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(54) Title: METHOD, APPARATUS, AND SYSTEM FOR NETWORK-BASED PEER-TO-PEER BUSINESS TRANSACTIONS

(57) Abstract:

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METHOD, APPARATUS, AND SYSTEM FOR NETWORK-BASED PEER-TO-PEER BUSINESS TRANSACTIONS

5   ## Background of the Invention

Field of the Invention

The present invention relates to methods, apparatus and systems for doing business over a network, and more particularly to methods, apparatus

10   and systems for performing network-based peer-to-peer business transactions.

Description of the Related Art

15   ### Enterprise Resource Planning System

Today's modern companies typically have in place an automated Enterprise Resource Planning (ERP) system. ERP systems integrate and streamline internal business processes, also known as "back-end" processes. Generally, back-end processes are the business processes that support

20   "doing business," that is, selling a company's products or services, and buying the goods and services that a company needs to produce its product or service. Back-end business processes include processes such as generating requisitions, searching supplier's catalogs, choosing products to purchase, generating purchase orders, generating sales orders, generating

25   invoices, and paying invoices. In modern businesses, for the most part, orders do not get processed, goods do not get shipped, and invoices do not get generated or paid, unless they are channeled through an ERP system.

An ERP system is typically implemented on a client/server computing architecture, which allows employees to easily access and utilize back-end

30   business processes even though they are spread throughout an organization in different departments and divisions. Automated ERP systems offer shorter

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cycle times, faster time-to-market, greater operating efficiencies, and lower cost of production compared to manual implementations of back-end processes. They are practically a necessity for companies hoping to compete in modern markets.

5 Problems arise, however, because conventional ERP systems stop at a company's door. FIG. 1 is a diagram of the information flow of a prior art business transaction, illustrating some of these problems. In a conventional business transaction, a buyer (not shown) enters purchase information, such as price, quantity, and authorization to purchase, into a buyer's ERP system

10 105.

  Buyer's ERP system 105 automatically generates a purchase order (PO) 110 based on the purchase information, typically printing out a hardcopy to send to a seller 125. Purchase order 110 is generally a standard business form with the purchase information filled into the appropriate fields. The

15 buyer takes the hardcopy PO and manually faxes it, using fax machine 115, to seller's fax machine 120. In some cases, PO 110 may be mailed to seller 125. Some modern ERP systems have a built-in fax capability such that they can directly fax PO 110 to the seller's fax machine 120, removing the need for the the buyer to manually feed the hardcopy into fax machine 115. In any

20 case, problems often arise because the buyer has no way of knowing exactly when seller 125 actually received and took action on PO 110. If seller's fax machine 120 is out of paper, unattended, or in an out-of-the-way mail room, · or if PO 110 is lost in the mail, there can be significant delays before seller 125 receives it and takes action.

25 Upon receiving PO 115 on fax machine 120, seller 125 takes the fax hardcopy and enters the purchase information from it into personal computer 130. Problems often arise during this step of a conventional business transaction as data entry errors are common. Fax copies are frequently hard to read, especially if the print is small, making data entry of faxes prone to

30 errors.

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Personal computer 130 transmits the entered purchase information to a seller's ERP system 135, which typically generates a sales order (not shown) and order confirmation (not shown). Seller 125 then takes a hardcopy of the order confirmation and faxes it to buyer's fax machine 115 using

5   seller's fax machine 120. The buyer's processing of the order confirmation, as well as the processing of all subsequently exchanged electronic business information or documents that frame the transaction, is then subject to the same problems just described.

EDI (Electronic Document Interchange)

10   One solution to the problems that arise when ERP systems stop at a company's door is to use an Electronic Document Interchange (EDI) system to connect ERP systems. An EDI system prescribes the format of the data that two entities exchange to complete a process so users must comply with the format. Unfortunately, however, different EDI systems use different

15   document standards to exchange information. Also, different EDI systems use different exchange mechanisms (for example, data networks) to transmit electronic documents between buyers and sellers.

The most common EDI standards are: X12, EDIFACT, and TRADACOM. Each standard has multiple versions. For example, ANSI X12

20   has over 20 versions. The first version 2000 was approved by ANSI on Feb. 1986. The most recent version is 4020. EDIFACT has about nine versions. The first one (98A) came out on May 1994. The most recent version is 98A on March 1998.

