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POSTAGE METERING SYSTEM AND METHOD FOR AUTOMATIC DETECTION OF REMOTE POSTAGE SECURITY DEVICES ON A NETWORK

Frankiersystem und Verfahren zur automatischen Detektion von ferngesteuerten Frankiersicherheitsvorrichtungen in einem Netz

Système d’affranchissement et procédé pour la détection automatique des dispositifs de sécurité d’affranchissement à distance dans un réseau

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Description

[0001] The present invention relates generally to a postage metering system and method for printing postage indicia using a personal computer and, more particularly, to a postage metering system and method for printing postage indicia in a network of personal computers.

[0002] PC-based postage metering systems are described in EP 0 775 988 A2 and EP 0 780 809 A2.


[0004] The Information-Based Indicia Program ("IBIP") is a distributed trusted system proposed by the United States Postal Service ("USPS") to retrofit and augment existing postage meters using new technology known as information-based indicia. The program relies on digital signature techniques to produce for each envelope an indicium whose origin cannot be repudiated and content cannot be modified. IBIP is expected to support new methods of applying postage in addition to the current approach, which typically relies on a postage meter to mechanically print indicia on mailpieces. IBIP requires printing a large, high density, two-dimensional ("2-D") bar code on a mailpiece. The 2-D bar code encodes information and is signed with a digital signature.

[0005] The USPS has published draft specifications for IBIP. The INFORMATION BASED INDICIA PROGRAM (IBIP) INDICIM SPECIFICATION, dated June 13, 1996, and revised July 23, 1997, ("IBIP Indicium Specification") defines the proposed requirements for a new indicium that will be applied to mail being processed using IBIP. The INFORMATION BASED INDICIA PROGRAM POSTAL SECURITY DEVICE SPECIFICATION, dated June 13, 1996, and revised July 23, 1997, ("IBIP PSD Specification") defines the proposed requirements for a Postal Security Device ("PSD") that will provide security services to support the creation of a new "information based" postage postmark or indicium that will be applied to mail being processed using IBIP. The INFORMATION BASED INDICIA PROGRAM HOST SYSTEM SPECIFICATION, dated October 9, 1996, defines the proposed requirements for a host system element of IBIP ("IBIP Host Specification"). The specifications are collectively referred to herein as the "IBIP Specifications". IBIP includes interfacing user (user), postal and vendor infrastructures which are the system elements of the program. The INFORMATION BASED INDICIA PROGRAM KEY MANAGEMENT PLAN SPECIFICATION, dated April 25, 1997, defines the generation, distribution, use and replacement of the cryptographic keys used by the USPS product/service provider and PSDs ("IBIP KMS Specification").

[0006] The user infrastructure, which resides at the user's site, comprises a PSD coupled to a host system ("Host") with printer. The PSD is a secure processor-based accounting device that dispenses and accounts for postal value stored therein.

[0007] The IBIP Indicium Specification provides requirements for the indicium that consists of both human-readable data and PDF417 bar code data. The human-readable information includes an originating address, including the 5-digit ZIP Code of the licensing postoffice, PSD ID/Type number, date of mailing and amount of the applied postage. The bar code region of the indicium elements includes postage amount, PSD ID, user ID, date of mailing, originating address, destination delivery point identification, ascending and descending registers and a digital signature.

[0008] An integrated mailing system is subject to open system requirements if it includes a computer interfaced to the meter and it prepares mailpiece fronts or labels that include both the destination address and the indicium. The integrated system is an open system even if different printers apply the address and the indicium. If the mailing system satisfies such criteria, the USPS considers the "meter" to be an open system peripheral device that performs the dual functions of printing the indicia and interfacing the PSD to the Host. The integrated mailing system must be approved by the USPS according to open system criteria.

[0009] The IBIP Host Specification sets forth the requirements for a Host in an open system. The Host produces the mailpiece front including the return address (optional), the delivery address (required), the Facing Identification Mark ("FIM"), and the indicium as an integral unit. The Host may print this unit on the actual mailpiece stock or label(s) for later attachment to the mailpiece. The Host provides the user with an option to omit the FIM (e.g., when the FIM is preprinted on envelopes). The Host produces standardized addresses, including standard POSTNET delivery point bar code, for use on the mailpiece. The Host verifies each address at the time of mailpiece creation. The Host then creates the indicium and transmits it to the printer.

[0010] The IBIP Specifications define a stand-alone open metering system, referred to herein as a PC Meter or Stand-alone PC Meter. The Stand-alone PC meter has one personal computer ("PC") which operates as the Host ("Host PC"). The Stand-alone PC meter communicates with the Host PC. The Stand-alone PC meter runs the metering application software and associated libraries (collectively referred to herein as "Host Applications" and "PC Meter Toolkit") and communicates with one or more attached PSDs. The Stand-alone PC Meter can only access PSDs coupled to the Host PC. There is no remote PSD access for the Stand-alone PC Meter.

[0011] The Stand-alone PC Meter processes transactions for dispensing postage, registration, and refill on the Host PC. Processing is performed locally between the Host and the PSD coupled thereto. Connections to a Data Center, for example for registration and refill transactions, are made locally from the Host through a local or network modem/internet connection. Accounting for
having a plurality of client devices to which the PSDs are coupled, the method comprising the steps of: broadcasting a request over the network by a first client device when the first client device logs onto the network, the request requesting the identity of each remote PSD coupled to the other of the plurality of client devices which are functioning as a host to the PSD and are logged onto the network; periodically thereafter rebroadcasting the request; broadcasting a second message over the network by each host when said each host first logs onto the network, the first message indicating the unique identification of the PSD coupled to said each host; broadcasting a second message over the network by said each host when said each host logs off the network, the second message indicating that the PSD coupled thereto is no longer available; and maintaining a list of PSDs available on the network.

According to a second aspect of the invention, there is provided a method for automatic detection of metering transactions on the network.

In this embodiment, the Data Center may accommodate more than one PSD, for example supporting one PSD per serial port. Several applications programs running on the Host PC, such as a word processor or an envelope designer, may access the Host Applications.

The IBIP Specifications do not address an IBIP open metering system on a network environment. However, the specifications do not prohibit such a network-based system. Generally, in a network environment a network Server PC controls remote printing requested by a Client PC on the network. Of course, the Client PC controls any local printing.

One version of a network metering system, referred to herein as a "Virtual Meter", has many Host PCs without any PSDs coupled thereto. The Host PCs run client applications, but all PSD functions are performed on Server PCs located at a Data Center. The Host PCs must connect with the Data Center to process transactions such as postage dispensing, meter registration, or meter refills. Transactions are requested by the Host PC and sent to the Data Center for remote processing. The transactions are processed centrally at the Data Center and the results are returned to the Host PC. Accounting for funds and transaction processing are centralized at the Data Center. See, for example, U.S. Patent No. 5,454,038, which is assigned to the assignee of the present invention. The Virtual Meter does not conform to all the current requirements of the IBIP Specifications. In particular, the IBIP Specifications do not permit PSD functions to be performed at the Data Center.

