, the create payment reservation, the synchronous change payment reservation, the notify of payment, the request credit card settlement, the change payment allocation based on clearing request confirmation, the notify of payment, the notify of payment cancellation, the notify of cash payment, the request cash payment cancellation, the request clearing, the request clearing cancellation, the create payment advice, the create bank statement, the process lock box, the cancel cash payment, the create cash payment, the request bill of exchange submission service operations; and

the cash management process component implements and the query liquidity status service operations.

8. The system of any one of claims 1 to 7, wherein the computer software deployed on the computer system comprises:

a plurality of deployment units, each of the deployment units being a package of software packaged together to be deployed on a single physical hardware platform, the plurality of deployment units including:

an expense and reimbursement management deployment unit to process an arrangement made by a company for an employee for expense reporting;

a due item management deployment unit to process due payment and receivables; and

a payment processing deployment unit to process payment information; and wherein:

the expense and reimbursement management deployment unit implements the notify of settlement result, the notify of settlement result cancellation, the request availability check, the maintain expense arrangement, the request validity check, the notify of settlement result and the notify of settlement result cancellation service operations;

the due item management deployment unit implements the get payment behavior summary, the notify of dunning invoice, the notify of dunning invoice cancellation, the notify of European community sales list report, the notify of product tax declaration, the get liquidity status, the notify of payment, the notify of payment cancellation, the cancel clearing,

the create clearing, the confirm clearing, the change payment based on payment request confirmation, the notify of provisional payment reservation change deletion, the notify of provisional payment reservation deletion, the request payment, the request payment cancellation, the request payment information and provisional payment reservation, the request payment information and provisional payment reservation change, the cancel
5 receivables payables and the create receivables payables service operations; and

the payment processing deployment unit implements the query liquidity status, the request payment order, the request file based payment order, the request check deposit, the confirm payment request, the change clearing house payment order based on credit card
10 settlement confirmation, the cancel payment order, the cancel payment reservation, the change payment reservation, the create payment order, the create payment reservation, the sync change payment reservation, the notify of payment, the request credit card settlement, the change payment allocation, based on clearing request confirmation, the notify of payment, the notify of payment cancellation, the notify of cash payment, the request cash payment
15 cancellation, the request clearing, the request clearing cancellation, the create payment advice, the create bank statement, the process lock box, the cancel cash payment, the create cash payment and the request bill of exchange submission service operations.

9. The system of any one of claims 1 to 8, further comprising:

a repository of service descriptions, the repository including a standards-based
20 description of each of the plurality of service operations.

10. A computer program product encoded on a tangible machine-readable information carrier for implementing a plurality of services, the product comprising computer software operable to implement on a computer system services operations, the services operations comprising:

a maintain expense arrangement operation operable to send a notification to update an
25 expense arrangement;

a request project task availability information operation operable to send a notification of an expense that applies to an existing project;

a notify of settlement result operation operable to send a notification of a settlement result;

a notify of settlement result cancellation operation operable to send a notification to cancel a settlement result;

a create receivables payables operation operable to send a notification to create a receivable or payable;

5 a cancel receivables payables operation operable to send a notification to cancel a receivable or payable;

a notify of European community sales list report operation operable to send a notification about a European community sales list report;

10 a notify of product tax declaration operation operable to send a notification about a product tax declaration;

a maintain bank directory entry operation operable to request to maintain a bank directory entry; and

a request bank directory transmission operation operable to requesting a bank directory transmission.

15 11. The product of claim 10, wherein the service operations further comprise:

a confirm payment request operation operable to send a confirmation notification to confirm a payment request;

a notify of payment request operation operable to send a notification of payment;

a create bank statement operation operable to create a bank statement;

20 a create payment advice operation operable to create a payment advice;

a process lock box operation operable to processing a lock box;

a create cash payment operation operable to create a cash payment notification;

a cancel cash payment operation operable to send a notification to cancel a cash payment;

25 a notify of payment operation operable to send a notification of payment;

a notify of payment cancellation operation operable to send a notification of cancellation of payment;

a notify of cash payment operation operable to send a notification of cash payment;

30 a request credit card settlement operation operable to send a notification to request a credit card settlement;

a request check deposit operation operable to send a notification request for a check deposit;

a request payment order operation operable to send a notification request for a payment order;

5 a request file based payment order operation operable to send a notification request for a file based payment order;

a notify of settlement result operation operable to send a notification of a settlement result based on an expense report;

10 a notify of settlement result cancellation operation operable to send a notification to cancel a settlement result based on an expense report previously sent;

a request project task availability information operation operable to send a notification of an expense that applies to an existing project;

a query liquidity status operation operable to querying liquidity status;

15 a create payment reservation operation operable to send a payment reservation creation request;

a cancel payment reservation operation operable to send a payment reservation cancellation request;

a synchronous change payment reservation operation operable to send a payment reservation synchronize change request;

20 a change payment reservation operation operable to send a payment reservation change request;

a create payment order operation operable to send a payment order creation request;

a cancel payment order operation operable to send a payment order cancellation request to update the payment order business object;

25 a request clearing operation operable to send a notification of a clearing request;

a request clearing cancellation operation operable to send a notification to cancel a clearing request;

a change clearing house payment order based on credit card settlement confirmation operation operable to send a notification to change a clearing house payment;

30 a get liquidity status operation operable to send a notification to get liquidity status;

a create clearing operation operable to send a notification to create a clearing;
a cancel clearing operation operable to send a notification to cancel a clearing;
a request payment operation operable to send a notification to request a payment;
a request payment cancellation operation operable to send a notification to cancel a

5 payment request;

a request payment information and provisional payment reservation operation
operable to send a notification to request provisional payment information;

a notify of provisional payment reservation deletion operation operable to send a
notification of deletion of a provisional payment reservation; and

10 a notify of provisional payment reservation change deletion operation operable to
send a notification to change a provisional payment deletion operation.

12. The product of claim 10 or 11, wherein the computer software comprises:

a plurality of process components, each of the process components being a package of
software deployed and executing on the computer system and implementing a respective and
distinct business process, the plurality of process components including:

15

an expense and reimbursement management process component used to
expense and reimburse;

a due item processing process component used to manage all payables and
receivables from service and supply and corresponding sales and withholding;

20 a payment processing process component used to handle all incoming and
outgoing payments and represent the main data base for the liquidity status; and

a cash management process component used to used for the analysis and the
management of the actual and future flow of money; and

wherein:

25 the expense and reimbursement management process component implements the
notify of settlement result, the notify of settlement result cancellation, the request availability
check, the maintain expense arrangement, the request validity check, the notify of settlement
result, and the notify of settlement result cancellation service operations;

30 the due item processing process component implements the get payment behavior
summary, the notify of dunning invoice, the notify of dunning invoice cancellation, the notify

of European community sales list report, the notify of product tax declaration, the get liquidity status, the notify of payment, the notify of payment cancellation, the cancel clearing, the create clearing, the confirm clearing, the change payment based on payment request confirmation, the notify of provisional payment reservation change deletion, the notify of
5 provisional payment reservation deletion, the request payment, the request payment cancellation, the request payment information and provisional payment reservation, the request payment information and provisional payment reservation change, cancel receivables payables, and the create receivables payables service operations;

the payment processing process component implements the request payment order,
10 the request file based payment order, the request check deposit, the confirm payment request, the change clearing house payment order based on credit card settlement confirmation, the cancel payment order, the cancel payment reservation, the change payment reservation, the create payment order, the create payment reservation, the synchronous change payment reservation, the notify of payment, the request credit card settlement, the change payment
15 allocation based on clearing request confirmation, the notify of payment, the notify of payment cancellation, the notify of cash payment, the request cash payment cancellation, the request clearing, the request clearing cancellation, the create payment advice, the create bank statement, the process lock box, the cancel cash payment, the create cash payment, the request bill of exchange submission service operations; and

20 the cash management process component implements the query liquidity status service operations.

13. The product of any one of claims 10 to 12, wherein the computer software comprises:

a plurality of deployment units, each of the deployment units being a package of software packaged together to be deployed on a single physical hardware platform, the plurality of deployment units including:

5 an expense and reimbursement management deployment unit that includes an expense arrangement and an expense report business object;

a due item management deployment unit that includes a European Community sales list report, a debt guarantee, a tax receivables payables register, a due payment run, a due clearing, a dunning run, a product tax declaration, a due payment, a withholding tax
10 declaration, a trade receivables payables account, a dunning, a trade receivables payables register, and a factoring business object; and

a payment processing deployment unit that includes an expected liquidity item, a liquidity forecast, an incoming check, a bank payment order, a house bank account, a cash payment, a bill of exchange payable, a check deposit, a bill of exchange book, a cash
15 storage, a payment advice, a check storage, a cash transfer, a payment card payment settlement run, a payment register, a payment media run, a payment allocation, an outgoing check, a bank statement, a clearing house account, a clearing house payment order, a bill of exchange receivable, a bill of exchange submission, and a payment order business object; and wherein:

20 the expense arrangement business object is made for internal employees per work agreement for purposes of expense reporting, and the expense report business object includes data on trip times, trip destinations, and mileage data used to calculate reimbursement amounts and expense amounts;

the debt guarantee business object represents obligations and demands relating to
25 bonds and guarantees, the due payment run business object represents a specification of the automated creation of payment requests for receivables payables from goods and services, the product tax declaration business object represents a declaration of the product tax payables/receivables of a company to the responsible tax authority according to the tax declaration arrangement and country specific legal requirements that triggers the payment to
30 the tax authority if required, the due payment business object represents a payment request or

payment confirmation with regard to trade receivables and payables from goods and services, the tax receivables payables register business object is a register of tax receivables and payables of a company that are due for delivered goods and rendered services between buyers and sellers or that are due for the consumption of goods or that are due for the transfer of goods or that are withheld from payments to sellers, the European Community sales list report business object represents European Community sales, the due clearing business object represents a group of receivables and payables for clearing, the dunning run business object is a specification of the automated creation of dunning business objects, the dunning business object represents a company's (the creditor's) demand upon a business partner (the debtor) for payment, relates to all receivable items in a trade receivables payables account for which payment will be demanded at a particular point in time, serves as the basis for creating and sending reminders or demands for payment, and controls and documents the dunning process, the factoring business object represents the sale of outstanding receivables for goods and services, the withholding tax declaration business object is a declaration of withholding tax payables of a company to a tax authority according to the tax declaration arrangement and country specific legal requirements that triggers the payment to the tax authority if required, the trade receivables payables account business object is a structure element of due item processing for data entry and reporting of all trade receivables or trade payables of a company from or to a business partner that contains guidelines and agreements with regards to a business partner concerning the payments and dunning for receivables and payables, and the trade receivables payables register business object is a register for all trade receivables and payables from goods and services of a company from/to its business partners; and