ANSI X12 uses a three digit number to designate each document. For

25   example, "850" is used for a purchase order and "810" for and invoice. There are more than 250 different documents specified in X12. The most commonly used documents are: 850, Purchase Order; 855, Purchase Order Response; 860, Purchase Order Change; 865, Purchase Order Change Response; 810, Invoice; 832, Sales Catalog; and 997, Acknowledgment.

30   The most common EDI exchange mechanism is a point-to-point connection. A point-to-point connection is typically a dial up connection or a

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dedicated line between two businesses. Another common exchange
mechanism is a "Value Added Network" (VAN). A VAN is a private, closed
EDI network that provides point-to-point communication with other previously
subscribed businesses connected to the same closed network. Connectivity

5   to the VAN hubs is via telephone lines, both dial-up and dedicated.
Authentication is provided by the private nature of the network. Only pre-
arranged users and data flows are allowed by the operator of the VAN hubs.
Data security is provided by the telephone infrastructure. The protocols used
for data communication must be determined in advance by trading parties

10   and generally are neither open nor consistent between VANs.

The variety of exchange protocols, variety of exchange mechanisms,
and the closed, proprietary nature of the exchange networks make today's
EDI systems inefficient, difficult to join, and difficult to use. They are
necessarily limited to a small subscriber base, and they prohibit any use that

15   is not pre-arranged.

Accordingly there is a need for methods, systems, and apparatus that
allow a buyer's ERP system to directly and easily connect and communicate
with a seller's ERP system, and visa-versa. There is a need for methods and
systems that allow organizations to do business across company boundaries

20   using an open, standardized exchange mechanism. There is a need for
systems and methods that efficiently link the back-end ERP systems on both
the buyer's and seller's sides so that organizations may exchange electronic
business information across an open public network using standard protocols.

Digital Marketplace

25   In the last few years, the Internet and Web portals have transformed
the way buyers and sellers communicate and do business. Various Web
portals have appeared to play a vital role in the exchange of information and
the creation of digital marketplaces.

At first, large numbers of information portals were developed that

30   focused on the broad exchange of information. These portals seek to
become the "home" page for millions of Web users by providing a focal point

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for information. Focusing on content, such portals typically provide the latest news headlines, as well as structured information categories and advanced search engines. Their intention, like that of a successful newspaper or magazine, is to keep users coming back by providing the best resource for
5 interesting and useful information. Information portals also attempt to persuade users to make the portal their home page by providing user interface personalization and free services such as an email account or financial tools for tracking and managing a personal stock portfolio.

More recently, so-called vertical information portals have emerged.
10 These portals focus on building Internet communities by tapping into vertical markets. These sites offer papers written by industry experts, industry news, product information, company directories, classified, and the like. But although such industry-specific portals can facilitate the creation of virtual communities and help bring buyers and sellers together, they do not offer
15 business solutions that enable buyers and sellers to electronically complete their business transactions. Thus, even when buyers and sellers make initial contact through an Internet portal, they must resort to using email, a telephone, a fax machine, traditional mail, or a proprietary EDI system to exchange business information or documents and complete a transaction.
20 Because so many diverse intermediate processes, systems, and mechanisms get involved in a conventional portal-based business transaction, participants are forced to establish and maintain communications on a case-by-case basis for each business partner relationship. So, while participants in a complete business ecosystem, including customers, suppliers, manufacturers, service
25 providers, business partners, and consumers, can meet and establish contacts by utilizing conventional vertical network portals, they cannot easily and efficiently establish and maintain business communications using a conventional portal's resources. Inefficient business communication adds unnecessary costs to business transactions.
30   To understand the benefits of reducing transaction costs between buyers and sellers, you need only look at the way a dollar breaks down within

a typical manufacturing organization. With typically 36 precent of each dollar being used to acquire operating resources, it follows that a mere five percent reduction in purchasing costs has the same impact as a 30 percent
5   increase in sales.

Accordingly, there is a need for systems and methods that automatically establish and maintain connections across open networks for buyers and sellers so they can easily communicate with each other. There is a related
10   need for systems and methods that recognize common communication interface definitions used among businesses and transparently translate communications between interfaces. Finally, there is a need to define and implement a common, standard process for conducting entire
15   business processes so that business partners can exchange electronic business information, usually in the form of electronic business documents, to implement a business transaction.

20   **SUMMARY OF THE INVENTION**

The present invention provides a method for a first organization to transact business over an open network, comprising the steps of: providing a business directory on an open network portal for selecting a second
25   organization; transmitting electronic business information intended for the second organization to the open network portal; fetching routing information for the second organization from the business directory; and transmitting the electronic business information from the open network
30   portal to the second organization based on the routing information, wherein the step of fetching routing information includes the substeps of: fetching a data format type of the second organization from the business

directory; and translating the electronic business information into the data format type of the second organization, and wherein the step of transmitting the electronic business information from the network portal includes the substep of: transmitting the translated electronic business information from the network portal to the second organization based on the routing information.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are intended to provide further explanation of the invention as claimed.

