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FILED
CLERK, U.S. DISTRICT COURT
NOV 21 2012
CENTRAL DISTRICT OF CALIFORNIA
BY DEPUTY

UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA

CV12-10012 DMF (JEMx)

PI-NET INTERNATIONAL, INC., Plaintiff, v. THE HERTZ CORPORATION; HERTZ GLOBAL HOLDINGS, INC.; Defendants.	NO. COMPLAINT FOR PATENT INFRINGEMENT DEMAND FOR JURY TRIAL

INTRODUCTION

1. Plaintiff PI-NET INTERNATIONAL, INC., files this complaint for patent infringement and jury demand against defendants THE HERTZ CORPORATION; HERTZ GLOBAL HOLDINGS, INC. (collectively, "the defendants"), and alleges as follows:

PARTIES

2. Plaintiff PI-NET INTERNATIONAL, INC. ("PI-NET") is a California corporation with its principal place of business in Menlo Park, California. PI-NET has been a provider of innovative software products, services and solutions that

enable distributed transaction processing and control over public and private networks, including, without limitation, the Internet and the World Wide Web.

3. The patents asserted here were issued to Dr. Lakshmi Arunachalam, PI-NET'S founder. The patents disclose the fundamental technology underlying Web commerce by use of Web applications. The patents describe a method and apparatus for providing real-time, two-way transactional capabilities on the Web. The examples of the pioneering technology in the patents encompass the transactions commonly entered into by defendants with their vehicle rental customers.

4. Defendant THE HERTZ CORPORATION is a subsidiary of HERTZ GLOBAL HOLDINGS, INC. (collectively "Hertz"). Hertz is a Delaware corporation with its headquarters in Park Ridge, New Jersey. Hertz operates as a car rental company in the United States under the names Hertz and Advantage Rent-A-Car.

JURISDICTION AND VENUE

5. This action arises under the patent laws of the United States, Title 35, United States Code, including 35 U.S.C. sections 271 and 281-285. This Court has jurisdiction over the action pursuant to 28 U.S.C. sections 1331 and 1338(a).

6. Upon information and belief, defendants are subject to this Court's specific and general personal jurisdiction due at least to their substantial business within the State of California and this judicial district, including:

(a) Operating a vehicle rental business by use of Internet transaction capabilities which infringe the patents herein alleged in California and in this judicial district; and

(b) Regularly doing or soliciting business, engaging in other persistent courses of conduct; and/or

(c) Deriving substantial revenue from products and/or services

provided to individuals in California and in this judicial district.

7. Venue is proper in this judicial district under 28 U.S.C. sections 1391(b) (c) and (d) and 28 U.S.C. section 1400(b).

GENERAL ALLEGATIONS

8. On November 16. 1999, the United States Patent and Trademark Office duly and legally issued United States Patent Number 5,987,500 (the "'500 patent") entitled "Value-Added Network System For Enabling Real-Time, By-Directional Transactions On A Network" to Dr. Lakshmi Arunachalam. PI-NET is the assignee of all rights, title and interest in the '500 patent including the right to recover damages for past infringement. A copy of the '500 patent is attached to the complaint as exhibit A.

9. On January 31, 2012, the United States Patent and Trademark Office duly and legally issued United States Patent Number 8,108,492 (the "'492 patent") entitled "Web Application Network Portal" to Dr. Lakshmi Arunachalam. PI-NET is the assignee of all rights, title and interest in the '492 patent, including the right to recover damages for past infringement. A copy of the '492 patent is attached to the complaint as exhibit B.

10. The '500 patent is valid and enforceable.

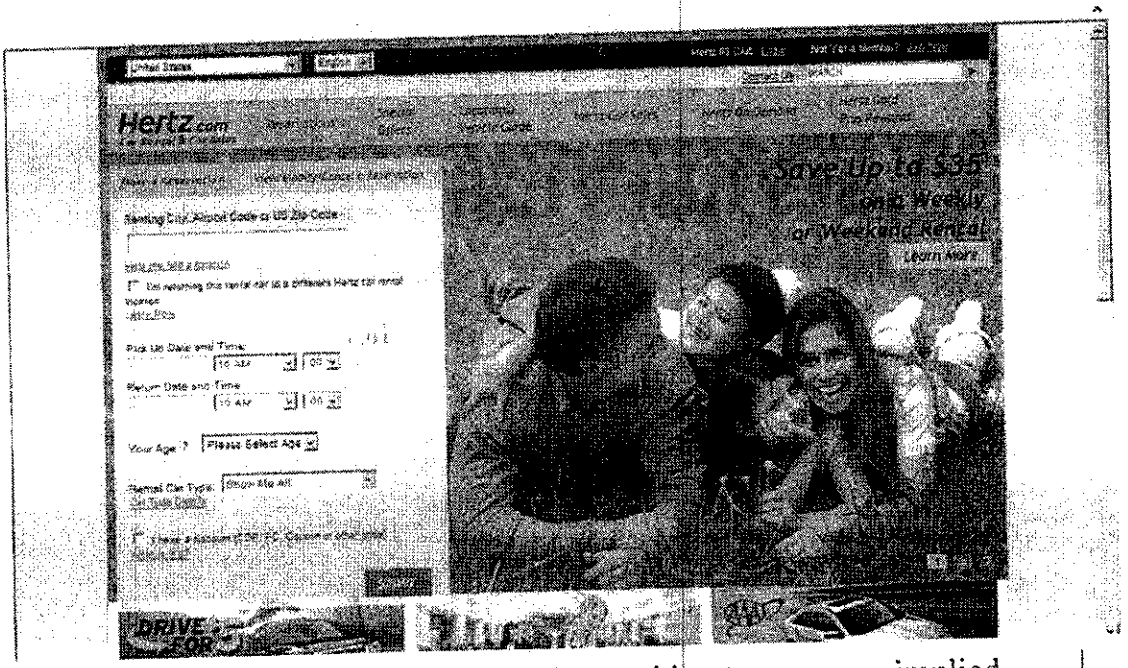
11. The '492 patent is valid and enforceable.

12. Defendants infringe the '500 patent directly, contributorily and/or by active inducement by conducting real-time two-way transactions on the Web concerning rental transactions for automobiles and/or trucks. Such capabilities include a reservations system, payment information, pickup and drop-off times and locations, selection of a class of vehicle, and other detailed information. This real-time two-way transactional capability on the Web is described in the '500 patent and infringed by each defendant.

13. Defendants infringe the '492 patent directly, contributorily and/or by

active inducement by conducting real-time two-way transactions on the Web concerning rental transactions for automobiles and/or trucks. Such capabilities include a reservations system, payment information, pickup and drop-off times and locations, selection of a class of vehicle, and other detailed information. This real-time two-way transactional capability on the Web is described in the '492 patent and infringed by each defendant.

14. The online capabilities of defendants The Hertz Corporation and Hertz Global Holdings, Inc. infringe the '500 and '492 patents, exemplified, in part, by the following screen shot of its opening screen which displays the reservation, location and vehicle selection applications of the inventions of the patents-in-suit:



15. Defendants' infringing acts have been without express or implied license by PI-NET, and/or in violation of PI-NET'S rights or claims for relief.

FIRST CLAIM FOR RELIEF

INFRINGEMENT OF THE '500 PATENT

(Against Both Defendants)

16. PI-NET incorporates by reference each and every allegation in

paragraphs 1 through 20, as though fully set forth herein.

17. Defendants have each been and now are infringing, inducing the infringement of, and/or contributing to the infringement of the '500 patent, literally and/or under the doctrine of equivalence, by conducting real-time two-way transactions on the Web in connection with the rental of vehicles to their customers.

18. PI-NET has not authorized either of the defendants to use its technology for transactions over the Web with its customers as covered by the '500 patent.

19. As a result of defendants' infringing conduct, PI-NET has suffered and will continue to suffer, substantial and irreparable damage. Upon information and belief, defendants' infringement, induced infringement and/or its contributory infringement of the '500 patent will continue unless enjoined by this Court.

20. Defendants' infringement is and has been willful.

21. Upon information and belief, to the extent any defendant lacked actual knowledge of the '500 patent prior to this lawsuit, at a minimum they had constructive notice of the '500 patent by operation of at least 35 U.S.C. section 287.

22. PI-NET has no adequate remedy at law for defendants' infringement, contributory infringement, and/or induced infringement of the '500 patent. Unless the defendants' infringing activities are enjoined by this Court, PI-NET will continue to suffer monetary damages in an amount not yet determined.

SECOND CLAIM FOR RELIEF

INFRINGEMENT OF THE '492 PATENT

(Against Both Defendants)

23. PI-NET incorporates by reference each and every allegation in paragraphs 1 through 20, as though fully set forth herein.

24. Defendants have each been and now are infringing, inducing the infringement of, and/or contributing to the infringement of the '492 patent, literally

and/or under the doctrine of equivalents, by conducting real-time two-way transactions on the Web in connection with the rental of vehicles to their customers.

25. PI-NET has not authorized the defendants to use its technology for transactions over the Web with its customers as covered by the '492 patent.

26. As a result of defendants' infringing conduct, PI-NET has suffered and will continue to suffer, substantial and irreparable damage. Upon information and belief, defendants' infringement, induced infringement and/or its contributory infringement of the '500 patent will continue unless enjoined by this Court.

27. Each defendant had knowledge of the '492 patent prior to filing of this complaint but have continued to engage in their infringing conduct nonetheless. Each defendant's infringement is and has been willful.

28. Upon information and belief, to the extent any defendant lacked actual knowledge of the '492 patent prior to this lawsuit, at a minimum they had constructive notice of the '500 patent by operation of at least 35 U.S.C. section 287.

29. PI-NET has no adequate remedy at law for defendants' infringement, contributory infringement, and/or induced infringement of the '492 patent. Unless the defendants' infringing activities are enjoined by this Court, PI-NET will continue to suffer monetary damages in an amount not yet determined.

PRAYER FOR RELIEF

WHEREFORE, PI-NET prays for judgment:

1. That defendants have infringed, contributorily infringed and/or actively induced infringement of the '500 patent.

2. That defendants have infringed, contributorily infringed and/or actively induced infringement of the '492 patent.

3. That defendants' infringement was willful.

4. That defendants be preliminarily and permanently enjoined from further acts of infringement of the '500 patent.

5. That defendants be preliminarily and permanently enjoined from further acts of infringement of the '492 patent.

6. That PI-NET be awarded damages adequate to compensate for defendants' infringement of the '500 patent.

7. That PI-NET be awarded damages adequate to compensate for defendants' infringement of the '492 patent.

8. That PI-NET be awarded prejudgment interest and post-judgment interest at the maximum rate allowed by law

9. That the Court declare this to be an exceptional case pursuant to 35 U.S.C. section 285, and award PI-NET its attorneys' fees.

10. That the Court award PI-NET enhanced damages pursuant to 35 U.S.C. section 284.

11. That the Court award a compulsory future royalty.

12. That PI-NET be awarded costs of Court; and

13. That PI-NET be awarded such other and further relief as the Court deems just and proper.

Dated: November 17, 2012

JOSEPH FARZAM LAW FIRM

By: _____

Joseph S. Farzam
Attorneys for Plaintiff
PI-NET INTERNATIONAL, INC.

DEMAND FOR JURY TRIAL

Plaintiff PI-NET INTERNATIONAL, INC. hereby demands a trial by jury in this matter.

Dated: November 17, 2012

JOSEPH FARZAM LAW FIRM

By: _____

Joseph S. Farzam
Attorneys for Plaintiff
PI-NET INTERNATIONAL, INC.

US005987500A

United States Patent [19]

Arunachalam

[11] Patent Number: 5,987,500

[45] Date of Patent: *Nov. 16, 1999

[54] **VALUE-ADDED NETWORK SYSTEM FOR ENABLING REAL-TIME, BY-DIRECTIONAL TRANSACTIONS ON A NETWORK**

[75] Inventor: **Lakshmi Arunachalam**, Menlo Park, Calif.

[73] Assignee: **Pi-Net International, Inc.**, Menlo Park, Calif.

[*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

[21] Appl. No.: **08/879,958**

[22] Filed: **Jun. 20, 1997**

Related U.S. Application Data

[62] Division of application No. 08/700,726, Aug. 5, 1996, Pat. No. 5,778,178

[60] Provisional application No. 60/006,634, Nov. 13, 1995.

[51] **Int. Cl.**[6] **G06F 13/00**

[52] **U.S. Cl.** **709/203**

[58] **Field of Search** ..... 364/DIG. 1, DIG. 2; 395/762, 200.3, 200.31, 200.32, 200.43, 681, 682, 683, 684, 685, 689; 709/200, 201, 202, 203, 213, 301, 302, 303, 304, 305; 710/200

[56] References Cited

PUBLICATIONS

"Coding with HTML forms: HTML goes interactive", Andrew Davidson, Dr. Dobb's Journal, V20, N6, Jun. 1995, p. 16.

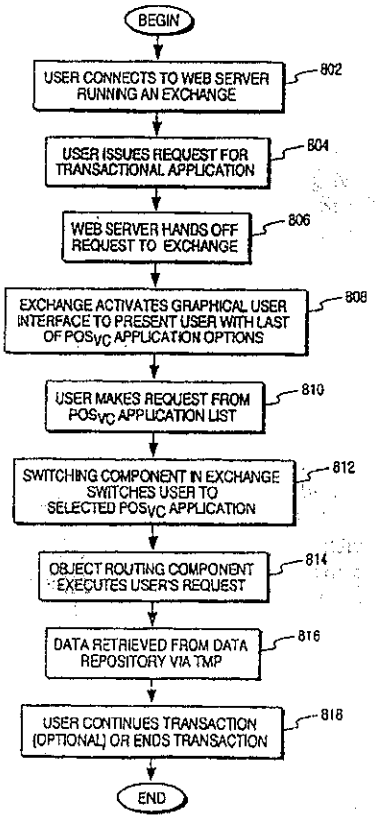
Primary Examiner—Robert B. Harrell

Attorney, Agent, or Firm—Blakely, Sokoloff, Taylor & Zafman LLP

[57] ABSTRACT

The present invention provides a method and apparatus for providing real-time, two-way transactional capabilities on the Web. Specifically, one embodiment of the present invention discloses a configurable value-added network switch for enabling real-time transactions on the World Wide Web. The configurable value added network switch comprises a system for switching to a transactional application in response to a user specification from a World Wide Web application, a system means for transmitting a transaction request from the transactional application, and a system for processing the transaction request. Additionally, a method for enabling object routing is disclosed, comprising the steps of creating a virtual information store containing information entries and attributes associating each of the information entries and the attributes with an object identity, and assigning a unique network address to each of the object identities. Finally, a method is disclosed for enabling service management of the value-added network service, to perform OAM&P functions on the services network.

35 Claims, 13 Drawing Sheets



9

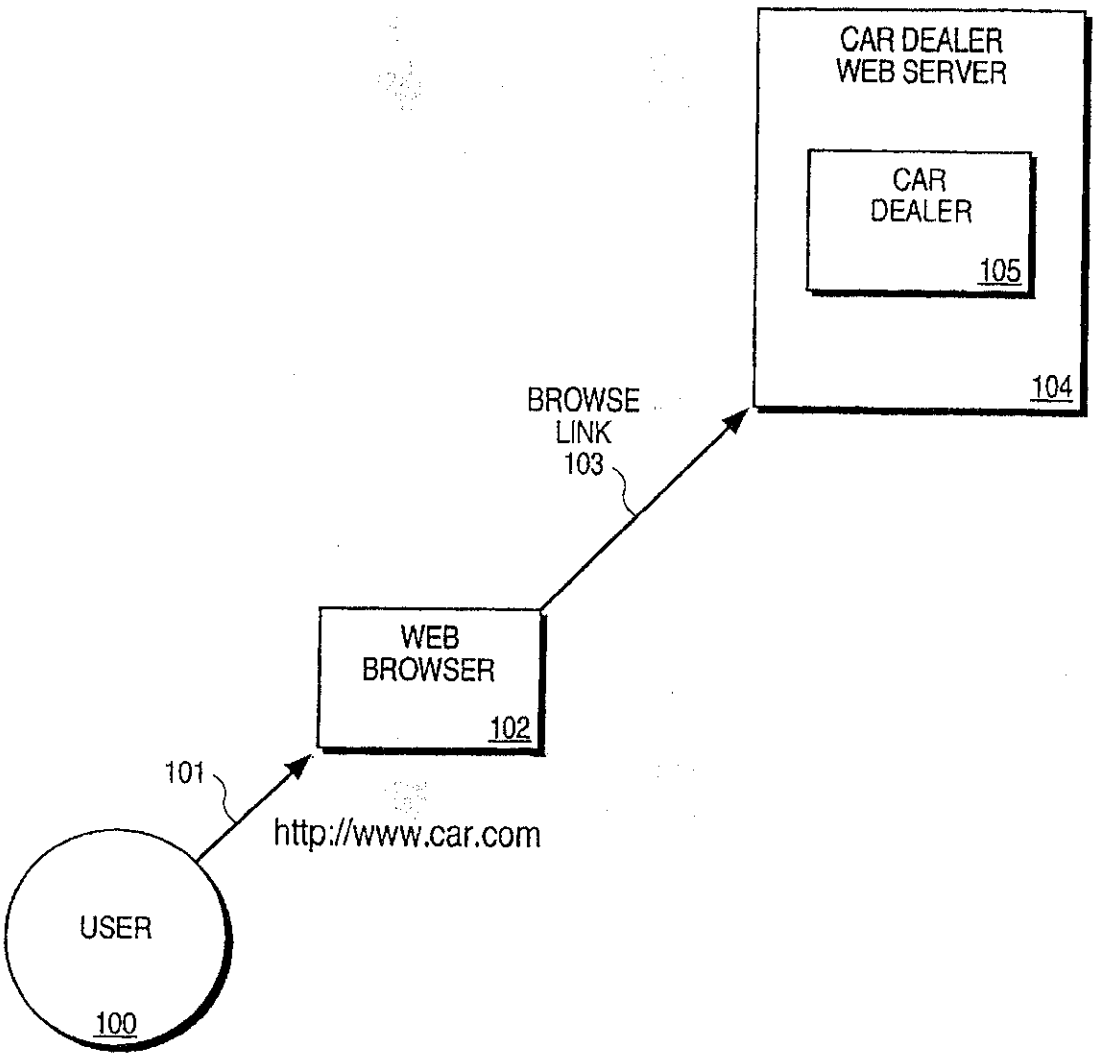


FIG. 1A (PRIOR ART)

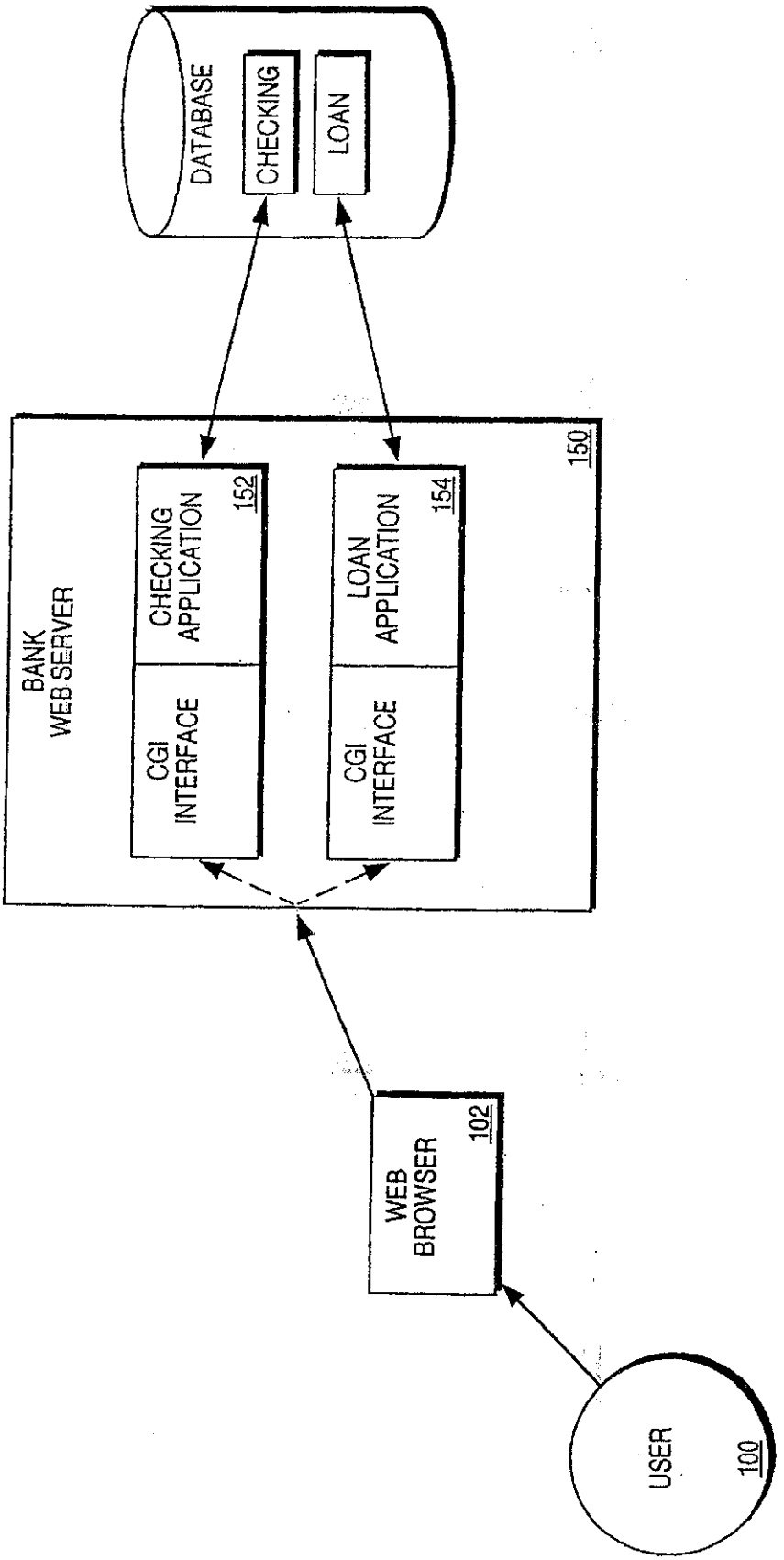


FIG. 1B (PRIOR ART)