According to a first aspect of the invention, there is provided a postage metering system comprising: a plurality of printing modules operatively connected as part of a network and operating as client printing modules on the network, the client printing modules including processor, memory and storage means; a plurality of postal security devices (PSDs) coupled to remote ones of the client printing modules, the PSD being local to the coupled client printing modules functioning as a host to the PSD and remote to the other of the plurality of printing modules, the PSD including unique identification, postal value storage means and digital signature means; means in the client printing modules for functioning as a postage metering network wherein a client printing module is arranged to request evidence of postage payment from a remote PSD for concluding postage metering transactions; and means in each client printing module for determining which of the remote PSDs are available for metering transactions on the network.

According to a second aspect of the invention, there is provided a method for automatic detection of remote postage security devices (PSDs) on a network having a plurality of client devices to which the PSDs are coupled, the method comprising the steps of: broadcasting a request over the network by a first client device when the first client device logs onto the network, the request requesting the identity of each remote PSD coupled to the other of the plurality of client devices which are functioning as a host to the PSD and are logged onto the network; periodically thereafter rebroadcasting the request; broadcasting a second message over the network by each host when said each host first logs onto the network, the first message indicating the unique identification of the PSD coupled to said each host; broadcasting a second message over the network by said each host when said each host logs off the network, the second message indicating that the PSD coupled thereto is no longer available; and maintaining a list of PSDs available on the network.
ent PC. Any Client PC may have one or more PSDs attached thereto. Each Client PC has access, if authorized, to both its own local PSD(s), if any, and any other Client PC’s PSD(s) (“remote PSDs”) in the network.

[0018] Each Client PC runs its own client metering application to dispense postage and to perform registration and refill operations. For each PSD in the Network PC Metering System, the Client PC to which the PSD is coupled controls processing transactions for dispensing postage and registration and refill of the PSD. When performing such operations, the Client PC functions as a server for the metering transaction, and is referred to herein as a “Meter Server PC”. In the Network PC Metering System the accounting for debits and credits to the PSD and the logging of transactions are performed on the Meter Server PC. Thus, the transaction processing is performed remotely when a Client PC is accessing a remote PSD. In alternate embodiments, the logging of transactions is performed on a network server to which the Client PCs are connected (“Network Server PC”).

[0019] In one embodiment, modems or internet connections for accessing the Data Center are located in the Meter Server PC. In alternate embodiments, the modem may be located in the PSD or the Client PC and the Internet connection may be in the Client PC.

[0020] It has also been found that the Network PC Metering System can be configured such that each Client PC dynamically knows which remote PSDs are available for use by such Client PC, and that each Meter Server PC, i.e., each Client PC with a PSD coupled thereto, dynamically knows which Client PCs are on-line that are authorized to use the PSD coupled to the Meter Server PC.

[0021] There are several benefits that are realized from the present system. One such benefit relates to the postal regulations requiring that the postage printed on a metered mailpiece must be obtained from a meter licensed from the local post office at which the mailpiece is deposited for mailing, commonly referred to as “origin of deposit” or “domain”. With a plurality of PSDs accessible over a computer network a user at a Client PC is not limited to a single PSD having a single origin of deposit or domain. For example, while most users of a network metering system located in Shelton, Connecticut may be willing to deposit their mailpieces in the Post Office in Shelton, Connecticut, other users may intend to deposit their mailpieces at different origins of deposit, such as Stamford, Connecticut. Furthermore, some of the users may be at a Client PC that is physically located in Stamford, Connecticut but is connected to a network server physically located in Shelton Connecticut. The present invention provides each user of a Client PC on the network with access to several PSDs having different origins of deposit.

[0022] Another benefit of the present system is that mailpiece generation does not have to be interrupted because of PSD funds limitation. For example, when a large mail run requires more postal value than is stored on a single PSD, the user can access another PSD on the network to complete the mail run without having to interrupt the mail run to refill the PSD that is low on funds.

[0023] The following describes a postage metering system that includes a plurality of printer modules connected as part of a network and operating as clients on the network. Postal security devices (PSDs) are coupled the clients. Each PSD is local to the coupled client functioning as a host to the PSD and remote to the other of the plurality of clients. The PSD includes unique identification, postal value storage and a digital signature generator. The clients function as a postage metering network wherein a client requests evidence of postage payment from a remote PSD for concluding postage metering transactions. Each of the clients determines which of the remote PSDs are available for metering transactions on the network by broadcast messages and requests. In one embodiment, a broadcast request for the identity of remote PSDs whose host is logged onto the network is sent over the network by a client when the client logs onto the network. Additional broadcast requests are periodically sent over the network by the client to other clients logged onto the network. Broadcast messages indicating the unique identification of the PSD coupled to a host are sent over the network by the host when the host logs onto the network. Additional broadcast messages are sent periodically over the network by the host. Another broadcast message indicating that a PSD is no longer available is sent over the network by the host when it logs off the network. In alternate embodiments a network server controls broadcast requests and messages.

[0024] In an open metering system, the printer modules are general purpose computers, such as personal computers. It has also been found that the present invention is also suitable for closed metering networks. In a closed metering system, the printer modules are postage meters, such as digital postage meters.

[0025] In describing the present system, reference is made to the drawings, wherein there is seen in Figs. 1-3, three alternate embodiments of a Network PC Metering System. Fig. 1 shows one embodiment of the present invention. A Network PC Metering System, generally designated 10, includes a plurality (five are shown) of Client PCs 20 conventionally coupled to a Network Server 30. Each PSD 40 (two are shown) of Network PC Metering System 10 is coupled to one of Client PCs 20. Each Client PC includes a conventional personal computer system with display, keyboard, and an unsecured printer. (Optionally, each Client PC may access a network printer 23 connected directly to the network.) Preferably, a plurality of PSDs exists in Network PC Metering System 10, with at least one PSD 40 being coupled to several Client PCs 20. When a specific PSD 40 is accessed for a metering transaction, Client PC 20, to which the PSD 40 is attached, becomes a Meter Server PC 21 (shown within parenthesis) for the remainder of the transaction. When the PSD 40 is being accessed by the Client PC 20 to which the PSD is coupled the Client PC 20 is function-
ing as a stand-alone PC meter. An example of a stand-alone PC metering system is described in European Patent Publication No. 0780809, filed December 19, 1996.  

In the preferred embodiment, the postal funds accounting and the transaction processing occur in the Meter Server PC 21. It will be understood that this is a decentralized approach concerning funds accounting and transaction accounting because each Client PC 20 having a PSD 40 attached thereto maintains accounting information (departmental accounting registers 42) and transaction information (transaction logs 44) relating to transactions occurring only at its PSD 40.  

Figs. 2A and 2B show alternate embodiments of the present invention. Network PC Metering System, generally designated '10', includes a plurality (five are shown) of Client PCs 20 conventionally coupled to a network server 30. Each PSD 40 (two are shown) of Network PC Metering System 10' is coupled to one of Client PCs 20. Each Client PC includes a conventional personal computer system with display, keyboard, and an unsecured printer 22 (and/or optional network printer 23). As in the preferred embodiment, a plurality of PSDs exists in Network PC Metering System 10', with at least one PSD 40 being coupled to several Client PCs 20. When the specific PSD is accessed for a metering transaction, the Client PC 20, to which the PSD 40 is attached, becomes a Meter Server PC 21 for the remainder of the transaction (Fig. 5). In this embodiment the postal funds accounting occurs in Meter Server PC 21 when the transaction has been concluded. However, the transaction processing occurs at Network Server 30. It will be understood that this is a decentralized approach concerning funds accounting because each Client PC 20 that has a PSD 40 attached thereto maintains accounting information (accounting registers 42) relating to transactions occurring only at its PSD. However, this embodiment provides a centralized approach concerning transaction accounting because one of the Meter Servers 21 (Fig. 2A) or Network Server 30 (Fig. 2B) maintains transaction information (transaction logs 44) relating to transactions occurring at any PSD.  