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BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute
a part of this specification, illustrate exemplary embodiments of the invention

5   and together with the description, serve to explain the principles of the
invention.

Figure 1 is a diagram illustrating the information flow of a prior art
business transaction;

Figure 2 is a flowchart showing the steps of a typical business

10   transaction;

Figure 3 is a block diagram illustrating the architecture of a system
consistent with the principles of the present invention;

Figures 4A and 4B are a flowchart showing the steps in a method for
performing network-based peer-to-peer business transactions consistent with

15   the principles of the present invention;

Figure 5 is a block diagram illustrating the information path of a
business document exchange in a system consistent with the principles of the
present invention;

Figure 6 is a flowchart showing the steps in a method for performing

20   business document exchange consistent with the principles of the present
invention.

DETAILED DESCRIPTION

25   Reference will now be made in detail to an embodiment of the present
invention as illustrated in the accompanying drawings. Wherever possible,
the same reference numbers will be used throughout the drawings to refer to
the same or like parts. It is to be understood that other embodiments may be
utilized and structural changes may be made without departing from the

30   scope of the present invention.

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An ERP system is a system that integrates various business application areas within a company, such as financial accounting, controlling, asset management, materials management, production planning and production control, sales and distribution, quality management, plant

5   maintenance, project management, service management, human resources, office communication, workflow functions, and industry solutions. An ERP system combines technology with comprehensive business functions to produce a high level of application integration, which ensures that all ERP system functions can be accessed directly throughout the system. For

10   example, an ERP system holds the current date in a common database accessible to all applications supported by the system; thus, all applications consistently use the same date.

An ERP system does not use independent and individual application modules to perform business processes. Instead, data and functions within

15   the system are integrated with each other, which enables the system to smoothly perform cross-application business processes.

An ERP system typically has a modular software architecture based upon a software-oriented client-server model. This architecture allows users to flexibly plan and operate their individual ERP system installations. Within

20   this architecture, an ERP system may be configured centrally or as a distributed system with numerous dedicated servers. This architecture provides separate application logic, application presentations, and databases. Such separation allows the user to distribute loads in the client-server configuration and take advantage of the performance potential and

25   various cost structures of present and future hardware generations. The ERP system's architecture also allows the user to adjust (scale) the performance of the installed host services if, for example, load profiles change as a result of increasing user numbers or because additional components are added.

A. Overview

30   FIG. 2 is a flow chart showing the steps of a typical method of doing business. A business entity desiring to do business first must find a potential

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business partner (step 205). Buyers must find sellers, and sellers must find buyers. For example, a buyer looking for a seller might use the yellow pages, referrals from other business partners, a World Wide Web search engine, or unsolicited advertisements to help find potential business partners.

5   Next, the business entity gains access to information about the potential business partner and exchanges information with the potential business partner (step 210). For example, a buyer may get information about a seller's reputation from the Better Business Bureau. A buyer may gain access to information about a seller's products and prices through a product

10   catalog. And, the buyer may get information about a possible transaction by exchanging offer, counteroffer, delivery date, and other information with the seller.

Once the business entity has the information it needs, it makes the decision whether or not to "do business" (step 215). For example, a buyer

15   may decide to purchase 100 items from the seller at the seller's catalog price or the buyer may decide to buy from someone else.

If the business entity decides not to do business, then it returns to step 205 to find other potential business partners. If the business entity decides to do business, then business documents are exchanged with the business

20   partner to implement the transaction (step 220). For example, a buyer may give the seller a purchase order (PO) for 100 items at the catalog price. The seller responds by giving the buyer an order confirmation. When the items are shipped, the seller gives the buyer an invoice. And, when the items are accepted, the buyer responds by giving the seller payment.

25   Systems, methods, and apparatus consistent with the principles of the present invention enable an organization to find a business partner, communicate with it, and automatically exchange business documents over an open network to complete a business transaction. The present invention integrates a network-based digital marketplace that is open to everyone, not

30   just pre-arranged subscribers, with business document exchange between ERP systems.