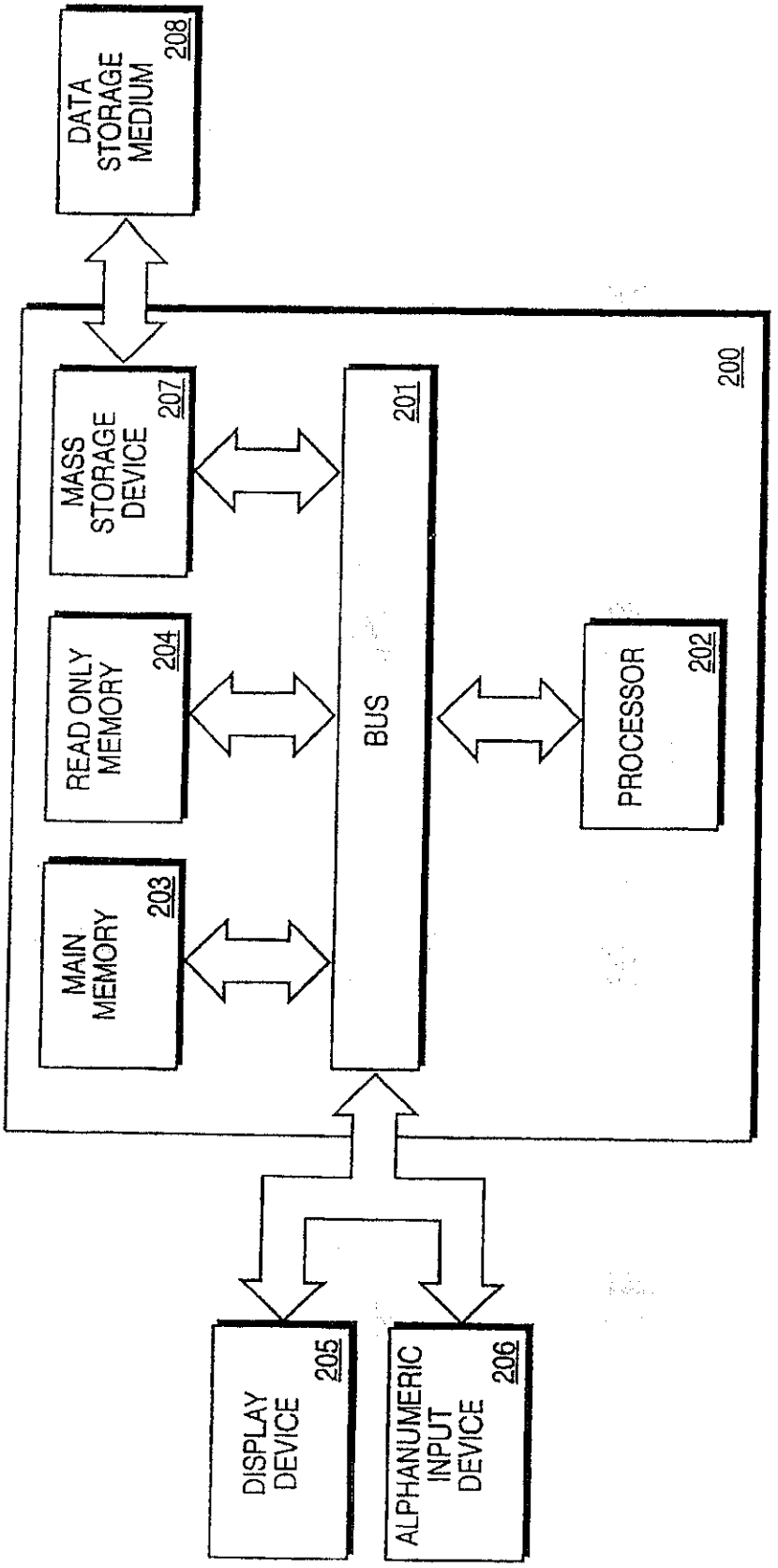

DATA STORAGE MEDIUM
208
200
MASS STORAGE DEVICE
207
201
READ ONLY MEMORY
204
BUS
PROCESSOR
202
MAIN MEMORY
203
DISPLAY DEVICE
205
ALPHANUMERIC INPUT DEVICE
206

FIG. 2

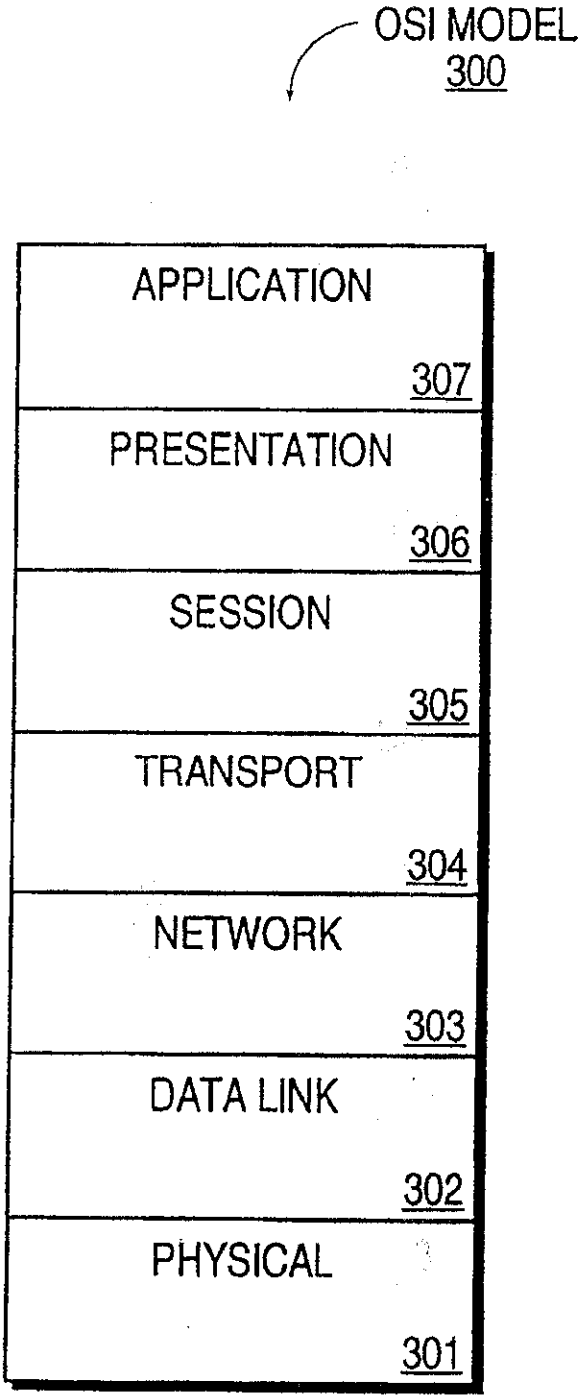

OSI MODEL
300
APPLICATION
307
PRESENTATION
306
SESSION
305
TRANSPORT
304
NETWORK
303
DATA LINK
302
PHYSICAL
301

FIG. 3

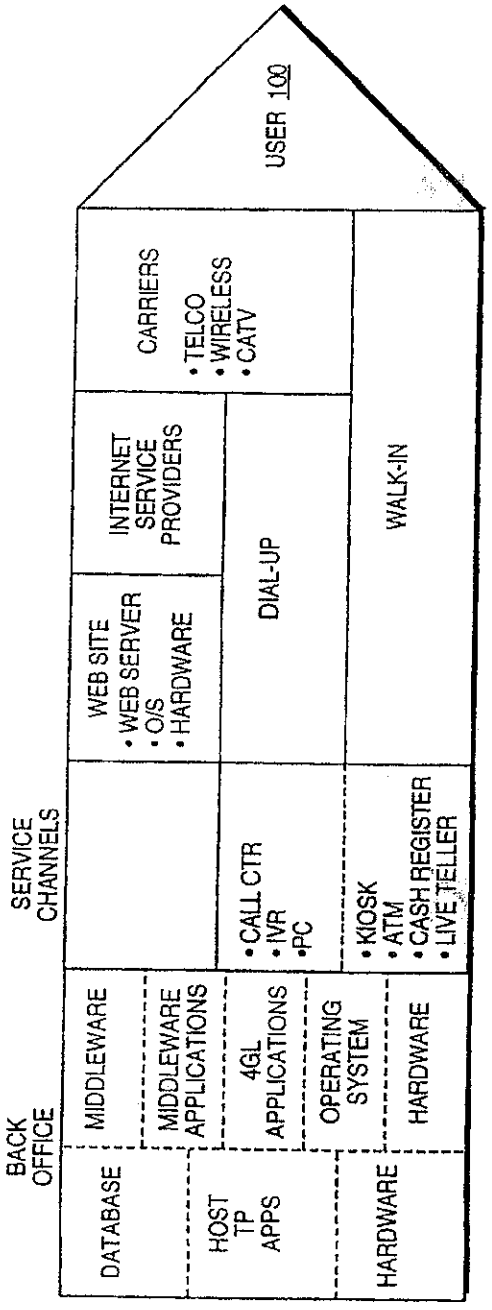

BACK OFFICE
DATABASE
HOST TP APPS
HARDWARE
MIDDLEWARE
MIDDLEWARE APPLICATIONS
4GL APPLICATIONS
OPERATING SYSTEM
HARDWARE
SERVICE CHANNELS
• CALL CTR • IVR • PC
• KIOSK • ATM • CASH REGISTER • LIVE TELLER
WEB SITE • WEB SERVER • O/S • HARDWARE
INTERNET SERVICE PROVIDERS
DIAL-UP
WALK-IN
CARRIERS • TELCO • WIRELESS • CATV
USER 100

FIG. 4A

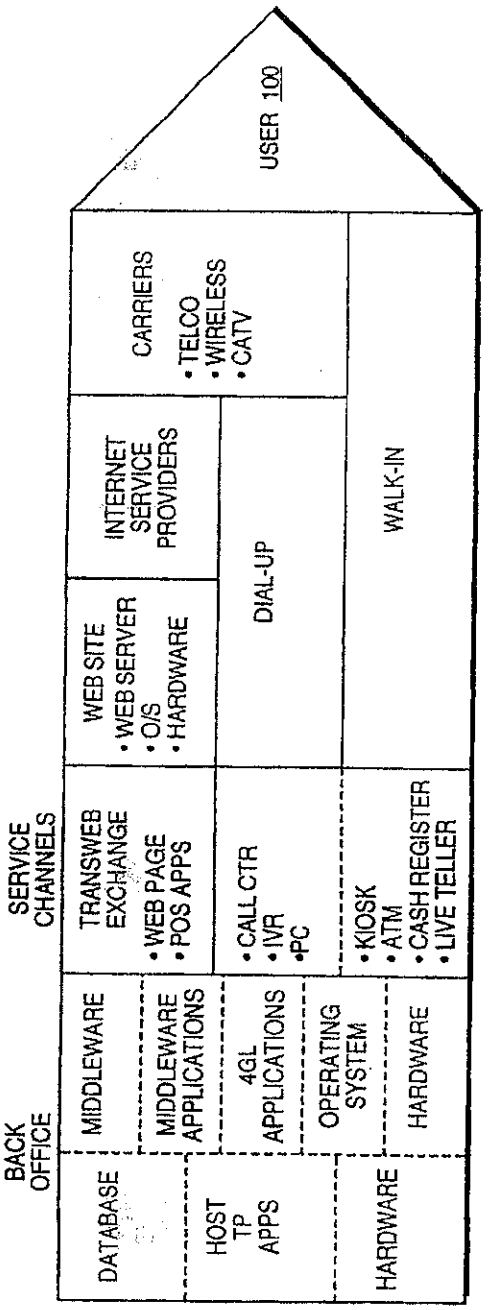

BACK OFFICE
DATABASE
HOST TP APPS
HARDWARE
MIDDLEWARE
MIDDLEWARE APPLICATIONS
4GL APPLICATIONS
OPERATING SYSTEM
HARDWARE
SERVICE CHANNELS
TRANSWEB EXCHANGE • WEB PAGE • POS APPS
• CALL CTR • IVR • PC
• KIOSK • ATM • CASH REGISTER • LIVE TELLER
WEB SITE • WEB SERVER • O/S • HARDWARE
INTERNET SERVICE PROVIDERS
DIAL-UP
WALK-IN
CARRIERS • TELCO • WIRELESS • CATV
USER 100

FIG. 4B

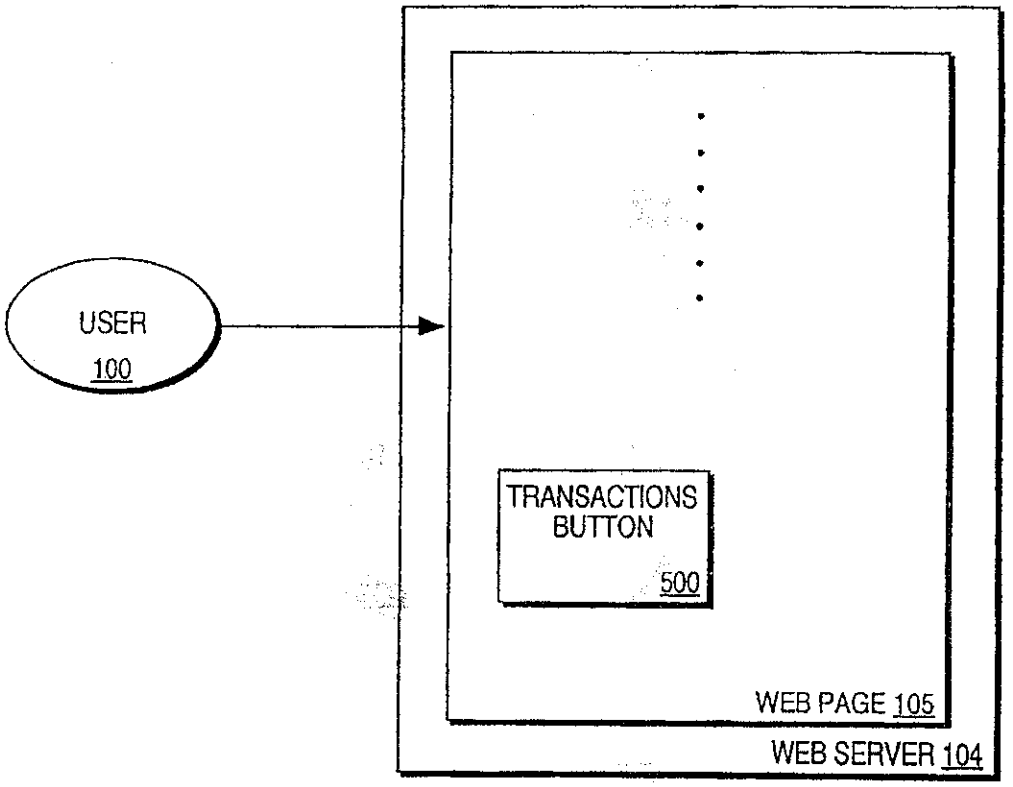

USER
100
TRANSACTIONS BUTTON
500
WEB PAGE 105
WEB SERVER 104

FIG. 5A

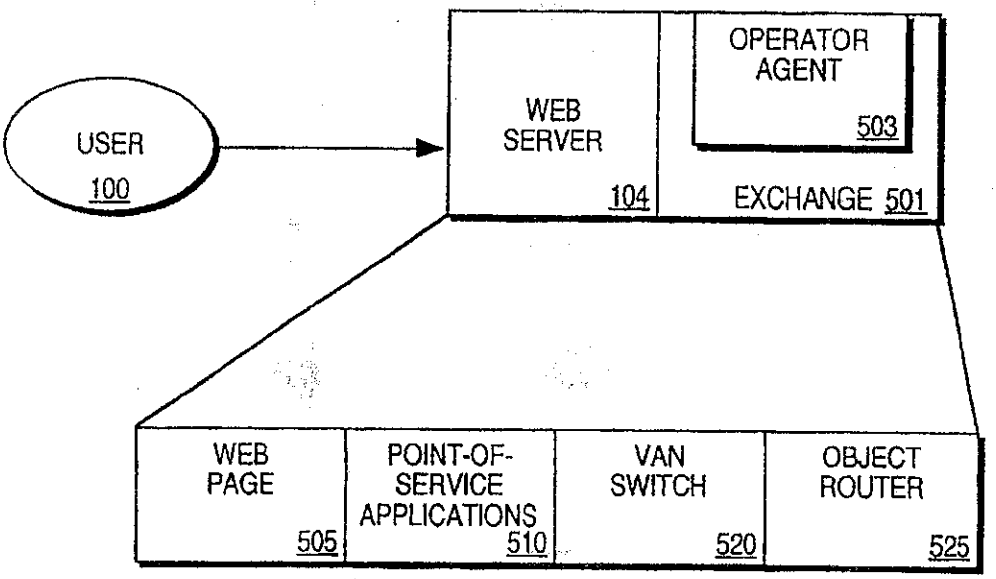

USER
100
WEB SERVER
104
OPERATOR AGENT
503
EXCHANGE 501
WEB PAGE
505
POINT-OF-SERVICE APPLICATIONS
510
VAN SWITCH
520
OBJECT ROUTER
525

FIG. 5B

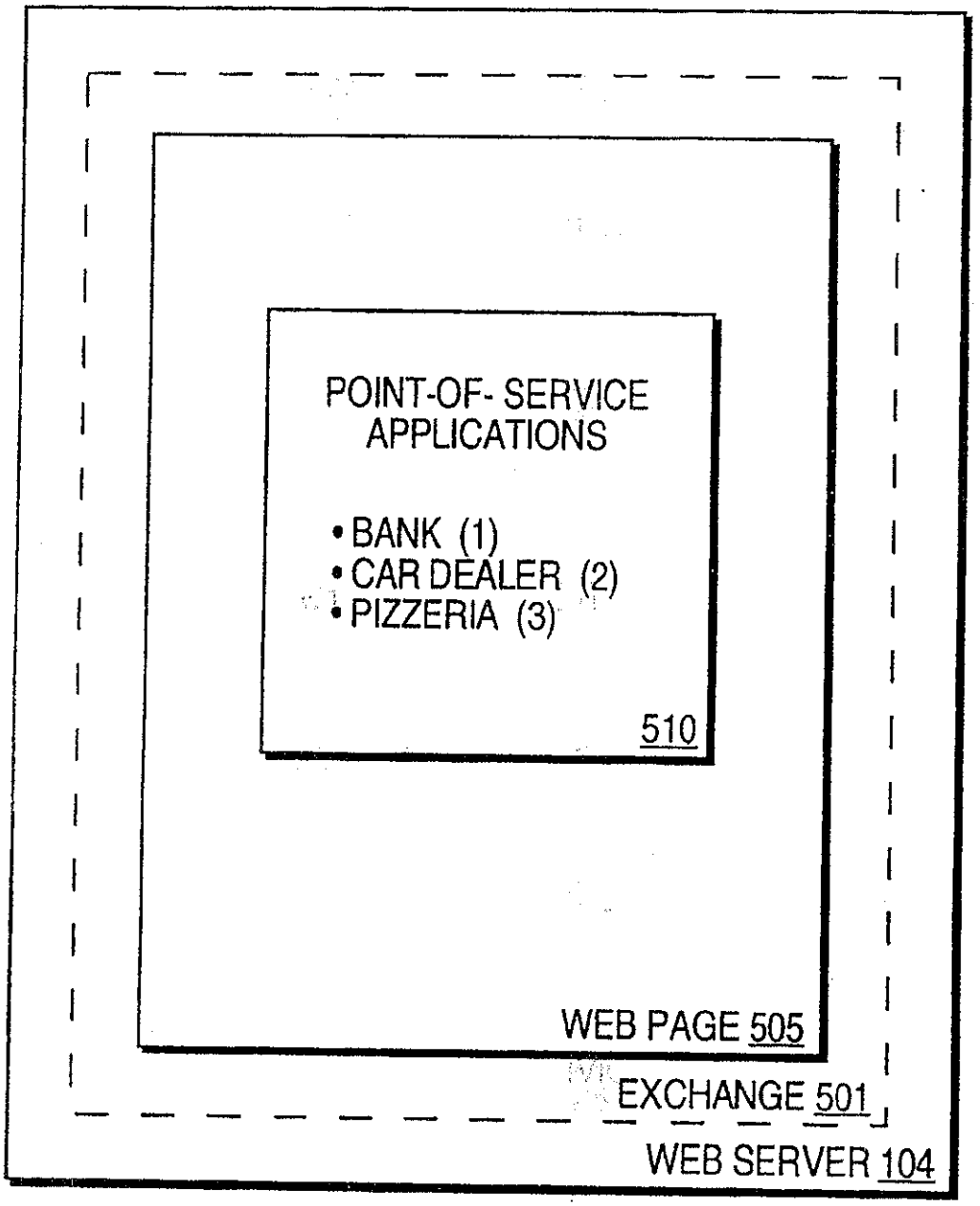

POINT-OF- SERVICE APPLICATIONS
• BANK (1)
• CAR DEALER (2)
• PIZZERIA (3)
510
WEB PAGE 505
EXCHANGE 501
WEB SERVER 104

FIG. 5C

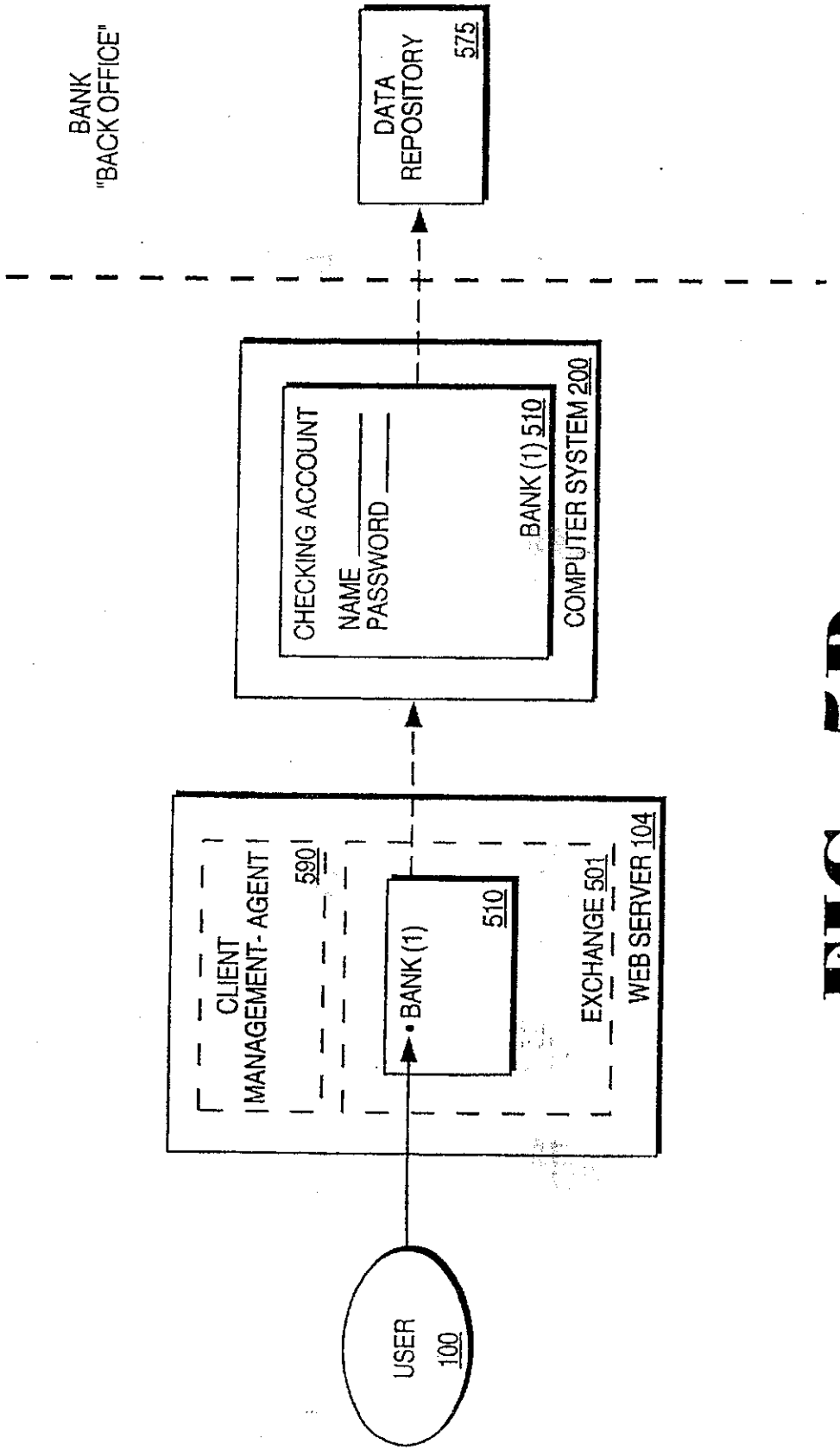

BANK "BACK OFFICE"
DATA REPOSITORY 575
CHECKING ACCOUNT
NAME
PASSWORD
BANK (1) 510
COMPUTER SYSTEM 200
CLIENT MANAGEMENT- AGENT 590
BANK (1) 510
EXCHANGE 501
WEB SERVER 104
USER 100

