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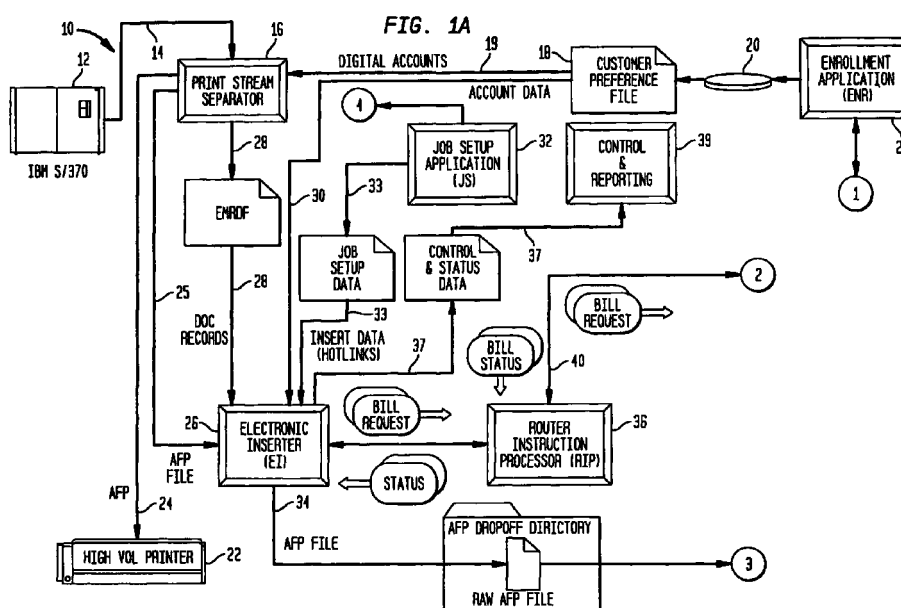
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(54) **Bill processing server and method for a digital document delivery system**

(57) A bill processing server and method forms part of an overall digital document delivery system and is primarily responsible for maintaining an account database which in turn contains information concerning the account balance of the customers which receive electronic bills. The bill processing server interacts with a router instruction processor for receipt of bill data objects for updating the account database as well as for receiving customer response information via an interactive bill presentment server so as to maintain the account database including receipt of payment informa-

tion from the customers. The bill processing server can send account information to an associated payment processing system. The bill processing server can also generate reports concerning the status of the account database and can further generate notification to the customer of an existence of an electronic bill. Finally the bill processing server can generate links to secondary documents to be associated with a generated primary document (bill).



Description

[0001] The present invention relates to a bill processing server for use in a digital document delivery system and method, particularly for use via the Internet. It is particularly directed to such a system for presenting documents such as bills to customers and for receipt of customer information.

[0002] Digital document delivery systems are for use in delivering documents which otherwise would typically be delivered by hard copy printing processes. In a preferred embodiment of such a digital document delivery system as set forth in a co-pending European patent application number (Attorney Docket Number E-789) entitled: System and Method for Presenting and Processing Documents on the Internet, filed by the present assignee on the same date hereof, the digital document delivery system typically incorporates a router instruction processor (RIP), a bill processing server (BPS) and an interactive bill presentment server (IBPS), all of which operate in conjunction with an electronic inserter and an associated electronic print stream and customer preference data for generating a primary document to a customer typically in the nature of a bill and associated secondary documents (inserts) which would normally accompany the printed form of such a bill if it were to be generated as hard copy.

[0003] A bill processing server (BPS) acts as a fulfillment center. It forms part of an overall digital document delivery system and performs a plurality of functions so as to act as an overall interface between a router instruction processor and an interactive bill presentment server. In particular, the BPS saves and retrieves customer account data stored in an associated customer account database. It also services requests for links associated with secondary documents that can be referenced ("linked to") by the customer viewing his or her primary document. The BPS also processes bill status requests from the IBPS.