the expected liquidity item business object increases or reduces liquidity for a company, the liquidity forecast business object represents the financial status on a time raster including future cash flows, the incoming check business object represents a check send by a business partner, the bank payment order business object represents a payment order which will be sent to a house bank, the house bank account business object is a representation of a house bank account (type of cash location), the cash payment business object represents incoming or outgoing cash payment from or to a business partner, the bill of exchange payable business object represents a bill of exchange sent to a business partner, the check

deposit business object sends a collection of incoming checks to the house bank for cashing, the cash storage business object represents a storage location for cash of a company, the payment advice business object represents a payment advice received from a business partner or house bank, the check storage business object is a location where incoming checks are stored, the cash transfer business object is an internal money transfer between bank account and bank account (bank transfer) - cash account and bank account (cash deposit) - bank account and cash account (cash withdrawal) - cash account and cash account (cash transfer), the payment card payment settlement run business object represents the specification of the automated creation of settlement requests for clearing house payment orders to a clearing house, the payment register business object represents registration for all self and foreign initiated incoming and outgoing payments of a company, the payment media run business object represents the specification of the automated creation of payment media, the payment allocation business object documents a process step by which open payments of different type belonging to one another are indicated as confirmed or sent to other components for post processing, the outgoing check business object represents a check send to a business partner, the bank statement business object represents a bank statement for a house bank account, the clearing house account business object represents a merchant at the clearing house for the processing of credit card settlement, the clearing house payment order business object represents clearing a collection of credit card payments to the clearing house, the bill of exchange receivable business object represents a bill of exchange received from or a bill of exchange request sent to a business partner, the bill of exchange submission business object sends incoming bills of exchange to the house bank for cashing, and the payment order business object creates payment media for either bank, credit card settlement institute, or business partner on the base of payment requests.

14. The product of claim 12, wherein:

each of the plurality of process components is assigned to no more than one deployment unit among multiple deployment units, and each deployment unit is deployable on the separate computer hardware platform independent of every other deployment unit; and

5 all interaction between the process component in one deployment unit and any other process component in any other deployment unit takes place through the respective service operations of the two process components.

15. The product of claim 14, wherein the deployment units comprise:

an expense and reimbursement management deployment unit that includes the expense and reimbursement management process component;

a due item management deployment unit that includes the due item processing process component; and

a payment deployment unit that includes a payment processing process component and a cash management process component.

15 16. The product of any one of claims 10 to 15, further comprising:

an expense and reimbursement management deployment unit that implements the notify of settlement result, the notify of settlement result cancellation, the request project task availability information, the maintain expense arrangement, the notify of settlement result, and the notify of settlement result cancellation service operations;

20 a due item management deployment unit that implements the get payment behavior summary, the notify of European community sales list report, the notify of product tax declaration, the get liquidity status, the notify of payment, the notify of payment cancellation, the cancel clearing, the create clearing, the confirm clearing, the notify of European Community sales list report, the change payment based on payment request confirmation, the
25 notify of provisional payment reservation change deletion, the notify of provisional payment reservation deletion, the request payment, the request payment cancellation, the request payment information and provisional payment reservation, the request payment information and provisional payment reservation change, the notify of dunning invoice, the notify of dunning invoice cancellation, the cancel receivables payables, and the create receivables

payables service operations; and

a payment deployment unit that implements the request payment order, the request file based payment order, the request check deposit, the confirm payment request, the change clearing house payment order based on settlement confirmation, the cancel payment order, the cancel payment reservation, the change payment reservation, the create payment order, the create payment reservation, the sync change payment reservation, the notify of payment, the request payment card payment settling, the change payment allocation based on clearing request confirmation, the notify of payment, the notify of payment cancellation, the notify of cash payment, the request cash payment cancellation, the request clearing, the request clearing cancellation, the create payment advice, the create bank statement, the process lock box, the cancel cash payment, the create cash payment, the request bill of exchange submission, and the query liquidity status service operations.

17. The product of claim 12, wherein:

the expense and reimbursement management process component includes an expense arrangement business object and an expense report business object, the expense arrangement business object being the business object that contains values relevant for determining per diem amounts, the type of standard vehicle, as well as a standard cost distribution for internal employees, the expense report business object being the business object that contains a collection of several expense receipts submitted by an expense reporter;

the due item processing process component includes a due payment business object, a dunning business object, a debt guarantee business object, a factoring business object, a withholding tax declaration business object, a due payment run business object, a due clearing business object, a dunning run business object, a European community sales list report business object, a trade receivables payables register business object, a tax receivables payables register business object, a trade receivables payables account business object, and a product tax declaration business object, wherein:

the due payment business object being the business object that creates payment requests for payment processing;

the dunning business object being the business object that is responsible for the dunning of outstanding receivables and sending a dunning letter to the business partner;

the debt guarantee business object being the business object that illustrates the contingent liabilities and demands from endorsements, payment warranties and other guarantees for deficiency guarantee, limited endorsement, directly liable endorsement and joint guarantee;

5 the factoring business object being the business object that illustrates the sales of pecuniary claims;

 the withholding tax declaration business object being the business object that declares the withholding tax liabilities of a company to a tax authority according to the tax declaration arrangement and country specific legal requirements that triggers a payment to the
10 tax authority;

 the due payment run business object being the business object that represents the specification of the automated creation of payment requests for receivables payables from goods and services;

 the due clearing business object being the business object that includes a
15 group of receivables and payables for clearing;

 the dunning run business object being the business object that represents the specification of the automated creation of dunning business objects;

 the European Community sales list report business object being the business object that declares the statistical tax liabilities and receivables of a member state company to
20 a tax authority according to the tax declaration arrangement and country specific legal requirements;

 the trade receivables payables register business object being the business object that is the register for all trade receivables and payables from goods and services of a company from/to its business partners;

25 the tax receivables payables register business object being the business object that is the register for all tax receivables and payables of a company;

 the trade receivables payables account master data object in process being the business object that contains guidelines and agreements with regards to a business partner concerning the payments and dunning for receivables and payables; and

30 the product tax declaration business object being the business object that is the

declaration of the product tax liabilities and receivables of a company to the responsible tax authority according to the tax declaration arrangement and country specific legal requirements that triggers the payment to the tax authority;

the payment processing process component includes a payment allocation business object, a cash payment business object, a cash transfer business object, a payment order business object, a clearing house payment order business object, a bill of exchange submission business object, a payment advice business object, a bank payment order business object, an outgoing check business object, a bill of exchange payable business object, a check deposit business object, a payment card payment settlement run business object, a payment register business object, a payment media run business object, a bill of exchange receivable business object, an incoming check business object, a bank statement business object, a house bank account master data object, a cash storage master data object, a check storage master data object, a clearing house account master data object, and a bill of exchange book master data object, wherein:

the payment allocation business object being the business object that documents a process step by which open payments of different types belonging to one another are indicated as confirmed or sent for post processing;

the cash payment business object being the business object that includes the incoming or outgoing cash payment from or to a business partner;

the cash transfer business object being the business object that includes an internal money transfer;

the payment order business object being the business object that creates payment media on the base of payment requests;

the clearing house payment order business object being the business object that includes the order for clearing a collection of credit card payments to the clearing house;

the bill of exchange submission business object being the business object that sends incoming bills of exchange to the house bank for cashing;

the payment advice business object being the business object that represents a payment advice received from a business partner or house bank;

the bank payment order business object being the business object that includes

a payment order which will be sent to the house bank;

the outgoing check business object being the business object that represents a check sent to a business partner;

the bill of exchange payable business object being the business object that represents a bill of exchange sent to a business partner;

the check deposit business object being the business object that sends a collection of incoming checks to the house bank for cashing;

the payment card payment settlement run business object being the business object that represents the specification of the automated creation of settlement requests for clearing house payment orders to a clearing house;

the payment register business object being the business object that represents the register for all self and foreign initiated incoming and outgoing payments of a company;

the payment media run business object being the business object that represents the specification of the automated creation of payment media;

the bill of exchange receivable business object being the business object that represents a bill of exchange received from or a bill of exchange request sent to a business partner;

the incoming check business object being the business object that represents a check sent by a business partner;

the bank statement business object being the business object that represents the bank statement for a house bank account;

the house bank account master data object being the business object that represents a business partner providing services for a company;

the cash storage master data object being the business object that represents a storage location for the cash of a company;

the check storage master data object being the business object that represents a location where incoming checks are stored;

the clearing house account master data object being the business object that represents a merchant at the clearing house for the processing of credit card settlement; and

the bill of exchange book master data object being the business object that

represents storage for incoming bills of exchange;

the cash management process component includes a liquidity forecast business object and an expected liquidity item business object, the liquidity forecast business object being the business object that presents the financial status on a time raster including future cash flows, the expected liquidity item business object being the business object depicting an expected increase or reduction of liquidity for a company used for business processes that are not directly monitored by liquidity forecast.

18. The product of any one of claims 10 to 17, wherein:

each of the process components includes one or more business objects; and

none of the business objects of any one of the process components interacts directly with any of the business objects included in any of the other process components.

19. The product of claim 18, wherein the business objects comprise the business process object.

20. The product of claim 18 or 19, wherein:

none of the business objects included in any one of the process components is included in any of the other process components.

21. The product of any one of claims 10 to 20, further comprising:

a plurality of process agents, each process agent being either an inbound process agent or an outbound process agent, an inbound process agent being operable to receive the message from an inbound operation, an outbound process agent being operable to cause an outbound operation to send the message, each process agent being associated with exactly one process component; wherein:

the inbound process agents comprise a first inbound process agent operable to start the execution of step requested in a first inbound message by creating or updating one or more business object instances; and

the outbound process agents comprise a first asynchronous outbound process agent

that is called after a business object that is associated with the first outbound process agent changes.

22. A method of providing services from a computer system having payment functionality, the method comprising:

5 providing services through the sending of messages, the messages including:

 a notification about a settlement result;

 a notification about settlement result cancellation;

 a notification about creation of receivables payables;

 a notification about cancellation of receivables payables;

10 a notification of credit commitment;

 a notification of payment behavior summary;

 a notification of product tax declaration; and

 a notification about a request bank directory transmission.