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In one embodiment, the present invention provides a World Wide Web portal comprising a business directory and a messaging engine. The business directory lists all the organizations participating in the "digital marketplace" provided by the portal. A portal user searches the business directory to find potential business partners (step 205). For example, a buyer may search the business directory by product sought, geographical location, price, availability, seller's name, or a combination of these attributes. Preferably, the business directory contains comprehensive information concerning all the members of a business ecosystem, such as buyers, sellers, distributors, service providers, and manufacturers.

The business directory also provides access to product catalogs, prices, websites, reputation assessments, and contact information for the businesses listed, among other things. A portal user can often get all the information needed to make a business decision (step 210) by using the business directory. And, with the contact information provided by the business directory, a portal user can easily establish communications with a prospective business partner and exchange additional information.

Once a portal user decides to do business with a portal business partner, both partners can complete the transaction using their existing back-end ERP systems to automatically exchange the necessary electronic business documents (step 220) through the portal's messaging engine. The messaging engine provides the services necessary for back-end ERP systems to communicate with each other across an open network, such as the Internet. For example, a buyer may enter purchase information into its ERP system, which generates a purchase order. The buyer's ERP system automatically transmits the PO to the web portal messaging engine. Upon receipt, the messaging engine translates the PO into a format that the seller's ERP system understands, if necessary, and retransmits it to the seller's ERP system. The seller's ERP system responds by transmitting an order confirmation back to the portal messaging engine, which, in turn, translates and retransmits the order confirmation to the buyer's ERP system. As the

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order-shipment-billing-payment cycle continues, business documents continue to be exchanged automatically until the transaction is completed.

In one embodiment, steps according to the present invention are embodied in machine-executable software instructions and the present

5   invention is carried out in a processing system or systems by a processor executing the instructions, as will be described in greater detail below. Those skilled in the art will recognize that other embodiments, for example hardwired circuitry, may be used in place of, or in combination with, software instructions to implement the present invention.

10   B. System Architecture

FIG. 3 is a block diagram illustrating the architecture of a system 305 consistent with the principles of the present invention. As shown, a buyer's system 310 comprises a procurement server 312 communicatively connected to a back-end ERP system 314, which itself is communicatively connected to

15   a business communications connector 316. Business communications connector 316 is communicatively connected to a network 320, through a firewall 318. Procurement server 312 is also communicatively connected to network 320. Network 320 is a conventional, open digital network, such as the Internet (the World Wide Web).

20   Procurement server 312 is preferably a high-speed workstation, such as a Sun (TM) workstation or a personal computer (PC) equipped with a Pentium III (TM) processor by Intel corporation, running business-to-business procurement software such as that produced by SAP AG, the assignee of the present invention. In one embodiment, procurement server 312 includes a

25   conventional web browser for gaining access to web page information, such as product catalogs, on the World Wide Web. A buyer uses procurement server 312 to find and purchase needed products and services. Its functions, among others, include finding sellers, selecting products, and inputting information for POs. Procurement server 312 communicates information,

30   including purchase information, to back-end ERP system 314 for processing.

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Back-end ERP system 314 is also preferably a high-speed work station or server running full capability ERP system software, such as SAP AG's R/3 (TM) System. Back-end ERP system 314 automates business processes, tracks work flow, and generates business documents, among other things.

5   For example, back-end ERP system 314 can receive purchase information from procurement server 312 and decide whether to reject the information or generate a valid purchase order.

Business communications connector 316 is preferably a software module or program running on the same high-speed server hosting back-end

10   ERP system 314. Business communications connector 316 is communicatively connected to an open network 320, such as the World Wide Web, through a conventional firewall 318. Business communications connector 316 includes the network connection information and protocols necessary to communicate with a secure message engine 340 included in a

15   network portal 370 over network 320. Business communications connector 316's functions include receiving business documents from back-end ERP system 314 and transmitting them to secure messaging engine 340, and receiving business documents from secure messaging engine 340 and transmitting them to back-end ERP system 314.

20   As shown, the system architecture includes a seller's system 350, which is similar to buyer's system 310 as just described. Seller's system 350 comprises an online store/catalog server 352 communicatively connected to a back-end ERP system 354, which itself is communicatively connected to a business communications connector 356. Business communications

25   connector 356 is communicatively connected to a network 320, through a conventional firewall 358. Online store/catalog server 352 is also communicatively connected to network 320.

Online store/catalog server 352 is preferably a high-speed workstation, such as a Sun (TM) workstation or a personal computer (PC) equipped with a

30   Pentium III (TM) processor by Intel corporation, running online sales software such as the Online Store or Customer Relationship Management software

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packages produced by SAP AG. In one embodiment, online store/catalog
server 352's primary function, among other functions, is to offer customers a
self-service browser-based interface that lets them purchase products via
network 320. Online store/catalog server 352 communicates information,

5   such as Sales Order information, to back-end ERP system 354 for
processing.