[0004] In addition, the BPS can generate reports of various types that the proprietor of the digital document delivery system desires, such as daily reports concerning customer usage of the digital document delivery system. Finally, the BPS can initiate payment feeds from the digital document delivery system to a payment processing system, such as a bank or other financial institution responsible for money transfers from customers' bank accounts or credit/debit card accounts to the account of the digital document delivery system proprietor.

Figure 1A and 1B form an overall block diagram of a digital document delivery system using a bill processing server according to the present invention,

Figure 2 is a generalized block/flow diagram of the bill processing server and the associated modules with which it communicates in order to perform its primary functions,

Figure 3 is a block/flow diagram of a portion of the digital document delivery system showing details and object flow associated with the BPS, the router instruction processor, and the interactive bill presentment server,

Figure 4 is a block diagram of the components of a Send Request Object and the definition thereof.

[0005] As used throughout this description, the words "user" and "customer" are synonymous as are the words "bill" and "primary document" and the words "insert" and "secondary document". Definitions of acronyms are presented in Table 1.

[0006] As best seen in Figures 1A and 1B, an overall digital document delivery system of which the bill processing server 42 of the present invention forms an integral part thereof, comprises a plurality of computer servers operating to perform various functions, including a router instruction processor 36, a bill processing server 42 and an interactive bill presentment server 44. These various devices can be implemented on one or more computer servers, such as the Intel based Pentium II™ 400 MHz computer with 512 megabytes random access memory and with a 9 gigabyte hard drive.

[0007] The overall operation of the digital document delivery system is more fully set forth in the previously mentioned European patent co-pending patent application number (Attorney Docket Number E-789) entitled: System and Method for Presenting and Processing Documents on the Internet. Further disclosure of the digital document delivery system is sent forth in a co-pending European patent application number (Attorney Docket Number E-780) entitled: System and Method for Separating a Print Stream into an Electronic Document Print Stream and a Physical Document Print Stream, filed on the same date hereof and owned by the same assignee hereof. As disclosed therein, the digital document delivery system is directed to generating an electronic equivalent of a primary document with one or more inserts associated therewith. An interactive bill presentation server (IBPS) generates HTML or other web based language statements for delivery via the Internet to a customer 52 using a web browser 54 on the customer's associated computer. By so doing, the primary document such as a customer bill 70, is presented on the customer's monitor via the web browser.

[0008] The IBPS receives the electronic print data typically from an electronic inserter (EI) module 26 which contains the primary document information such as a customer bill and information concerning secondary documents (inserts) which would normally be sent along with the bill if it were to be generated as hard copy.

[0009] The BPS is primarily responsible for processing digital bill data associated with a bill presented to the customer via the digital document delivery system. In this manner, the BPS 42 acts as an interface between the storage of

customer bill data in an associated account database 56 and presentment of that bill data to customers interested in viewing such data in electronic form as presented to the customer over the Internet by the output of the IBPS 44. In turn, the BPS shields the router instruction processor (RIP) from bill processing and bill payment concerns. Thus, the BPS is the primary device responsible for storing and retrieving customer bill data from the database and updating that data as required, based upon interaction of the customer with the digital document delivery system.

[0010] The BPS also acts as a "traffic cop" so as to prevent a customer from viewing a primary document and any secondary documents until all necessary documents are available for viewing. Thus the IBPS will not present a primary document to a customer requesting it until it receives permission from the BPS.

[0011] The BPS is also the server that typically is used to notify a customer that a primary document is available for viewing. Such notification can be achieved by E-mail, fax, pager or regular mail. An alternative method can be used if the customer does not view a primary document within some period of time. Thus for instance, if the customer does not respond to an E-mail request within some time period (such as a week, for instance) a fax or regular mail message could be sent to the customer.

[0012] As seen in Figures 1A and 1B, the overall primary document, which could be a customer bill, is presented to the IBPS for presentment to the customer via the Internet. A summary of the primary document, such as bill data, if the primary document is a bill, is presented to the BPS from the RIP. The bill data is in the form of a Bill Data Object. The Bill Data Object forms part of a Bill Request Object (bR). The Bill Request Object is a type of Send Request Object as more fully described with reference to Figure 4.