1/18

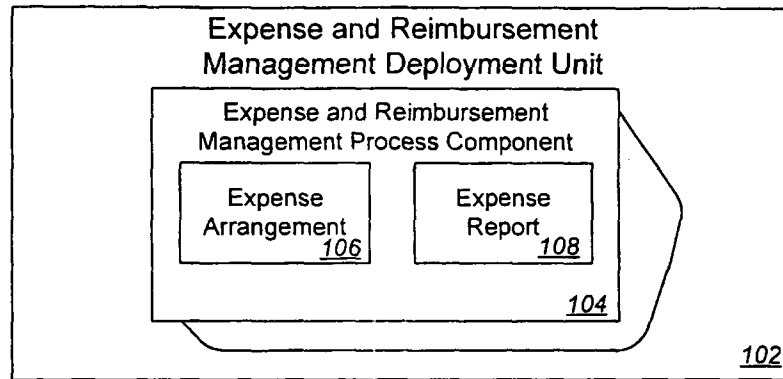


FIG. 1A

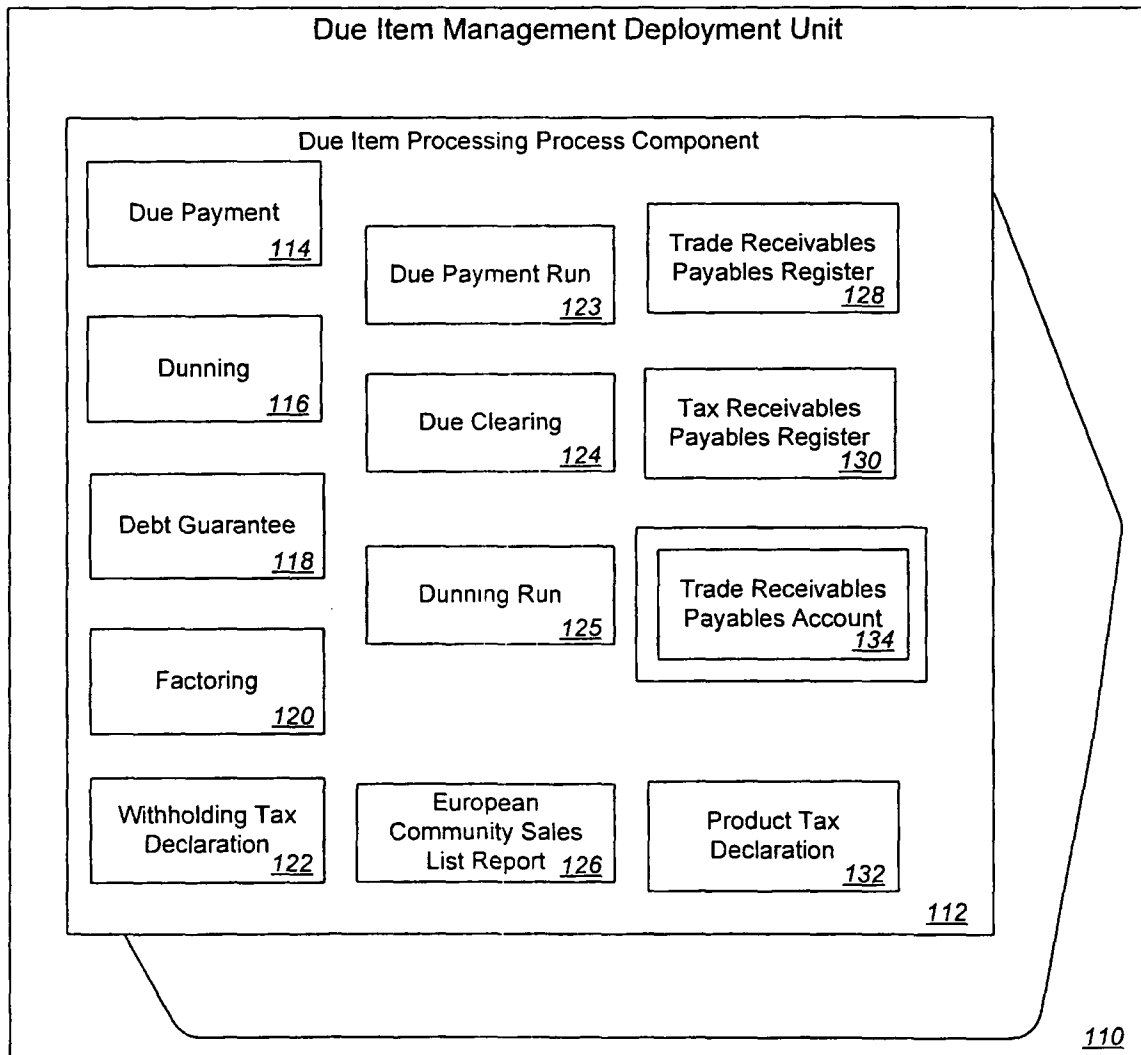


FIG. 1B

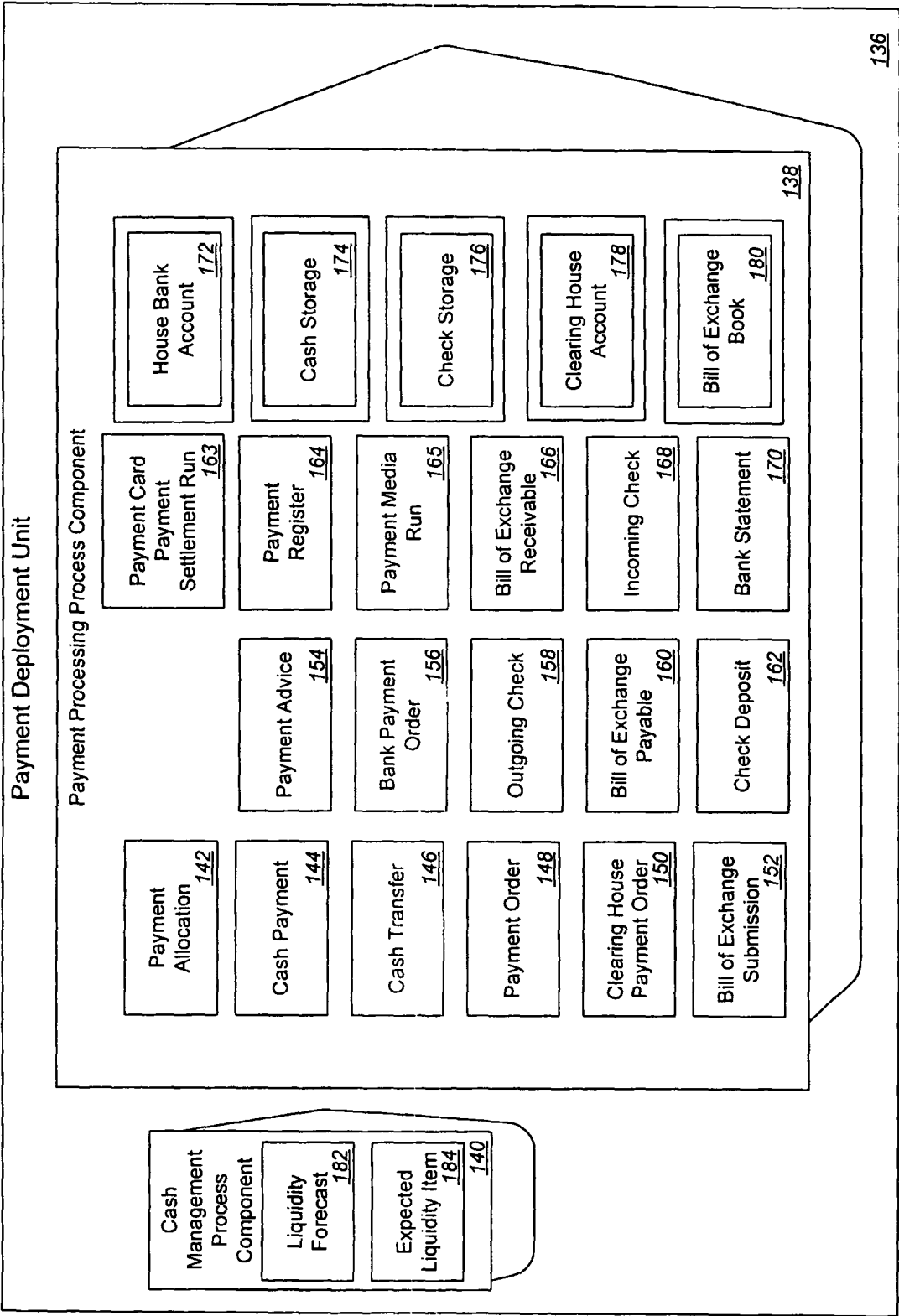


FIG. 1C

3/18

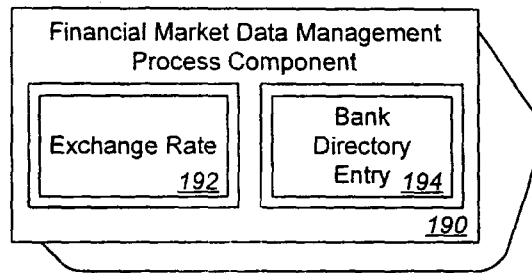


FIG. 1D