FIG. 5D

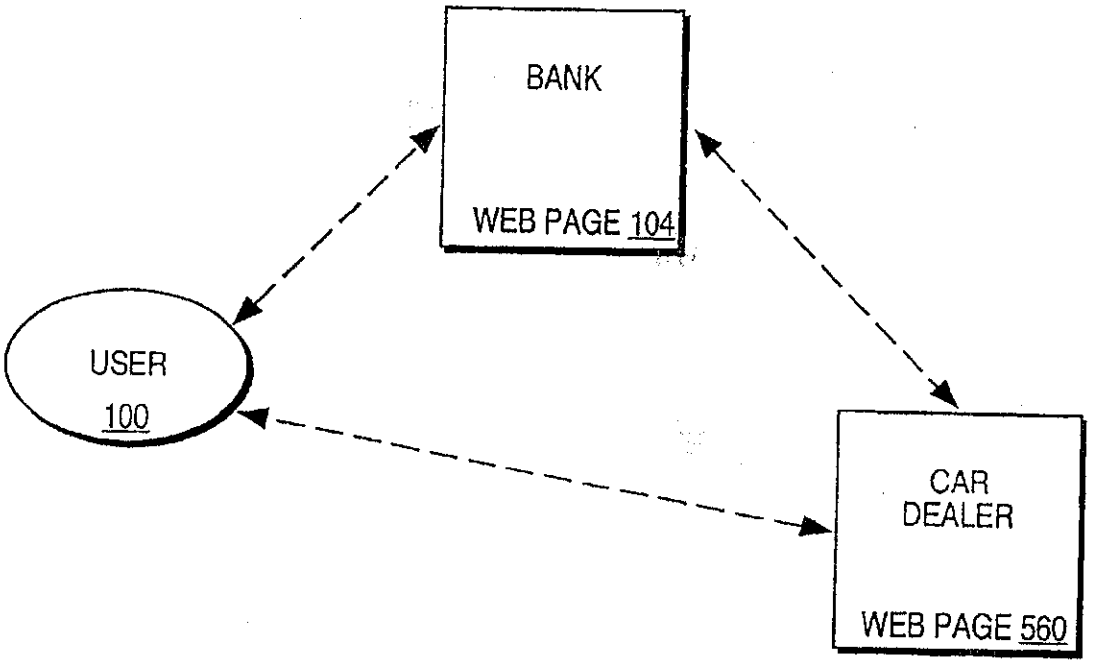


FIG. 5E

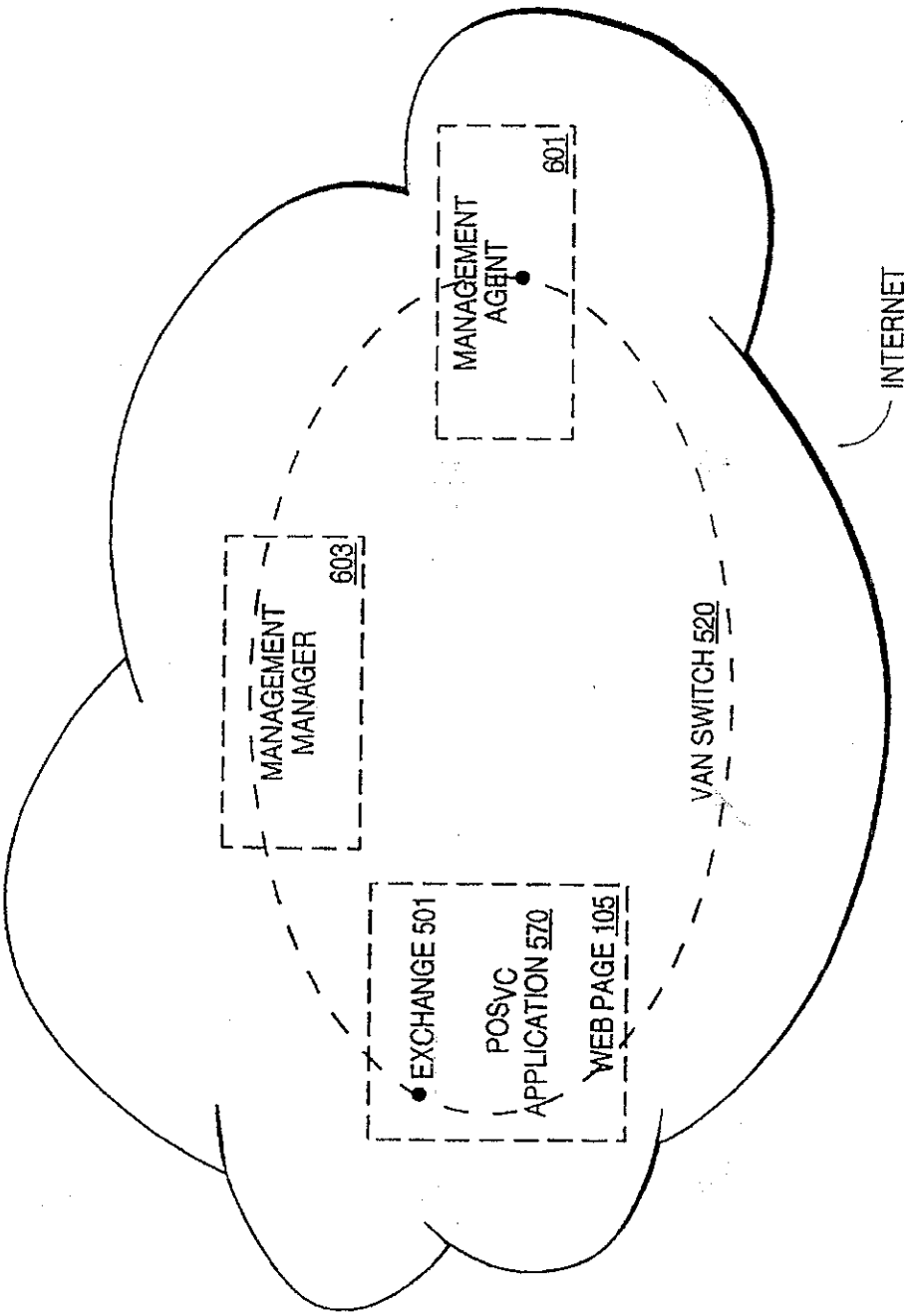

INTERNET
MANAGEMENT AGENT
601
MANAGEMENT MANAGER
603
VAN SWITCH 520
EXCHANGE 501
POSVC APPLICATION 570
WEB PAGE 105

FIG. 6A

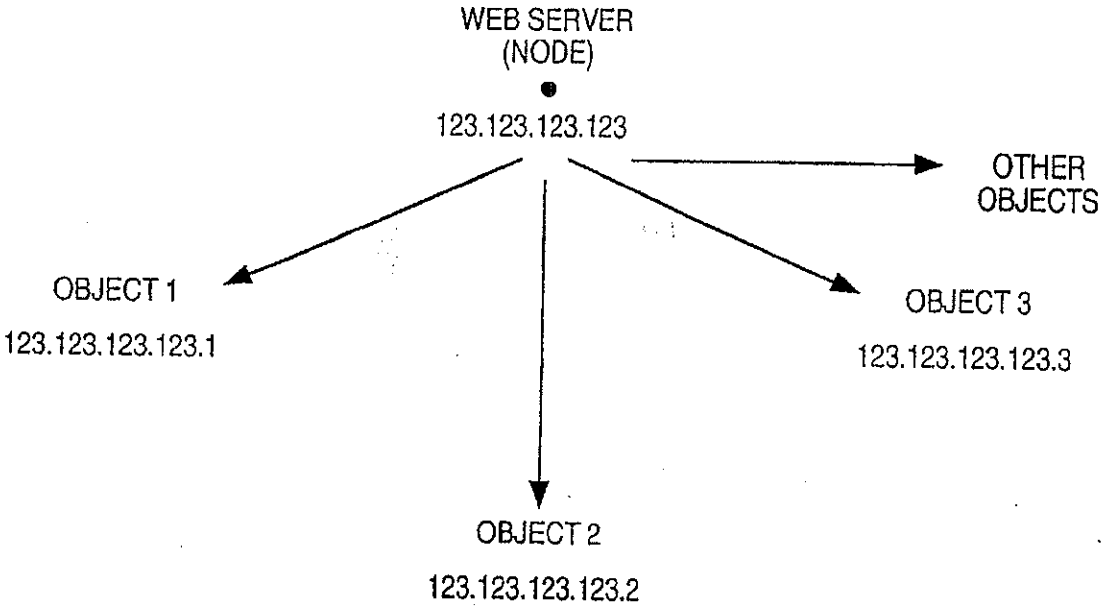

WEB SERVER
(NODE)
123.123.123.123
OTHER
OBJECTS
OBJECT 1
123.123.123.123.1
OBJECT 3
123.123.123.123.3
OBJECT 2
123.123.123.123.2

FIG. 6B

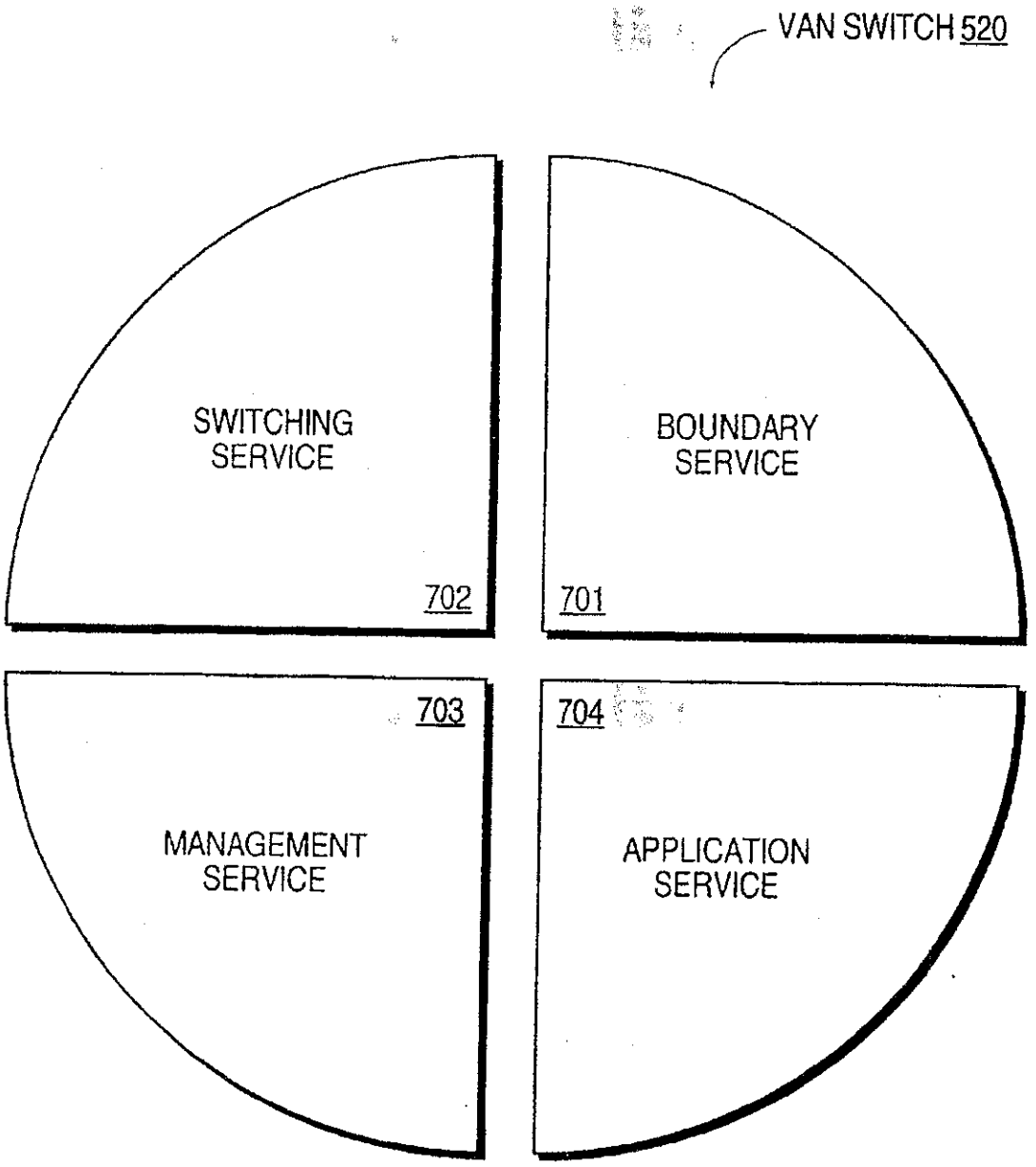

VAN SWITCH 520
SWITCHING SERVICE
702
BOUNDARY SERVICE
701
703
MANAGEMENT SERVICE
704
APPLICATION SERVICE

FIG. 7

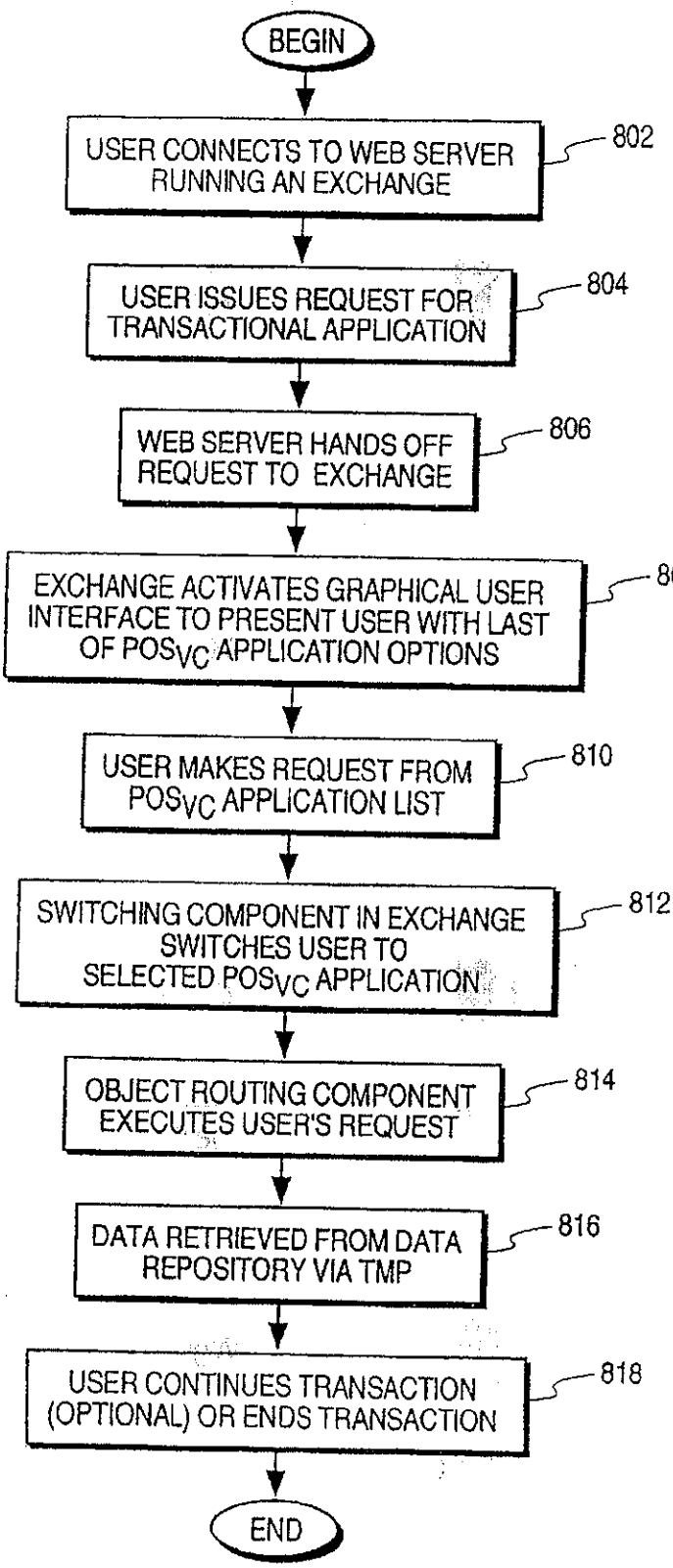

BEGIN
USER CONNECTS TO WEB SERVER RUNNING AN EXCHANGE
802
USER ISSUES REQUEST FOR TRANSACTIONAL APPLICATION
804
WEB SERVER HANDS OFF REQUEST TO EXCHANGE
806
EXCHANGE ACTIVATES GRAPHICAL USER INTERFACE TO PRESENT USER WITH LAST OF POSVC APPLICATION OPTIONS
808
USER MAKES REQUEST FROM POSVC APPLICATION LIST
810
SWITCHING COMPONENT IN EXCHANGE SWITCHES USER TO SELECTED POSVC APPLICATION
812
OBJECT ROUTING COMPONENT EXECUTES USER'S REQUEST
814
DATA RETRIEVED FROM DATA REPOSITORY VIA TMP
816
USER CONTINUES TRANSACTION (OPTIONAL) OR ENDS TRANSACTION
818
END

FIG. 8

VALUE-ADDED NETWORK SYSTEM FOR ENABLING REAL-TIME, BY-DIRECTIONAL TRANSACTIONS ON A NETWORK

RELATED APPLICATIONS

This is a divisional of application Ser. No. 08/700,726, filed Aug. 5, 1996, now U.S. Pat. No. 5,778,178.

FIELD OF THE INVENTION

The present invention relates to the area of Internet communications. Specifically, the present invention relates to a method and apparatus for configurable value-added network switching and object routing.

BACKGROUND OF THE INVENTION

With the Internet and the World Wide Web ("the Web") evolving rapidly as a viable consumer medium for electronic commerce, new on-line services are emerging to fill the needs of on-line users. An Internet user today can browse on the Web via the use of a Web browser. Web browsers are software interfaces that run on Web clients to allow access to Web servers via a simple user interface. A Web user's capabilities today from a Web browser are, however, extremely limited. The user can perform one-way, browse-only interactions. Additionally, the user has limited "deferred" transactional capabilities, namely electronic mail (e-mail) capabilities. E-mail capabilities are referred to as "deferred transactions" because the consumer's request is not processed until the e-mail is received, read, and the person or system reading the e-mail executes the transaction. This transaction is thus not performed in real-time.

FIG. 1A illustrates typical user interactions on the Web today. User **100** sends out a request from Web browser **102** in the form of a universal resource locator (URL) **101** in the following manner: http://www.car.com. URL **101** is processed by Web browser **102** that determines the URL corresponds to car dealer Web page **105**, on car dealer Web server **104**. Web browser **102** then establishes browse link **103** to car dealer Web page **105**. User **100** can browse Web page **105** and select "hot links" to jump to other locations in Web page **105**, or to move to other Web pages on the Web. This interaction is typically a browse-only interaction. Under limited circumstances, the user may be able to fill out a form on car dealer Web page **105**, and e-mail the form to car dealer Web server **104**. This interaction is still strictly a one-way browse mode communications link, with the e-mail providing limited, deferred transactional capabilities.

Under limited circumstances, a user may have access to two-way services on the Web via Common Gateway Interface (CGI) applications. CGI is a standard interface for running external programs on a Web server. It allows Web servers to create documents dynamically when the server receives a request from the Web browser. When the Web server receives a request for a document, the Web server dynamically executes the appropriate CGI script and transmits the output of the execution back to the requesting Web browser. This interaction can thus be termed a "two-way" transaction. It is a severely limited transaction, however, because each CGI application is customized for a particular type of application or service.

For example, as illustrated in FIG. 1B, user **100** may access bank **150**'s Web server and attempt to perform transactions on checking account **152** and to make a payment on loan account **154**. In order for user **100** to access checking account **152** and loan account **154** on the Web, CGI application scripts must be created for each account, as illustrated in FIG. 1B. The bank thus has to create individual scripts for each of its services to offer users access to these services. User **100** can then interact in a limited fashion with these individual applications. Creating and managing individual CGI scripts for each service is not a viable solution for merchants with a large number of services.

As the Web expands and electronic commerce becomes more desirable, the need increases for robust, real-time, bi-directional transactional capabilities on the Web. A true real-time, bi-directional transaction would allow a user to connect to a variety of services on the Web, and perform real-time transactions on those services. For example, although user **100** can browse car dealer Web page **105** today, the user cannot purchase the car, negotiate a car loan or perform other types of real-time, two-way transactions that he can perform with a live salesperson at the car dealership. Ideally, user **100** in FIG. 1A would be able to access car dealer Web page **105**, select specific transactions that he desires to perform, such as purchase a car, and perform the purchase in real-time, with two-way interaction capabilities. CGI applications provide user **100** with a limited ability for two-way interaction with car dealer Web page **105**, but due to the lack of interaction and management between the car dealer and the bank, he will not be able to obtain a loan and complete the purchase of the car via a CGI application. The ability to complete robust real-time, two-way transactions is thus not truly available on the Web today.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a method and apparatus for providing real-time, two-way transactional capabilities on the Web. Specifically, one embodiment of the present invention discloses a configurable value-added network switch for enabling real-time transactions on the World Wide Web. The configurable value added network switch comprises means for switching to a transactional application in response to a user specification from a World Wide Web application, means for transmitting a transaction request from the transactional application, and means for processing the transaction request.

According to another aspect of the present invention, a method and apparatus for enabling object routing on the World Wide Web is disclosed. The method for enabling object routing comprises the steps of creating a virtual information store containing information entries and attributes, associating each of the information entries and the attributes with an object identity, and assigning a unique network address to each of the object identities.

Other objects, features and advantages of the present invention will be apparent from the accompanying drawings and from the detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

The features and advantages of the present invention will be apparent from the accompanying drawings and from the detailed description of the present invention as set forth below.

FIG. 1A is an illustration of a current user's browse capabilities on the Web via a Web browser.

FIG. 1B is an illustration of a current user's capabilities to perform limited transactions on the Web via CGI applications.

FIG. 2 illustrates a typical computer system on which the present invention may be utilized.

FIG. 3 illustrates the Open Systems Interconnection (OSI) Model.

FIG. 4A illustrates conceptually the user value chain as it exists today.

FIG. 4B illustrates one embodiment of the present invention.

FIG. 5A illustrates a user accessing a Web server including one embodiment of the present invention.

FIG. 5B illustrates the exchange component according to one embodiment of the present invention.

FIG. 5C illustrates an example of a point-of-service (POSvc) application list.

FIG. 5D illustrates a user selecting a bank POSvc application from the POSvc application list.

FIG. 5E illustrates a three-way transaction according to one embodiment of the present invention.

FIG. 6A illustrates a value-added network (VAN) switch.

FIG. 6B illustrates the hierarchical addressing tree structure of the networked objects in DOLSIBs.

FIG. 7 illustrates conceptually the layered architecture of a VAN switch.