Fig. 3 shows a third embodiment of a Network PC Metering System, generally designated '10", in which at least one PSD 40 is coupled to a Network Server 30 and a plurality of Client PCs 20 are conventionally connected to the Network Server 30. Each Client PC includes a conventional personal computer system with display, keyboard, and an unsecured printer 22 (and/or optional network printer 23). All accounting occurs in PSD 40 and transaction logs 44 are stored in Network Server 30. An example such an embodiment is described in European Patent Publication No. EP-A-0780809, filed December 19, 1996. This embodiment comprises a Network Server 30 functioning as server for a conventional network, such as a local area network, and also functioning as Meter Server PC 21 with PSD 40 coupled thereto. Requests for indicia originate from and printing of indicia occur at a Client PC 20. However, funds accounting and transaction processing occur at Network Server 30. It will be understood that the Client PCs 20 may be connected to Network Server 30 by modem. It will further be understood that Network Server 30 may be located at a Data Center. It will be understood that this is a centralized approach concerning funds accounting and transaction accounting because the PSD coupled to Network Server 30 maintains departmental accounting (accounting registers 42) and transaction information (transaction logs 44) relating to transactions occurring only in Network PC Metering System 10".  

Referring again to Figs. 1 and 2, Network PC Metering Systems 10 and 10' are configured with one or more PSDs 40 coupled to one or more Client PCs 20. In such configurations, the Client PC 20 becomes a Stand-alone PC Meter when a metering transaction is processed locally on its coupled PSD 40. When operating as a Stand-alone PC Meter, Client PC 20 performs the previously described metering transaction, acting as both the requesting Client PC and the Meter Server PC. As a Stand-alone PC Meter, Client PC 20 can only access the PSD 40 coupled to it. There is no remote vault access when a Client PC is processing a metering transaction on the local PSD.  

Referring now to Fig. 4, a Client PC 20 is shown in Stand-alone PC Meter mode, generally designated 100. Stand-alone PC Meter 100 includes Host PC 102, PSD 104 and printer 106. Stand-alone PC Meter 100 processes the functions for PSD registration, PSD refill, and postage dispensing as transactions for PSD 104. Processing is performed locally by metering software component 110 (referred to herein as "PC Meter Toolkit") running in Host PC 102. In the preferred embodiment, PC Meter Toolkit is a Component Object Model/Distributed Component object Model (COM/DCOM) object (typically implemented as a dynamic link library (DLL) or OLE control) with interfaces to perform metering operations. One such interface maintains a list of local and remote PSDs on the network. This interface maintains a current list of all known and attached PSDs (the 'metertable') at the time it is instantiated. There is also a refresh method that Host and Client applications may use to update the list. An example of a PC metering system using a DLL with interfaces to perform metering operations is described in previously noted European Patent Publication No. EP-A-0780809, filed December 19, 1996.  

This Toolkit implementation allows Meter Servers to be local or remote without any changes in the Client PC interface. The PC Meter Toolkit and Meter Server could be within the same computer, computers connected via a local area network or the internet. Network protocol negotiation is handled, for example, by the Windows operating system. For additional information on COM/DCOM see technical white papers for Microsoft Windows NT® Server, including: DCOM Architecture; DCOM Technical Overview; and DCOM The Distributed Component Object Model, A Business Overview.  

PC Meter Toolkit 110 includes the following
components: a transaction handler, a vault interface, and a transaction log handler. Connections to the Data Center 5 can be made locally from the Stand-alone PC Meter 100 via modem 130. Accounting for debits and credits to the PSD are also performed locally, logging the transactions on the hard drive of Stand-alone PC Meter 100. In this manner, the transaction processing and funds accounting are centralized on the Client PC operating as Stand-alone PC Meter 100.

[0033] Stand-alone PC Meter 100 may accommodate more than one PSD per PC, for example, supporting one vault per serial port. Several Host or client applications programs 140, such as a word processor or an envelope designer, may access the PC Meter Toolkit 110 concurrently.

[0034] The PC Meter Toolkit 110 provides standard metering functions, such as dispensing postage, PSD refills, and PSD registration. The PC Meter Toolkit 110 resides in all Meter Servers and remote Client PCs capable of printing postage. The user of Stand-alone PC Meter 100 can access local or remote PSDs using PC Meter Toolkit 110. The PC Meter Toolkit 110 provides a list of the available PSDs from which the user selects a desired PSD for a particular transaction.

[0035] The COM/DCOM network concept provides mechanisms for a remote Client PC to gain access rights to the PC Meter Toolkit component in a PC Meter Server. Optionally, every Client PC can be given access rights to the PC Meter Server, whereby the PC Meter Server’s PSD PIN (password) can be used to authorize access to postage functions in the PC Meter Server and its PSD. By default, all PSDs are considered remotely accessible by all Client PCs unless configured differently by the user. Alternatively, the list of available PSDs can be customized based on user or system filters. For example, only sharing vaults whose origin zip matches the return address of the mail piece. In the preferred embodiment, the PSD is not active during access for authorization because PIN validation is performed by the PC Meter Server. The PC Meter Server obtains the PSD PIN from the PSD to perform validation. In an alternate embodiment, the PIN validation could occur within the PSD. This is a secure process because the PIN is stored in the PSD.

[0036] During the creation of a mailpiece, the user performs the following functions whether the PC meter is operated in stand-alone mode or network mode. The user can select CD-ROM addressing or dialup addressing (at the Data Center 5) to obtain correct addressee information. The user can choose the class of mail service (rate category) for the mailpiece. The user can select CD-ROM addressing or dialup addressing for the mailpiece and print preview the mailpiece. The user can change the postage amount, class of service and date of mailing. These changes are reflected in the indicium image.

[0037] PC Meter Toolkit 110 provides postal funds security because the user can not print an indicium without accounting for a debit to the PSD. Furthermore, there is no direct access to the indicium image, except through the PC Meter Toolkit transactions. The PC Meter Toolkit uses atomic transactions to tie the debit to PSD with the enabling of printing of the indicium image. The atomic transaction ensures that the debit to the PSD is complete before printing the indicium.

[0038] The transaction log stores funds transactions for PSD dispensing and refills. For Network PC Metering System 10, each Client PC stores the daily transaction log file for its local PSD(s). The user may select the local drive and directory path for the log file. For Network PC Metering System 10', each Client PC forwards transaction information for its local PSD(s) to Network Server 30 which stores the daily transaction log file. Once the accounting for a mailpiece transaction is completed, the client application requesting the transaction spoolls the mail piece corresponding to the transaction to the PC print manager for printing the indicium.