4/18

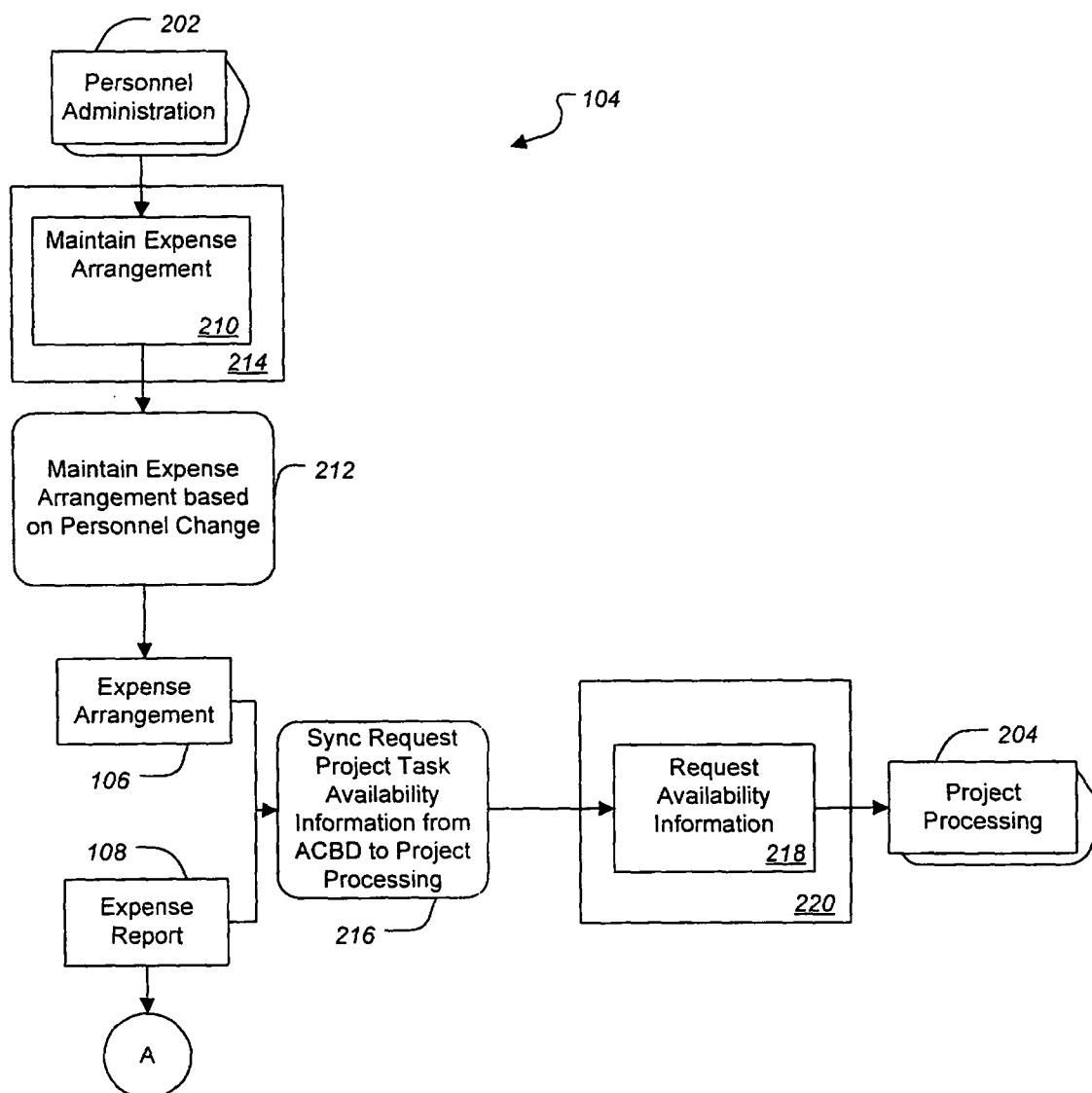


FIG. 2A

5/18

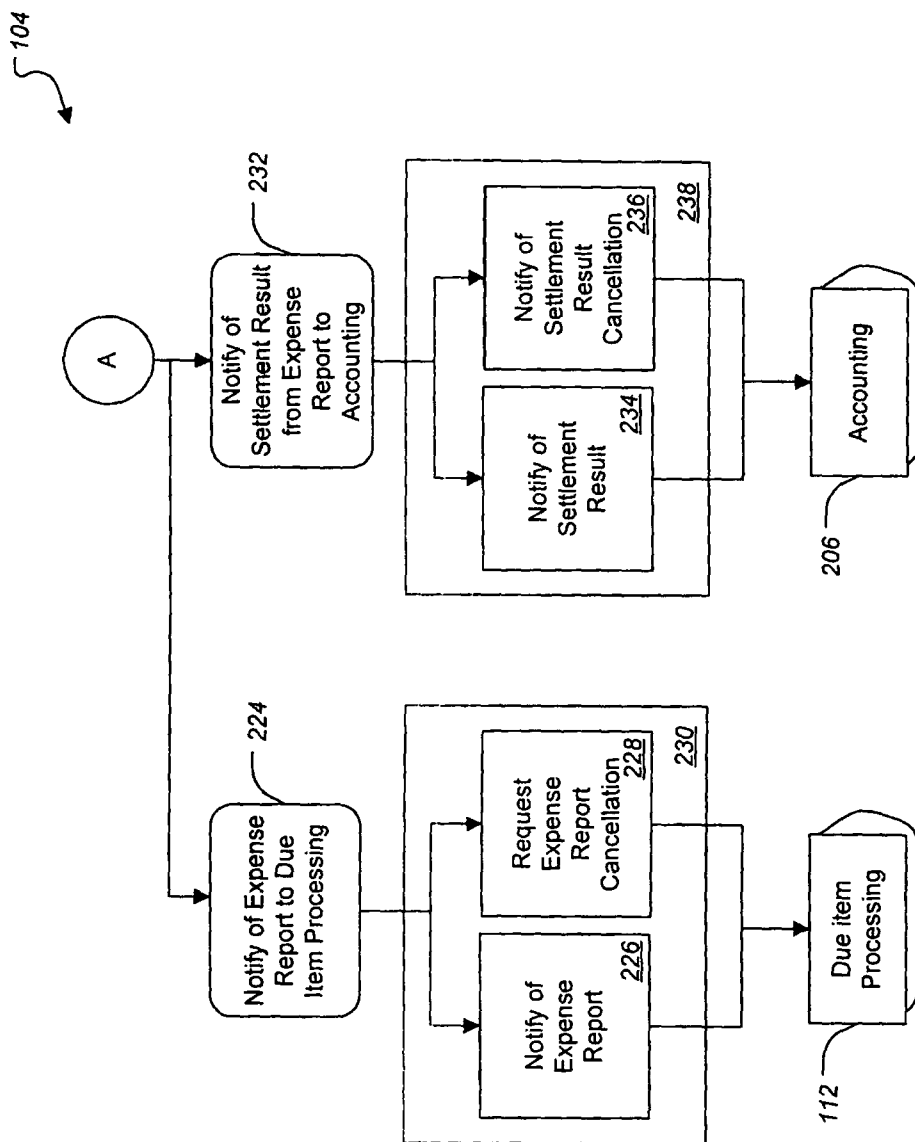


FIG. 2B

6/18

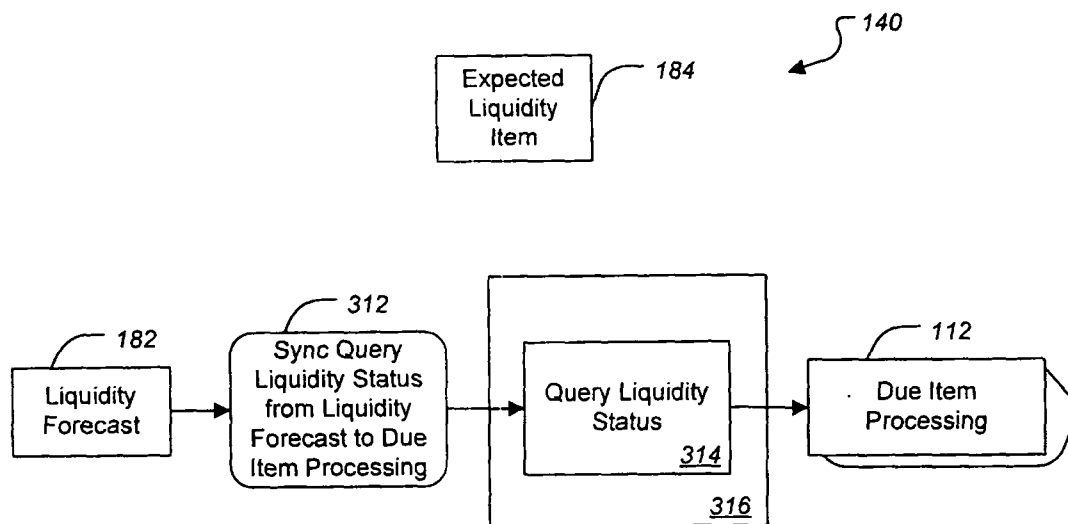


FIG. 3

7/18

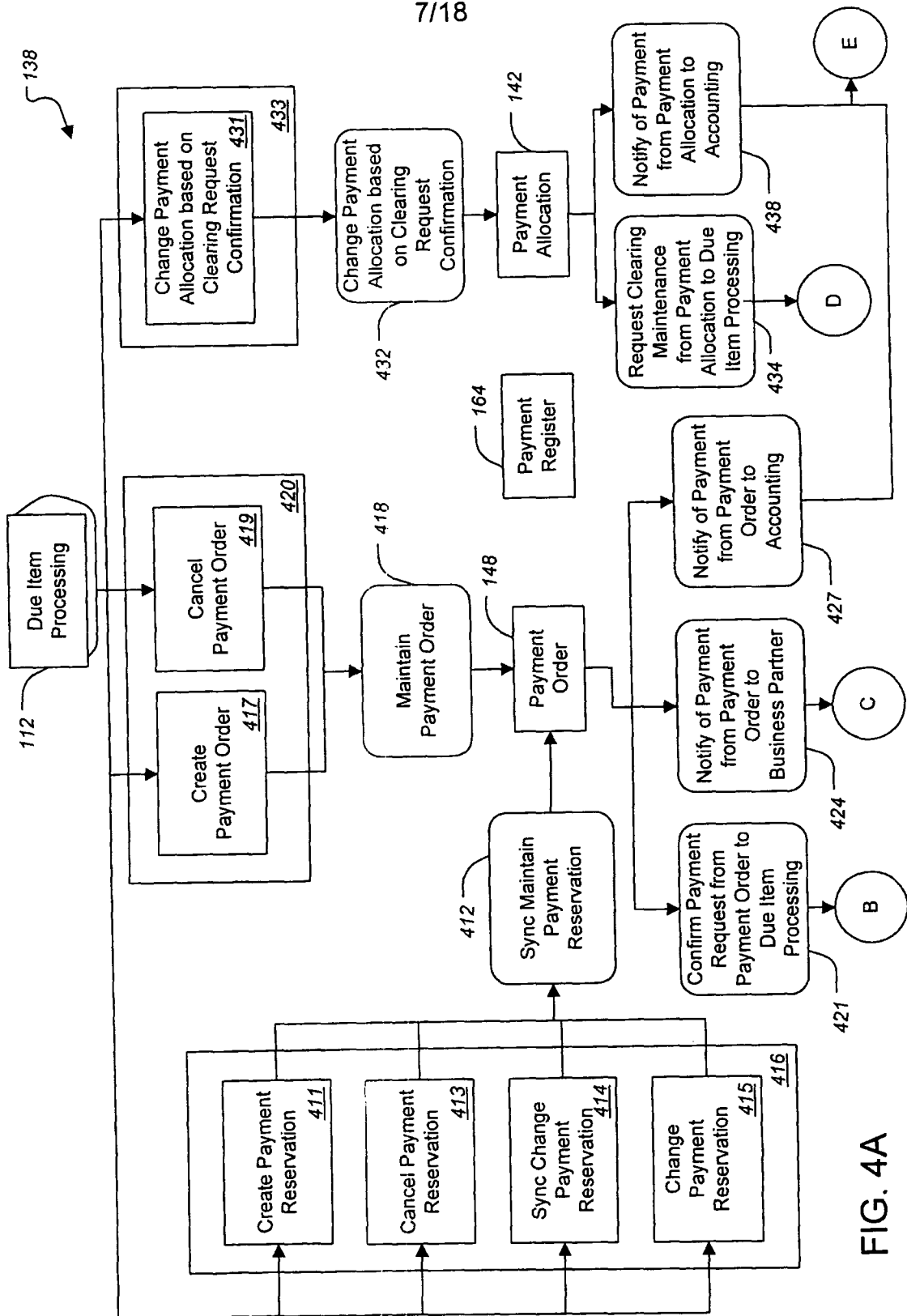