Back-end ERP system 354 is also preferably a high-speed work station
or server running full capability ERP system software, such as SAP AG's R/3
(TM) System. Back-end ERP system 354 automates business processes,

10   tracks work flow, and generates business documents, among other things.
For example, back-end ERP system 354 can receive sales order information
from online store/catalog server 352 and decide whether to reject the
information or generate a valid sales order. For another example, back-end
ERP system 354 can communicate "available quantity" information for a

15   product to online store/catalog server 352 for display in an online catalog.

Business communications connector 356 is preferably a software
module or program running on the same high-speed server hosting back-end
ERP system 356. Business communications connector 356 is
communicatively connected to a network 320, such as the World Wide Web,

20   through a conventional firewall 358. Business communications connector 356
includes the network connection information and protocols necessary to
communicate with a secure message engine 340, included in network portal
370, over network 320. Business communications connector 356's functions
include receiving business documents from back-end ERP system 354 and

25   transmitting them to secure messaging engine 340, and receiving business
documents from secure messaging engine 340 and transmitting them to
back-end ERP system 354.

The system architecture of FIG. 3 shows a network portal 370, which
includes a search engine 330, a business directory 335, and a secure

30   messaging engine 340. Network portal 370 is communicatively connected to
network 320, which is preferably the Internet. A user with access to network

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320 can reach network portal 370 and its included components by conventional means, for example, by using a Universal Resource Locator.

Secure messaging engine 340 is communicatively connected to business directory 335, and search engine 330 is also communicatively

5   connected to business directory 335. Search engine 330, business directory 335, and secure messaging engine 340 are preferably all software modules or programs running on a high-performance server, such as those produced by Sun Microsystems Corp.

As noted above, secure messaging engine 340 is communicatively

10   connected to network 320 and via network 320 can communicate with business communications connector 316 in buyer's system 310 and business communications connector 356 in seller's system 350. Secure messaging engine 340's functions include, among other things, providing a secure communications path for business document exchange between buyer's

15   system 310 and seller's system 350. Buyers and sellers communicate with each other and exchange electronic business documents through secure messaging engine 340. In one embodiment, secure messaging engine 340 gets information it needs to provide the communications path between seller's system 350 and buyer's system 310 from business directory 335.

20   Business directory 335 contains information about business and organizations that are users of network portal 370. This information includes contact information, online catalog information, and network communication routing information. Using business directory 335, portal users can find each other and become business partners.

25   Search engine 330 helps a user find information in business directory 335. In one embodiment, search engine 330 allows users to search business directory 335 based on product, service, business name, geography, industry-standard classifications, keywords, full-text searches, or a combination of these parameters. Search engine 330 helps buyers and sellers listed in

30   business directory 335 find each other and helps them exchange and access information about each other. For example, as shown by arrow 360 in FIG. 3,

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a user at procurement server 312 can communicate with search engine 330 via network 320 using, for example, a conventional browser. The user may locate a promising-looking seller of a desired product in business directory 335 and follow a link from the seller's business directory entry to the seller's

5   online catalog hosted on online store/catalog server 352, as shown by arrow 365. The user can then use the online catalog to get product, price, and availability information.

Although specific components of a system consistent with the principles of the present invention have been described, one skilled in the art

10   will appreciate that a system suitable for use with methods and systems consistent with the present invention may contain any combination of the above components, or any number of different components, interfaces, and other devices. For example, network 320 may be two separate networks, one of which connects buyer's system 310 and web portal 370 and the other of

15   which connects seller's system 350 and web portal 370. And, although aspects of one embodiment are depicted as being hosted on specific computers and servers, one skilled in the art will appreciate that all or some of these aspects may be stored or hosted on different computers remotely located from those shown. For example, business directory 335 and secure

20   messaging engine 340 could be hosted on separate servers communicatively connected to network 320.

C. Network-Based Peer-to-Peer Business Transactions

Figures 4A and 4B depict a flowchart of the steps in a process for performing network-based peer-to-peer business transactions consistent with

25   the principles of the present invention. As shown in FIG. 4A, the process begins with a buyer searching business directory 335 for a seller offering a desired product or service (step 405). In one embodiment, the buyer uses a conventional web browser executing on procurement server 312 to invoke search engine 330 and perform the search for a potential business partner.