[0013] The BPS responds to these objects by persisting the Bill Data Objects by permanently storing these objects in an account database 56. The BPS also maintains the status of all customer interaction with respect to the digital document delivery system.

[0014] An acknowledgement is then sent from the BPS to the RIP indicating that the Bill Data Objects have been successfully saved.

[0015] At the same time but asynchronously with respect thereto, as status data is received from the IBPS from the customer viewing his or her primary document, the information is forwarded from the IBPS to the BPS on demand by the BPS. The BPS stores the status data for logging and archiving as well as for updating the Bill Data Object with the newly retrieved status before forwarding a status message back to the RIP.

[0016] In addition, the BPS is responsible for periodically processing bill payments made by the customer by merging the bill data from the account database 60 with the payment data received from the customer and forwarding this processed information indicative of the overall account balance of the customer to an associated payment processing system 43 such as a financial institution. In this manner, the payment processing system has an accurate and timely summary of all of the customers for whom electronic bills are generated, including their account balances based upon payments received from such customers.

[0017] Also, the BPS can generate reports 80 of various types that the proprietor of the digital document delivery system desires, such as daily reports concerning customer usage of the digital document delivery system.

[0018] Furthermore, the BPS serves up secondary document (insert) data in the form of web hotlink references to the IBPS on demand. Thus the IBPS when it generates the web documents does so with links to the associated secondary document(s).

[0019] Figure 3 presents details of the BPS, RIP and IBPS modules. These figures detail the transfer of the objects between the modules as well as the language protocols used in the preferred embodiment of the present invention.

[0020] Figure 4 presents a detailed description of a Send Request Object. A Bill Request Object (bR) is a particular type of Send Request Object. Not all the components of a Send Request Object need to be present in a particular object sent from the RIP to the BPS.

[0021] Details of the modules are also described above so as to achieve the stated operation are present in Table 2.

[0022] The RIP, BPS and IBPS can be implemented on computer servers; e.g., Intel processor based servers using Microsoft Windows NT™ operating systems. A high level object oriented language, e.g., Sun Microsystems' JAVA language, can be preferably used to implement the specific instructions for performing above-described tasks.

[0023] The bill processing server is an integral part of an overall digital document delivery system whose primary responsibility is for maintaining and updating customer account data based upon generation of customer bills and receipt of payment information from customers. It can also be the device for generating customer notification of a bill so as to inform the customer, such as via an e-mail message, to access a web location which contains the electronically generated bill and associated inserts. The bill processing server also receives Bill Request Objects with embedded Bill Data Objects from an associated router instruction processor which allows the BPS to update customer account information based upon the generation of associated electronic bills.

[0024] In the foregoing specification, the invention has been described as referenced to specific embodiments thereof. It will, however, be evident that various modification and changes may be made thereto without departing from the broader spirit and scope of the invention. The specification and drawings are, accordingly, to be regarded as illustrative rather than in a restrictive sense.

Table 1

ACRONYMS	DEFINITIONS
ACH	Automated Clearing House
AFP	Advanced Format for Printing
ASCII	American Standard Code for Information Exchange
CORBA	Common Object Request Broker Architecture
EBCDIC	Extended Binary Coded Decimal Interchange Code
HTML	Hypertext Markup Language
HTTP	Hypertext Transport Protocol
IIOP	Internet Inter-ORB Protocol
JDBC	JAVA Database Connectivity
MRDF	Mail Run Data File
ORB	Object Request Broker
PDF	Portable Document Format
SMTP	Simple Mail Transfer Protocol
XML	Extended Markup Language

