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(54) **Virtual vending system and method for managing the distribution, licensing and rental of electronic data**

(57) A virtual vending machine manages a comprehensive vending service for the distribution of licensed electronic data (i.e., products) over a distributed computer system. The distributed computer system includes a group of client computers, a group of vendors that contribute the products to the virtual vending machine for distribution, and a server computer for operating the virtual vending machine. The virtual vending machine distributes licenses for the electronic data for the complete product or for components thereof and for a variety of time frames, including permanent licenses and rental period licenses. The virtual vending machine provides client computers with the capability to obtain information regarding the available products and the associated license fees and rental periods, to receive the product upon receipt of a corresponding electronic payment, and to reload the product during the term of the license. The virtual vending machine provides vendors with the capability of establishing a particular vending service that includes point-of-sale electronic payment and a means to communicate with the client computers to which licensed electronic data has been distributed.
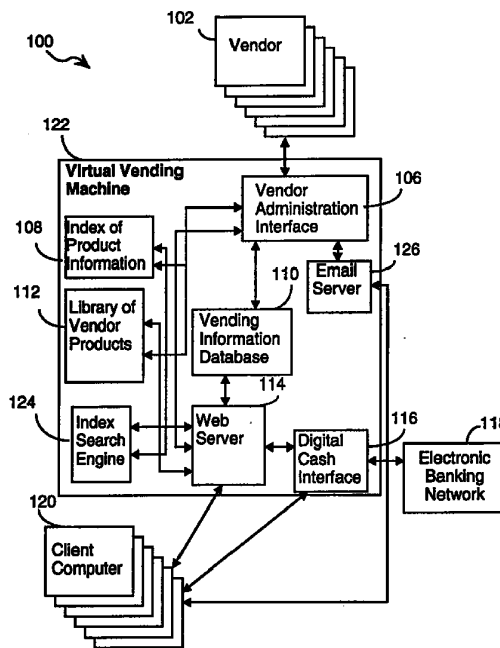
FIG. 1

Description

The present invention relates to systems and methods for managing the distribution of licensed electronic data including the distribution of applications, application components, and computer readable data on either a permanent or time-limited rental basis.

BACKGROUND OF THE INVENTION

The interconnection of various computer systems has provided a new medium for the distribution of computer software. Currently, networked computer systems are used to distribute computer software without any usage restrictions or a license fee. A number of "try and buy" systems also exist which enable users to try certain software programs in a limited time period without incurring a license fee. The "try and buy" systems typically limit the rights of the users of the trial versions by enclosing "time bombs" or "usage metering" schemes which limit the lifespan of the program to the trial period. The objective of the "try and buy" system is to allow the user to test the program before the user purchases it. Typically, the user can purchase the software at a retail store. Alternatively, the software can be downloaded to the user over the network and the user, in turn, mails the license fee to the vendor.

The success of these systems is due in part to the fast access that the network provides in acquiring the software. However, these systems are limited in the vending services that they provide. Specifically, the current systems do not provide any capability to acquire separate components of a software product or the capability to rent the software (or any machine transmitted information) or components thereof for a limited time period. Typically, a user acquires a license for a software product for the lifetime of the product. However, a user may have a need to use the product for a short time period with no need for it thereafter. For instance, a user may need to rent the latest version of a tax preparation software product each April. As the tax code changes annually, the user may prefer to rent the latest version of the software for one month prior to April 15th instead of purchasing the complete package each year.

Moreover, the current systems do not provide a capability for managing the redistribution (or reloading) of licensed computer software during the license period. This capability is essential for computer systems with limited or no secondary storage.

Therefore, the aim of the present invention is to account for the abovementioned limitations. Accordingly, it is a goal of the present invention to provide a virtual vending machine which fully utilizes electronic-network services in the procurement of electronic data on either a permanent or rental license basis.

It is a further goal of the present invention to provide a system and method as described above for the distribution of electronic data upon receipt of electronic payment of the associated license fee.

It is yet another goal of the present invention to provide a system and method as described above which provides a facility for reloading electronic data during the licensed period.

Another goal of the present invention is to provide a system and method which provides vendors of electronic data with a medium for distributing the electronic data to users interconnected by a communications link and to receive the appropriate license fees in an automated manner.

Other general and specific objects of this invention will be apparent and evident from the accompanying drawings and the following description.