30   Next, the buyer uses the seller's online interactive catalog to select the desired product or service, and places the selected product or service in an

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electronic shopping cart (step 410). The use, function, and implementation of
an electronic shopping cart are well known in the art. In one embodiment, the
buyer uses a link from the seller's entry in business directory 335 to gain
access to an online interactive catalog hosted on the seller's online/store
5   catalog server 352.

To purchase the selected product or service, the buyer activates the
"checkout" function for the items in the electronic shopping cart (step 415), as
is well known in the art. In response, the seller's system 350 transfers
information describing the purchased product or service in the electronic
10   shopping cart to the buyer's system 310 (step 420). The shopping cart
information is transferred using the known HTTP protocol method POST.
Specifically, when the buyer enters the seller's system 350, the location of the
returning post (the buyer's system 310) is given to the seller. The seller's
system 350 saves this location until the buyer is ready to checkout. At this
15   point the seller's system 350 posts the shopping cart to the location it had
saved.

Upon receiving the electronic shopping cart information, the buyer's
system 310 generates an electronic purchase order and transmits it to the
seller's system 350 (step 425). In one embodiment of the present invention,
20   the buyer's back-end ERP system 314 generates the PO and transmits it,
using business communications connector 316, to secure messaging engine
340, which in turn transmits it to the seller's business communications
connector 356.

Upon receiving the PO, the seller's system 350 generates a sales
25   order, shipping documents and an electronic order confirmation (step 430).
The seller's system 350 transmits the order confirmation to the buyer's
system 310. In one embodiment of the present invention, the order
confirmation is transmitted through network portal 370 on the same
communications path used by the PO, but in the opposite direction.
30   The seller's system 350 tracks the status of the sales order (step 435)
to determine whether the ordered product shipped or whether the ordered

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service was completed. Referring now also to FIG. 4B, if the ordered product was shipped or the ordered service performed, seller's system 350 generates an invoice and transmits it to buyer's system 310 (steps 435 and 440). In one embodiment of the present invention, the invoice and all other electronic

5   business documents exchanged between the buyer and seller are transmitted on a communications path that runs through network portal 370.

The buyer's system 310 tracks the status of the product or service invoiced and if the product or service is accepted, the buyer's system 310 generates a payment authorization (steps 445 and 450). In one embodiment,

10 buyer's system 310 generates a payment authorization by automatically causing a wire transfer of payment into the seller's bank account. If, however the product or service is not accepted, buyer's system 310 generates a rejection notice and transmits it to seller's system 350 (steps 445 and 455).

One skilled in the art will appreciate that many steps could be added

15 to, modified, or taken away from this process without departing from the principles of the present invention. For example, after the buyer selects goods in step 410, the seller could adjust the catalog price based on rebates, based on a special contract price previously offered to the buyer and not available to the general public, or based on a volume discount. Another

20 example is to add a step wherein the buyer and seller negotiate a price through email messages before the final buying decision is made.

D. ERP-to-ERP Business Document Exchange

The present invention allows ERP systems to directly communicate with each other, exchanging business documents through web portal 370

25 without human intervention. Using the present invention, once the decision is made to "do business," that is to buy something from, or sell something to, a business partner, the remainder of the transaction is handled automatically by the ERP systems.

Figure 5 is a block diagram illustrating the information path of a

30 business document exchange in a system consistent with the principles of the present invention. A business document, for example an electronic PO

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generated by a buyer's ERP system 314 is transmitted by a buyer's business communication connector 316 via network 320 to secure messaging engine 340. Buyer's business communication connector 316 transmits the business document in a format X 522, and secure messaging engine 340 receives the business document in format X 522.   Format X may be any format used by buyer's ERP system 214.

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It is important to note that although buyer's business communication connector 316 ultimately seeks to communicate with seller's business communication connector 356, to do so it need not know the network address of, or data format for, seller's business communication connector 356. Buyer's business communication connector 316 need only be able to communicate in its native format X 522 with secure messaging engine 340 and secure messaging engine 340 takes care of forwarding the message, translated to the proper format, to seller's business communication connector 356. Thus, a buyer can communicate with any number of sellers, and visa-versa, using a single interface provided by secure messaging engine 340. Buyers and sellers do not need to establish and maintain the details of each point-to-point connection in order to exchange electronic documents with all their business partners.   Web portal 370 takes care of all the connection details. Buyers can purchase different products and services from different sellers using a single interface--the interface to web portal 370.