Table 2

MODULE	FUNCTION
Enrollment Application Module 27	Capture customer account number, full name of customer, e-mail address of customer, checking account number, customer's account bank name, bank routing number, WEB password
Print Stream Separator 16	Based on customer account number, split out documents destined by digital delivery, send these documents as AFP file.
Electronic Inserter 26	Get data from Job Setup Module 32, customer preference file from customer preference database 20, print stream separator 16 and EMRDF output, compose bill request objects (bR), receive status messages from RIP, control AFP feed to IBPS.
Job Setup Application 32	Produce file of inserts in the form of hotlinks that are logically assigned to physical inserter bins.
Router Instruction Processor (RIP) 36	Service incoming requests from multiple clients (EIs), route requests to FAX, EMAIL, WEB, LOCAL PRINT, and PAGER, issue notifications based on status received, process status back to clients.
Database Account 56	Store remittance data, bill data, and status data for digital bills.
Bill Processing Server (BPS) 42	Save and retrieve bill data to the database, service CORBA requests for hotlinks from IBPS, process bill status messages from IBPS back to the RIP, issue reports and initiate payments feeds.
Interactive Bill Present Server (IBPS) 44	Process interactive events performed on the bill by customers, render HTML to customers based on downloaded servlets and stored XML rules, design document templates.

Claims

1. A bill processing server for use in a digital document delivery system having a router instruction processor (RIP) for controlling via an electronic inserter, the generation of an electronic print stream for presentation to an associated interactive bill presentment server (IBPS), with the IBPS responsible for generating the print stream data in an electronic form for viewing primary and secondary documents by a customer, the bill processing server for further communicating with a database containing customer account information; comprising:
 - means for receiving bill requests from the RIP, said bill request containing bill data objects regarding the nature of an electronic bill primary document to be sent electronically over a network for viewing by the customer;
 - means for updating the database based upon the received bill data objects;
 - means for instructing the IBPS to generate an electronically viewable version of a primary document with N associated secondary documents, where N is an integer equal to or greater than zero; and
 - means for receipt of information from the IBPS concerning any customer responses so as to update the database.
2. A bill processing server as defined in Claim 1, further comprising means for generating a notification message for delivery to the customer so as to notify the customer of the existence of a primary document directed to the customer.
3. A bill processing server as defined in Claim 1, wherein the means for updating of the database includes means for updating information concerning when the customer has paid some or all of an outstanding balance.
4. A bill processing server as defined in Claim 3, wherein at least some of the data presented to the bill processing server from the IBPS includes customer information concerning when the customer has reviewed an associated bill directed to the customer.
5. A bill processing server as defined in Claim 4, further wherein the bill processing server communicates with the RIP to indicate that the bill processing server has successfully received the bill data object and has stored it in the account database.
6. A bill processing server as defined in Claim 5, wherein the bill processing server further has means for generating account information for submission to an associated payment processing system.
7. A bill processing server as defined in Claim 1, wherein the means for updating the database includes means for maintaining status information in said database with respect to customer interaction with the digital document delivery system.
8. A bill processing server as defined in Claim 1, further comprising means for maintaining status information concerning the digital document delivery system in said database.
9. A bill processing server as defined in Claim 1, wherein the means for instructing the IBPS to generate electronically viewable documents includes means for generating information regarding links to one or more secondary documents, said links to be positioned on the primary document.
10. A method of controlling an account database containing information concerning customers' account balances associated with the delivery of electronic bills to the customers, comprising the steps of:
 - a) receiving a bill request containing bill data objects representative of the nature of a bill to be presented to a customer;
 - b) based upon the bill data objects, updating the data stored in the account database for that customer; and
 - c) receiving customer response information concerning the electronic bill delivered to the customer and based upon this response information, updating the account database for that customer.
11. A bill processing method as defined in Claim 10, further comprising the step of generating periodic reports concerning the status of the account database.
12. A bill processing method as defined in Claim 11, further comprising the step of generating links to secondary doc-

uments that are associated with a bill.

13. A bill processing method as defined in Claim 12, further comprising the step of notifying the customer of an existence of an electronic document to be viewed by the customer.

14. A bill processing method as defined in Claim 13, wherein the means for generating the notification to the customer is by electronic mail delivered to the electronic mail box associated with the customer.