[0039] Network PC Metering System (10 or 10') has many Client PC’s with or without PSD(s) attached. Each Client PC has access to both its own local PSD(s) and remote PSDs in the network. Each Client PC can run its client application to dispense postage and initiate registration and refills.

[0040] As previously stated, Network PC Metering System (10 or 10') processes transactions for dispensing postage, PSD registration, and PSD refill on the Client PC 20 where the specific PSD 40 is located. This requires the transaction processing to be performed remotely if the user is accessing a remote PSD. Modems for accessing Data Center 5 are preferably located on each Client PC 20 having a PSD 40 coupled thereto. However, a single modem may be located on the Network Server 30 instead of several modems on each Client PC 20 having a PSD 40 coupled thereto. In this manner, PSD registrations, and PSD refills are processed through Network Server 30.

[0041] The software components for the Network PC Metering System (10 or 10') include the software components for the Stand-alone PC Meter along with two additional components, listed below.

[0042] Referring now to Fig. 5, a Client PC 20 enters Meter Server PC 21 mode when another Client PC 20 on the network initiates remote access of PSD 41 through its PC Meter Toolkit 110. Meter Server PC 21 processes the functions for PSD registration, PSD refill, and postage.
dispensing as transactions for PSD 41. Processing is performed at Meter Server PC 21 by the previously described PC Meter Toolkit 110 residing in Meter Server 21 and at Client PC 20 by the PC Meter Toolkit 110 residing in Client PC 20.

[0043] Using a DCOM implementation, the PC Meter Toolkits 110 residing in the Client PC 20 and the Meter Server 21 operate in conjunction with each other such that the remote requesting Client PC 20 and Meter Server PC 21 operate collectively as a PC meter regardless of PSD/Toolkit location. The PC Meter Toolkit 110 residing in Meter Server 21 handles messages from and to the requesting Client PC 20, and handles standard metering functions, such as dispensing postage, PSD refills, and PSD registration, for PSD 41 in the same manner as when in stand-alone mode.

[0044] Referring now to Fig. 6, at step 200, Client PC 20 sends a request through its PC Meter Toolkit 110 to remote PSD 41 for postal value for a mailpiece. At step 205, Meter Server 21 determines whether the Client PC 20 is authorized to make the request. If not authorized, then at 210, Meter Server 21 responds to Client PC 20 that it is not authorized to access PSD 41. If authorized, then at step 215, Meter Server 21 processes the request through its PC Meter Toolkit 110 and sends the request to PSD 41 with information received from remote Client PC 20. At step 220, PSD 41 dispenses the requested postal value including a digital signature based on the request. At step 225, PSD 41 sends the digital signature and transaction information to Meter Server 21. At step 230, Meter Server 21 through its PC Meter Toolkit 110 records the transaction information in a transaction log on its hard drive. At step 235, Meter Server 21 sends a request through its PC Meter Toolkit 110 to remote PSD 41 for the identity and location of any attached PSDs. Should messages be received indicating that a new PSD is located, and how to communicate with it.

[0045] Microsoft's Windows 95 and Windows NT™ operating systems provide facilities through DCOM and other mechanisms to implement network communications. Through the use of DCOM, objects can communicate via a mechanism referred to as connection points, which can be used to implement direct communication, multi-casting (more than one client receives messages), or broadcasting (all clients receive messages). This can be done between processes on the same computer or multiple computers on a network or on the internet. Mailslots is another Windows mechanism that permits the same communications facilities. The PC Meter Toolkit 110 uses these facilities to exchange information about the location and disposition of PSDs on the network.

[0046] When a Client PC logs into the network, the PC Meter Toolkit 110 running on the Client PC registers the necessary connection points; one common to all PC Meter Toolkits on the network, and one specific to the Client PC itself. The common connection point is used to send and receive multi-casted messages from all Clients. The specific connection point is for messages intended solely for one particular Client PC Meter Toolkit, such as a request or response for evidence of postage payment.

[0047] Upon initialization, the Client PC’s PC Meter Toolkit 110 uses the common connection point to send a message for all other PC Meter Toolkits to respond with available PSDs. PC Meter Toolkits running on PC Meter Servers 21 then respond to the Client PC’s specific connection point with information about the location and identities of any attached PSDs. Referring to figure 2A, the list of available PSDs is consolidated and presented to applications that require postage metering functions. Referring to Figure 2B, the list of available PSDs is consolidated along with locally attached PSDs and the complete list presented to applications that require postage metering functions. In this case, the PC Meter Toolkit 110 also sends messages to the common PC Meter Toolkit connection point indicating that another PSD is available for use by other PC Meter Toolkits.

[0048] When a remote Client PC 20 selects a PSD 40 to use, the PC Meter Toolkit 110 uses the information collected at initialization to know where the particular PSD is located, and how to communicate with it.

[0049] In operation, the PC Meter Toolkit 110 also handles messages regarding the status of PC Meter Toolkits 110 on the network. Should new PC Meter Toolkits be started on other Client PCs 20, the local PC Meter Toolkit responds with information regarding any attached PSDs 40. Should messages be received indicating that a new PSD is located, and how to communicate with it.

[0050] The effect of the Client PC Startup and Shutdown multi-casts is that all Client PCs 20 dynamically know exactly which PSDs 40 are available. Clients also have the ability to ask explicitly for a refreshed list of available PSDs 40 since it is possible that a machine can go offline without proper notification. DCOM also provides mechanisms for this with continual pinging to catch computers improperly notifying clients/servers.

[0051] Referring now to Fig. 7, at step 400, a Client PC starts up and queries for local PSDs at step 402. If local PSDs are available, Client PC is also a Meter Server for the local PSDs. At step 404, PC Meter Toolkit 110 in the Client PC creates mailslot connection points in the Client PC. When the Client PC detects the presence of a network, at step 406, then PC Meter Toolkit 110 broadcasts a message, at step 408, for the availability of its local PSD(s), if previously detected, and, at step 410, broadcasts a request for the identity and location of re-
remote PSDs available on the network. The broadcast request is repeated whenever a periodic time has elapsed at step 412. This ensures that the Client PC is updated with information on the current available remote PSDs on the network. When Client PC receives, at step 414, a response to its requests or receives messages from other Client PCs identifying remote PSDs on the network, then at step 416, PC Meter Toolkit 110 builds / modifies a list of available PSDs on the network. At step 418, if the Client PC is a Meter Server with a local PSD and it logs off the network, i.e., powers down, the Client PC broadcasts its logoff which advises the other Client PCs that its local PSD is no longer available on the network. At step 420, PC Meter Toolkit 110 in the Client PC destroys the mailslot connection points in the Client PC.

Centralized vs. Distributed Processing On the Network

A PC Metering system must account for funds for all mail pieces and refills. This requires saving transaction records in a sequential transaction log file. Both postage dispensing and refills should be kept in the same sequential file such that meter discrepancies, such as discrepancies due to meter movement between Client PCs on the network, can be reconciled. The following paragraphs summarize the impact of using centralized vs. decentralized accounting for the transaction log on a network metering system.