FIG. 4A

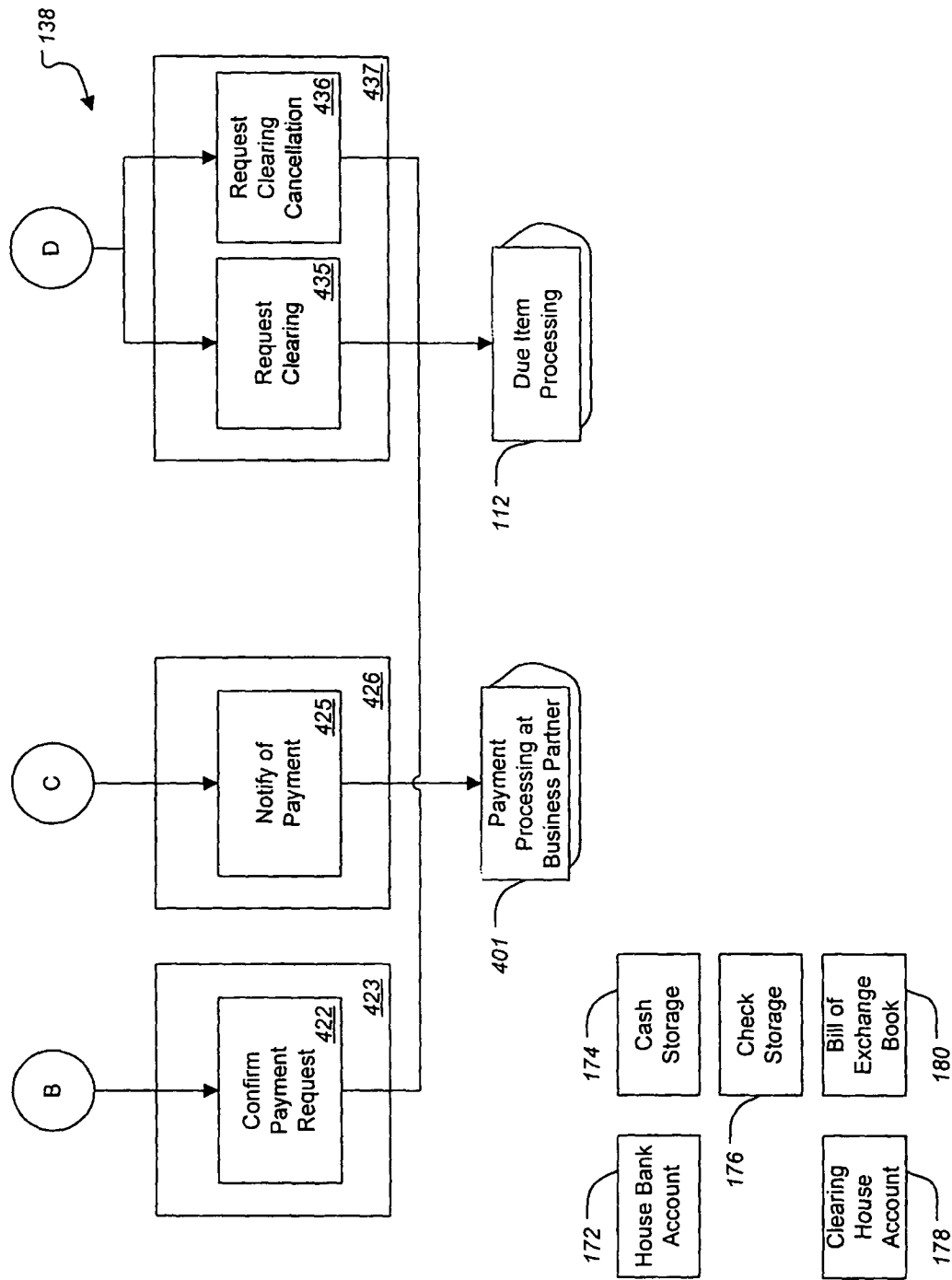


FIG. 4B

9/18

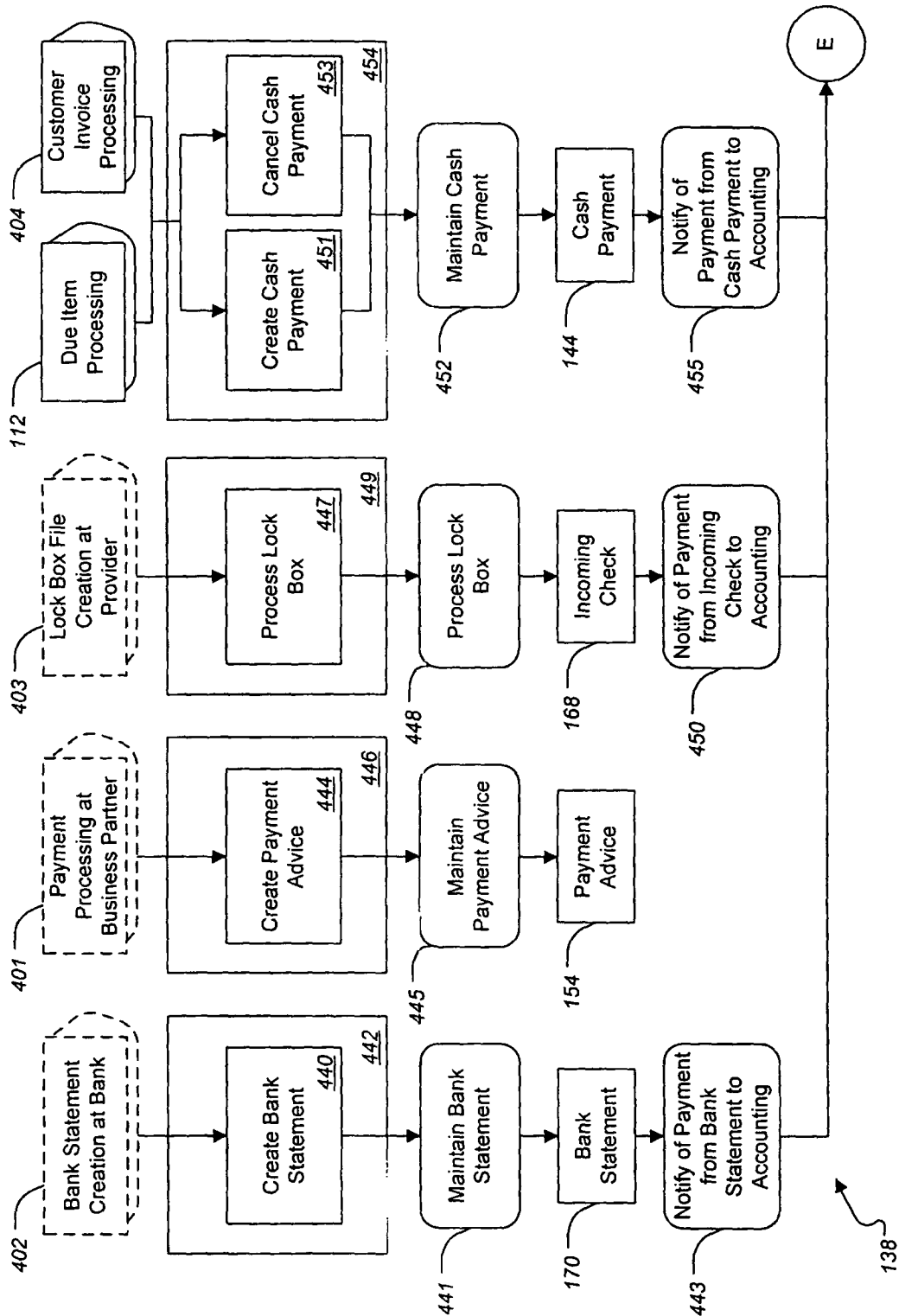


FIG. 4C

10/18

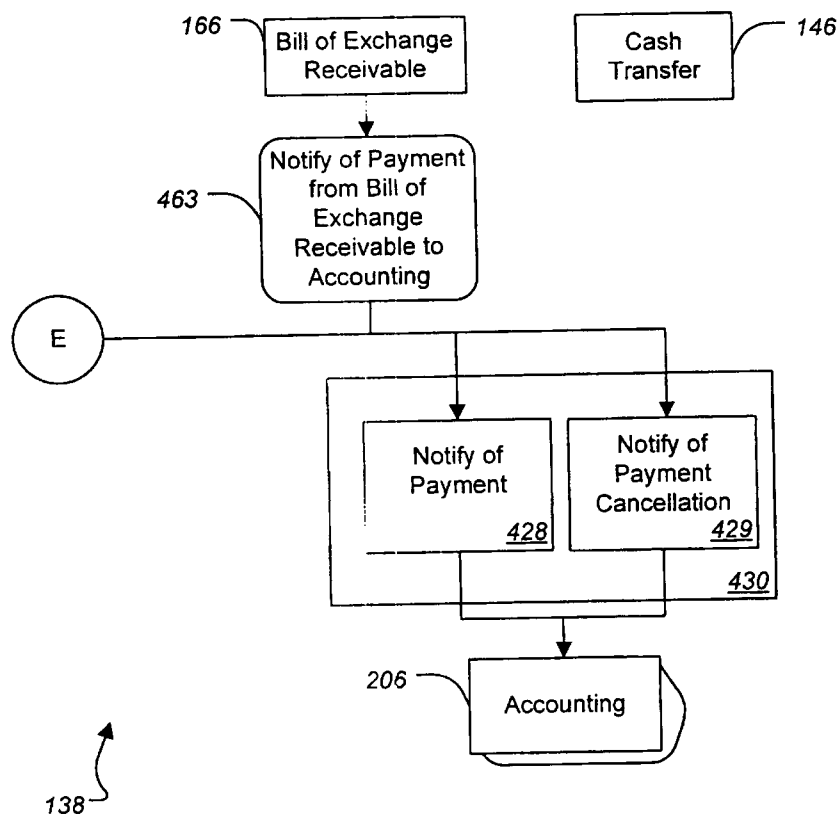
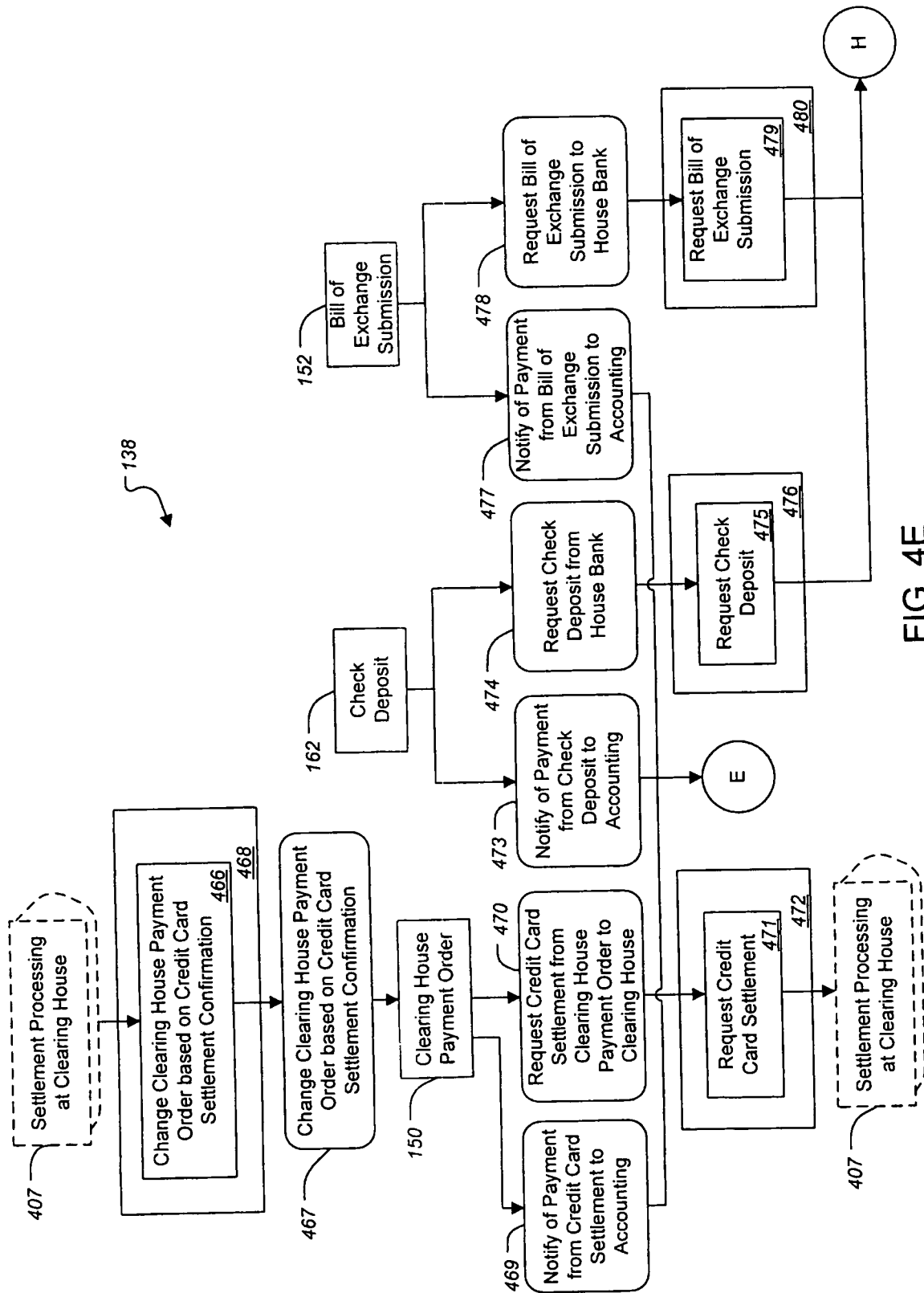