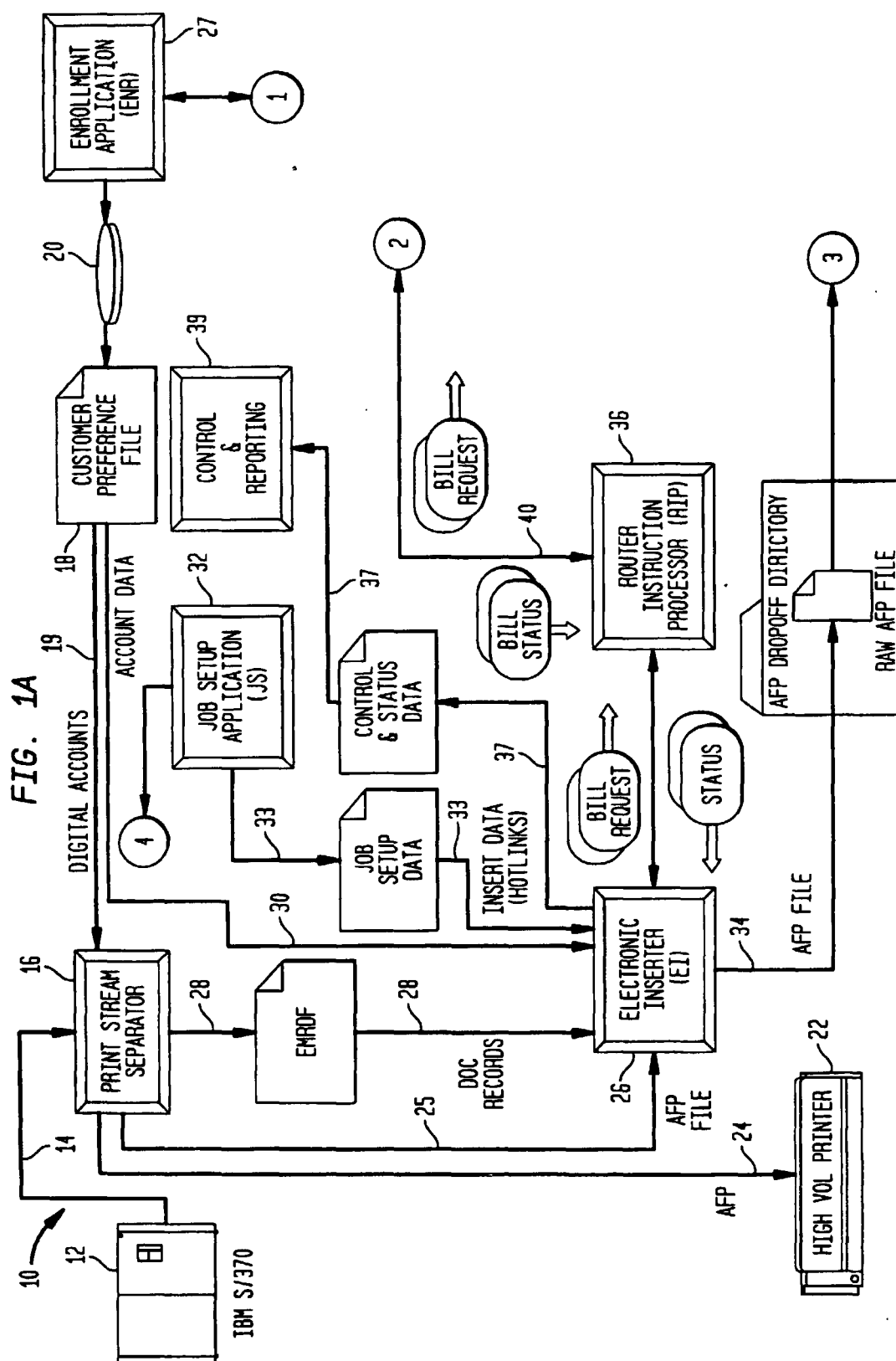