SUMMARY OF THE INVENTION

The present invention pertains to a virtual vending machine which manages a comprehensive electronic vending service for the distribution of licensed electronic data over a distributed computer system. The distributed computer system includes a group of client computers, a group of vendors, and at least one server computer which executes the virtual vending machine. The electronic data offered for procurement by the virtual vending machine includes any form of computer readable data that the vendor has the legal right to distribute. Further, the electronic data can be acquired as a complete product or as separate components thereof. There are also various license options available which can include procuring a license for a permanent time period or on a time-limited or rental basis.

The virtual vending machine provides the vendors with a mechanism to market, to distribute, to receive payment for the vendors electronic data, and to communicate with the users of the vendor's electronic data with minimal intervention by the vendor.

Users of the virtual vending machine are provided with a central repository of electronic data that can be procured in an expedient manner. The virtual vending machine provides the users with product information for the electronic data which details the operational requirements for the product as well as the associated license fees. The product information can be searched by the user using various keywords. Further, the electronic data can be electronically purchased by the user and repeatedly reloaded during the license period. Notifications or other announcements concerning the product are automatically forwarded to the user by the vendor.

The virtual vending machine can include several components which operate on a server computer. A vending information database is used to track the electronic data made available by the vendors and the sales transactions that occur. A Web server provides the users with Web pages (e.g., with product and pricing information) for each of the electronic data available for procurement. The electronic data is categorized by several search keywords for use by a search engine to retrieve a requested Web page. Vendors interact with a vending administration interface to establish a vending

service for their particular electronic data. Point-of-sale electronic payment is facilitated by a digital cash interface which is connected to an electronic banking network. An electronic mail server is utilized to forward communications from the vendors to the users of the vendor's electronic data.

BRIEF DESCRIPTION OF THE DRAWINGS

Additional objects and features of the invention will be more readily apparent from the following detailed description and appended claims when taken in conjunction with the drawings, in which:

Fig. 1 is a block diagram of an embodiment of a distributed computer system incorporating the present invention.

Fig. 2 is a block diagram of the virtual vending machine in a preferred embodiment of the invention.

Figs. 3A and 3B depict the vending information database used to store information about licensable products and sales information in a preferred embodiment of the invention.

Fig. 4 is a block diagram of the client computer in the distributed computer system of Fig. 1.

Fig. 5 is a schematic representation of an exemplary virtual vending machine Web page used to facilitate the distribution of the vendor products for licensing.

Fig. 6 is a schematic representation of an exemplary Web page used to obtain information on the procurement of a license for a vendor product.

Fig. 7 is a flow chart of an embodiment of the method for processing a request to license a vendor product in accordance with the present invention.

Fig. 8 is a schematic representation of an exemplary Web page used to obtain information on reloading a previously licensed product.

Fig. 9 is a flow chart of an embodiment of the method for processing a request to reload a previously licensed product in accordance with the present invention.

Fig. 10 is a flow chart of an embodiment of the method for processing service requests from the vendor in accordance with the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

For the purposes of this document, the term electronic data encompasses all forms of computer readable data, including but not limited to machine executable modules (e.g., applications, applications program, application components) and information content products (e.g., digitized video, voice data, chapter of books, and mailing lists). Further, the terms electronic data, vendor product, and product are used interchangeably.

Figs. 1 and 2 illustrate the preferred embodiment of the computer system of the present invention. Referring to Figs. 1 and 2, there is shown a distributed computer system 100 having many client computers 120. Each client computer 120 can be connected to at least one server computer 212 through a network interconnectivity means 202, preferably the Internet. The present invention is not limited to the use of the Internet as other types of communication connections can be used. While most client computers 120 are desktop computers, such as Sun workstations, IBM compatible computers and Macintosh computers, virtually any type of computer can be a client computer. One or more users (not shown) can be associated with each client computer 120. It should be noted that the present invention is not limited to a distributed computer system. It may be practiced without the specific details and may be implemented in various computer systems and in various configurations, or makes or models of tightly-coupled processors or in various configurations of loosely-coupled microprocessor systems.

In the preferred embodiment, there can be at least one specially designated server computer referred to as the virtual vending machine 122. The virtual vending machine 122 can be used to manage the distribution of electronic data and components thereof on a variety of license terms between the client computers 120 and the vendors 102. Specifically, virtual vending machine 122 can be used to provide information on the various vendor products and components thereof that are available for distribution; provide information on the associated licensing fees and rental options; receive orders for a particular product; obtain electronic payment for a particular product; distribute the particular product to the client computer 120 initially and repeatedly within the licensed period; and provide the vendors 102 with a communications channel to the licensed users of their product.