In a network metering configuration, if accounting for funds is summarized by a user, transactions could be logged where the user is located. This would require consolidating log files only if the user has more than one PC at which transactions can be initiated, i.e., the user moves between PCs). This method uses decentralized accounting, logging transactions on the user’s PC.

If accounting for funds is summarized by a meter, transactions should be logged where the meter, i.e. the PSD, is located. This would require consolidating log files only if the PSD could be attached to any PC (PSD moves between PCs). This method uses decentralized accounting, logging transactions on the PSD’s PC.

If accounting for funds is summarized by department (i.e. departments have several users that can access several PSDs), transactions must be consolidated if the logging of transactions was performed where the user is located or where the PSD is located.

An alternative to such consolidation of log files from PCs is a centralized accounting and logging of all transactions on same PC or a centralized server. Transactions would have to be sent to the Network Server PC for every mail piece, producing heavy network traffic. If the centralized server is down, or otherwise not available, then no postage dispensing or refills can occur, disabling metering capabilities over the entire network. A centralized server for Network PC Metering System is not the preferred embodiment of the present invention.

Network PC Metering Systems 10 and 10’ are representative of distributed processing of the metering transaction. Network PC Metering System 10 involves local transaction processing requested by a requesting Client PC 20, and remote accounting and logging at the Meter Server PC 21, i.e., where the PSD 40 and transaction log file 44 are located. Network PC Metering System 10’ involves local transaction processing by the requesting Client PC 20, remote accounting at the Meter Server PC 21, i.e., where the PSD 40 is located, and remote logging at the Network Server 30, i.e. where transaction log file 44 is located. Thus, the transaction processing is split from the accounting functionality in distributed processing. The steps of the transaction are split between different PCs of the network.

There is an advantage to configuring network metering for distributed processing, such as In Network PC Metering Systems 10 and 10’. If Network Server 30 is down, metering transactions may still be performed when Client PCs having PSDs coupled thereto operate in stand-alone mode. Furthermore, network-metering transactions may be performed even when a Client PC 20 with a PSD attached thereto is not logged on the network. For example, the Client PC not logged on the network can operate in stand-alone mode, and the Client PCs logged on the network can access other Client PCs having PSDs coupled thereto.

When a Client PC is attempting to access remote PSDs on the network, an optional prioritized list of available PSDs can be displayed to the user for selection. The prioritized ordering of the available PSDs may use the following heuristics:

- 1. PSDs sharing the same ZIP as the originating address of the mailpiece
- 2. Local PSDs (same location as the Client PC)
- 3. Remote PSDs sharing the same origin ZIP as the local PSDs
- 4. PSDs having the same three digit ZIP as items 1-3
- 5. Remaining PSDs

The preferred embodiment of the present invention has been described based on a Windows operating system for the Client computers. It will be understood that the present invention is suitable for use with any computer operating system. It will further be understood that although the embodiments of the present invention are described as postage metering systems, the present invention is applicable to any value metering system that includes transaction evidencing, such as monetary transactions, item transactions and information transactions.

The preferred embodiment has been described for an open system metering network. It will be understood that the present invention applies also to a closed system metering network wherein digital postage meters are used in place of the Client PCs described in the preferred embodiment. Such a closed system metering network is shown in Fig. 8. A Network Metering System, generally designated 510, includes a plurality (five are
A postage metering system comprising:

1. A postage metering system comprising:

   a plurality of printing modules (22) operatively connected as part of a network (10) and operating as client printing modules on the network, the client printing modules including processor (20), memory and storage means;
   
a plurality of postal security devices (40) (PSDs) coupled to respective ones of the client printing modules (20, 22), the PSD (40) being local to the coupled client printing modules functioning as a host to the PSD and remote to the other of the plurality of printing modules, the PSD including unique identification, postal value storage means and digital signature means;
   
means in the client printing modules for functioning as a postage metering network wherein a client printing module is arranged to request evidence of postage payment from a remote PSD for concluding postage metering transactions; and
   
means in each client printing module for determining which of the remote PSDs are available for metering transactions on the network.

2. The system of Claim 1, wherein the determining means comprises a broadcast request sent over the computer network by a first client printing module when a first client printing module logs onto the network, the broadcast request being for the identity of remote PSDs coupled to a host that is logged onto the network.

3. The system of Claim 1 or 2, wherein each host is operable to function as a meter server (20) for metering transactions between the other clients and the PSD coupled to said each host.

4. The system of Claim 3, wherein means are provided to store in the meter server transaction information received from the PSD for each metering transaction.

5. The system of any one of the preceding claims wherein the determining means comprises a broadcast request periodically sent over the network by first client printing module to other client printing modules logged onto the network, the broadcast request being for the identity of remote PSDs (40) coupled to a host logged onto the network (10).

6. The system of any one of Claims 1 to 4, wherein the determining means comprises a broadcast message sent over the network by a host of a PSD when the host first logs onto the network, the broadcast message including the unique identification of the PSD coupled to the host.

7. The system of any one of Claims 1 to 4, wherein the determining means comprises a broadcast message sent periodically over the network by a host of a PSD, the broadcast message including the unique identification of the PSD coupled to the host.

8. The system of any one of Claims 1 to 4, wherein the determining means comprises a broadcast request periodically sent by a network server to each of the client printing modules logged onto the network for the identity of the PSDs coupled to the client printing modules.

9. The system of Claim 8, wherein the client printing modules are arranged to find available PSDs through the network server.

10. The system of any one of Claims 1 to 4, wherein the determining means comprises a broadcast message sent over the network by the client printing module having a PSD coupled thereto when the client printing module logs off the network, the broadcast message indicating that the PSD coupled thereto is no longer available.

[0062] While the present invention has been disclosed with reference to the embodiments thereof, it will be apparent, as noted above, that variations and modifications may be made therein. It is, thus, intended that the following claims to cover each variation and modification that falls within the scope of the present invention.
11. The system of any one of the preceding claims wherein each of the client printing modules is limited to accessing only certain ones of the PSDs.

12. The system of Claim 11, wherein first client printing module functions as a meter server for first metering transactions between the other client printing modules and the local PSD coupled to the first client printing module, the other client printing modules functioning as a meter client on the postage metering network for the first metering transactions.

13. The system of Claim 12, wherein the meter server determines whether the client printing module is authorized to request postage from the PSD.

14. The system of Claim 12, wherein the PSD determines whether the client printing module is authorized to request postage from the PSD.

15. The system of any one of the preceding claims wherein the printing modules are personal computers.

16. The system of any one of Claims 1 to 14, wherein the printing modules are meter printers.

17. The system of Claim 1, wherein each of the printing modules comprises a general purpose computer (20) operating as a client computer on the network, the client computers each including processor, memory and storage means.

18. The system of Claim 17, wherein the determining means comprises:

   a broadcast request sent over the network by a first client computer when the first client computer logs onto the network and periodically thereafter, the broadcast request requesting the identity of each remote PSD coupled to a host computer logged onto the network;
   a broadcast message sent over the network by each host computer when said each host computer logs onto the network and periodically thereafter, the broadcast message indicating the unique identification of the PSD coupled to said each host computer; and
   a broadcast message sent over the network by said each host computer when said each host computer logs off the network, the broadcast message indicating that the PSD coupled thereto is no longer available.