FIG. 1B

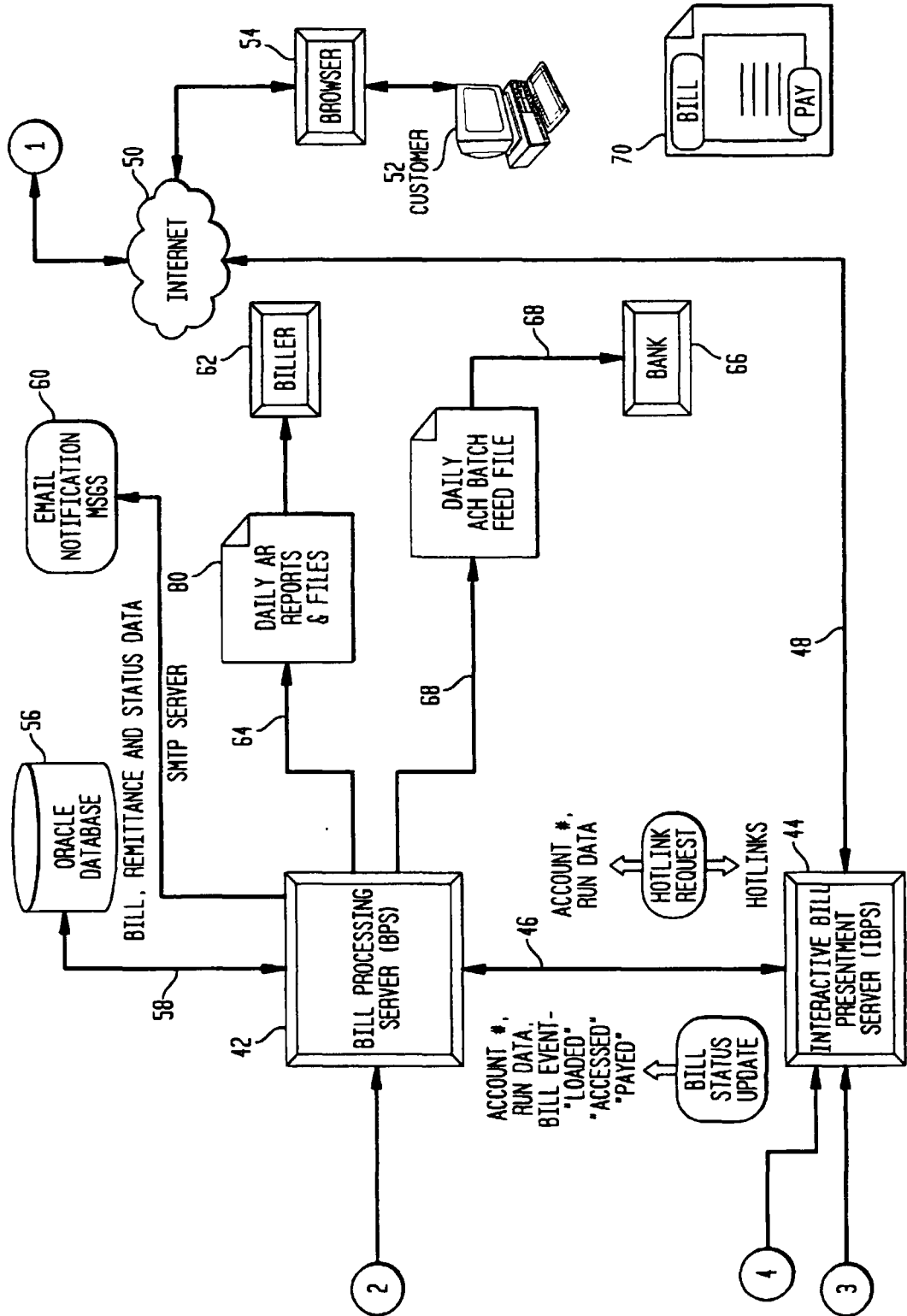