The virtual vending machine 122 can include a central processing unit (CPU) 204, a memory 210 (i.e., fast random access memory as well as non-volatile memory, such as disk storage), a user interface 206, and a communications interface 208 for communication with the client computers 120 and the vendors 102 via the communications network 202.

Referring to Figs. 1 and 2, in the memory 210 of virtual vending machine 122, there can be stored the following components:

- an operating system 214;
- Internet access procedures 216;
- web server procedures 114;
- Web pages 220;
- a vending information database 110;
- a library of vendor products 112;
- digital cash interface procedures 116;
- vendor interface administration procedures 106;
- an index of the product information 108;
- an index search engine 124;
- an encryption and formatting module 218;
- electronic mail (email) server procedures 126; and
- electronic invoices 222.

A more detailed description of these components is provided below.

In the preferred embodiment, the virtual vending machine 122 can utilize a World Wide Web Server 114 (Web Server) to facilitate the management of the vending services. The Web Server 114 interacts with the client computers 120 utilizing standard World Wide Web (WWW) protocols. However, the present invention is not limited to this particular type of information server. Other information servers can be used, such as but not limited to, gopher servers, WAIS (Wide Area Information Servers) servers, other Internet database servers, or the like.

The Web Server 114 responds to requests from users for information and orders for a vendor product. The Web Server 114 interacts with other system components in the virtual vending machine 122 in order to process the user's request. The virtual vending machine 122 can include a vending information database 110, a library of vendor products 112, a vendor administration interface 106, an index search engine 124, and a digital cash interface 116. The vending information database 110 can contain product and sales information for each available vendor product. The library of vendor products 112 can be a repository for the available vendor products. The vendor administration interface 106 can interact with the vendors 102 in establishing a particular vending service for the vendor's products. The index search engine 124 can be used to perform searches on the available vendor products offered by the virtual vending machine 122. The digital cash interface 116 can provide the point-of-sale cash payment for the license fees associated with the vendor products. A more detailed description of each of these components will be presented below.

The distributed computer system 100 can be linked to numerous vendors 102 which provide the virtual vending machine 122 with products for distribution to the users associated with the client computers 120. The vendors can be any party in communication with the network 202 and who has the right to legally distribute the electronic data. Accordingly, the vendor can be a user associated with a client computer 120, a user associated with a server computer 212, online information service providers, or any other type of licensed distributor.

The vendors 102 interact with the virtual vending machine 122 through a vendor administration interface 106. The vendor administration interface 106 services requests from the vendors 102 which can include: requests to establish a vending service (i.e., make a vendor product available for distribution, license or rent, by the virtual vending machine); requests to update a vending service (i.e., update the vendor product and/or its documentation); requests to discontinue a vending service; and requests to communicate with the users of the vendor's product.

The distributed computer system 100 can further include a digital cash interface 116 for obtaining point-of-sale electronic payment for the license fee associated with a particular vendor product. The digital cash interface 116 is connected to an electronic banking network 118 which is a communications link to financial institutions such as banks, automatic clearing houses, and the like. Digital cash interface 116 interacts with the user and the virtual vending machine 122 in obtaining the pertinent payment information and forwards the transaction to the appropriate financial institution through the electronic banking network 118.

Digital cash interface 116 can be a digital cash server such as the CyberCash server. However, the present invention is not limited to this type of point-of-sale electronic payment scheme. Others can be used which provide an appropriate point-of-sale electronic payment method, which can include but is not limited to, such systems as First Virtual Holdings, DigiCash, Checkfree, and the like. Further, the present invention is not constrained to credit card payment transactions but can include all forms of electronic payment, including but not limited to, debit transactions, electronic funds transfer, and other types of cash transactions.