FIG. 8 is a flow diagram illustrating one embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention relates to a method and apparatus for configurable value-added network switching and object routing and management. "Web browser" as used in the context of the present specification includes conventional Web browsers such as NCSA Mosaic™ from NCSA and Netscape Mosaic™ from Netscape™. The present invention is independent of the Web browser being utilized and the user can use any Web browser, without modifications to the Web browser. In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be apparent to one of ordinary skill in the art, however, that these specific details need not be used to practice the present invention. In other instances, well-known structures, interfaces and processes have not been shown in detail in order not to unnecessarily obscure the present invention.

FIG. 2 illustrates a typical computer system **200** in which the present invention operates. The preferred embodiment of the present invention is implemented on an IBM™ Personal Computer manufactured by IBM Corporation of Armonk, N.Y. Alternate embodiments may be implemented on a Macintosh™ computer manufactured by Apple™ Computer, Incorporated of Cupertino, Calif. It will be apparent to those of ordinary skill in the art that other alternative computer system architectures may also be employed.

In general, such computer systems as illustrated by FIG. 2 comprise a bus **201** for communicating information, a processor **202** coupled with the bus **201** for processing information, main memory **203** coupled with the bus **201** for storing information and instructions for the processor **202**, a read-only memory **204** coupled with the bus **201** for storing static information and instructions for the processor **202**, a display device **205** coupled with the bus **201** for displaying information for a computer user, an input device **206** coupled with the bus **201** for communicating information and command selections to the processor **202**, and a mass storage device **207**, such as a magnetic disk and associated disk drive, coupled with the bus **201** for storing information and instructions. A data storage medium **208** containing digital information is configured to operate with mass storage device **207** to allow processor **202** access to the digital information on data storage medium **208** via bus **201**.

Processor **202** may be any of a wide variety of general purpose processors or microprocessors such as the Pentium™ microprocessor manufactured by Intel™ Corporation or the Motorola™ 68040 or Power PC™ brand microprocessor manufactured by manufactured by Motorola™ Corporation. It will be apparent to those of ordinary skill in the art, however, that other varieties of processors may also be used in a particular computer system. Display device **205** may be a liquid crystal device, cathode ray tube (CRT), or other suitable display device. Mass storage device **207** may be a conventional hard disk drive, floppy disk drive, CD-ROM drive, or other magnetic or optical data storage device for reading and writing information stored on a hard disk, a floppy disk, a CD-ROM a magnetic tape, or other magnetic or optical data storage medium. Data storage medium **208** may be a hard disk, a floppy disk, a CD-ROM, a magnetic tape, or other magnetic or optical data storage medium.

In general, processor **202** retrieves processing instructions and data from a data storage medium **208** using mass storage device **207** and downloads this information into random access memory **203** for execution. Processor **202**, then executes an instruction stream from random access memory **203** or read-only memory **204**. Command selections and information input at input device **206** are used to direct the flow of instructions executed by processor **202**. Equivalent input device **206** may also be a pointing device such as a conventional mouse or trackball device. The results of this processing execution are then displayed on display device **205**.

The preferred embodiment of the present invention is implemented as a software module, which may be executed on a computer system such as computer system **200** in a conventional manner. Using well known techniques, the application software of the preferred embodiment is stored on data storage medium **208** and subsequently loaded into and executed within computer system **200**. Once initiated, the software of the preferred embodiment operates in the manner described below.

FIG. 3 illustrates the Open Systems Interconnection (OSI) reference model. OSI Model **300** is an international standard that provides a common basis for the coordination of standards development, for the purpose of systems interconnection. The present invention is implemented to function as a routing switch within the "application layer" of the OSI model. The model defines seven layers, with each layer communicating with its peer layer in another node through the use of a protocol. Physical layer **301** is the lowest layer, with responsibility to transmit unstructured bits across a link. Data link layer **302** is the next layer above physical layer **301**. Data link layer **302** transmits chunks across the link and deals with problems like checksumming to detect data corruption, orderly coordination of the use of shared media and addressing when multiple systems are reachable. Network bridges operate within data link layer **302**.

Network layer **303** enables any pair of systems in the network to communicate with each other. Network layer **303** contains hardware units such as routers, that handle routing, packet fragmentation and reassembly of packets. Transport layer **304** establishes a reliable communication stream between a pair of systems, dealing with errors such as lost packets, duplicate packets, packet reordering and fragmen-

tation. Session layer **305** offers services above the simple communication stream provided by transport layer **304**. These services include dialog control and chaining. Presentation layer **306** provides a means by which OSI compliant applications can agree on representations for data. Finally, application layer **307** includes services such as file transfer, access and management services (FTAM), electronic mail and virtual terminal (VT) services. Application layer **307** provides a means for application programs to access the OSI environment. As described above, the present invention is implemented to function as a routing switch in application layer **307**. Application layer routing creates an open channel for the management, and the selective flow of data from remote databases on a network.

A. Overview

FIG. 4A illustrates conceptually the user value chain as it exists today. The user value chain in FIG. 4A depicts the types of transactions that are performed today, and the channels through which the transactions are performed. A "transaction" for the purposes of the present invention includes any type of commercial or other type of interaction that a user may want to perform. Examples of transactions include a deposit into a bank account, a request for a loan from a bank, a purchase of a car from a car dealership or a purchase of a car with financing from a bank. A large variety of other transactions are also possible.

A typical user transaction today may involve user **100** walking into a bank or driving up to a teller machine, and interacting with a live bank teller, or automated teller machine (ATM) software applications. Alternatively, user **100** can perform the same transaction by using a personal computer (PC), activating application software on his PC to access his bank account, and dialing into the bank via a modem line. If user **100** is a Web user, however, there is no current mechanism for performing a robust, real-time transaction with the bank, as illustrated in FIG. 4A. CGI scripts provide only limited two-way capabilities, as described above. Thus, due to this lack of a robust mechanism by which real-time Web transactions can be performed, the bank is unable to be a true "Web merchant," namely a merchant capable of providing complete transactional services on the Web.

According to one embodiment of the present invention, as illustrated in FIG. 4B, each merchant that desires to be a Web merchant can provide real-time transactional capabilities to users who desire to access the merchants' services via the Web. This embodiment includes a service network running on top of a facilities network, namely the Internet, the Web or e-mail networks. For the purposes of this application, users are described as utilizing PC's to access the Web via Web server "switching" sites. (Switching is described in more detail below). Users may also utilize other personal devices such as network computers or cellular devices to access the merchants' services via appropriate switching sites. These switching sites include non-Web network computer sites and cellular provider sites. Five components interact to provide this service network functionality, namely an exchange, an operator agent, a management agent, a management manager and a graphical user interface. All five components are described in more detail below.

As illustrated in FIG. 5A, user **100** accesses Web server **104**. Having accessed Web server **104**, user **100** can decide that he desires to perform real-time transactions. When Web server **104** receives user **100**'s indication that he desires to perform real-time transactions, the request is handed over to an exchange component. Thus, from Web page **105**, for example, user **100** can select button **500**, entitled "Transactions" and Web server **104** hands user **100**'s request over to the exchange component. The button and the title can be replaced by any mechanism that can instruct a Web server to hand over the consumer's request to the exchange component.

FIG. 5B illustrates exchange **501**. Exchange **501** comprises Web page **505** and point-of-service (POSvc) applications **510**. Exchange **501** also conceptually includes a switching component and an object routing component (described in more detail below). POSvc applications **510** are transactional applications, namely applications that are designed to incorporate and take advantage of the capabilities provided by the present invention. Although exchange **501** is depicted as residing on Web server **104**, the exchange can also reside on a separate computer system that resides on the Internet and has an Internet address. Exchange **501** may also include operator agent **503** that interacts with a management manager (described in more detail below). Exchange **501** creates and allows for the management (or distributed control) of a service network, operating within the boundaries of an IP-based facilities network. Thus, exchange **501** and a management agent component, described in more detail below, under the headings "VAN Switch and Object Routing," together perform the switching, object routing, application and service management functions according to one embodiment of the present invention.

Exchange **501** processes the consumer's request and displays an exchange Web page **505** that includes a list of POSvc applications **510** accessible by exchange **501**. A POSvc application is an application that can execute the type of transaction that the user may be interested in performing. The POSvc list is displayed via the graphical user interface component. One embodiment of the present invention supports HyperText Markup Language as the graphical user interface component. Virtual Reality Markup Language and Java™ are also supported by this embodiment. A variety of other graphical user interface standards can also be utilized to implement the graphical user interface.

An example of a POSvc application list is illustrated in FIG. 5C. User **100** can thus select from POSvc applications Bank **510(1)**, Car Dealer **510(2)** or Pizzeria **510(3)**. Numerous other POSvc applications can also be included in this selection. If user **100** desires to perform a number of banking transactions, and selects the Bank application, a Bank POSvc application will be activated and presented to user **100**, as illustrated in FIG. 5D. For the purposes of illustration, exchange **501** in FIG. 5D is shown as running on a different computer system (Web server **104**) from the computer systems of the Web merchants running POSvc applications (computer system **200**). Exchange **501** may, however, also be on the same computer system as one or more of the computer systems of the Web merchants.

Once Bank POSvc application **510** has been activated, user **100** will be able to connect to Bank services and utilize the application to perform banking transactions, thus accessing data from a host or data repository **575** in the Bank "Back Office." The Bank Back Office comprises legacy databases and other data repositories that are utilized by the Bank to store its data. This connection between user **100** and Bank services is managed by exchange **501**. As illustrated in FIG. 5D, once the connection is made between Bank POSvc application **510(1)**, for example, and Bank services, an operator agent on Web server **104** may be activated to ensure the availability of distributed functions and capabilities.

Each Web merchant may choose the types of services that it would like to offer its clients. In this example, if Bank

decided to include in their POSvc application access to checking and savings accounts, user **100** will be able to perform real-time transactions against his checking and savings accounts. Thus, if user **100** moves $500 from his checking account into his savings account, the transaction will be performed in real-time, in the same manner the transaction would have been performed by a live teller at the bank or an ATM machine. Therefore, unlike his prior access to his account, user **100** now has the capability to do more than browse his bank account. The ability to perform these types of robust, real-time transactions from a Web client is a significant aspect of the present invention.

Bank can also decide to provide other types of services in POSvc application **510(1)**. For example, Bank may agree with Car dealership to allow Bank customers to purchase a car from that dealer, request a car loan from Bank, and have the entire transaction performed on the Web, as illustrated in FIG. 5E. In this instance, the transactions are not merely two-way, between the user and Bank, but three-way, amongst the consumer, Bank and Car dealership. According to one aspect of the present invention, this three-way transaction can be expanded to n-way transactions, where n represents a predetermined number of merchants or other service providers who have agreed to cooperate to provide services to users. The present invention therefore allows for "any-to-any" communication and transactions on the Web, thus facilitating a large, flexible variety of robust, real-time transactions on the Web.

Finally, Bank may also decide to provide intra-merchant or intra-bank services, together with the inter-merchant services described above. For example, if Bank creates a POSvc application for use by the Bank Payroll department, Bank may provide its own employees with a means for submitting timecards for payroll processing by the Bank's Human Resources (HR) Department. An employee selects the Bank HR POSvc application, and submits his timecard. The employee's timecard is processed by accessing the employee's payroll information, stored in the Bank's Back Office. The transaction is thus processed in real-time, and the employee receives his paycheck immediately.

B. Van Switching and Object Routing

As described above, exchange **501** and management agent **601**, illustrated in FIG. 6A, together constitute a value-added network (VAN) switch. These two elements may take on different roles as necessary, including peer-to-peer, client-server or master-slave roles. Management manager **603** is illustrated as residing on a separate computer system on the Internet. Management manager **603** can, however, also reside on the same machine as exchange **501**. Management manager **603** interacts with the operator agent **503** residing on exchange **501**.

VAN switch **520** provides multi-protocol object routing, depending upon the specific VAN services chosen. This multi-protocol object routing is provided via a proprietary protocol, TransWeb™ Management Protocol (TMP). TMP incorporates the same security features as the traditional Simple Network Management Protocol, SNMP. It also allows for the integration of other traditional security mechanisms, including RSA security mechanisms.

One embodiment of the present invention utilizes TMP and distributed on-line service information bases (DOLSIBs) to perform object routing. Alternatively, TMP can incorporate s-HTTP, Java™, the WinSock API or ORB with DOLSIBs to perform object routing. DOLSIBs are virtual information stores optimized for networking. All information entries and attributes in a DOLSIB virtual information store are associated with a networked object identity. The networked object identity identifies the information entries and attributes in the DOLSIB as individual networked objects, and each networked object is assigned an Internet address. The Internet address is assigned based on the IP address of the node at which the networked object resides.

For example, in FIG. 5A, Web server **104** is a node on the Internet, with an IP address. All networked object associated with Web server **104** will therefore be assigned an Internet address based on the Web server **104**'s IP address. These networked objects thus "branch" from the node, creating a hierarchical tree structure. The Internet address for each networked object in the tree essentially establishes the individual object as an "IP-reachable" or accessible node on the Internet. TMP utilizes this Internet address to uniquely identify and access the object from the DOLSIB. FIG. 6B illustrates an example of this hierarchical addressing tree structure.

Each object in the DOLSIB has a name, a syntax and an encoding. The name is an administratively assigned object ID specifying an object type. The object type together with the object instance serves to uniquely identify a specific instantiation of the object. For example, if object **610** is information about models of cars, then one instance of that object would provide user **100** with information about a specific model of the car while another instance would provide information about a different model of the car. The syntax of an object type defines the abstract data structure corresponding to that object type. Encoding of objects defines how the object is represented by the object type syntax while being transmitted over the network.

C. Management and Administration

As described above, exchange **501** and management agent **601** together constitute a VAN switch. FIG. 7 illustrates conceptually the layered architecture of VAN switch **520**. Specifically, boundary service **701** provides the interfaces between VAN switch **520**, the Internet and the Web, and multi-media end user devices such as PCs, televisions or telephones. Boundary service **701** also provides the interface to the on-line service provider. A user can connect to a local application, namely one accessible via a local VAN switch, or be routed or "switched" to an application accessible via a remote VAN switch.

Switching service **702** is an OSI application layer switch. Switching service **702** thus represents the core of the VAN switch. It performs a number of tasks including the routing of user connections to remote VAN switches, described in the paragraph above, multiplexing and prioritization of requests, and flow control. Switching service **702** also facilitates open systems' connectivity with both the Internet (a public switched network) and private networks including back office networks, such as banking networks. Interconnected application layer switches form the application network backbone. These switches are one significant aspect of the present invention.

Management service **703** contains tools such as Information Management Services (IMS) and application Network Management Services (NMS). These tools are used by the end users to manage network resources, including VAN switches. Management service **703** also provides applications that perform Operations, Administration, Maintenance & Provisioning (OAM&P) functions. These OAM&P functions include security management, fault management, configuration management, performance management and billing management. Providing OAM&P functions for applications in this manner is another significant aspect of the present invention.

Finally, application service **704** contains application programs that deliver customer services. Application service **704** includes POSvc applications such as Bank POSvc described above, and illustrated in FIG. 6A. Other examples of VAN services include multi-media messaging, archival/retrieval management, directory services, data staging, conferencing, financial services, home banking, risk management and a variety of other vertical services. Each VAN service is designed to meet a particular set of requirements related to performance, reliability, maintenance and ability to handle expected traffic volume. Depending on the type of service, the characteristics of the network elements will differ. VAN service **704** provides a number of functions including communications services for both management and end users of the network and control for the user over the user's environment.

FIG. **8** is a flow diagram illustrating one embodiment of the present invention. A user connects to a Web server running an exchange component in step **802**. In step **804**, the user issues a request for a transactional application, and the web server hands off the request to an exchange in step **806**. The exchange activates a graphical user interface to present user with a list of POSvc application options in step **808**. In step **810**, the user makes a selection from the POSvc application list. In step **812**, the switching component in the exchange switches the user to the selected POSvc application, and in step **814**, the object routing component executes the user's request. Data is retrieved from the appropriate data repository via TMP in step **816**, and finally, the user may optionally continue the transaction in step **818** or end the transaction.

Thus, a configurable value-added network switching and object routing method and apparatus is disclosed. These specific arrangements and methods described herein are merely illustrative of the principles of the present invention. Numerous modifications in form and detail may be made by those of ordinary skill in the art without departing from the scope of the present invention. Although this invention has been shown in relation to a particular preferred embodiment, it should not be considered so limited. Rather, the present invention is limited only by the scope of the appended claims.

We claim:

1. A configurable value-added network switch for enabling real-time transactions on a network, said configurable value-added network switch compromising:

means for switching to a transactional application in response to a user specification from a network application, said transactional application providing a user with a plurality of transactional services managed by at least one value-added network service provider, said value-added network service provider keeping a transaction flow captive, said plurality of transactional services being performed interactively and in real time;

means for transmitting a transaction request from said transactional application; and

means for processing said transaction request.

2. The configurable value-added network switch as claimed in claim **1** wherein said means for switching to a transactional application further comprises:

means for receiving said user specification;

means for enabling a switch to said transactional application; and

means for activating said transactional application.

3. The configurable value-added network switch as claimed in claim **2** wherein said means for activating said transactional application further includes means for creating a transaction link between said network application and said transactional application.

4. The configurable value-added network switch as claimed in claim **2** wherein said means for receiving said user specification further comprises:

means for presenting said user with a list of transactional applications, each of said transactional application being associated with a particular value-added network service provider; and

means for submitting said user specification according to a user's selection of said transactional application from said list of transactional applications.

5. The configurable value-added network switch as claimed in claim **1** wherein said means for processing said transaction request further comprises means for coupling said means for transmitting to a host means.

6. The configurable value-added network switch as claimed in claim **5** wherein said host means contains data corresponding to said transaction request.

7. The configurable value-added network switch as claimed in claim **1** wherein said value-added network service providers cooperating to provide said plurality of transactional services to users.

8. The configurable value-added network switch as claimed in claim **1** further comprising means for controlling and prioritizing multiple transaction requests initiated by various users.

9. The configurable value-added network switch as claimed in claim **1** further comprising means for providing security management, fault management, configuration management, performance management and billing management.

10. A method for configuring a value-added network switch for enabling real-time transactions on a network, said method for configuring said value-added network switch compromising the steps of:

switching to a transactional application in response to a user specification from a network application, said transactional application providing a user with a plurality of transactional services managed by at least one value-added network service provider, said value-added network service provider keeping a transaction flow captive, said plurality of transactional services being performed interactively and in real time;

transmitting a transaction request from said transactional application; and processing said transaction request.

11. The method for configuring said value-added network switch as claimed in claim **10** wherein said step of switching to a transactional application further comprises the steps of:

receiving said user specification;

enabling a switch to said transactional application; and

activating said transactional application.

12. The method for configuring said value-added network switch as claimed in claim **11** wherein said step of activating said transactional application further includes a step of creating a transaction link between said network application and said transactional application.

13. The method for configuring said value-added network switch as claimed in claim **11** further comprising the steps of:

controlling security;

performing fault management;

providing configuration management;

managing performance; and

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enabling billing management.

14. The method for configuring said value-added network switch as claimed in claim 11 wherein said step of receiving said user specification further comprises steps of:

presenting said user with a list of transactional applications, each of said transactional application being associated with a particular Internet service provider; and

submitting said user specification according to a user's selection of said transactional application from said list of transactional applications.

15. The method for configuring said value-added network switch as claimed in claim 10 wherein said step of processing said transaction request further comprises the step of transmitting said transaction request to a host means.

16. The method for configuring said value-added network switch as claimed in claim 15 wherein said host means contains data corresponding to said transaction request.

17. The method for configuring said value-added network switch as claimed in claim 10 wherein said value-added network service providers cooperate to provide said plurality of transactional services to said user.

18. The method for configuring said value-added network switch as claimed in claim 10 further comprising the step of controlling and prioritizing multiple transaction requests initiated by various users.

19. A method for enabling object routing on a network, said method for enabling object routing comprising the steps of:

associating an object identity with information entries and attributes, wherein the object identity represents a networked object;

storing said information entries and said attributes in a virtual information store; and

assigning a unique network address to said object identity.

20. The method in claim 19 wherein said step of associating said object identity with said information entries and said attributes in said virtual information store further includes the step of associating a name, a syntax and an encoding for said object identity.

21. The method in claim 20 wherein said name associated with said object identity specifies an object type.

22. The method in claim 21 wherein said object type and an object instance uniquely identify an instantiation of said object type.

23. The method in claim 22 wherein said syntax defines a data structure for said object type.

24. The method in claim 19 further comprising the step of utilizing said unique network address to identify and route said object identity on the network.

25. The method in claim 19 further comprising the step of utilizing said unique network address to identify and route said object identity on the Internet.

26. The method in claim 19 further comprising the step of utilizing said unique network address of said object identity to perform Operations, Administration, Maintenance & Provisioning (OAM&P) functions.

27. An object router on a network, said object router comprising:

means for associating an object identity with information entries and attributes, wherein the object identity represents a networked object;

means for storing said information entries and said attributes in a virtual information store; and

means for assigning a unique network address to said object identity.

28. The object router in claim 27 wherein said means for associating said object identity with said information entries and said attributes in said virtual information store further includes means for associating a name, a syntax and an encoding for said object identity.

29. The object router in claim 28 wherein said name of said object identity specifies an object type.

30. The object router in claim 29 wherein said object type and an object instance uniquely identify an instantiation of said object type.

31. The object router in claim 30 wherein said syntax defines a data structure for said object type.

32. The object router in claim 27 further comprising means for utilizing said unique network address to identify and route said object identity on the network.

33. The object router in claim 27 further comprising means for utilizing said unique network address to identify and route said object identity on the Internet.

34. The object router in claim 27 further comprising the step of utilizing said unique network address of said object identity to perform Operations, Administration, Maintenance & Provisioning (OAM&P) functions.

35. A configurable value-added network system for enabling real-time transactions on a network, said configurable value-added network system comprising:

means for switching to a transactional application in response to a user specification from a network application, said transactional application providing a user with a plurality of transactional services managed by at least one value-added network service provider, said value-added network service provider keeping a transaction flow captive, said plurality of transactional services being performed interactively and in real time;

means for activating an agent to create a transaction link between said user application and said transactional application;

means for transmitting a transaction request from said transactional application; and

a host means for processing said transaction request and retrieving data corresponding to said transaction request.

* * * * *

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(54) **WEB APPLICATION NETWORK PORTAL**

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(60) Division of application No. 11/980,185, filed on Oct. 30, 2007, now Pat. No. 8,037,158, which is a continuation-in-part of application No. 09/792,323, filed on Feb. 23, 2001, now Pat. No. 7,340,506, which is a division of application No. 09/296,207, filed on Apr. 21, 1999, now Pat. No. 6,212,556, which is a continuation-in-part of application No. 08/879,958, filed on Jun. 20, 1997, now Pat. No. 5,987,500, which is a division of application No. 08/700,726, filed on Aug. 5, 1996, now Pat. No. 5,778,178.

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(51) **Int. Cl.**
G06F 13/00 (2006.01)

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(58) **Field of Classification Search** 709/217, 709/219, 223, 224, 225, 227, 229
See application file for complete search history.