19. The system of Claim 17 or 18, wherein the determining means comprises a broadcast request periodically sent by a network server to all client computers logged onto the network, the broadcast request requesting that each of the client computers logged onto the network and functioning as a host computer identity each PSD coupled thereto, wherein the client computers are operable to find available PSDs through the network server.

20. The system of any one of Claims 17 to 19, wherein said each host computer functions as a meter server for metering transactions between the other client computers and the PSD coupled to said each host computer and the other client computers function as meter clients on the network, wherein transaction information received from the PSD for each transaction request is stored in the meter server.

21. The system of Claim 20, wherein the meter server is operable to determine whether the client computer is authorized to request postage from the PSD.

22. The system of Claim 20, wherein the PSD is operable to determine whether the client computer is authorized to request postage from the PSD.

23. The system of any one of Claims 17 to 22 wherein each of the client computers is limited to accessing only certain ones of the PSDs.

24. The system of any one of Claims 17 to 23, wherein said determining means in each client computer is for determining which of the remote PSDs are available for transactions on the network and the identification of each client computer coupled to the available PSDs.

25. A method for automatic detection of remote postage security devices (40) (PSDs) on a network (10) having a plurality of client devices (20) to which the PSDs are coupled, the method comprising the steps of:

   broadcasting (410) a request over the network (10) by a first client device (20) when the first client device logs onto the network, the request requesting the identity of each remote PSD coupled to a host computer logged onto the network;
   broadcast a message sent over the network by each host computer when said each host computer logs onto the network and periodically thereafter, the broadcast message indicating the unique identification of the PSD coupled to said each host computer; and
   broadcast a message sent over the network by said each host computer when said each host computer logs off the network, the broadcast message indicating that the PSD coupled thereto is no longer available.

26. The system of any one of Claims 17 to 25 wherein said determining means comprises a broadcast request periodically sent by a network server to all client computers logged onto the network, the broadcast request requesting that each of the client computers logged onto the network and functioning as a host computer identity each PSD coupled thereto, wherein the client computers are operable to find available PSDs through the network server.

27. The system of any one of Claims 17 to 26, wherein said each host computer functions as a meter server for metering transactions between the other client computers and the PSD coupled to said each host computer and the other client computers function as meter clients on the network, wherein transaction information received from the PSD for each transaction request is stored in the meter server.

28. The system of Claim 27, wherein the meter server is operable to determine whether the client computer is authorized to request postage from the PSD.

29. The system of Claim 27, wherein the PSD is operable to determine whether the client computer is authorized to request postage from the PSD.

30. The system of any one of Claims 17 to 28 wherein each of the client computers is limited to accessing only certain ones of the PSDs.

31. The system of any one of Claims 17 to 29 wherein said determining means in each client computer is for determining which of the remote PSDs are available for transactions on the network and the identification of each client computer coupled to the available PSDs.
maintaining (416) a list of PSDs available on the network.

Patentansprüche

1. Postfrankiersystem, umfassend:
   - eine Vielzahl von Druckmodulen (22), die operativ als Teil eines Netzes (10) verbunden sind, und als Client-Druckmodule auf dem Netz arbeiten, wobei die Client-Druckmodule einen Prozessor (20), Arbeitsspeicher und Speichermedium beinhalten;
   - eine Vielzahl von Porto-Sicherheitseinrichtungen (40) (PSDs), die zu jeweiligen der Client-Druckmodule (20, 22) gekoppelt sind, wobei die PSD (40) lokal zu dem gekoppelten Client-Druckmodul, als Host zu der PSD funktionieren, und entfernt zu den anderen der Vielzahl von Druckmodulen ist, wobei die PSD eindeutige Identifikation, Postwertspeichermittel und digitale Signaturmittel beinhaltet;
   - Mittel, in den Client-Druckmodulen, zum Funktionieren als Postfrankiernetz, wobei ein Client-Druckmodul angeordnet ist, um einen Nachweis von Portozahlung von einer entfernten PSD anzufragen zum Abschließen von Postfrankiertransaktionen; und
   - Mittel, in jedem Client-Druckmodul, zum Bestimmen, welche der entfernten PSDs verfügbar sind für Frankier-Transaktionen auf dem Netz.

2. System nach Anspruch 1, wobei das Bestimmungsmittel eine Broadcast-Anfrage, die über das Computeretz durch ein erstes Client-Druckmodul gesendet wird, wenn sich das erste Client-Druckmodul an dem Netz anmeldet, umfasst, wobei die Broadcast-Anfrage für die Identität von entfernten PSDs ist, die mit einem Host gekoppelt sind, der an dem Netz angemeldet ist.

3. System nach Anspruch 1 oder 2, wobei jeder Host betreibbar ist, um als Frankierserver (20) für Frankier-Transaktionen zwischen den anderen Clients und der PSD, der mit jedem Host gekoppelt sind, zu funktionieren.

4. System nach Anspruch 3, wobei Mittel zur Verfügung gestellt werden, um, in dem Frankierserver, Transaktionsinformationen, die von der PSD für jede Frankier-Transaktion empfangen werden, zu speichern.

5. System nach einem der vorangegangenen Ansprüche, wobei das Bestimmungsmittel eine Broadcast-Anfrage umfasst, die periodisch über das Netz durch ein erstes Client-Druckmodul zu anderen Client-Druckmodulen, die an dem Netz angemeldet sind, gesendet wird, wobei die Broadcast-Anfrage für die Identität der entfernten PSDs (40), die mit einem Host gekoppelt sind, der an dem Netz (10) angemeldet ist.

6. System nach einem der Ansprüche 1 bis 4, wobei das Bestimmungsmittel eine Broadcast-Nachricht umfasst, die über das Netz durch einen Host einer PSD gesendet wird, wenn der Host sich zuerst an dem Netz anmeldet, wobei die Broadcast-Nachricht die eindeutige Identifikation der PSD, die mit dem Host gekoppelt ist, beinhaltet.

7. System nach einem der Ansprüche 1 bis 4, wobei das Bestimmungsmittel eine Broadcast-Nachricht umfasst, die periodisch über das Netz durch einen Host einer PSD gesendet wird, wobei die Broadcast-Nachricht die eindeutige Identifikation der PSD, die mit dem Host gekoppelt ist, beinhaltet.

8. System nach einem der Ansprüche 1 bis 4, wobei das Bestimmungsmittel eine Broadcast-Anfrage umfasst, die periodisch durch einen Netzserver zu jedem der Client-Druckmodule, die an dem Netz angemeldet sind, gesendet wird für die Identität der PSDs, die mit den Client-Druckmodulen gekoppelt sind.

9. System nach Anspruch 8, wobei die Client-Druckmodule angeordnet sind, um verfügbare PSDs durch den Netzserver zu finden.

10. System nach einem der Ansprüche 1 bis 4, wobei das Bestimmungsmittel eine Broadcast-Nachricht umfasst, die über das Netz durch das Client-Druckmodul gesendet wird, das eine PSD daran gekoppelt hat, wenn sich das Client-Druckmodul an dem Netz abmeldet, wobei die Broadcast-Nachricht anzeigt, dass die PSD, die daran gekoppelt ist, nicht länger verfügbar ist.