Figs. 3A and 3B depict the structure of the vending information database 110 in the preferred embodiment. The vending information database 110 maintains product information for each vendor product that is offered by the virtual vending machine 122 and tracks sales data for each product purchased. The vending information database 110 contains an entry 302 for each vendor product and can contain the following information:

- a product identifier 304, which can be any alphanumeric character string (such as the product name) that uniquely identifies the product;
- the number of copies of the vendor product available for sale or rental 306 (i.e., the number of licenses authorized by the product's vendor, minus the number of licenses granted so far);
- a pointer to the location of the vendor product in the library of vendor products 308;
- product information 310 which can include the following information:

  * vendor information 312, which contains data on the particular vendor which supplied the vendor

product, preferably the vendor's name and net-
work address;

* Web pages 314, which provide information on
the product including but not limited to a gen-
eral description, the version number, hardware
and software requirements and restrictions,
and the like; and

* category and keywords 316, which denote
classifications that are used in referencing and
searching the vendor products available in the
virtual vending machine 122;

• sale and/or rental license fee schedules 318, which
indicate the licensing fees for the vendor product
and the separately-acquired components on a pur-
chasable and/or rental basis;

• a schedule of components 320 that are part of the
vendor product and can be purchased or rented
independently;

• sales information 322, which can include an entry
for each license of the vendor product 302 pur-
chased through the virtual vending machine 122,
where each entry 324 can include the following:

* license number 326;
* buyer identifier and security code 328, which
uniquely represents the buyer;
* product option 330, which indicates the partic-
ular product and/or component acquired;
* purchase option 332, which indicates whether
the particular product and/or component was
purchased or rented;
* reload count 334, which is a count of the
number of times the product has been redistrib-
uted to the user within the rental or license
period;
* time stamp 336; and
* network address 338, which indicates the net-
work address of the buyer.

Referring to Figs. 2 and 3, there is an indexing
structure known as the index of product information 108
which is associated with the Web pages for each vendor
product. The index 108 is used to provide quick access
to reference or search information on the various vendor
products available for license by the virtual vending
machine 122. As vendor products and their associated
Web pages are inserted and deleted into the vending
information database 110, the index structure 108 is
updated to reflect the change. The indexing structure
108 is used by the index search engine 126 in response
to requests by the user and will be described in more
detail below.

It should be noted that the present invention is not
constrained to this particular design or format of the
vending information database 110 and the index 108.
Alternate database formats and indexing structures can
be utilized so long as they provide similar functionality.

Referring to Fig. 4, there is shown a block diagram

of the client computer 120 in the distributed computer
system 100. The client computer 120 can include a cen-
tral processing unit (CPU) 402, a user interface 404, a
memory 408, and a communications interface 406 for
communication with the virtual vending machine 122 via
the communications network 202. The memory 408 of
the client computer 120 can be used to store the follow-
ing:

• operating system 410;
• Internet access procedures 412;
• web browser 414;
• client encryption keys 416;
• decryption module 418 for decoding encrypted
electronic data received from the virtual vending
machine; and
• a repository of rented and purchased vendor prod-
ucts 420.

Referring to Fig. 5 there is shown a schematic rep-
resentation of an exemplary virtual vending machine
home Web page 220 of the Web server 114, accessible
by a user using client computer 120. The Web page 220
includes menu selection buttons for: searching the vari-
ous categories of vendor products 506; viewing infor-
mation about the available vendor products 508;
viewing the licensing fee schedules for the vendor prod-
ucts 510; initiating the purchase of a license for a vendor
product on a permanent or limited time period basis
512; requesting the reloading of a previously acquired
vending product 514; requesting access to various ven-
dor services 516; and obtaining help on the virtual vend-
ing machine 518.

The vendor products can be classified into catego-
ries 502. The categories 502 can be classified by prod-
uct types (e.g., compilers, Java applications, Web
browsers, screen savers, digitized music scores, video
data, device drivers, or non-software categories such as
books, still photos, phone directories, music, movies,
etc.), by vendors (e.g., Microsoft, Sun, IBM, etc), or any
other classification scheme. Associated with each cate-
gory can be menu buttons displaying the particular cat-
egory 502. For each category, there can be a
corresponding selection button for the title of each ven-
dor product within the category 504. It should be noted
that the present invention is not limited to the particular
design depicted in the exemplary Web page. Others can
be used which provide similar functionality.

If the user wants to perform a search of the various
vendor products or categories that are available, the
user selects the perform category search menu button
506. A search Web page (not shown) will be down-
loaded to the user which will guide the user on the avail-
able search capabilities and search keywords. The
index search engine 126 will receive the user's search
criteria and perform the search utilizing the index of the
product information 108.

If the user wants to access information describing a
particular product, the user selects the button 504 cor-

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