FIG. 4D

11/18



12/18

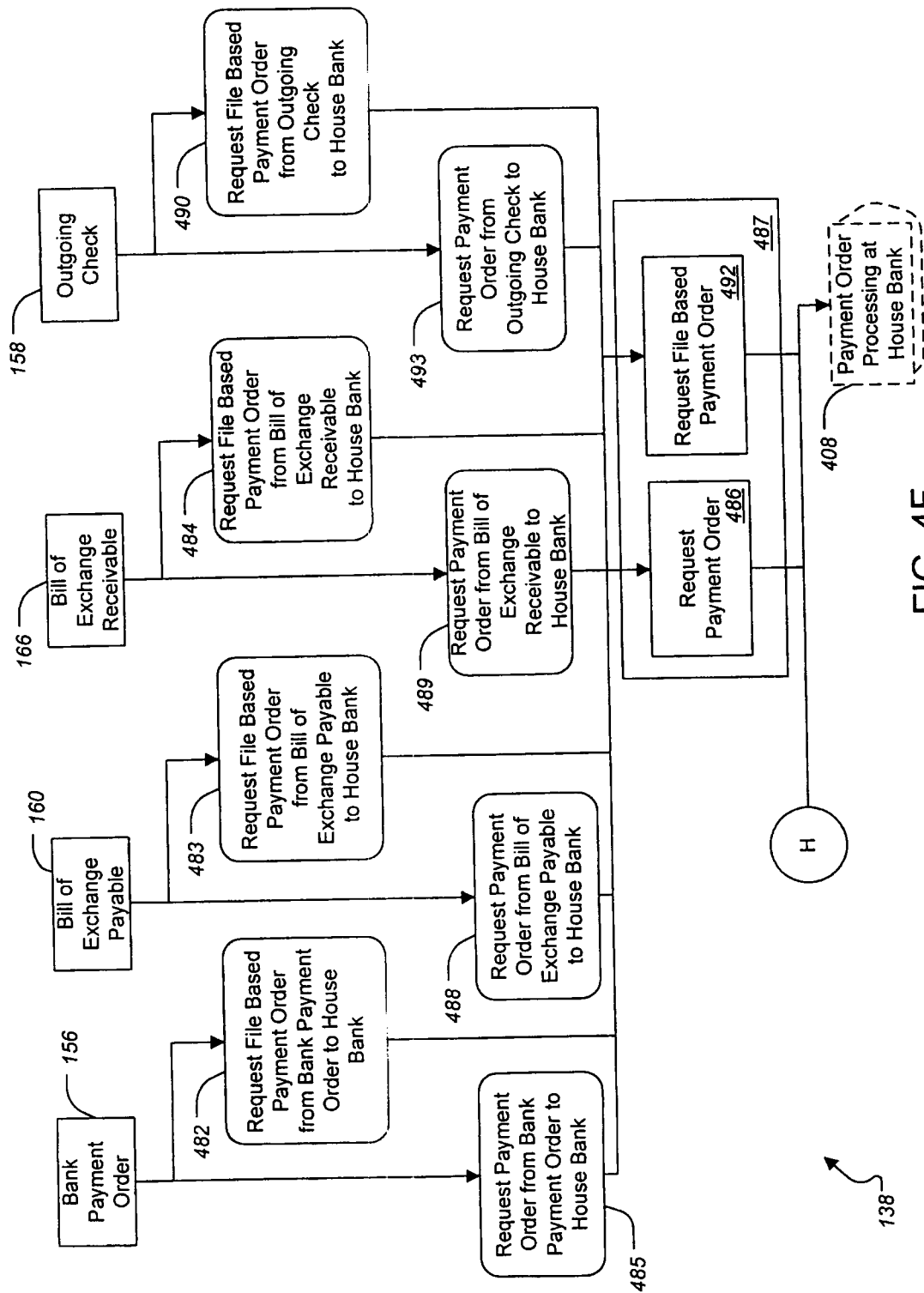


FIG. 4F

13/18

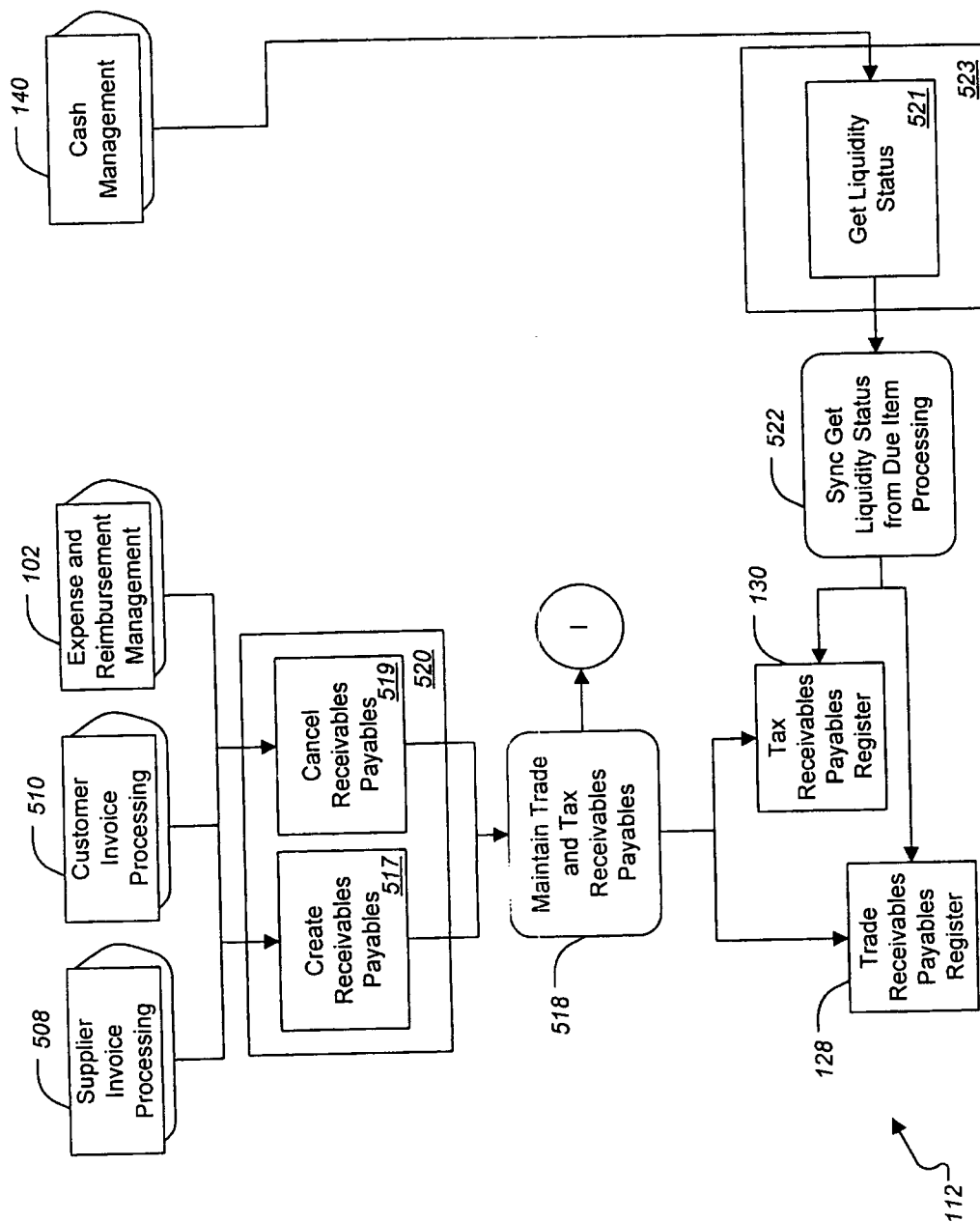


FIG. 5A

14/18

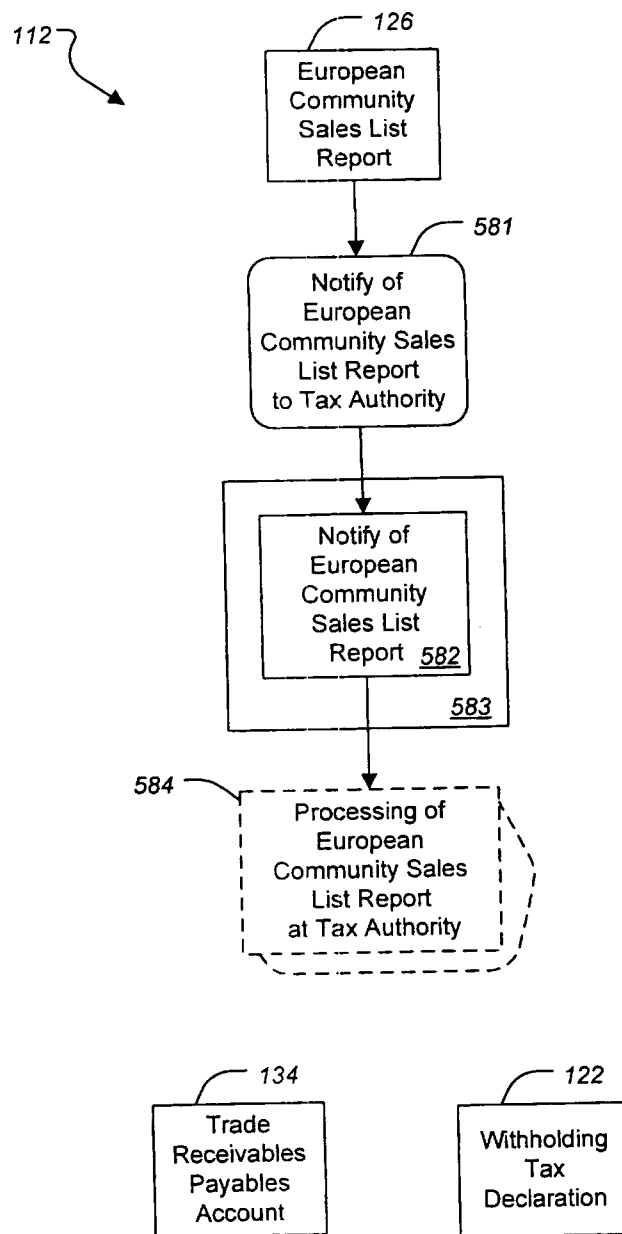


FIG. 5B

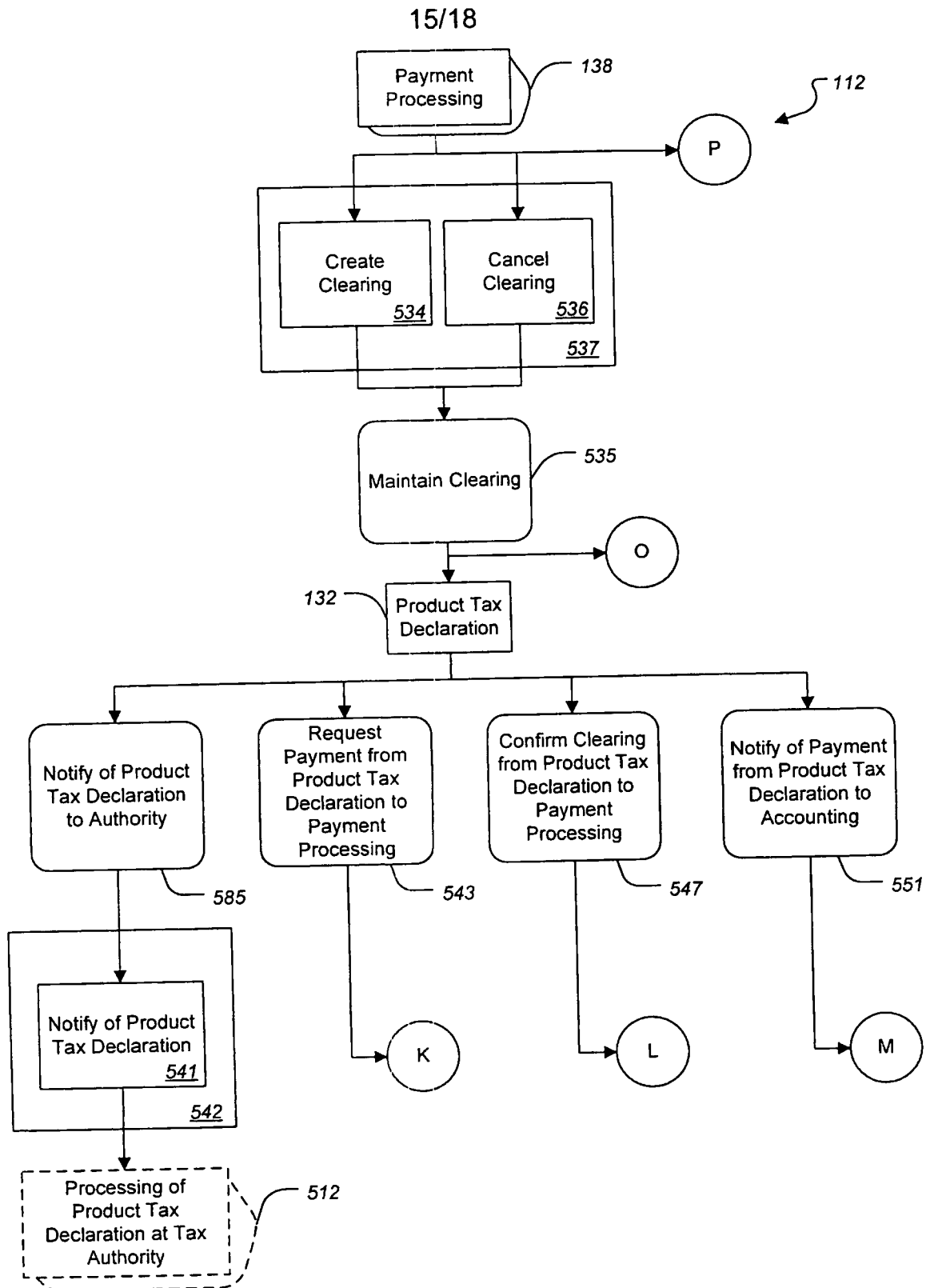


FIG. 5C

16/18

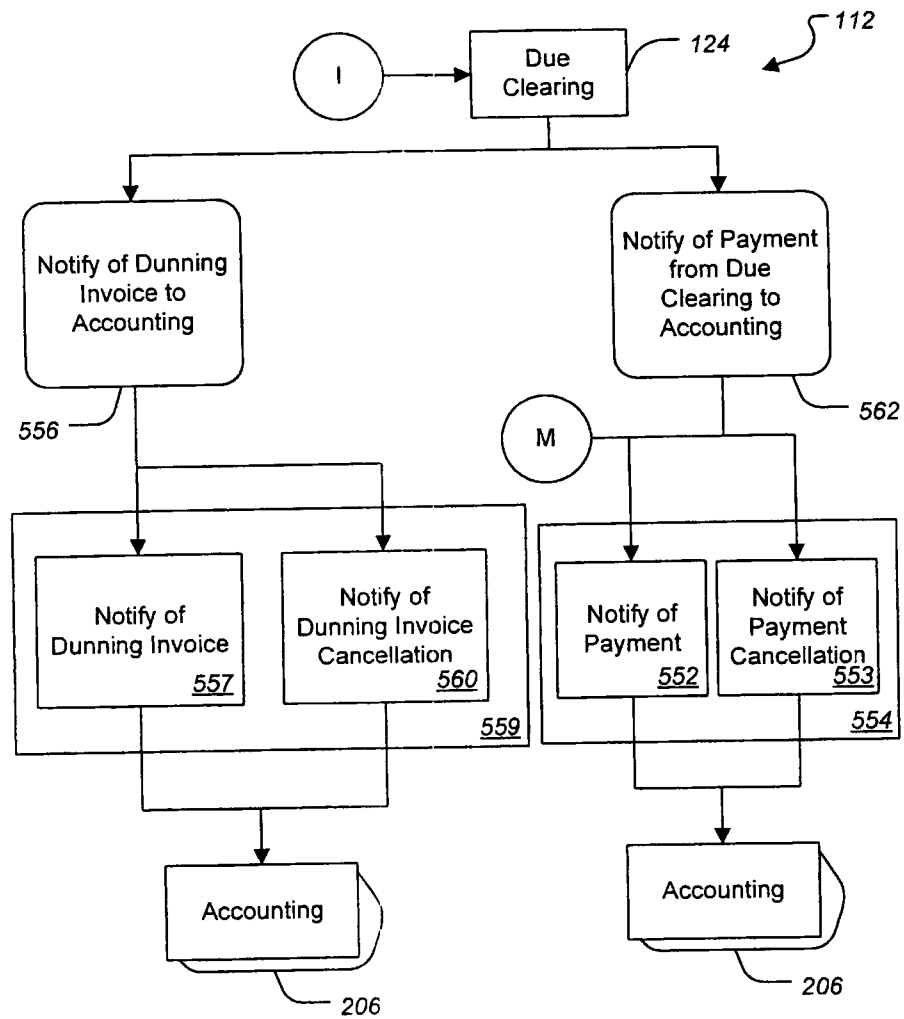


FIG. 5D

17/18

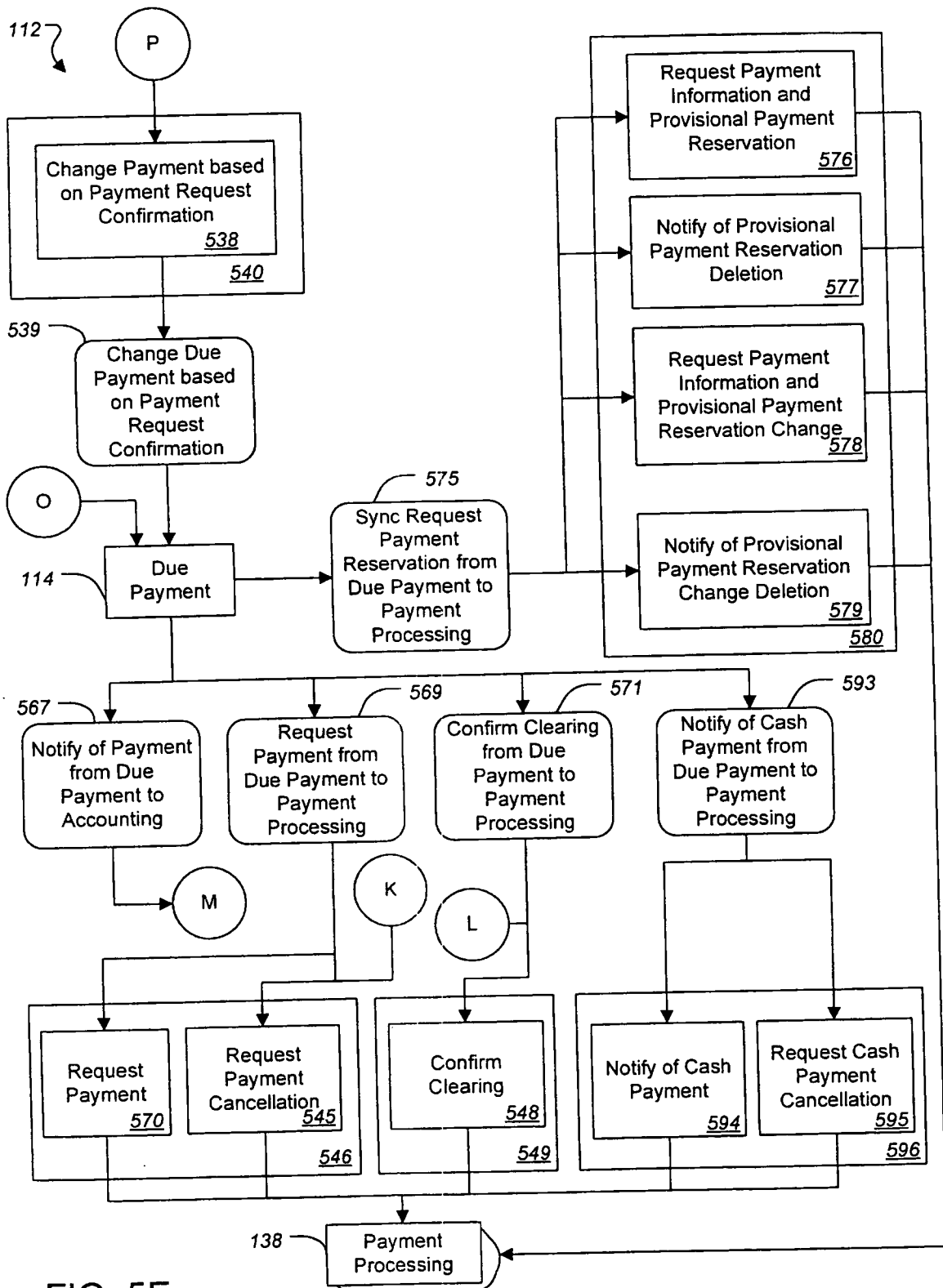


FIG. 5E

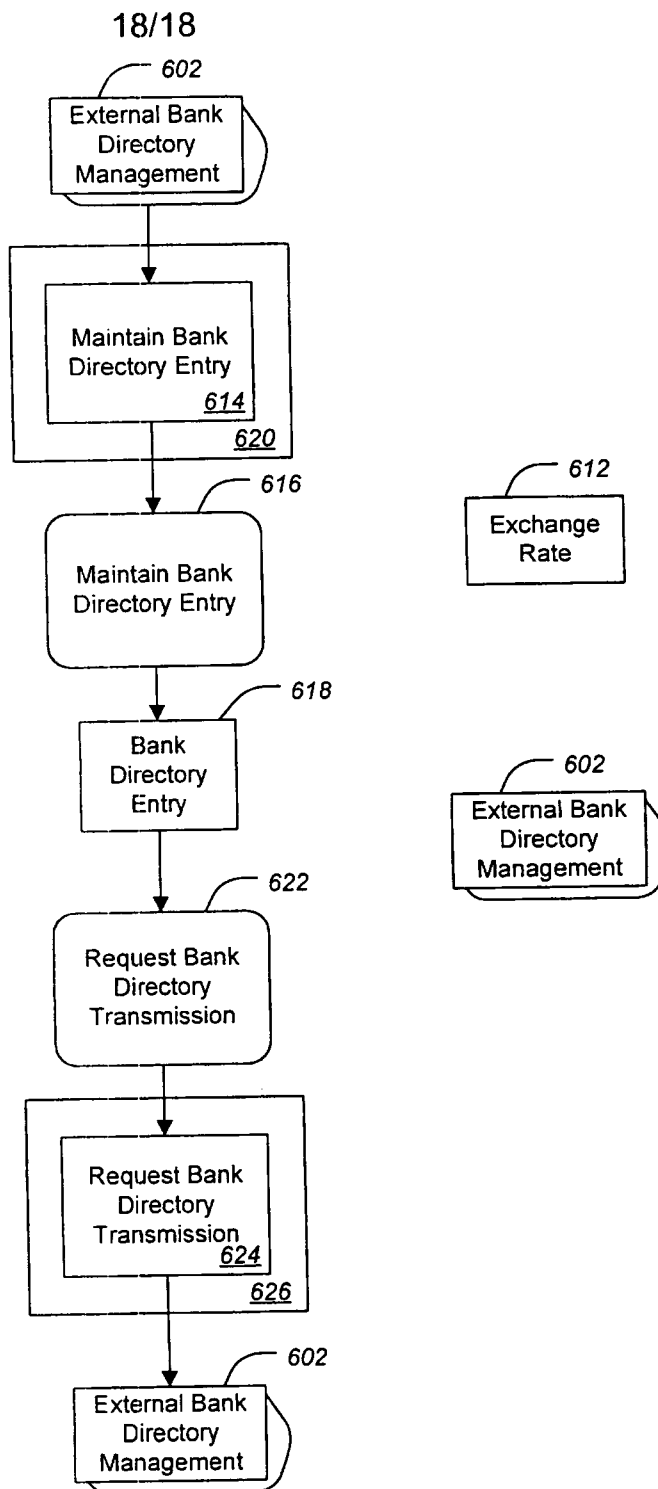


FIG. 6

PATENT COOPERATION TREATY

PCT

DECLARATION OF NON-ESTABLISHMENT OF INTERNATIONAL SEARCH REPORT

(PCT Article 17(2)(a), Rules 13ter.1(c) and Rule 39)

Applicant's or agent's file reference S 8606WO-Ds/a1	IMPORTANT DECLARATION	Date of mailing(day/month/year) 17/07/2007
International application No. PCT/EP2007/002836	International filing date(day/month/year) 29/03/2007	(Earliest) Priority date(day/month/year) 30/03/2006
International Patent Classification (IPC) or both national classification and IPC G06Q10/00, G06Q20/00		
Applicant SAP AG		

This International Searching Authority hereby declares, according to Article 17(2)(a), that **no international search report will be established** on the international application for the reasons indicated below

1. ☒ The subject matter of the international application relates to:
 - a. ☐ scientific theories
 - b. ☐ mathematical theories
 - c. ☐ plant varieties
 - d. ☐ animal varieties