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Upon receiving an electronic business document from buyer's business communication connector 316, secure messaging engine 340 performs, among others, three basic functions; it reformats (if necessary) the business document to a format understood by seller's system 350, it retransmits the reformatted business document to seller's business communication connector 356, and it stores a copy of the electronic business document in message store 525. In a preferred embodiment, a mapping component 520 of secure messaging engine 340 performs these functions, which are explained in greater detail below.

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As shown in FIG. 5, mapping component 520 is communicatively connected to business directory 335, which contains information about the buyer and the seller who are exchanging electronic business documents. Mapping component 520 gets information it needs to create a communication

5   link between the buyer's and seller's ERP systems from business directory 335, including information concerning data formats and routing information for connecting over a network. As shown in the example illustrated by FIG. 5, using the data format information from business directory 335, mapping component 520 translates the buyer's business document from format X 522

10   to format Z 524. Using the routing information, mapping component 520 transmits the translated data to seller's business communication connector 356 via network 320.

Mapping component 520 is also communicatively connected to message store 525. Mapping component 520 stores a copy of every

15   business document that passes through secure messaging engine 340 in message store 525. Thus, an audit trail of every business transaction is created and stored in message store 525. The audit trail provides proof, maintained by a third party who is neutral with respect to a business transaction, that a transaction occurred. Neither the buyer nor the seller can

20   later repudiate an online commercial transaction by denying that it occurred.

Figure 6 is a flowchart showing the steps to perform business document exchange in a manner consistent with the principles of the present invention. In step 610, a system consistent with the principles of the present invention receives a business communication, which includes addressee

25   (seller) information, from a buyer's system 310 in the buyer's system's data format. An electronic purchase order is an example of such a business communication.

The system retrieves the addressee's data format information stored in business directory 335 (step 615). If the seller's data format is not the same

30   as the buyer's data format (step 617), then the system translates the business

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communication from the buyer's format to the seller's format (step 620).
Otherwise, no translation is needed and none takes place.

Next, the system retrieves the network routing address of seller's
system 350 from the seller's information stored in business directory 335
5   (step 625). Then, the system transmits the translated business
communication to the seller's routing address (step 630). The system also
stores a copy of the business communication in message store 525, from
which it can be retrieved later as necessary (step 635).

One of ordinary skill in the art will recognize that all the steps and
10   processes described can also operate in the other direction. For example,
similar steps occur when a seller's system sends a business communication
to the buyer's system.

E. Business Document Exchange Process and Format

In order for various businesses and organizations to implement a
15   business transaction using the present invention's business document
exchange feature, they ideally adhere to a standardized process for
conducting business. In one embodiment, systems consistent with the
principles of the present invention define and enforce a business document
exchange process or sequence, so that business partners' systems know
20   what to expect and how to react during a business transaction. In one
embodiment of the present invention, the system defines the business
document exchange process as: buyer transmits a PO to seller, seller
transmits an Order Acknowledgment in response, seller transmits an Invoice
when the product is shipped, and buyer transmits a Payment Confirmation
25   when the product is accepted, completing the transaction. In one
embodiment, as shown in FIG. 3, web portal 370 provides visually-interactive
electronic tools that help users implement automatic business document
exchange. The tools lay out the sequence of steps users must take to
implement the business document exchange process.

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Business may communicate business information in any of several formats. In one embodiment of the present invention, the system uses an Extensible Markup Language-formatted communications model for business document exchange. All Extensible Markup Language (XML) document

5 definitions are preferably stored in open Internet-standard Lightweight Directory Access Protocol (LDAP) servers in a common information model repository. Users can use the repository's electronic business documents to establish communications and perform transactions with business partners. For example, a buyer can access the repository to find standard XML format

10 document definitions for use in, for example, locating products, requesting quotes, and issuing purchase orders. Similarly, a seller can use standard XML format repository definitions to, for example, upload catalog data, issue order confirmations, create sales orders, and create invoices.

In another embodiment of the present invention, buyer's business

15 communication connector 316 and seller's business communication connector 356 automatically translate ERP-system-generated electronic business documents directly into XML format before transmitting them to web portal 370.

In yet another embodiment, the present invention supports several

20 current and emerging format standards for electronic business communication. In this embodiment, the present invention can deliver and receive electronic documents using business formats such as EDI, XML, BizTalk, RosettaNet, and CXML.