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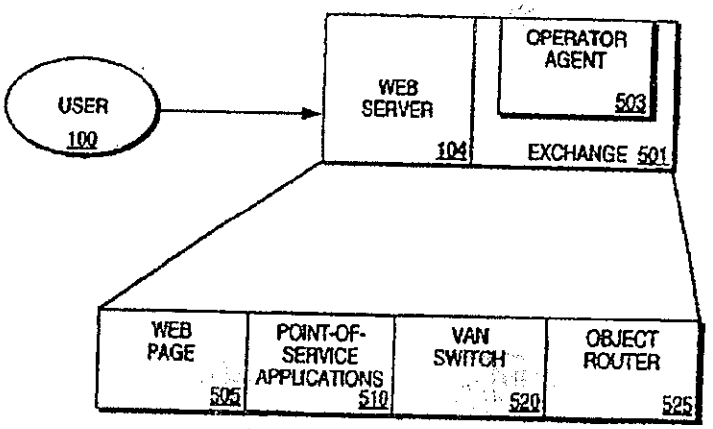
Primary Examiner — Viet Vu

(57) **ABSTRACT**

The present invention provides a method and apparatus for providing real-time, two-way transactional capabilities on the Web. Specifically, one embodiment of the present invention discloses a method for enabling object routing, the method comprising the steps of creating a virtual information store containing information entries and attributes associating each of the information entries and the attributes with an object identity, and assigning a unique network address to each of the object identities. A method is also disclosed for enabling service management of the value-added network service, to perform OAM&P functions on the services network.

13 Claims, 13 Drawing Sheets



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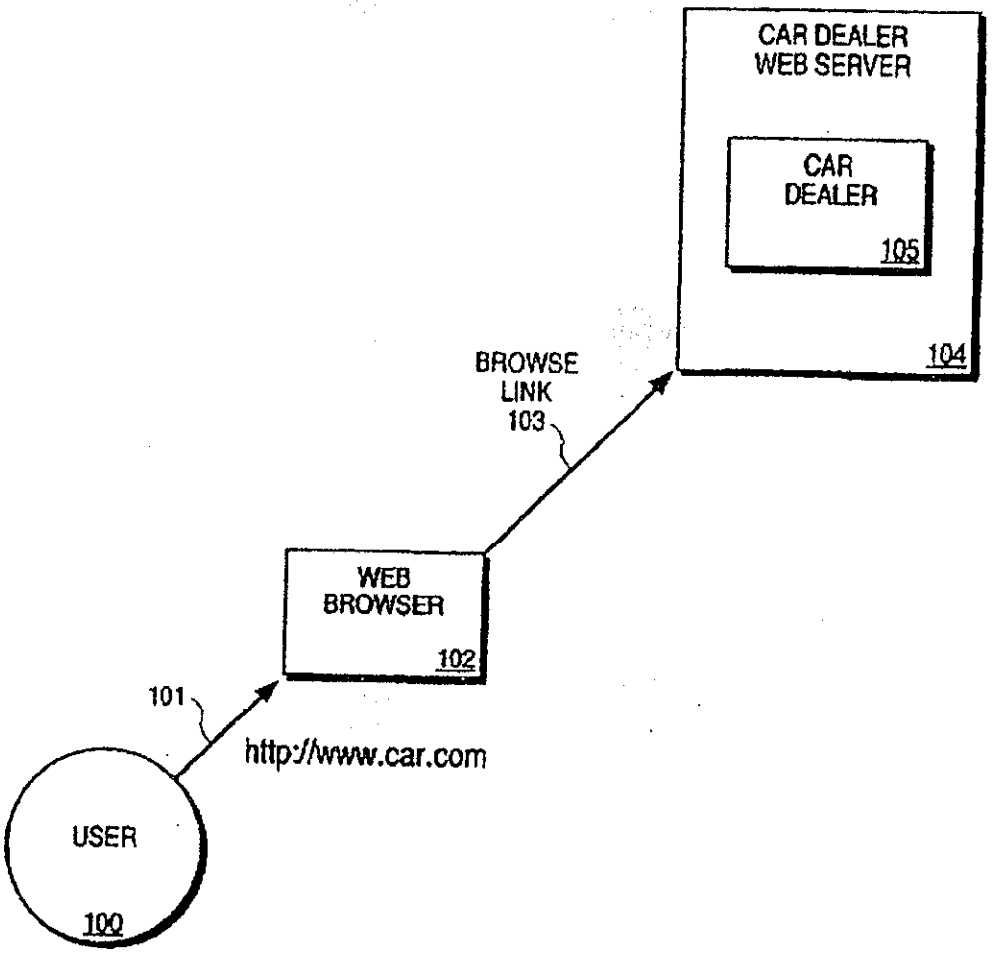


FIG. 1A (PRIOR ART)

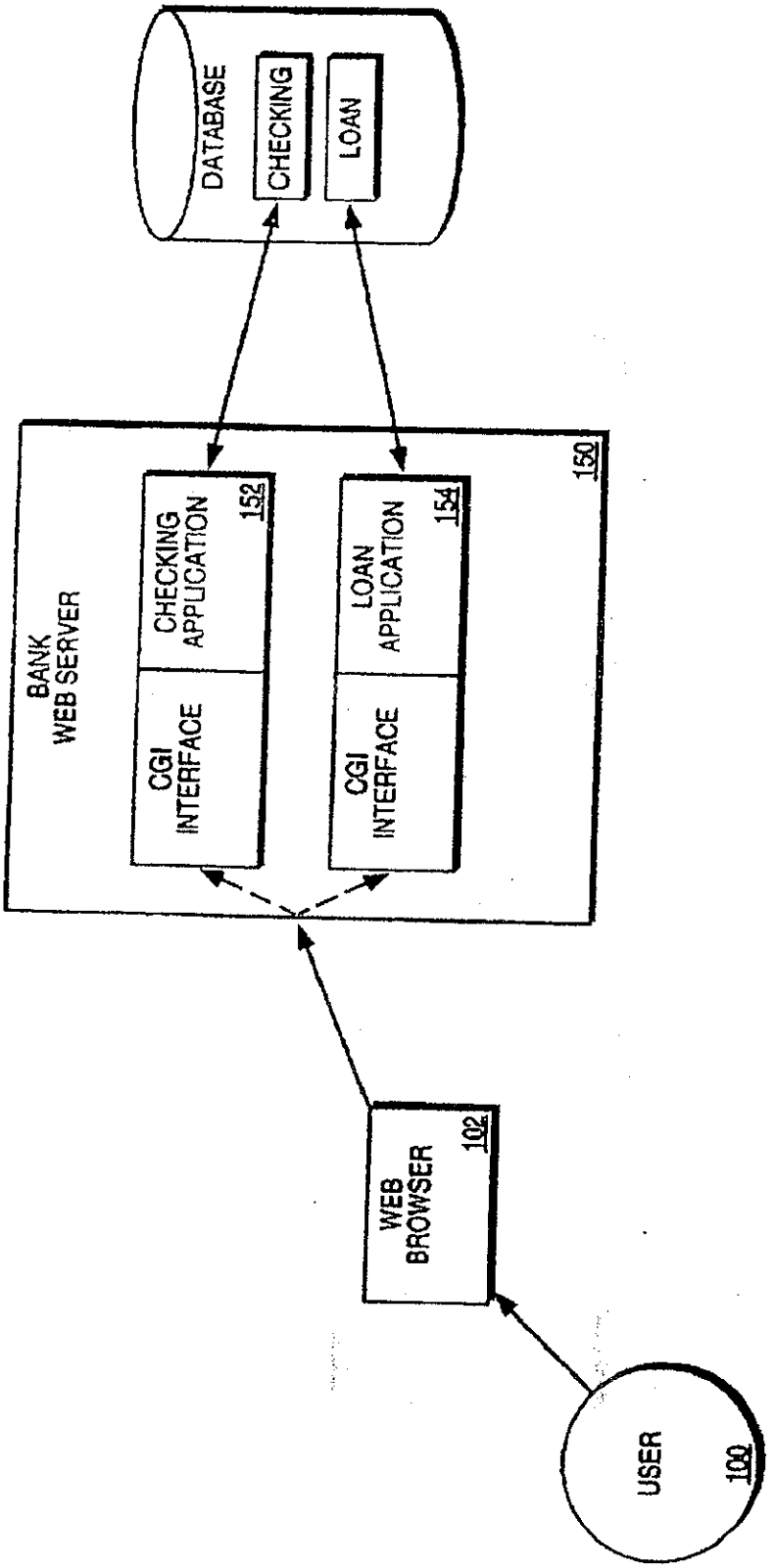


FIG. 1B (PRIOR ART)

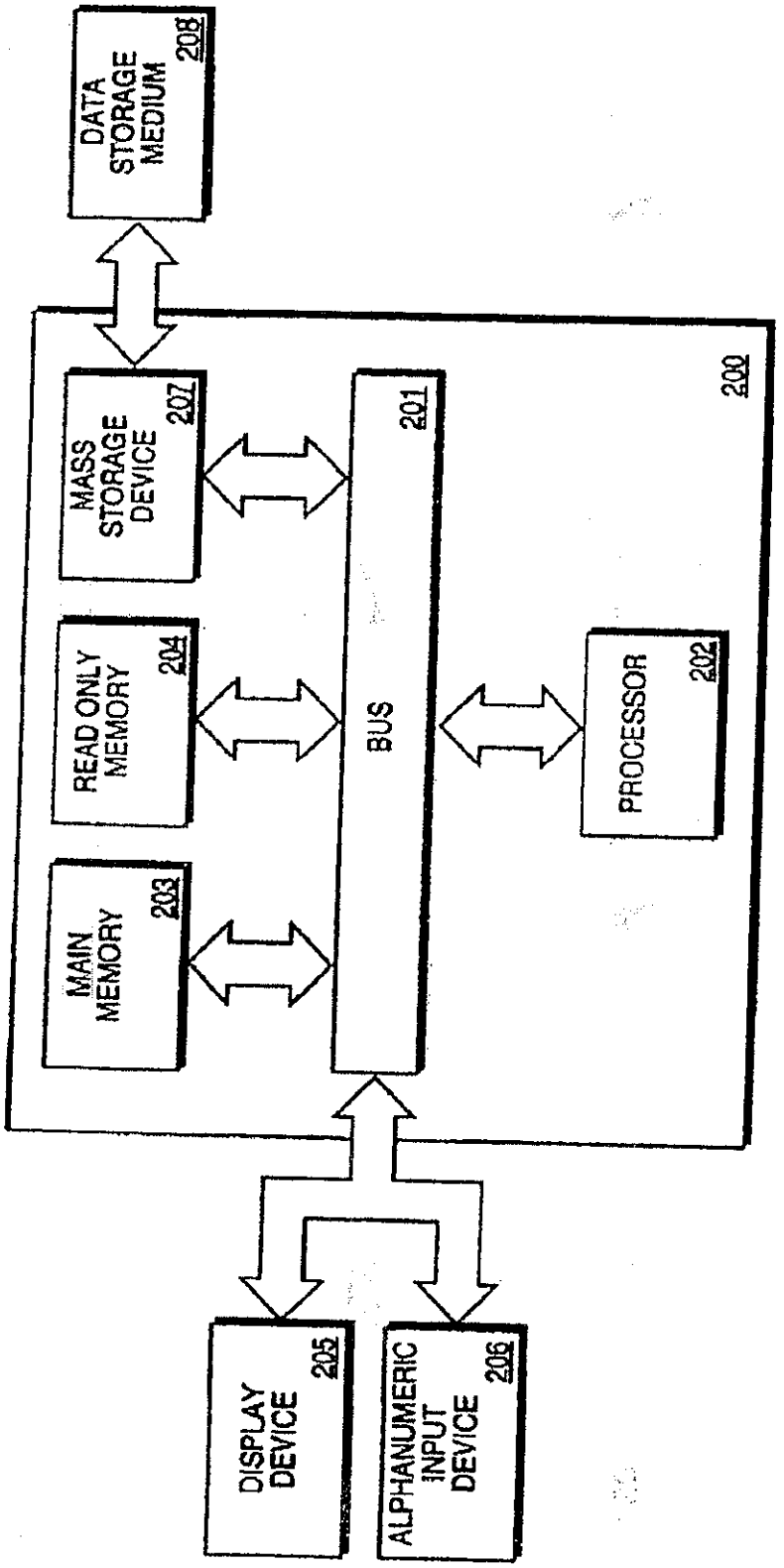

DATA STORAGE MEDIUM
208
200
MASS STORAGE DEVICE
207
201
READ ONLY MEMORY
204
BUS
PROCESSOR
202
MAIN MEMORY
203
DISPLAY DEVICE
205
ALPHANUMERIC INPUT DEVICE
206

FIG. 2

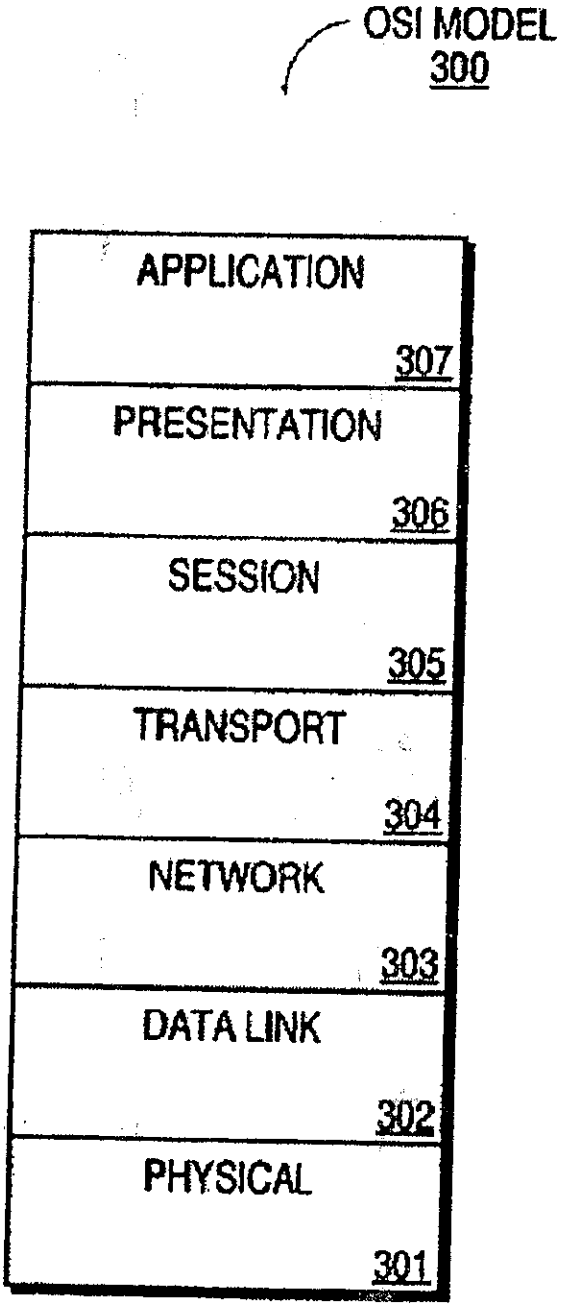

OSI MODEL
300
APPLICATION
307
PRESENTATION
306
SESSION
305
TRANSPORT
304
NETWORK
303
DATA LINK
302
PHYSICAL
301

FIG. 3

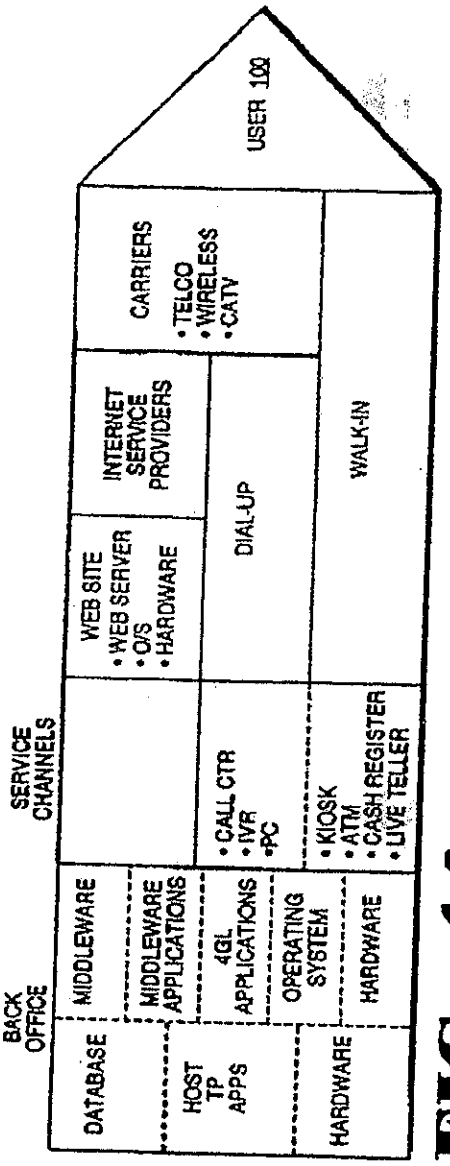

USER 100
CARRIERS
• TELCO
• WIRELESS
• CATV
INTERNET SERVICE PROVIDERS
WEB SITE
• WEB SERVER
• O/S
• HARDWARE
DIAL-UP
WALK-IN
SERVICE CHANNELS
• CALL CTR
• IVR
• PC
• KIOSK
• ATM
• CASH REGISTER
• LIVE TELLER
BACK OFFICE
MIDDLEWARE
MIDDLEWARE APPLICATIONS
4GL APPLICATIONS
OPERATING SYSTEM
HARDWARE
DATABASE
HOST TP APPS
HARDWARE

FIG. 4A

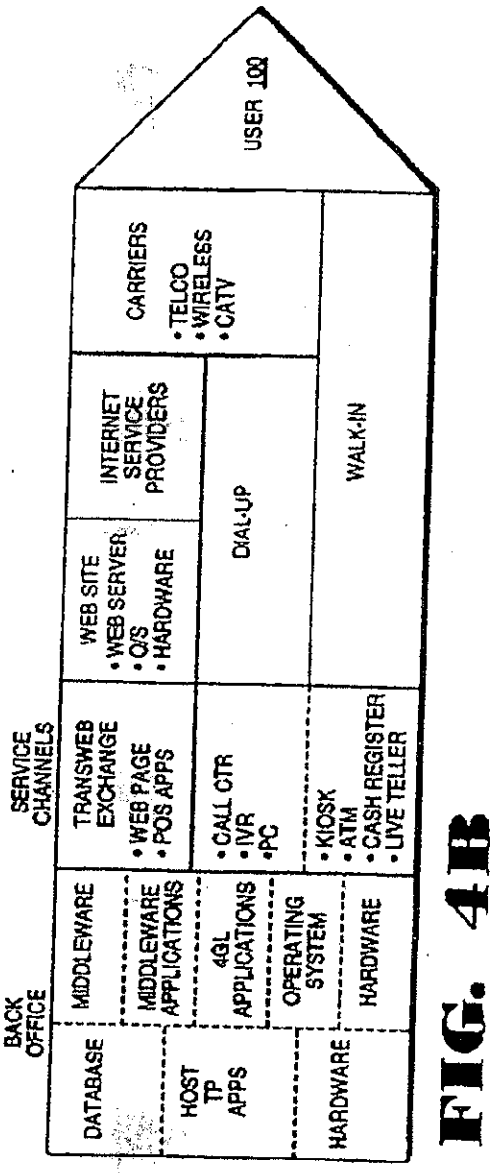

USER 100
CARRIERS
• TELCO
• WIRELESS
• CATV
INTERNET SERVICE PROVIDERS
WEB SITE
• WEB SERVER
• O/S
• HARDWARE
DIAL-UP
WALK-IN
SERVICE CHANNELS
TRANSWEB EXCHANGE
• WEB PAGE
• POS APPS
• CALL CTR
• IVR
• PC
• KIOSK
• ATM
• CASH REGISTER
• LIVE TELLER
BACK OFFICE
MIDDLEWARE
MIDDLEWARE APPLICATIONS
4GL APPLICATIONS
OPERATING SYSTEM
HARDWARE
DATABASE
HOST TP APPS
HARDWARE

FIG. 4B

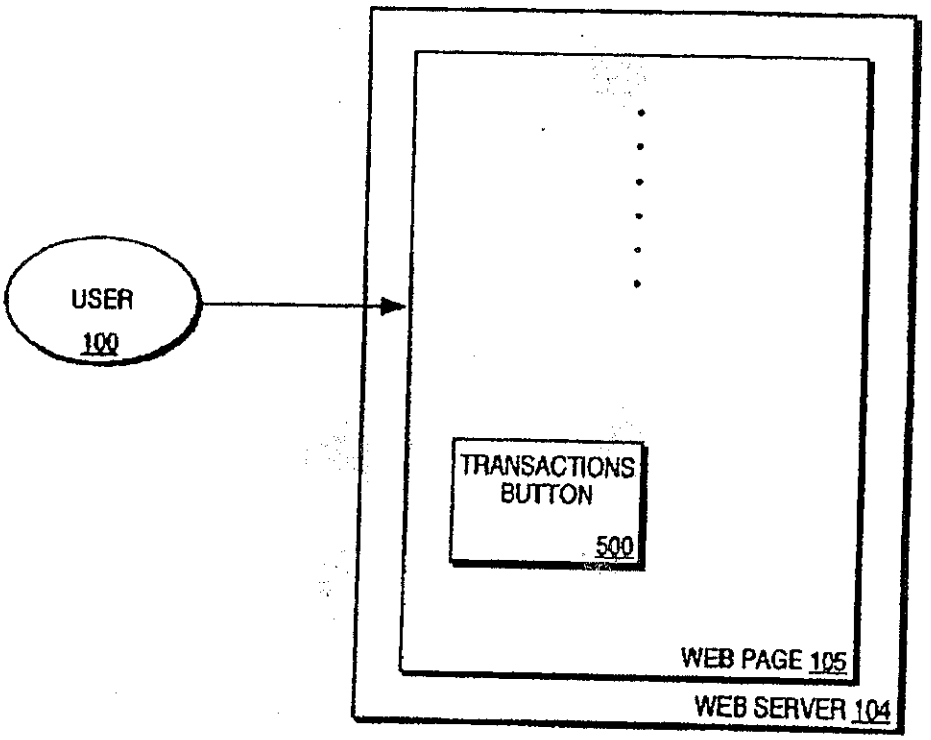

USER
100
TRANSACTIONS BUTTON
500
WEB PAGE 105
WEB SERVER 104

FIG. 5A

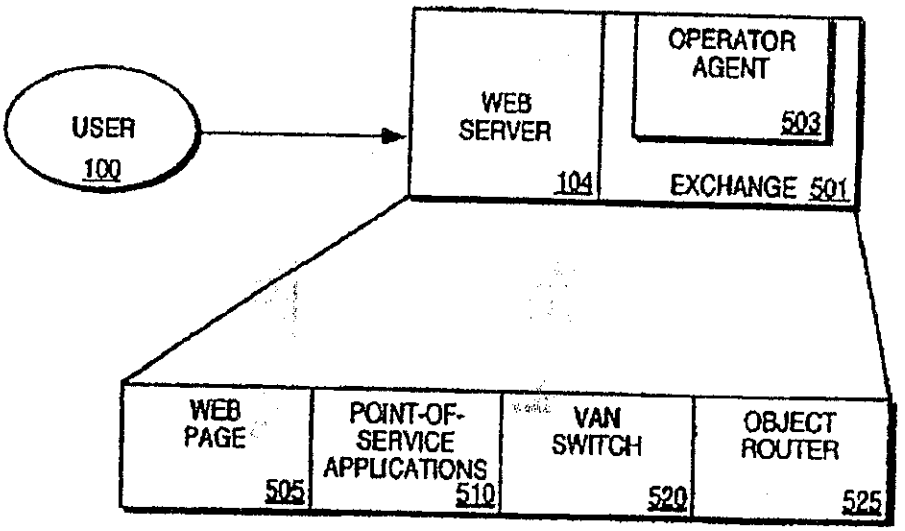

USER
100
WEB SERVER
104
OPERATOR AGENT
503
EXCHANGE 501
WEB PAGE
505
POINT-OF-SERVICE APPLICATIONS
510
VAN SWITCH
520
OBJECT ROUTER
525