 - e. ☐ essentially biological processes for the production of plants and animals, other than microbiological processes and the products of such processes
 - f. ☒ schemes, rules or methods of doing business
 - g. ☐ schemes, rules or methods of performing purely mental acts
 - h. ☐ schemes, rules or methods of playing games
 - i. ☐ methods for treatment of the human body by surgery or therapy
 - j. ☐ methods for treatment of the animal body by surgery or therapy
 - k. ☐ diagnostic methods practised on the human or animal body
 - l. ☐ mere presentations of information
 - m. ☒ computer programs for which this International Searching Authority is not equipped to search prior art
2. ☒ The failure of the following parts of the international application to comply with prescribed requirements prevents a meaningful search from being carried out:

☐ the description
 ☒ the claims
 ☐ the drawings
3. ☐ A meaningful search could not be carried out without the sequence listing; the applicant did not, within the prescribed time limit:

☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.
☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.
☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rule 13ter.1(a) or (b).
4. ☐ A meaningful search could not be carried out without the tables related to the sequence listings; the applicant did not, within the prescribed time limit, furnish such tables in electronic form complying with the technical requirements provided for in Annex C-bis of the Administrative Instructions, and such tables were not available to the International Searching Authority in a form and manner acceptable to it.
5. Further comments:

Name and mailing address of the International Searching Authority



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Authorized officer

Roger Thomas

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 203

The claims relate to subject matter for which no search is required according to Rule 39 PCT. Given that the claims are formulated in terms of such subject matter or merely specify commonplace features relating to its technological implementation, the search examiner could not establish any technical problem which might potentially have required an inventive step to overcome. Hence it was not possible to carry out a meaningful search into the state of the art (Art. 17(2)(a)(i) and (ii) PCT; see PCT International Search Guidelines, Chapter 9).

The problems which are addressed do not appear to require a technical, but rather an administrative/organisational, or business, solution. The implementation of this solution may include the use of generic technical features, however these do not interact to solve any overall technical problem but merely serve their well-known functions.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.