11. System nach einem der vorangegangenen Ansprüche, wobei jedes der Client-Druckmodule befrachtet ist, nur auf bestimmte der PSDs zuzugreifen.

12. System nach Anspruch 11, wobei ein erstes Client-Druckmodul als ein Frankierserver für erste Frankier-Transaktionen zwischen den anderen Client-Druckmodulen und der lokalen PSD, die mit dem ersten Client-Druckmodul verbunden ist, funktioniert, wobei die anderen Client-Druckmodule als ein Frankier-Client auf dem Postfrankiernetz für die ersten Frankier-Transaktionen funktionieren.

13. System nach Anspruch 12, wobei der Frankierserver bestimmt, ob das Client-Druckmodul autorisiert ist Porto von der ersten PSD anzufragen.
14. System nach Anspruch 12, wobei die PSD bestimmt, ob das Client-Druckmodul autorisiert ist Porto von der PSD anzufragen.

15. System nach einem der vorangegangenen Ansprüche, wobei die Druckmodule Personalcomputer sind.

16. System nach einem der Ansprüche 1 bis 14, wobei die Druckmodule Frankierdrucker sind.

17. System nach Anspruch 1, wobei jedes der Druckmodule einen Universalcomputer (20), der als Client-Computer auf dem Netz arbeitet, umfasst, wobei der Client-Computer jeder einen Prozessor, Arbeitspeicher und Speichermittel beinhaltet.

18. System nach Anspruch 17, wobei das Bestimmungsmittel umfasst:

- eine Broadcast-Anfrage, die über das Netz durch einen ersten Client-Computer gesendet wird, wenn sich der erste Client-Computer an dem Netz anmeldet und periodisch danach, wobei die Broadcas-Anfrage die Identität von jeder entfernten PSD, die mit einem Host-Computer gekoppelt ist, der an dem Netz angemeldet ist, anfragt;
- eine Broadcast-Nachricht, die über das Netz durch jeden Host-Computer gesendet wird, wenn sich der jede Host-Computer an dem Netz anmeldet und periodisch danach, wobei die Broadcast-Nachricht die eindeutige Identifikation der PSD, die mit dem jeden Host-Computer gekoppelt ist, beinhaltet; und
- eine Broadcast-Nachricht, die über das Netz durch den jeden Host-Computer gesendet wird, wenn sich der jeder Host-Computer an dem Netz abmeldet, wobei die Broadcast-Nachricht anzeigt, dass die PSD, die damit verbunden ist, nicht länger verfügbar ist.

19. System nach einem der Ansprüche 17 oder 18, wobei das Bestimmungsmittel eine Broadcast-Anfrage umfasst, die periodisch durch einen Netzserver zu allen Client-Computer zu allen Client-Computer, die am Netz angemeldet sind, gesendet wird, wobei die Broadcast-Anfrage anfragt, dass jeder der Client-Computer, der am Netz angemeldet ist und als ein Host-Computer funktioniert, jede PSD, die daran gekoppelt ist, identifiziert, wobei die Client-Computer betreibbar sind, um verfügbare PSDs durch den Netzserver zu finden.

20. System nach einem der Ansprüche 17 bis 19, wobei jede Host-Computer als Frankierserver funktioniert für Frankier-Transaktionen zwischen den anderen Client-Computern und der PSD, die zu dem jeden Host-Computer gekoppelt ist, und die anderen Client-Computer als Frankier-Clients auf dem Netz funktionieren, wobei Transaktions-Information, die von der PSD für jede Transaktionsanfrage empfangen wird, in dem Frankierserver gespeichert wird.

21. System nach Anspruch 20, wobei der Frankierserver betreibbar ist, um zu bestimmen, ob der Client-Computer autorisiert ist Porto von der PSD anzufragen.

22. System nach Anspruch 20, wobei die PSD betreibbar ist, um zu bestimmen, ob der Client-Computer autorisiert ist Porto von der PSD anzufragen.

23. System nach einem der Ansprüche 17 bis 22, wobei jeder der Client-Computer beschränkt ist, nur auf bestimmte der PSDs zuzugreifen.

24. System nach einem der Ansprüche 17 bis 23, wobei das Bestimmungsmittel in jedem Client-Computer zum Bestimmen, welche der entfernten PSDs verfügbar sind für Transaktionen auf dem Netz und der Identifikation von jedem Client-Computer, der mit den verfügbaren PSDs gekoppelt ist, ist.

25. Verfahren zur automatischen Erfassen von entfernten Portosicherheitseinrichtungen (40) (PSDs) in einem Netz (10), das eine Vielzahl von Client-Einrichtungen (20) aufweist, zu welchen die PSDs gekoppelt sind, das Verfahren umfassend die Schritte:

- Broadcasten (410) einer Anfrage über das Netz (10) durch eine erste Client-Einrichtung (20), wenn sich die erste Client-Einrichtung an dem Netz anmeldet, wobei die Anfrage die Identität von jeder entfernten PSD (40), die mit den anderen der Vielzahl von Client-Einrichtungen (20) gekoppelt sind, anfragt, welche als Host zu der PSD funktionieren und an dem Netz angemeldet sind;
- Broadcasten (420) einer zweiten Nachricht über das Netz durch den jede Host, wenn der jede Host sich an dem Netz abmeldet, wobei die zweite Nachricht anzeigt, dass die PSD, die damit verbunden ist, nicht länger verfügbar ist; und
- Halten (416) einer Liste von PSDs, die in einem Netz verfügbar sind.

Revendications

1. Système d’affranchissement postal comprenant :
une pluralité de modules d’impression (22) fonctionnellement reliés en tant que partie d’un réseau (10) et servant de modules d’impression clients sur le réseau, les modules d’impression clients comprenant un processeur (20), une mémoire et un moyen de stockage ; une pluralité de dispositifs de sécurité postaux (40) (PSD) couplés à des modules respectifs parmi les modules d’impression clients (20, 22), le PSD (40) étant local par rapport aux modules d’impression clients couplés servant d’hôte au PSD et distant par rapport aux autres modules de la pluralité de modules d’impression, le PSD comprenant une identification unique, un moyen de stockage de valeur postale et un moyen de signature numérique ; un moyen dans les modules d’impression clients pour servir de réseau d’affranchissement où un module d’impression client est agencé pour demander une attestation de paiement d’affranchissement à un PSD distant afin de conclure des transactions d’affranchissement ; et un moyen dans chaque module d’impression client pour déterminer quels PSD distants sont disponibles pour les transactions d’affranchissement sur le réseau.

2. Système selon la revendication 1, dans lequel le moyen de détermination comprend une demande de diffusion envoyée sur le réseau d’ordinateurs par le premier module d’impression client lorsque le premier module d’impression client entre en communication avec le réseau, la demande de diffusion étant pour l’identité de PSD distants couplés à un hôte qui est entré en communication avec le réseau.

3. Système selon la revendication 1 ou 2, dans lequel chaque hôte est utilisable pour servir de serveur de machines à affranchir (20) pour compter les transactions entre les autres clients et les PSD couplés à chaque dit hôte.

4. Système selon la revendication 3, dans lequel des moyens sont prévus pour stocker les informations de transactions de serveur de machines à affranchir reçues depuis le PSD pour chaque transaction d’affranchissement.