FIG. 5B

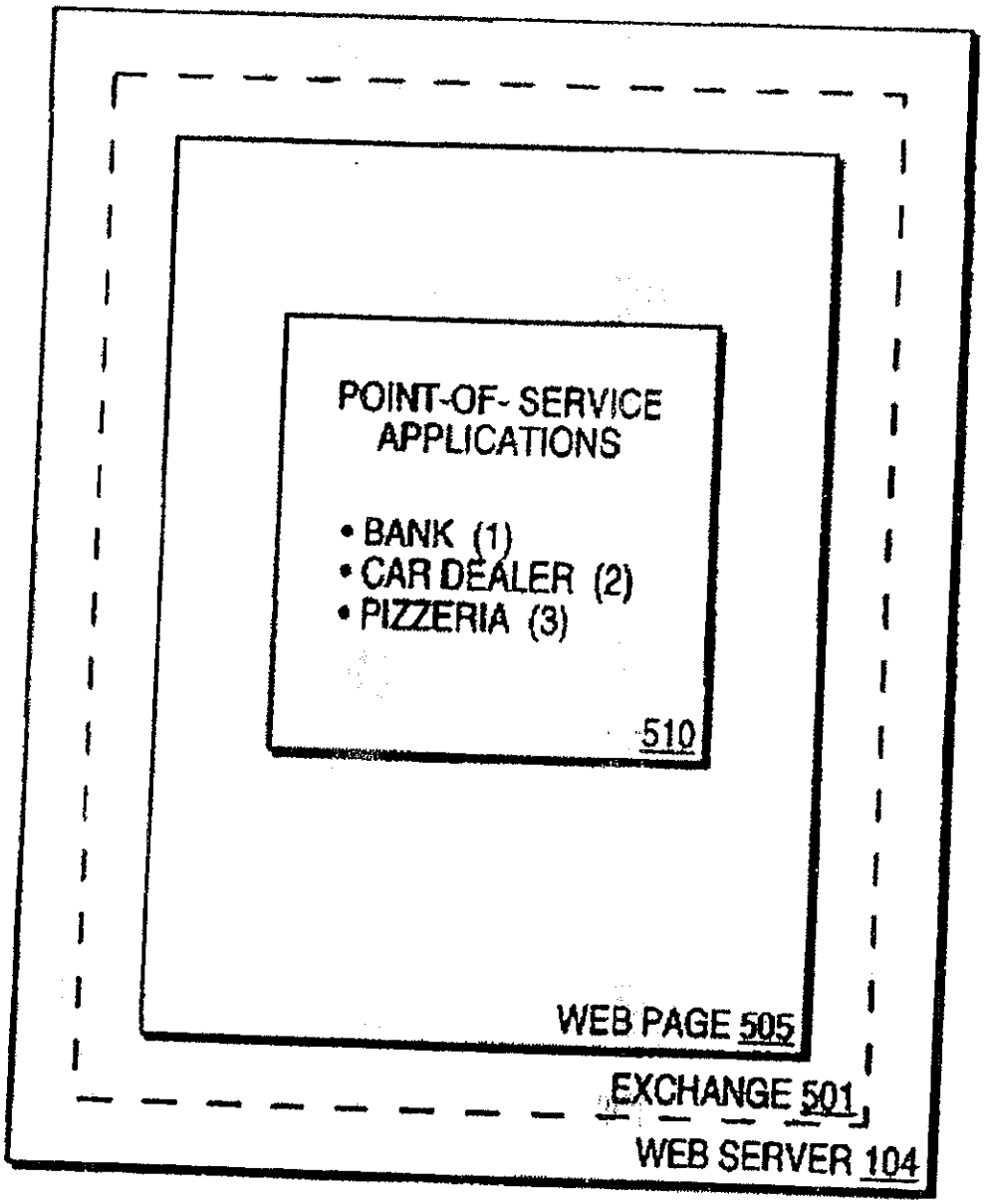

POINT-OF- SERVICE APPLICATIONS
• BANK (1)
• CAR DEALER (2)
• PIZZERIA (3)
510
WEB PAGE 505
EXCHANGE 501
WEB SERVER 104

FIG. 5C

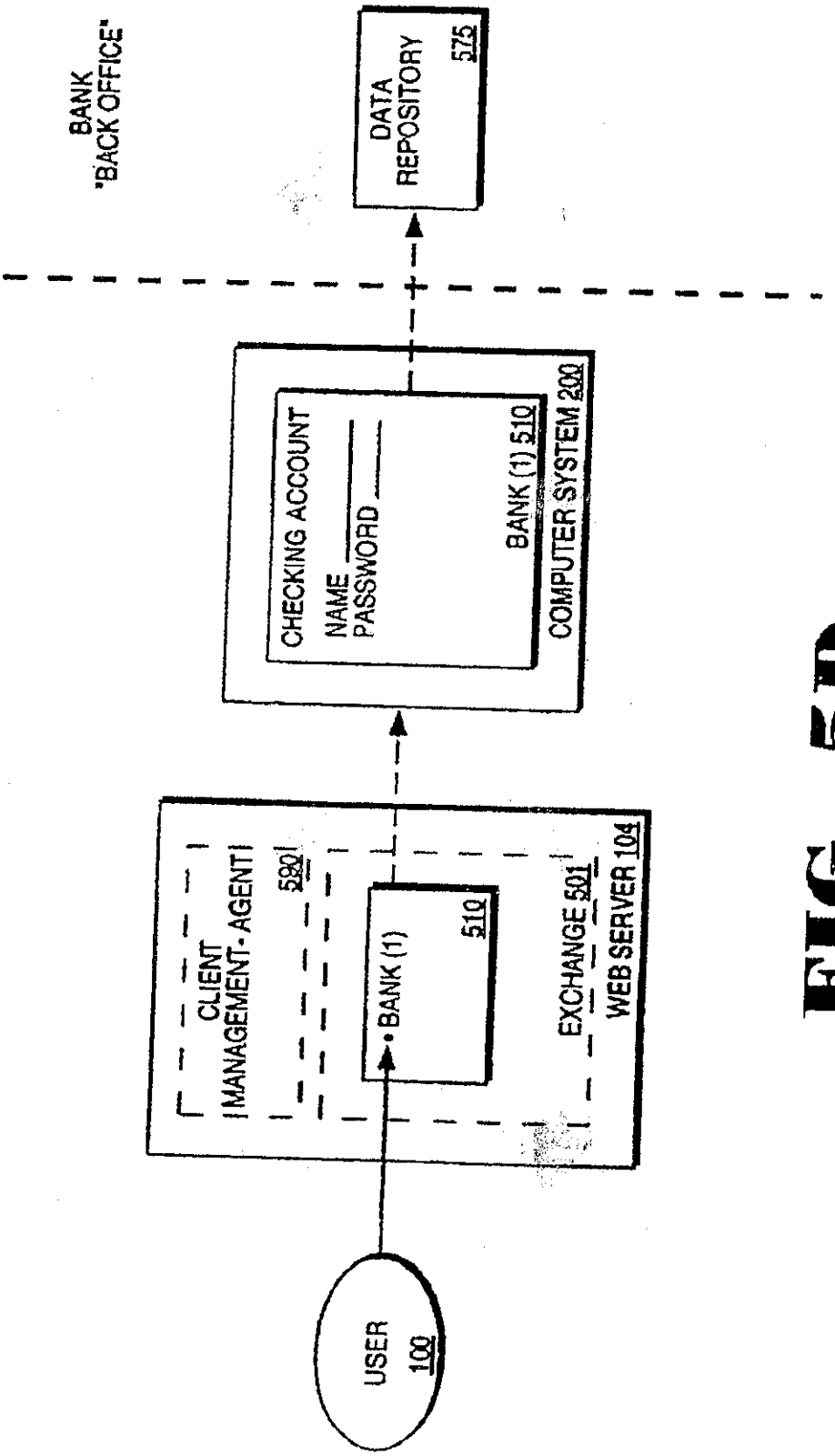

BANK "BACK OFFICE"
DATA REPOSITORY 575
CHECKING ACCOUNT
NAME
PASSWORD
BANK (1) 510
COMPUTER SYSTEM 200
CLIENT MANAGEMENT- AGENT 580
BANK (1) 510
EXCHANGE 501
WEB SERVER 104
USER 100

FIG. 5D

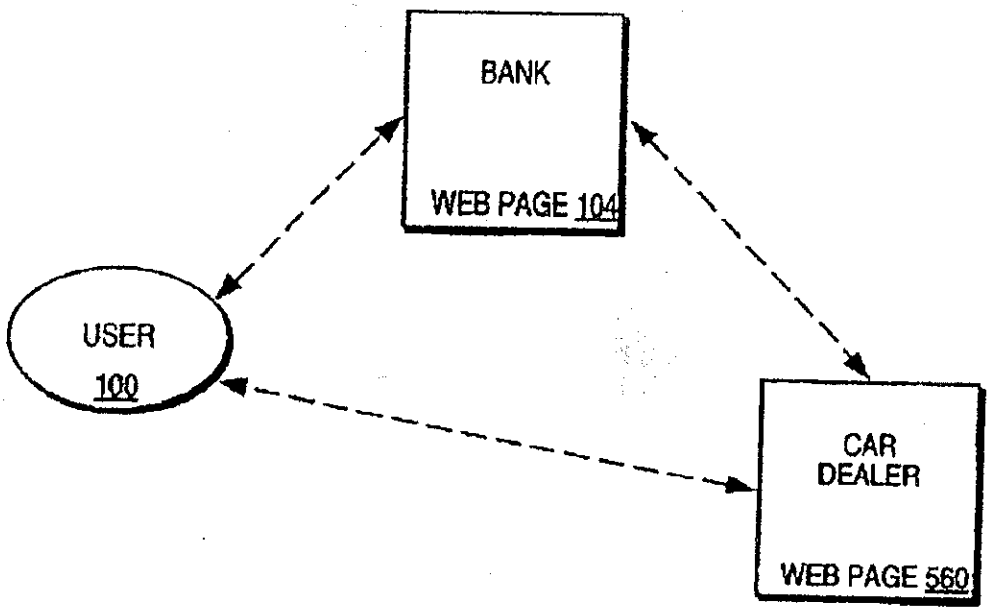


FIG. 5E

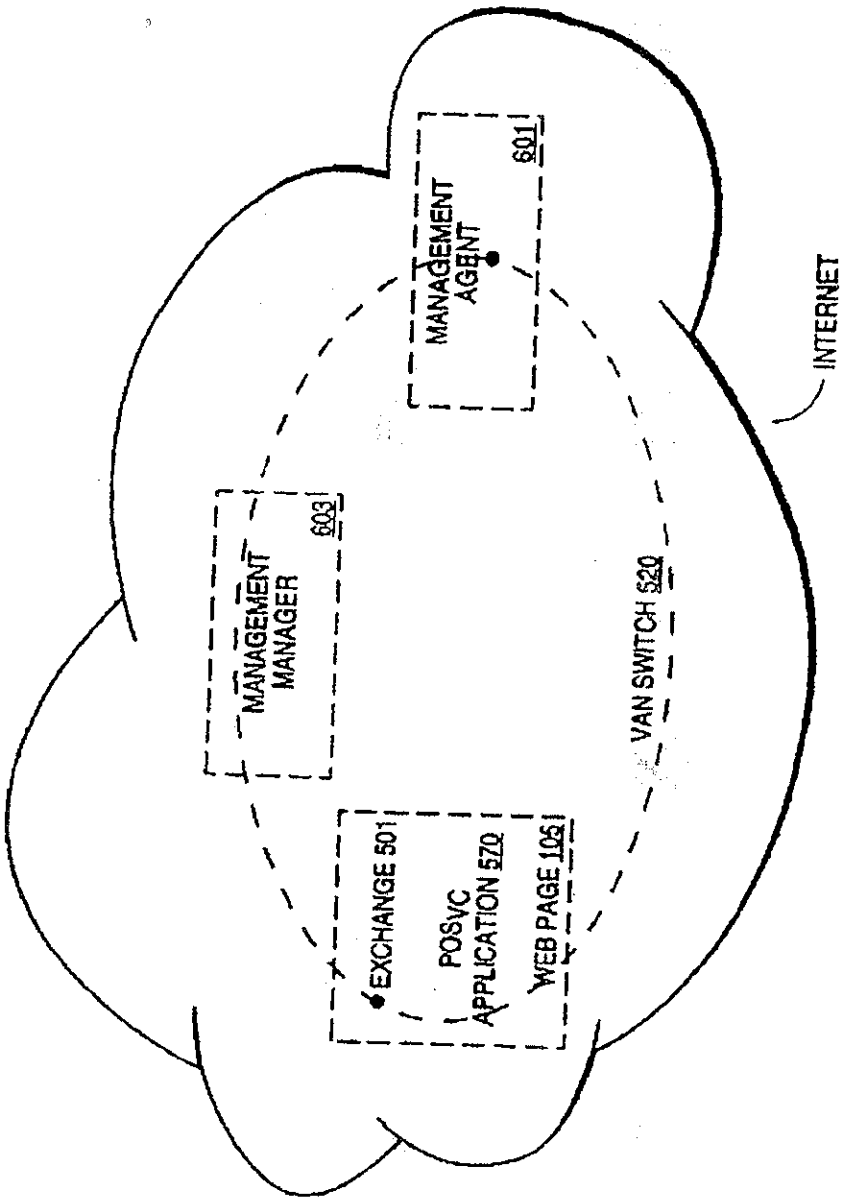

INTERNET
MANAGEMENT AGENT
601
MANAGEMENT MANAGER
603
VAN SWITCH 520
EXCHANGE 501
POSVC APPLICATION 570
WEB PAGE 105

FIG. 6A

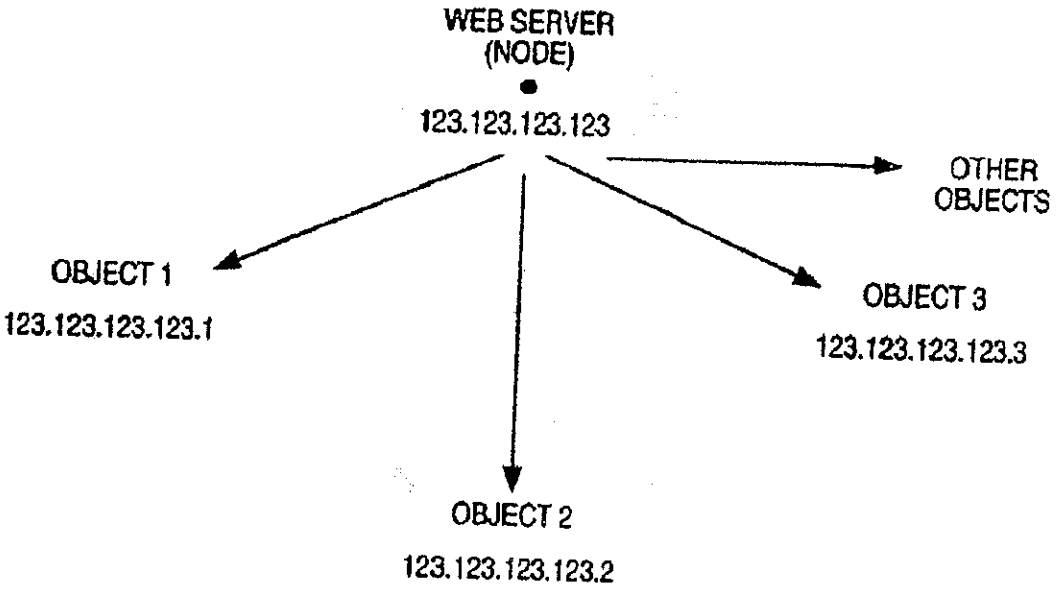

WEB SERVER
(NODE)
123.123.123.123
OTHER
OBJECTS
OBJECT 1
123.123.123.123.1
OBJECT 3
123.123.123.123.3
OBJECT 2
123.123.123.123.2

FIG. 6B

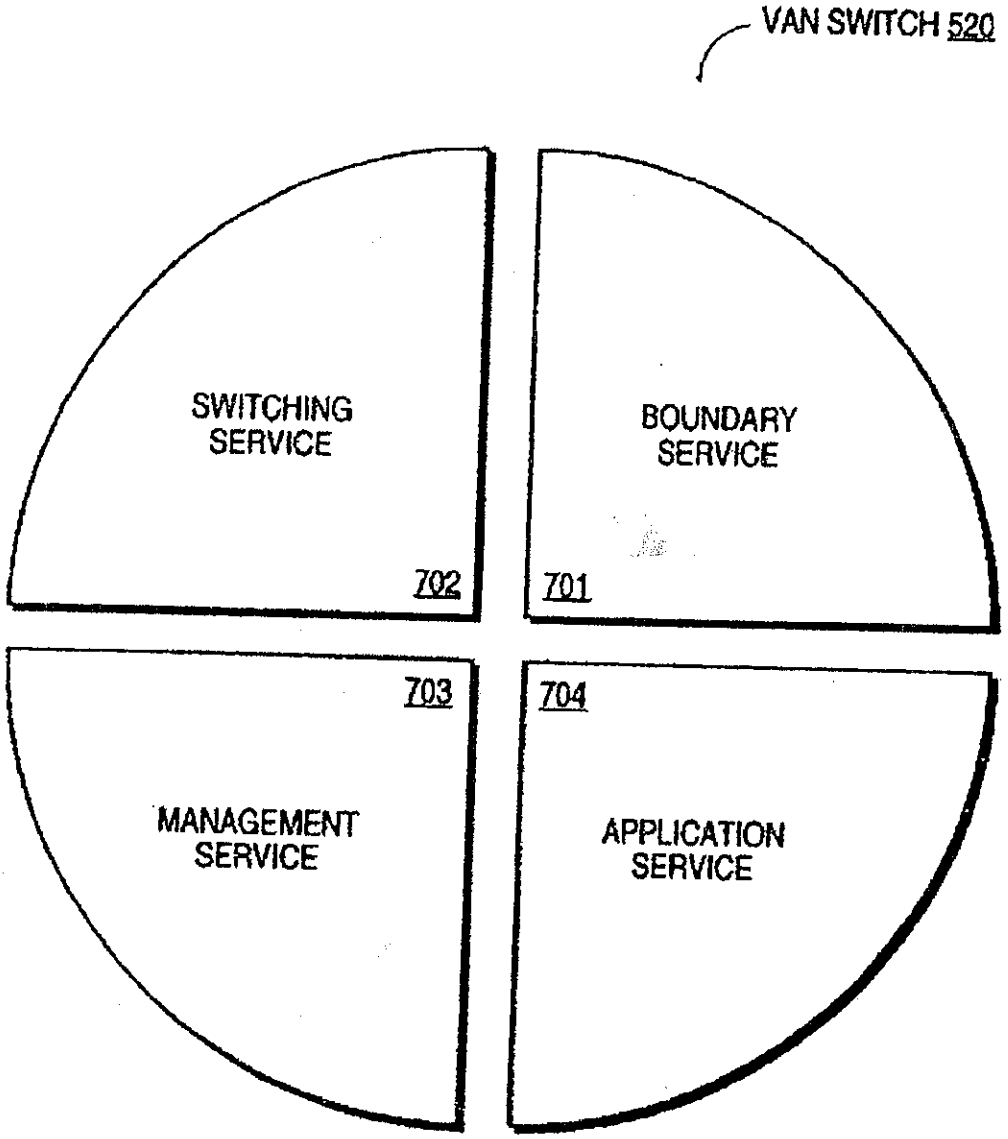

VAN SWITCH 520
SWITCHING SERVICE
702
BOUNDARY SERVICE
701
703
MANAGEMENT SERVICE
704
APPLICATION SERVICE

FIG. 7

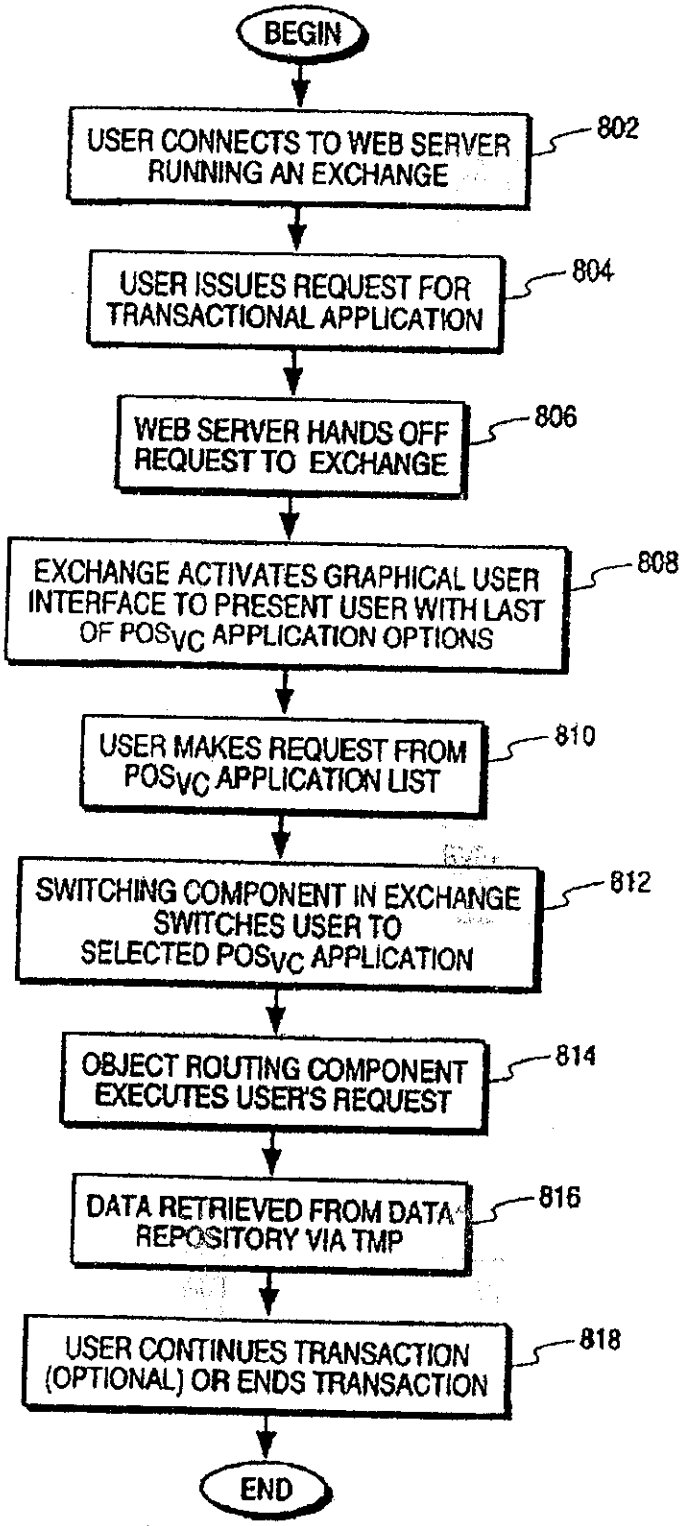

BEGIN
USER CONNECTS TO WEB SERVER RUNNING AN EXCHANGE
802
USER ISSUES REQUEST FOR TRANSACTIONAL APPLICATION
804
WEB SERVER HANDS OFF REQUEST TO EXCHANGE
806
EXCHANGE ACTIVATES GRAPHICAL USER INTERFACE TO PRESENT USER WITH LAST OF POSVC APPLICATION OPTIONS
808
USER MAKES REQUEST FROM POSVC APPLICATION LIST
810
SWITCHING COMPONENT IN EXCHANGE SWITCHES USER TO SELECTED POSVC APPLICATION
812
OBJECT ROUTING COMPONENT EXECUTES USER'S REQUEST
814
DATA RETRIEVED FROM DATA REPOSITORY VIA TMP
816
USER CONTINUES TRANSACTION (OPTIONAL) OR ENDS TRANSACTION
818
END

FIG. 8

WEB APPLICATION NETWORK PORTAL

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a divisional and claims the priority benefit of U.S. patent application Ser. No. 11/980,185 filed Oct. 30, 2007 now U.S. Pat. No. 8,037,158, which is a continuation-in-part of U.S. patent application Ser. No. 09/792,323, now U.S. Pat. No. 7,340,506, filed Feb. 23, 2001, which is a divisional of U.S. patent application Ser. No. 09/296,207, filed Apr. 21, 1999, now U.S. Pat. No. 6,212,556, which is a continuation-in-part of U.S. patent application Ser. No. 08/879,958, now U.S. Pat. No. 5,987,500, filed Jun. 20, 1997, which is a divisional and claims the priority benefit of U.S. patent application Ser. No. 08/700,726, now U.S. Pat. No. 5,778,178, filed Aug. 5, 1996, which claims the priority benefit of U.S. provisional application 60/006,634 filed Nov. 13, 1995. This application also claims benefit under 35 U.S.C. 119(e) to U.S. Provisional application Ser. No. 60/006,634 filed Nov. 13, 1995. The following applications are related applications: application Ser. Nos. 09/863,704; 12/628,066; 12/628,068; 12/628,069, 12/932,758 and 60/206,422.