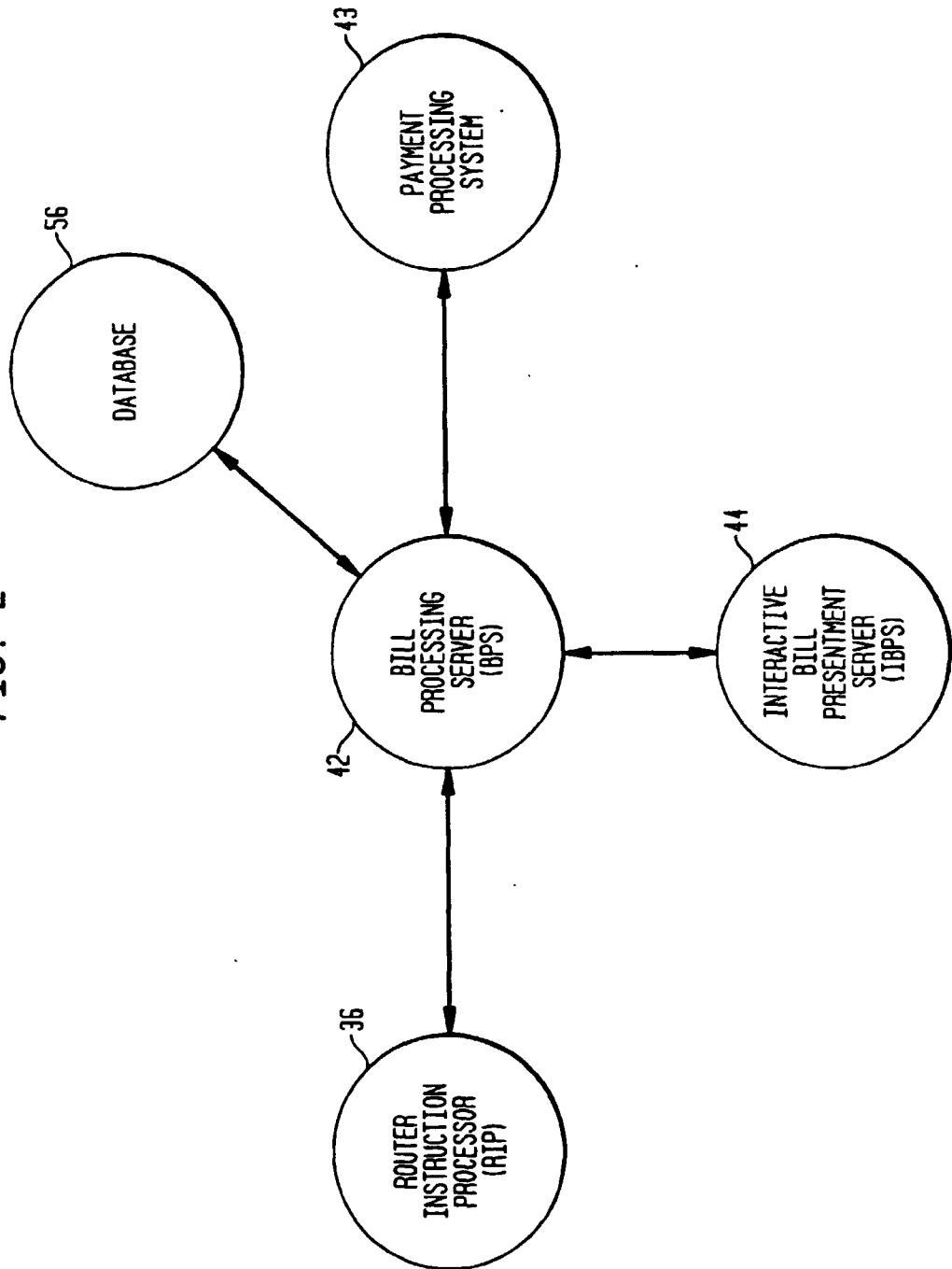