5. Système selon l’une quelconque des revendications précédentes, dans lequel le moyen de détermination comprend une demande de diffusion envoyée périodiquement sur le réseau par le premier module d’impression client aux autres modules d’impression clients entrés en communication avec le réseau, la demande de diffusion étant pour l’identité de PSD distants (40) couplés à un hôte entré en communication avec le réseau (10).

6. Système selon l’une quelconque des revendications 1 à 4, dans lequel le moyen de détermination comprend un message de diffusion envoyé sur le réseau par un hôte d’un PSD lorsque l’hôte entre en communication avec le réseau pour la première fois, le message de diffusion comprenant l’identification unique du PSD couplé à l’hôte.

7. Système selon l’une quelconque des revendications 1 à 4, dans lequel le moyen de détermination comprend un message de diffusion envoyé périodiquement sur le réseau par un hôte d’un PSD, le message de diffusion comprenant l’identification unique du PSD couplé à l’hôte.

8. Système selon l’une quelconque des revendications 1 à 4, dans lequel le moyen de détermination comprend une demande de diffusion envoyée périodiquement par un serveur de réseau à chacun des modules d’impression clients entrés en communication avec le réseau pour l’identité des PSD couplés aux modules d’impression clients.

9. Système selon la revendication 8, dans lequel les modules d’impression clients sont agencés pour trouver des PSD disponibles via le serveur de réseau.

10. Système selon l’une quelconque des revendications 1 à 4, dans lequel le moyen de détermination comprend un message de diffusion envoyé sur le réseau par le module d’impression client ayant un PSD qui lui est couplé lorsque le module d’impression client sort du réseau, le message de diffusion indiquant que le PSD qui lui est couplé n’est plus disponible.

11. Système selon l’une quelconque des revendications précédentes, dans lequel chacun des modules d’impression clients est limité à l’accès de seulement certains PSD.

12. Système selon la revendication 11, dans lequel le premier module d’impression client sert de serveur de machines à affranchir pour des premières transactions d’affranchissement entre les autres modules d’impression clients et le PSD local couplé au premier module d’impression client, les autres modules d’impression clients servant de client de machines à affranchir sur le réseau d’affranchissement pour les premières transactions d’affranchissement.

13. Système selon la revendication 12, dans lequel le serveur de machines à affranchir détermine si le module d’impression client est autorisé à demander l’affranchissement au PSD.

14. Système selon la revendication 12, dans lequel le PSD détermine si le module d’impression client est
autorisé à demander l'affranchissement au PSD.

15. Système selon l’une quelconque des revendications précédentes, dans lequel les modules d’impression sont des ordinateurs personnels.

16. Système selon l’une quelconque des revendications 1 à 14, dans lequel les modules d’impression sont des imprimantes de machines à affranchir.

17. Système selon la revendication 1, dans lequel chacun des modules d’impression comprend un ordinateur à usage général (20) servant d’ordinateur client sur le réseau, les ordinateurs clients comprenant chacun un processeur, une mémoire et un moyen de stockage.

18. Système selon la revendication 17, dans lequel le moyen de détermination comprend :

une demande de diffusion envoyée sur le réseau par un premier ordinateur client lorsque le premier ordinateur client entre en communication avec le réseau et périodiquement, ensuite, la demande de diffusion demandant l’identité de chaque PSD distant couplé à un ordinateur hôte entré en communication avec le réseau ;

un message de diffusion envoyé sur le réseau par chaque ordinateur hôte lorsque chaque ordinateur hôte entre en communication avec le réseau et périodiquement, ensuite, le message de diffusion indiquant l’identification unique du PSD couplé à chaque ordinateur hôte ; et

un message de diffusion envoyé sur le réseau par chaque ordinateur hôte lorsque chaque ordinateur hôte sort du réseau, le message de diffusion indiquant que le PSD qui lui est couplé n’est plus disponible.

19. Système selon la revendication 17 ou 18, dans lequel le moyen de détermination comprend une demande de diffusion envoyée périodiquement par un serveur de réseau à tous les ordinateurs clients entrés en communication avec le réseau, la demande de diffusion demandant qu’aucun des ordinateurs clients entrés en communication avec le réseau et servant d’ordinateur hôte identifie chaque PSD qui lui est couplé, où les ordinateurs clients sont aptes à trouver des PSD disponibles via le serveur de réseau.

20. Système selon l’une quelconque des revendications 17 à 19, dans lequel chaque ordinateur hôte sert de serveur de machines à affranchir pour des transactions d’affranchissement entre les autres ordinateurs hôtes et les autres ordinateurs clients servent de clients de machines à affranchir sur le réseau, où les informations de transactions reçues du PSD pour chaque demande de transaction sont stockées dans le serveur de machines à affranchir.

21. Système selon la revendication 20, dans lequel le serveur de machines à affranchir est utilisable pour déterminer si l’ordinateur client est autorisé à demander l’affranchissement au PSD.

22. Système selon la revendication 20, dans lequel le PSD est utilisable pour déterminer si l’ordinateur client est autorisé à demander l’affranchissement au PSD.

23. Système selon l’une quelconque des revendications 17 à 22, dans lequel chacun des ordinateurs clients est limité à l’accès de seulement certains PSD.

24. Système selon l’une quelconque des revendications 17 à 23, dans lequel ledit moyen de détermination dans chaque ordinateur client est conçu pour déterminer quels PSD distants sont disponibles pour les transactions sur le réseau et l’identification de chaque ordinateur client couplé aux PSD disponibles.

25. Procédé pour la détection automatique de dispositifs de sécurité postaux distants (40) (PSD) sur un réseau (10) ayant une pluralité de dispositifs clients (20) auxquels sont couplés les PSD, le procédé comprenant les étapes consistant à :

diffuser (410) une demande sur le réseau (10) par un premier dispositif client (20) lorsque le premier dispositif client (20) entre en communication avec le réseau, la demande demandant l’identification unique du PSD couplé à chaque ordinateur hôte ;

diffuser (408) un premier message sur le réseau par chaque hôte lorsque chaque hôte entre en communication avec le réseau pour la première fois, le premier message indiquant l'identification unique du PSD couplé à chaque hôte ;

diffuser (420) un deuxième message sur le réseau par chaque hôte lorsque chaque hôte sort du réseau, le deuxième message indiquant que le PSD qui lui est couplé n’est plus disponible ; et

tenir à jour (416) une liste de PSD disponibles sur le réseau.
FIG. 7

1. POWER-UP CLIENT
2. QUERY FOR LOCAL PSDS
3. CREATE MAIL SLOT CONNECTION POINTS
4. NETWORK AVAILABLE
   - YES: BROADCAST MESSAGE OF LOCAL PSD
   - NO: BROADCAST REQUEST FOR REMOTE PSDS
5. PERIODIC TIME ELAPSED
   - YES: BUILD / MODIFY PSD LIST
   - NO: RECEIVED RESPONSES & MESSAGES
     - YES: BROADCAST LOGOFF
     - NO: POWER DOWN
6. YES: BROADCAST LOGOFF
7. DESTROY CONNECTION POINTS
REFERENCES CITED IN THE DESCRIPTION

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