BACKGROUND

1. Field of the Invention

The present invention relates to the area of Internet communications. Specifically, the present invention relates to a method and apparatus for configurable value-added network switching and object routing.

2. Background of the Invention

With the Internet and the World Wide Web ("the Web") evolving rapidly as a viable consumer medium for electronic commerce, new on-line services are emerging to fill the needs of on-line users. An Internet user today can browse on the Web via the use of a Web browser. Web browsers are software interfaces that run on Web clients to allow access to Web servers via a simple user interface. A Web user's capabilities today from a Web browser are, however, extremely limited. The user can perform one-way, browse-only interactions. Additionally, the user has limited "deferred" transactional capabilities, namely electronic mail (e-mail) capabilities. E-mail capabilities are referred to as "deferred transactions" because the consumer's request is not processed until the e-mail is received, read, and the person or system reading the e-mail executes the transaction. This transaction is thus not performed in real-time.

FIG. 1A illustrates typical user interactions on the Web today. User **100** sends out a request from Web browser **102** in the form of a universal resource locator (URL) **101** in the following manner: http://www.car.com. URL **101** is processed by Web browser **102** that determines the URL corresponds to car dealer Web page **105**, on car dealer Web server **104**. Web browser **102** then establishes browse link **103** to car dealer Web page **105**. User **100** can browse Web page **105** and select "hot links" to jump to other locations in Web page **105**, or to move to other Web pages on the Web. This interaction is typically a browse-only interaction. Under limited circumstances, the user may be able to fill out a form on car dealer Web page **105**, and e-mail the form to car dealer Web server **104**. This interaction is still strictly a one-way browse mode communications link, with the e-mail providing limited, deferred transactional capabilities.

Under limited circumstances, a user may have access to two-way services on the Web via Common Gateway Interface (CGI) applications. CGI is a standard interface for running external programs on a Web server. It allows Web servers to create documents dynamically when the server receives a request from the Web browser. When the Web server receives a request for a document, the Web server dynamically executes the appropriate CGI script and transmits the output of the execution back to the requesting Web browser. This interaction can thus be termed a "two-way" transaction. It is a severely limited transaction, however, because each CGI application is customized for a particular type of application or service.

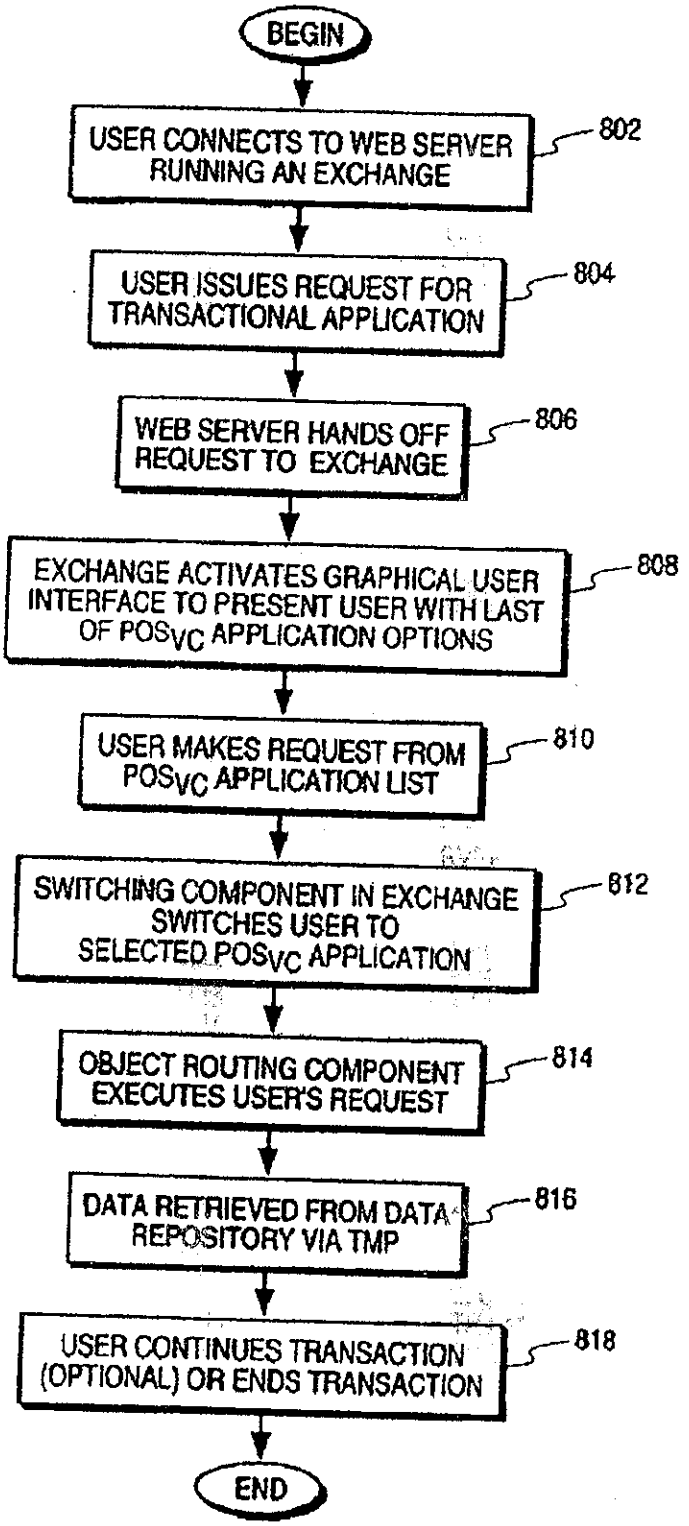
For example, as illustrated in FIG. 1B, user **100** may access bank **150**'s Web server and attempt to perform transactions on checking account **152** and to make a payment on loan account **154**. In order for user **100** to access checking account **152** and loan account **154** on the Web, CGI application scripts must be created for each account, as illustrated in FIG. 1B. The bank thus has to create individual scripts for each of its services to offer users access to these services. User **100** can then interact in a limited fashion with these individual applications. Creating and managing individual CGI scripts for each service is not a viable solution for merchants with a large number of services.

As the Web expands and electronic commerce becomes more desirable, the need increases for robust, real-time, bi-directional transactional capabilities on the Web. A true real-time, bi-directional transaction would allow a user to connect to a variety of services on the Web, and perform real-time transactions on those services. For example, although user **100** can browse car dealer Web page **105** today, the user cannot purchase the car, negotiate a car loan or perform other types of real-time, two-way transactions that he can perform with a live salesperson at the car dealership. Ideally, user **100** in FIG. 1A would be able to access car dealer Web page **105**, select specific transactions that he desires to perform, such as purchase a car, and perform the purchase in real-time, with two-way interaction capabilities. CGI applications provide user **100** with a limited ability for two-way interaction with car dealer Web page **105**, but due to the lack of interaction and management between the car dealer and the bank, he will not be able to obtain a loan and complete the purchase of the car via a CGI application. The ability to complete robust real-time, two-way transactions is thus not truly available on the Web today.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a method and apparatus for providing real-time, two-way transactional capabilities on the Web. Specifically, one embodiment of the present invention discloses a configurable value-added network switch for enabling real-time transactions on the World Wide Web. The configurable value added network switch comprises means for switching to a transactional application in response to a user specification from a World Wide Web application, means for transmitting a transaction request from the transactional application, and means for processing the transaction request.

According to another aspect of the present invention, a method and apparatus for enabling object routing on the World Wide Web is disclosed. The method for enabling object routing comprises the steps of creating a virtual information store containing information entries and attributes, associating each of the information entries and the attributes with an object identity, and assigning a unique network address to each of the object identities.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DATA RETRIEVED FROM DATA REPOSITORY VIA TMP
816
USER CONTINUES TRANSACTION (OPTIONAL) OR ENDS TRANSACTION
818
END

FIG. 8

Other objects, features and advantages of the present invention will be apparent from the accompanying drawings and from the detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

The features and advantages of the present invention will be apparent from the accompanying drawings and from the detailed description of the present invention as set forth below.

FIG. 1A is an illustration of a current user's browse capabilities on the Web via a Web browser.

FIG. 1B is an illustration of a current user's capabilities to perform limited transactions on the Web via CGI applications.

FIG. 2 illustrates a typical computer system on which the present invention may be utilized.

FIG. 3 illustrates the Open Systems Interconnection (OSI) Model.

FIG. 4A illustrates conceptually the user value chain as it exists today.

FIG. 4B illustrates one embodiment of the present invention.

FIG. 5A illustrates a user accessing a Web server including one embodiment of the present invention.

FIG. 5B illustrates the exchange component according to one embodiment of the present invention.

FIG. 5C illustrates an example of a point-of-service (POSvc) application list.

FIG. 5D illustrates a user selecting a bank POSvc application from the POSvc application list.

FIG. 5E illustrates a three-way transaction according to one embodiment of the present invention.

FIG. 6A illustrates a value-added network (VAN) switch.

FIG. 6B illustrates the hierarchical addressing tree structure of the networked objects in DOLSIBs.

FIG. 7 illustrates conceptually the layered architecture of a VAN switch.

FIG. 8 is a flow diagram illustrating one embodiment of the present invention.

DETAILED DESCRIPTION

The present invention relates to a method and apparatus for configurable value-added network switching and object routing and management. "Web browser" as used in the context of the present specification includes conventional Web browsers such as NCSA Mosaic™ from NCSA and Netscape Mosaic™ from Netscape™. The present invention is independent of the Web browser being utilized and the user can use any Web browser, without modifications to the Web browser. In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be apparent to one of ordinary skill in the art, however, that these specific details need not be used to practice the present invention. In other instances, well-known structures, interfaces and processes have not been shown in detail in order not to unnecessarily obscure the present invention.

FIG. 2 illustrates a typical computer system 200 in which the present invention operates. The preferred embodiment of the present invention is implemented on an IBM™ Personal Computer manufactured by IBM Corporation of Armonk, N.Y. Alternate embodiments may be implemented on a Macintosh™ computer manufactured by Apple™ Computer, Incorporated of Cupertino, Calif. It will be apparent to those

of ordinary skill in the art that other alternative computer system architectures may also be employed.

In general, such computer systems as illustrated by FIG. 2 comprise a bus 201 for communicating information, a processor 202 coupled with the bus 201 for processing information, main memory 203 coupled with the bus 201 for storing information and instructions for the processor 202, a read-only memory 204 coupled with the bus 201 for storing static information and instructions for the processor 202, a display device 205 coupled with the bus 201 for displaying information for a computer user, an input device 206 coupled with the bus 201 for communicating information and command selections to the processor 202, and a mass storage device 207, such as a magnetic disk and associated disk drive, coupled with the bus 201 for storing information and instructions. A data storage medium 208 containing digital information is configured to operate with mass storage device 207 to allow processor 202 access to the digital information on data storage medium 208 via bus 201.

Processor 202 may be any of a wide variety of general purpose processors or microprocessors such as the Pentium™ microprocessor manufactured by Intel™ Corporation or the Motorola™ 68040 or Power PC™ brand microprocessor manufactured by manufactured by Motorola™ Corporation. It will be apparent to those of ordinary skill in the art, however, that other varieties of processors may also be used in a particular computer system. Display device 205 may be a liquid crystal device, cathode ray tube (CRT), or other suitable display device. Mass storage device 207 may be a conventional hard disk drive, floppy disk drive, CD-ROM drive, or other magnetic or optical data storage device for reading and writing information stored on a hard disk, a floppy disk, a CD-ROM a magnetic tape, or other magnetic or optical data storage medium. Data storage medium 208 may be a hard disk, a floppy disk, a CD-ROM, a magnetic tape, or other magnetic or optical data storage medium.

In general, processor 202 retrieves processing instructions and data from a data storage medium 208 using mass storage device 207 and downloads this information into random access memory 203 for execution. Processor 202, then executes an instruction stream from random access memory 203 or read-only memory 204. Command selections and information input at input device 206 are used to direct the flow of instructions executed by processor 202. Equivalent input device 206 may also be a pointing device such as a conventional mouse or trackball device. The results of this processing execution are then displayed on display device 205.

The preferred embodiment of the present invention is implemented as a software module, which may be executed on a computer system such as computer system 200 in a conventional manner. Using well known techniques, the application software of the preferred embodiment is stored on data storage medium 208 and subsequently loaded into and executed within computer system 200. Once initiated, the software of the preferred embodiment operates in the manner described below.

FIG. 3 illustrates the Open Systems Interconnection (OSI) reference model. OSI Model 300 is an international standard that provides a common basis for the coordination of standards development, for the purpose of systems interconnection. The present invention is implemented to function as a routing switch within the "application layer" of the OSI model. The model defines seven layers, with each layer communicating with its peer layer in another node through the use of a protocol. Physical layer 301 is the lowest layer, with responsibility to transmit unstructured bits across a link. Data

link layer 302 is the next layer above physical layer 301. Data link layer 302 transmits chunks across the link and deals with problems like checksumming to detect data corruption, orderly coordination of the use of shared media and addressing when multiple systems are reachable. Network bridges operate within data link layer 302.

Network layer 303 enables any pair of systems in the network to communicate with each other. Network layer 303 contains hardware units such as routers that handle routing, packet fragmentation and reassembly of packets. Transport layer 304 establishes a reliable communication stream between a pair of systems, dealing with errors such as lost packets, duplicate packets, packet reordering and fragmentation. Session layer 305 offers services above the simple communication stream provided by transport layer 304. These services include dialog control and chaining. Presentation layer 306 provides a means by which OSI compliant applications can agree on representations for data. Finally, application layer 307 includes services such as file transfer, access and management services (FTAM), electronic mail and virtual terminal (VT) services. Application layer 307 provides a means for application programs to access the OSI environment. As described above, the present invention is implemented to function as a routing switch in application layer 307. Application layer routing creates an open channel for the management, and the selective flow of data from remote databases on a network.

A. Overview

FIG. 4A illustrates conceptually the user value chain as it exists today. The user value chain in FIG. 4A depicts the types of transactions that are performed today, and the channels through which the transactions are performed. A "transaction" for the purposes of the present invention includes any type of commercial or other type of interaction that a user may want to perform. Examples of transactions include a deposit into a bank account, a request for a loan from a bank, a purchase of a car from a car dealership or a purchase of a car with financing from a bank. A large variety of other transactions are also possible.

A typical user transaction today may involve user 100 walking into a bank or driving up to a teller machine, and interacting with a live bank teller, or automated teller machine (ATM) software applications. Alternatively, user 100 can perform the same transaction by using a personal computer (PC), activating application software on his PC to access his bank account, and dialing into the bank via a modem line. If user 100 is a Web user, however, there is no current mechanism for performing a robust, real-time transaction with the bank, as illustrated in FIG. 4A. CGI scripts provide only limited two-way capabilities, as described above. Thus, due to this lack of a robust mechanism by which real-time Web transactions can be performed, the bank is unable to be a true "Web merchant," namely a merchant capable of providing complete transactional services on the Web.

According to one embodiment of the present invention, as illustrated in FIG. 4B, each merchant that desires to be a Web merchant can provide real-time transactional capabilities to users who desire to access the merchants' services via the Web. This embodiment includes a service network running on top of a facilities network, namely the Internet, the Web or e-mail networks. For the purposes of this application, users are described as utilizing PC's to access the Web via Web server "switching" sites. (Switching is described in more detail below). Users may also utilize other personal devices such as network computers or cellular devices to access the merchants' services via appropriate switching sites. These switching sites include non-Web network computer sites and cellular provider sites. Five components interact to provide this service network functionality, namely an exchange, an operator agent, a management agent, a management manager and a graphical user interface. All five components are described in more detail below.

As illustrated in FIG. 5A, user 100 accesses Web server 104. Having accessed Web server 104, user 100 can decide that he desires to perform real-time transactions. When Web server 104 receives user 100's indication that he desires to perform real-time transactions, the request is handed over to an exchange component. Thus, from Web page 105, for example, user 100 can select button 500, entitled "Transactions" and Web server 104 hands user 100's request over to the exchange component. The button and the title can be replaced by any mechanism that can instruct a Web server to hand over the consumer's request to the exchange component.

FIG. 5B illustrates exchange 501. Exchange 501 comprises Web page 505 and point-of-service (POSvc) applications 510. Exchange 501 also conceptually includes a switching component and an object routing component (described in more detail below). POSvc applications 510 are transactional applications, namely applications that are designed to incorporate and take advantage of the capabilities provided by the present invention. Although exchange 501 is depicted as residing on Web server 104, the exchange can also reside on a separate computer system that resides on the Internet and has an Internet address. Exchange 501 may also include operator agent 503 that interacts with a management manager (described in more detail below). Exchange 501 creates and allows for the management (or distributed control) of a service network, operating within the boundaries of an IP-based facilities network. Thus, exchange 501 and a management agent component, described in more detail below, under the headings "VAN Switch and Object Routing," together perform the switching, object routing, application and service management functions according to one embodiment of the present invention.

Exchange 501 processes the consumer's request and displays an exchange Web page 505 that includes a list of POSvc applications 510 accessible by exchange 501. A POSvc application is an application that can execute the type of transaction that the user may be interested in performing. The POSvc list is displayed via the graphical user interface component. One embodiment of the present invention supports HyperText Markup Language as the graphical user interface component. Virtual Reality Markup Language and Java™ are also supported by this embodiment. A variety of other graphical user interface standards can also be utilized to implement the graphical user interface.

An example of a POSvc application list is illustrated in FIG. 5C. User 100 can thus select from POSvc applications Bank 510(1), Car Dealer 510(2) or Pizzeria 510(3). Numerous other POSvc applications can also be included in this selection. If user 100 desires to perform a number of banking transactions, and selects the Bank application, a Bank POSvc application will be activated and presented to user 100, as illustrated in FIG. 5D. For the purposes of illustration, exchange 501 in FIG. 5D is shown as running on a different computer system (Web server 104) from the computer systems of the Web merchants running POSvc applications (computer system 200). Exchange 501 may, however, also be on the same computer system as one or more of the computer systems of the Web merchants.

Once Bank POSvc application 510 has been activated, user 100 will be able to connect to Bank services and utilize the application to perform banking transactions, thus accessing

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data from a host or data repository **575** in the Bank "Back Office." The Bank Back Office comprises legacy databases and other data repositories that are utilized by the Bank to store its data. This connection between user **100** and Bank services is managed by exchange **501**. As illustrated in FIG. **5D**, once the connection is made between Bank POSvc application **510(1)**, for example, and Bank services, an operator agent on Web server **104** may be activated to ensure the availability of distributed functions and capabilities.

Each Web merchant may choose the types of services that it would like to offer its clients. In this example, if Bank decided to include in their POSvc application access to checking and savings accounts, user **100** will be able to perform real-time transactions against his checking and savings accounts. Thus, if user **100** moves $500 from his checking account into his savings account, the transaction will be performed in real-time, in the same manner the transaction would have been performed by a live teller at the bank or an ATM machine. Therefore, unlike his prior access to his account, user **100** now has the capability to do more than browse his bank account. The ability to perform these types of robust, real-time transactions from a Web client is a significant aspect of the present invention.

Bank can also decide to provide other types of services in POSvc application **510(1)**. For example, Bank may agree with Car dealership to allow Bank customers to purchase a car from that dealer, request a car loan from Bank, and have the entire transaction performed on the Web, as illustrated in FIG. **5E**. In this instance, the transactions are not merely two-way, between the user and Bank, but three-way, amongst the consumer, Bank and Car dealership. According to one aspect of the present invention, this three-way transaction can be expanded to n-way transactions, where n represents a predetermined number of merchants or other service providers who have agreed to cooperate to provide services to users. The present invention therefore allows for "any-to-any" communication and transactions on the Web, thus facilitating a large, flexible variety of robust, real-time transactions on the Web.

Finally, Bank may also decide to provide intra-merchant or intra-bank services, together with the inter-merchant services described above. For example, if Bank creates a POSvc application for use by the Bank Payroll department, Bank may provide its own employees with a means for submitting timecards for payroll processing by the Bank's Human Resources (HR) Department. An employee selects the Bank HR POSvc application, and submits his timecard. The employee's timecard is processed by accessing the employee's payroll information, stored in the Bank's Back Office. The transaction is thus processed in real-time, and the employee receives his paycheck immediately.

B. Van Switching and Object Routing

As described above, exchange **501** and management agent **601**, illustrated in FIG. **6A**, together constitute a value-added network (VAN) switch. These two elements may take on different roles as necessary, including peer-to-peer, client-server or master-slave roles. Management manager **603** is illustrated as residing on a separate computer system on the Internet. Management manager **603** can, however, also reside on the same machine as exchange **501**. Management manager **603** interacts with the operator agent **503** residing on exchange **501**.

VAN switch **520** provides multi-protocol object routing, depending upon the specific VAN services chosen. This multi-protocol object routing is provided via a proprietary protocol, TransWeb™ Management Protocol (TMP). TMP incorporates the same security features as the traditional Simple Network Management Protocol, SNMP. It also allows for the integration of other traditional security mechanisms, including RSA security mechanisms.