FIG. 2



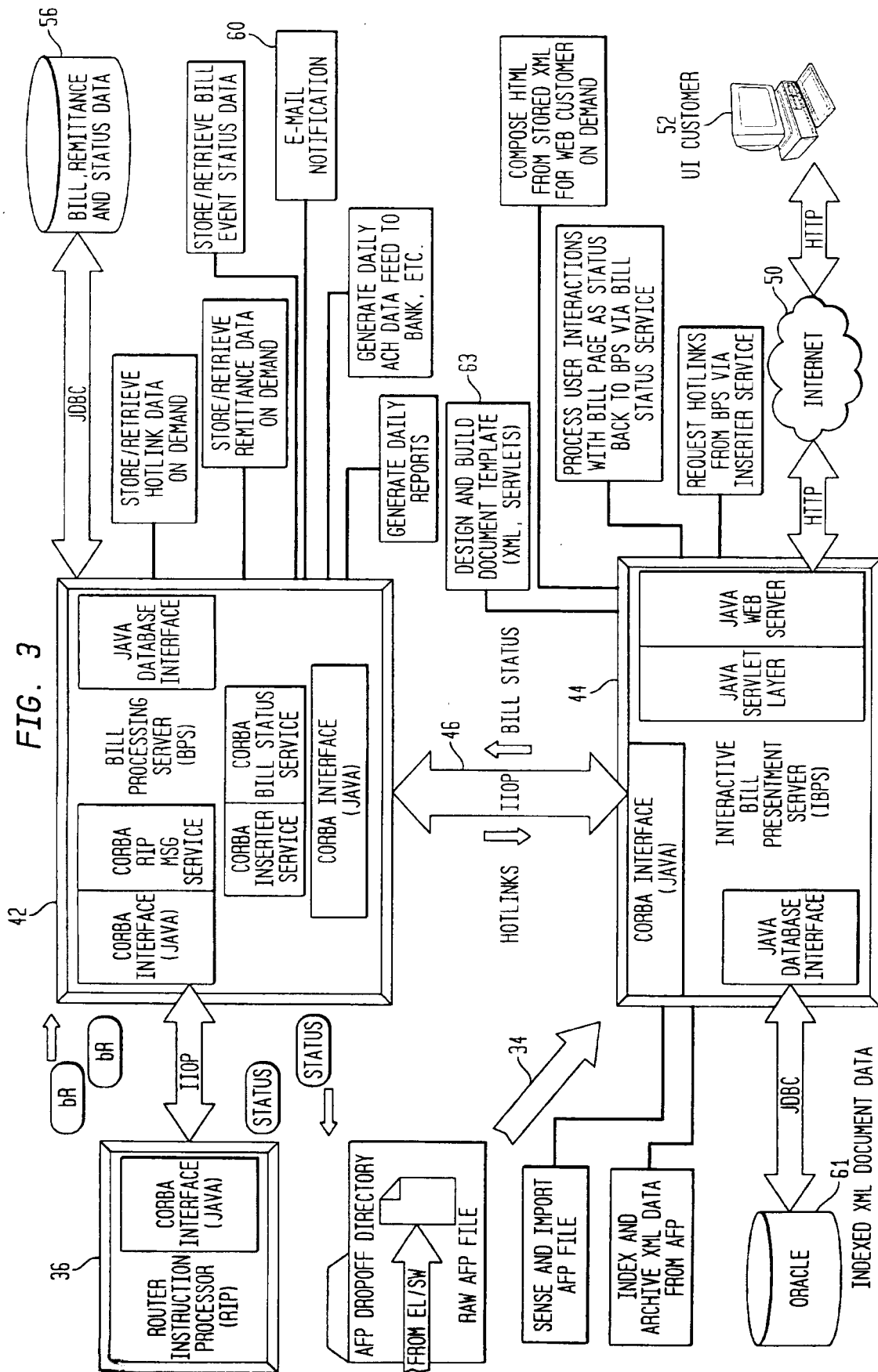


FIG. 4