F. The Business Directory

25   To do business, buyers must find business partners to buy from and sellers must find business partners to sell to. Systems, methods, and apparatus consistent with the principles of the present invention provide access to a business directory 335, which contains a list of potential business partners. Users use the directory to locate other businesses that offer

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desired products and services. Users must register their profiles in business directory 335. A user's profile contains information about the user and the user's products and/or services. Business directory 335 contains user information that includes, but is not limited to: business description and

5 business category information; contact information such as email address, website address, and brick and mortar physical address; online catalog information such as product descriptions, service descriptions, prices, availability, and intelligent purchasing options; network routing information for electronic business document exchange; and application information for

10 electronic business document exchange, such as vendor master data information, data format and other information for back-end ERP system integration, role information (manufacturer, distributor, etc), data mapping information for business document formats, and subscription service information. In another embodiment, business directory 335 uses the Dun

15 and Bradstreet Data Universal Numbering System (DUNS) ID number for keeping track of business information. In one embodiment, business directory 335 also contains user system information such as: the name of the software package used to communicate with web portal 370, the communication software's release level, a list of business documents

20 supported by the user's system, a list of the user's connectivity requirements , and the user's exception handling information.

In yet another embodiment, business directory 335 uses the Internet-standard Lightweight Directory Access Protocol (LDAP) to provide access to the directory service engine. Using this protocol, users can create, read,

25 update, and delete information, and access the directory's event and replication services.

Associated with the business directory is a search engine 330. Search engine 330 offers various search capabilities to help users find desired business partners. In one embodiment, search engine 330 provides

30 taxonomic indexing strategies using industry-standard classifications,

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browsing, keyword searches, geographic area searches, geographic radius searches, and full-text search functions.

In another embodiment of the present invention, business directory 335 includes authentication information for each user's entry. The authentication

5   information assures business partners that the entity they are doing business with is bona fide trading partner and not a hacker or other illicit entity. In one embodiment, each organization listed in business directory 335 is investigated periodically, their authentication information is updated, and partners with whom they are doing business are notified of any changes in

10   status.

In yet another embodiment of the present invention, business directory 335 includes authorization information in each user's entry. The authorization information defines which persons within a user organization can use what services provided by the present invention. Users use

15   authorization information to limit access to certain transactions so that only designated employees within a user company can perform them. For example, a company can designate that only the comptroller has authority to submit purchase orders over $10,000. After referencing this authorization information in business directory 335, the system will refuse to deliver to a

20   seller any $10,000 or greater purchase order that was not initiated by the comptroller.

Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples

25   be considered as exemplary only, with a true scope and spirit of the invention being indicated by the following claims.

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It is to be understood that, if any prior art publication is referred to herein, such reference does not constitute an admission that the publication forms a part of the common general knowledge in the art, in Australia

5   or any other country.

WHAT IS CLAIMED IS

1.   A method for a first organization to transact business over an open network, comprising the steps of:

providing a business directory on an open network
5   portal for selecting a second organization;

transmitting electronic business information intended for the second organization to the open network portal;

fetching routing information for the second organization from the business directory; and

10   transmitting the electronic business information from the open network portal to the second organization based on the routing information, wherein the step of fetching routing information includes the substeps of:

fetching a data format type of the second
15   organization from the business directory; and

translating the electronic business information into the data format type of the second organization, and wherein the step of transmitting the electronic business information from the network portal includes the
20   substep of:

transmitting the translated electronic business information from the network portal to the second organization based on the routing information.

25   2.   The method of claim 1, further comprising the step of:

storing a copy of the electronic business information at the open network portal for later auditing.

30   3.   The method of claim 1, further comprising the step of:

enforcing a business information exchange process.

4.   The method of claim 1, wherein the open network is the Internet.

5.   A method for a first organization to transact business substantially as herein described with reference to the accompanying drawings.

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 7781.7-304	IMPORTANT DECLARATION	Date of mailing*(day/month/year)* 17/01/2002
International application No. PCT/US 01/ 21228	International filing date*(day/month/year)* 06/07/2001	(Earliest) Priority date*(day/month/year)* 11/07/2000
International Patent Classification (IPC) or both national classification and IPC G06F17/60		
Applicant SAP AKTIENGESELLSCHAFT		

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. [X]   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.   [X]   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. [ ]   The failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions prevents a meaningful search from being carried out:

   [ ] the written form has not been furnished or does not comply with the standard.

   [ ] the computer readable form has not been furnished or does not comply with the standard.

4. Further comments:

Name and mailing address of the International Searching Authority	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Lucia Van Pinxteren

Form PCT/ISA/203 (July 1998)

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 Guidelines Part B Chapter VIII, 1-6).

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.