One embodiment of the present invention utilizes TMP and distributed on-line service information bases (DOLSIBs) to perform object routing. Alternatively, TMP can incorporate s-HTTP, Java™, the WinSock API or ORB with DOLSIBs to perform object routing. DOLSIBs are virtual information stores optimized for networking. All information entries and attributes in a DOLSIB virtual information store are associated with a networked object identity. The networked object identity identifies the information entries and attributes in the DOLSIB as individual networked objects, and each networked object is assigned an Internet address. The Internet address is assigned based on the IP address of the node at which the networked object resides.

For example, in FIG. **5A**, Web server **104** is a node on the Internet, with an IP address. All networked object associated with Web server **104** will therefore be assigned an Internet address based on the Web server **104**'s IP address. These networked objects thus "branch" from the node, creating a hierarchical tree structure. The Internet address for each networked object in the tree essentially establishes the individual object as an "IP-reachable" or accessible node on the Internet. TMP utilizes this Internet address to uniquely identify and access the object from the DOLSIB. FIG. **6B** illustrates an example of this hierarchical addressing tree structure.

Each object in the DOLSIB has a name, a syntax and an encoding. The name is an administratively assigned object ID specifying an object type. The object type together with the object instance serves to uniquely identify a specific instantiation of the object. For example, if object **610** is information about models of cars, then one instance of that object would provide user **100** with information about a specific model of the car while another instance would provide information about a different model of the car. The syntax of an object type defines the abstract data structure corresponding to that object type. Encoding of objects defines how the object is represented by the object type syntax while being transmitted over the network.

C. Management and Administration

As described above, exchange **501** and management agent **601** together constitute a VAN switch. FIG. **7** illustrates conceptually the layered architecture of VAN switch **520**. Specifically, boundary service **701** provides the interfaces between VAN switch **520**, the Internet and the Web, and multi-media end user devices such as PCs, televisions or telephones. Boundary service **701** also provides the interface to the on-line service provider. A user can connect to a local application, namely one accessible via a local VAN switch, or be routed or "switched" to an application accessible via a remote VAN switch.

Switching service **702** is an OSI application layer switch. Switching service **702** thus represents the core of the VAN switch. It performs a number of tasks including the routing of user connections to remote VAN switches, described in the paragraph above, multiplexing and prioritization of requests, and flow control. Switching service **702** also facilitates open systems' connectivity with both the Internet (a public switched network) and private networks including back office networks, such as banking networks. Interconnected application layer switches form the application network backbone. These switches are one significant aspect of the present invention.

Management service **703** contains tools such as Information Management Services (IMS) and application Network Management Services (NMS). These tools are used by the end users to manage network resources, including VAN

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switches. Management service **703** also provides applications that perform Operations, Administration, Maintenance & Provisioning (OAM&P) functions. These OAM&P functions include security management, fault management, configuration management, performance management and billing management. Providing OAM&P functions for applications in this manner is another significant aspect of the present invention.

Finally, application service **704** contains application programs that deliver customer services. Application service **704** includes POSvc applications such as Bank POSvc described above, and illustrated in FIG. **6**A. Other examples of VAN services include multi-media messaging, archival/retrieval management, directory services, data staging, conferencing, financial services, home banking, risk management and a variety of other vertical services. Each VAN service is designed to meet a particular set of requirements related to performance, reliability, maintenance and ability to handle expected traffic volume. Depending on the type of service, the characteristics of the network elements will differ. VAN service **704** provides a number of functions including communications services for both management and end users of the network and control for the user over the user's environment.

FIG. **8** is a flow diagram illustrating one embodiment of the present invention. A user connects to a Web server running an exchange component in step **802**. In step **804**, the user issues a request for a transactional application, and the web server hands off the request to an exchange in step **806**. The exchange activates a graphical user interface to present user with a list of POSvc application options in step **808**. In step **810**, the user makes a selection from the POSvc application list. In step **812**, the switching component in the exchange switches the user to the selected POSvc application, and in step **814**, the object routing component executes the user's request. Data is retrieved from the appropriate data repository via TMP in step **816**, and finally, the user may optionally continue the transaction in step **818** or end the transaction.

Thus, a configurable value-added network switching and object routing method and apparatus is disclosed. These specific arrangements and methods described herein are merely illustrative of the principles of the present invention. Numerous modifications in form and detail may be made by those of ordinary skill in the art without departing from the scope of the present invention. Although this invention has been shown in relation to a particular preferred embodiment, it should not be considered so limited. Rather, the present invention is limited only by the scope of the appended claims.

What is claimed is:

1. A system, comprising:

a Web server, including a processor and a memory, for offering one or more Web applications as respective point-of-service applications in a point-of-service application list on a Web page;

each Web application of the one or more Web applications for requesting a real-time Web transaction;

a value-added network (VAN) switch running on top of a facilities network selected from a group consisting of the World Wide Web, the Internet and an e-mail network, the VAN switch for enabling the real-time Web transactions from the one or more Web applications;

a service network running on top of the facilities network for connecting through the Web server to a back-end transactional application; and

a computer system executing the Back-end transactional application for processing the transaction request in real-time.

2. The system of claim **1**, wherein the VAN switch is an application layer switch in the application layer of the OSI model.

3. The system of claim **1**, wherein the VAN switch enables the switching to Web merchant services in response to a Web server's receipt of a selection of one of the point-of-service Web applications corresponding to the Web merchant services from the point-of-service application list on the Web page.

4. The system of claim **1**, wherein each Web merchant service includes one of the one or more Web applications offered as a VAN service, utilizing the VAN switch.

5. The system of claim **1**, wherein each Web application of the one or more Web applications is a value-added network (VAN) service or online service atop the Web, utilizing the VAN switch.

6. The system of claim **1**, wherein the service network includes the one or more Web applications and wherein the service network manages the flow of real-time Web transactions from the one or more Web applications and includes the VAN switch.

7. The system of claim **1**, wherein the Web server is configured to receive a Web transaction request and wherein the Web transaction request is a request to perform one of the real-time Web transactions from one of the one or more Web applications, utilizing the VAN switch.

8. The system of claim **1**, further comprising:

a computer system executing a back-end transactional application for processing the transaction request in real-time, wherein said computer system includes a data repository, wherein the data repository is a data repository to store banking data, and wherein retrieving data includes retrieving banking data to complete a real-time Web banking transaction as one of the real-time Web transactions from a banking Web application as one of the one or more Web applications.

9. The system of claim **1**, further comprising the one or more Web applications offered as software-as-a-service atop the Web.

10. A method for performing real-time Web transactions from a Web application, comprising:

receiving a request at a Web server, including a processor and a memory, for a real-time Web transaction from a Web application on a Web page, wherein the Web server is configured to hand over the request to a Value Added Network (VAN) switch;

offering a plurality of Web applications including the Web application on a Web page, upon receipt from a Web server a selection of the Web application from the offered Web applications, the Web application corresponding to a respective back-end transactional application, wherein the back-end transactional application is an application running at the back-office server of one or more Web merchants or at the back-end;

receiving a request for Web merchant services upon receipt by a Web server a selection of the Web application, wherein the request for Web merchant services is a request to connect to the selected back-end transactional application to perform an interactive real-time Web transaction from the Web application, wherein the transactional application is an on-line service provided by one or more Web merchants or the back-end;

switching utilizing the VAN switch to the back-end transactional application in response to receiving the request from the Web server;

providing distributed control of a service network, operating within the boundaries of an IP-based facilities network;

connecting to specified ones of the Web merchant services or to back-end services, wherein the connection to the Web merchant services or back-end transactional services is managed;

accessing data from a host or data repository coupled to the back office server of one or more Web merchants or to the back-end transactional application, wherein the back office server or back-end is coupled to legacy databases and other data repositories that are utilized by the one or more of the Web merchants or the back-end transactional application to store data; and

completing the real-time Web transactions from the Web application.

11. The method of claim 10, wherein the real-time Web transactions are Web transactions from the Web application accessing a value-added network service.

12. A computer-implemented system, operated by a business entity comprising:

a Web application network portal, wherein the portal includes memory and a processor and one or more Web applications offered respectively by one or more Web merchants or other service providers, or by multiple sub-entities of the business entity who have agreed to cooperate to provide on-line Value Added Network (VAN) services atop the Web for access by employees of the business entity;

a list of one or more point-of-service employee Web applications on a Web page offered by the business entity that operates the portal, said portal allowing access to the one or more point-of-service applications on the Web page from said list, and wherein the portal offers the one or more point-of-service applications as on-line services on the Web page, and further wherein the portal is operated by the business entity over a service network running on top of a facilities network, the facilities network being selected from a group consisting of: the World Wide Web, the Internet and email networks, said service network including a VAN Switch;

one or more back-end transactional applications running at one or more back-end host computers, corresponding, respectively to the one or more point-of-service applications accessed, to complete a real-time Web transaction from the Web application on the Web page.

13. The portal of claim 12, wherein the one or more Web applications include a plurality of point-of-service applications on the Web page, wherein the business entity and the sub-entities offer Web applications which are selected from a group consisting of payroll Web applications, human resources Web applications, expense report Web applications, time card Web applications, travel Web applications, vacation Web applications, financial Web applications and sales commission Web applications.

* * * * *

UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA

NOTICE OF ASSIGNMENT TO UNITED STATES MAGISTRATE JUDGE FOR DISCOVERY

This case has been assigned to District Judge George King and the assigned discovery Magistrate Judge is John E. McDermott.

The case number on all documents filed with the Court should read as follows:

CV12- 10012 GHK (JEMx)

Pursuant to General Order 05-07 of the United States District Court for the Central District of California, the Magistrate Judge has been designated to hear discovery related motions.

All discovery related motions should be noticed on the calendar of the Magistrate Judge

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NOTICE TO COUNSEL

A copy of this notice must be served with the summons and complaint on all defendants (if a removal action is filed, a copy of this notice must be served on all plaintiffs).

Subsequent documents must be filed at the following location:

[x] **Western Division**
312 N. Spring St., Rm. G-8
Los Angeles, CA 90012

[ ] **Southern Division**
411 West Fourth St., Rm. 1-053
Santa Ana, CA 92701-4516

[ ] **Eastern Division**
3470 Twelfth St., Rm. 134
Riverside, CA 92501

Failure to file at the proper location will result in your documents being returned to you.

AO 440 (Rev. 06/12) Summons in a Civil Action

UNITED STATES DISTRICT COURT

for the

Central District of California

PI-NET INTERNATIONAL, INC.,

Plaintiff(s)

v.

THE HERTZ CORPORATION; HERTZ GLOBAL HOLDINGS, INC.;

Defendant(s)

CV 12-10012 DMF (JEMx)

Civil Action No.

SUMMONS IN A CIVIL ACTION

To: *(Defendant's name and address)* THE HERTZ CORPORATION; HERTZ GLOBAL HOLDINGS, INC.;

A lawsuit has been filed against you.

Within 21 days after service of this summons on you (not counting the day you received it) — or 60 days if you are the United States or a United States agency, or an officer or employee of the United States described in Fed. R. Civ. P. 12 (a)(2) or (3) — you must serve on the plaintiff an answer to the attached complaint or a motion under Rule 12 of the Federal Rules of Civil Procedure. The answer or motion must be served on the plaintiff or plaintiff's attorney, whose name and address are: JOSEPH FARZAM LAW FIRM, 1875 Century Park E, Suite 1345, Los Angeles, California 90067

If you fail to respond, judgment by default will be entered against you for the relief demanded in the complaint. You also must file your answer or motion with the court.

Date: NOV 21 2012

CLERK OF COURT

JULIE PRADO

Signature of Clerk or Deputy Clerk

Civil Action No.

PROOF OF SERVICE

(This section should not be filed with the court unless required by Fed. R. Civ. P. 4 (l))

This summons for *(name of individual and title, if any)* _____

was received by me on *(date)* _____.

❒ I personally served the summons on the individual at *(place)* _____

_____ on *(date)* _____ ; or

❒ I left the summons at the individual's residence or usual place of abode with *(name)* _____

_____, a person of suitable age and discretion who resides there,

on *(date)* _____, and mailed a copy to the individual's last known address; or

❒ I served the summons on *(name of individual)* _____, who is

designated by law to accept service of process on behalf of *(name of organization)* _____

on *(date)* _____ ; or

❒ I returned the summons unexecuted because _____ ; or

❒ Other *(specify):*

My fees are $ _____ for travel and $ _____ for services, for a total of $ 0.00 .

I declare under penalty of perjury that this information is true.

Date: _____

_____

Server's signature

_____

Printed name and title

_____

Server's address

Additional information regarding attempted service, etc:

UNITED STATES DISTRICT COURT, CENTRAL DISTRICT OF CALIFORNIA
CIVIL COVER SHEET

I (a) PLAINTIFFS (Check box if you are representing yourself ☐)	DEFENDANTS
PI-NET INTERNATIONAL, INC.	THE HERTZ CORPORATION; HERTZ GLOBAL HOLDINGS, INC.;
(b) Attorneys (Firm Name, Address and Telephone Number. If you are representing yourself, provide same.) Joseph S. Farzam (State Bar No. 210817), JOSEPH FARZAM LAW FIRM 1875 Century Park E. Suite 1345, Los Angeles, California 90067 Telephone (310) 226-6890 Facsimile (310) 226-6891	Attorneys (If Known)

II. BASIS OF JURISDICTION (Place an X in one box only.)

- ☐ 1 U.S. Government Plaintiff
- ☑ 3 Federal Question (U.S. Government Not a Party)
- ☐ 2 U.S. Government Defendant
- ☐ 4 Diversity (Indicate Citizenship of Parties in Item III)

III. CITIZENSHIP OF PRINCIPAL PARTIES - For Diversity Cases Only (Place an X in one box for plaintiff and one for defendant.)

	PTF	DEF		PTF	DEF
Citizen of This State	☐ 1	☐ 1	Incorporated or Principal Place of Business in this State	☐ 4	☐ 4
Citizen of Another State	☐ 2	☐ 2	Incorporated and Principal Place of Business in Another State	☐ 5	☐ 5
Citizen or Subject of a Foreign Country	☐ 3	☐ 3	Foreign Nation	☐ 6	☐ 6

IV. ORIGIN (Place an X in one box only.)

☑ 1 Original Proceeding ☐ 2 Removed from State Court ☐ 3 Remanded from Appellate Court ☐ 4 Reinstated or Reopened ☐ 5 Transferred from another district (specify): ☐ 6 Multi-District Litigation ☐ 7 Appeal to District Judge from Magistrate Judge

V. REQUESTED IN COMPLAINT: JURY DEMAND: ☑ Yes ☐ No (Check 'Yes' only if demanded in complaint.)

CLASS ACTION under F.R.C.P. 23: ☐ Yes ☑ No ☐ **MONEY DEMANDED IN COMPLAINT: $**

VI. CAUSE OF ACTION (Cite the U.S. Civil Statute under which you are filing and write a brief statement of cause. Do not cite jurisdictional statutes unless diversity.)

Patent Infringement; 33 U.S.C. 271 and 281-285

VII. NATURE OF SUIT (Place an X in one box only.)

OTHER STATUTES
- ☐ 400 State Reapportionment
- ☐ 410 Antitrust
- ☐ 430 Banks and Banking
- ☐ 450 Commerce/ICC Rates/etc.
- ☐ 460 Deportation
- ☐ 470 Racketeer Influenced and Corrupt Organizations
- ☐ 480 Consumer Credit
- ☐ 490 Cable/Sat TV
- ☐ 810 Selective Service
- ☐ 850 Securities/Commodities/ Exchange
- ☐ 875 Customer Challenge 12 USC 3410
- ☐ 890 Other Statutory Actions
- ☐ 891 Agricultural Act
- ☐ 892 Economic Stabilization Act
- ☐ 893 Environmental Matters
- ☐ 894 Energy Allocation Act
- ☐ 895 Freedom of Info. Act
- ☐ 900 Appeal of Fee Determination Under Equal Access to Justice
- ☐ 950 Constitutionality of State Statutes

CONTRACT
- ☐ 110 Insurance
- ☐ 120 Marine
- ☐ 130 Miller Act
- ☐ 140 Negotiable Instrument
- ☐ 150 Recovery of Overpayment & Enforcement of Judgment
- ☐ 151 Medicare Act
- ☐ 152 Recovery of Defaulted Student Loan (Excl. Veterans)
- ☐ 153 Recovery of Overpayment of Veteran's Benefits
- ☐ 160 Stockholders' Suits
- ☐ 190 Other Contract
- ☐ 195 Contract Product Liability
- ☐ 196 Franchise

REAL PROPERTY
- ☐ 210 Land Condemnation
- ☐ 220 Foreclosure
- ☐ 230 Rent Lease & Ejectment
- ☐ 240 Torts to Land
- ☐ 245 Tort Product Liability
- ☐ 290 All Other Real Property

TORTS
PERSONAL INJURY
- ☐ 310 Airplane
- ☐ 315 Airplane Product Liability
- ☐ 320 Assault, Libel & Slander
- ☐ 330 Fed. Employers' Liability
- ☐ 340 Marine
- ☐ 345 Marine Product Liability
- ☐ 350 Motor Vehicle
- ☐ 355 Motor Vehicle Product Liability
- ☐ 360 Other Personal Injury
- ☐ 362 Personal Injury-Med Malpractice
- ☐ 365 Personal Injury-Product Liability
- ☐ 368 Asbestos Personal Injury Product Liability

IMMIGRATION
- ☐ 462 Naturalization Application
- ☐ 463 Habeas Corpus-Alien Detainee
- ☐ 465 Other Immigration Actions

TORTS
PERSONAL PROPERTY
- ☐ 370 Other Fraud
- ☐ 371 Truth in Lending
- ☐ 380 Other Personal Property Damage
- ☐ 385 Property Damage Product Liability

BANKRUPTCY
- ☐ 422 Appeal 28 USC 158
- ☐ 423 Withdrawal 28 USC 157

CIVIL RIGHTS
- ☐ 441 Voting
- ☐ 442 Employment
- ☐ 443 Housing/Accommodations
- ☐ 444 Welfare
- ☐ 445 American with Disabilities - Employment
- ☐ 446 American with Disabilities - Other
- ☐ 440 Other Civil Rights

PRISONER PETITIONS
- ☐ 510 Motions to Vacate Sentence Habeas Corpus
- ☐ 530 General
- ☐ 535 Death Penalty
- ☐ 540 Mandamus/ Other
- ☐ 550 Civil Rights
- ☐ 555 Prison Condition

FORFEITURE / PENALTY
- ☐ 610 Agriculture
- ☐ 620 Other Food & Drug
- ☐ 625 Drug Related Seizure of Property 21 USC 881
- ☐ 630 Liquor Laws
- ☐ 640 R.R. & Truck
- ☐ 650 Airline Regs
- ☐ 660 Occupational Safety /Health
- ☐ 690 Other

LABOR
- ☐ 710 Fair Labor Standards Act
- ☐ 720 Labor/Mgmt. Relations
- ☐ 730 Labor/Mgmt. Reporting & Disclosure Act
- ☐ 740 Railway Labor Act
- ☐ 790 Other Labor Litigation
- ☐ 791 Empl. Ret. Inc. Security Act

PROPERTY RIGHTS
- ☐ 820 Copyrights
- ☑ 830 Patent
- ☐ 840 Trademark

SOCIAL SECURITY
- ☐ 861 HIA (1395ff)
- ☐ 862 Black Lung (923)
- ☐ 863 DIWC/DIWW (405(g))
- ☐ 864 SSID Title XVI
- ☐ 865 RSI (405(g))

FEDERAL TAX SUITS
- ☐ 870 Taxes (U.S. Plaintiff or Defendant)
- ☐ 871 IRS-Third Party 26 USC 7609

CV12-10012

FOR OFFICE USE ONLY: Case Number: _____

AFTER COMPLETING THE FRONT SIDE OF FORM CV-71, COMPLETE THE INFORMATION REQUESTED BELOW.

UNITED STATES DISTRICT COURT, CENTRAL DISTRICT OF CALIFORNIA
CIVIL COVER SHEET

III(a). IDENTICAL CASES: Has this action been previously filed in this court and dismissed, remanded or closed? ☑ No ☐ Yes
yes, list case number(s):

III(b). RELATED CASES: Have any cases been previously filed in this court that are related to the present case? ☐ No ☑ Yes
yes, list case number(s): CV12-04394 PSG (JEM); CV12-04303 PSG (JEM); CV12-04301 PSG (JEM); CV12-04301 PSG (JEM); CV12-04270 PSG (JEM)

ivil cases are deemed related if a previously filed case and the present case:
Check all boxes that apply) ☐ A. Arise from the same or closely related transactions, happenings, or events; or
☑ B. Call for determination of the same or substantially related or similar questions of law and fact; or
☐ C. For other reasons would entail substantial duplication of labor if heard by different judges; or
☑ D. Involve the same patent, trademark or copyright, and one of the factors identified above in a, b or c also is present.

X. VENUE: (When completing the following information, use an additional sheet if necessary.)

a) List the County in this District; California County outside of this District; State if other than California; or Foreign Country, in which **EACH** named plaintiff resides.
Check here if the government, its agencies or employees is a named plaintiff. If this box is checked, go to item (b).

County in this District:*	California County outside of this District; State, if other than California; or Foreign Country
Los Angeles County	

b) List the County in this District; California County outside of this District; State if other than California; or Foreign Country, in which **EACH** named defendant resides.
Check here if the government, its agencies or employees is a named defendant. If this box is checked, go to item (c).

County in this District:*	California County outside of this District; State, if other than California; or Foreign Country
Los Angeles County	

c) List the County in this District; California County outside of this District; State if other than California; or Foreign Country, in which **EACH** claim arose.
Note: In land condemnation cases, use the location of the tract of land involved.

County in this District:*	California County outside of this District; State, if other than California; or Foreign Country
Los Angeles County	

* **Los Angeles, Orange, San Bernardino, Riverside, Ventura, Santa Barbara, or San Luis Obispo Counties**
Note: In land condemnation cases, use the location of the tract of land involved

X. SIGNATURE OF ATTORNEY (OR PRO PER): _____ Date November 19, 2012

Notice to Counsel/Parties: The CV-71 (JS-44) Civil Cover Sheet and the information contained herein neither replace nor supplement the filing and service of pleadings or other papers as required by law. This form, approved by the Judicial Conference of the United States in September 1974, is required pursuant to Local Rule 3-1 is not filed but is used by the Clerk of the Court for the purpose of statistics, venue and initiating the civil docket sheet. (For more detailed instructions, see separate instructions sheet.)

Key to Statistical codes relating to Social Security Cases:

Nature of Suit Code	*Abbreviation*	*Substantive Statement of Cause of Action*
861	HIA	All claims for health insurance benefits (Medicare) under Title 18, Part A, of the Social Security Act, as amended. Also, include claims by hospitals, skilled nursing facilities, etc., for certification as providers of services under the program. (42 U.S.C. 1935FF(b))
862	BL	All claims for "Black Lung" benefits under Title 4, Part B, of the Federal Coal Mine Health and Safety Act of 1969. (30 U.S.C. 923)
863	DIWC	All claims filed by insured workers for disability insurance benefits under Title 2 of the Social Security Act, as amended; plus all claims filed for child's insurance benefits based on disability. (42 U.S.C. 405(g))
863	DIWW	All claims filed for widows or widowers insurance benefits based on disability under Title 2 of the Social Security Act, as amended. (42 U.S.C. 405(g))
864	SSID	All claims for supplemental security income payments based upon disability filed under Title 16 of the Social Security Act, as amended.
865	RSI	All claims for retirement (old age) and survivors benefits under Title 2 of the Social Security Act, as amended. (42 U.S.C. (g))