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(54) Title: SYSTEM AND METHOD OF PLATFORM-INDEPENDENT DEVICE SWITCHING

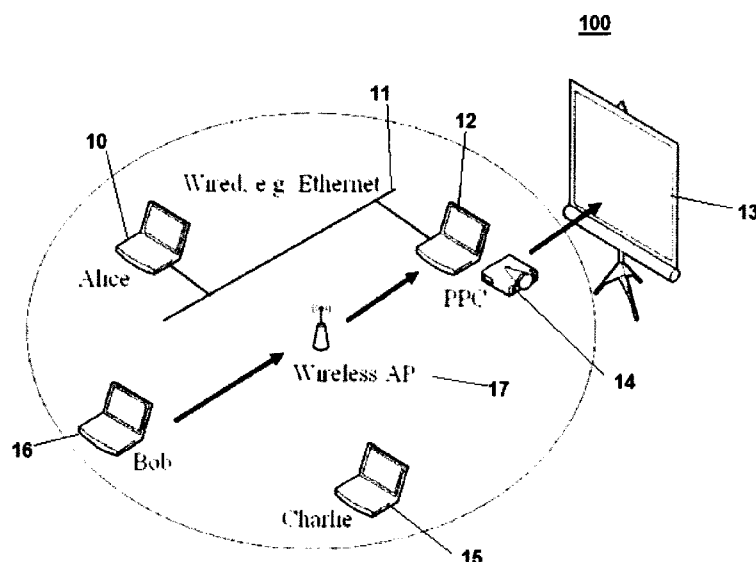


FIGURE 1

(57) Abstract: A system of platform independent device switching comprising a client device (200) for instantly transferring active document to a server device that is connected to a projector across any network and a server device (300) for supporting instant transfer of document from a remote client device across any access network.



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SYSTEM AND METHOD OF PLATFORM-INDEPENDENT DEVICE SWITCHING

TECHNICAL FIELD

- 5 The present invention relates to ubiquitous computing system and method and more particularly to a system and method of platform independent device switching, for user to access services e.g voice, video and/or data through any network at anytime from one device to another.

10 BACKGROUND ART

- Ubiquitous computing (ubicomput) is a post-desktop model of human and computer interaction in which information processing has been thoroughly integrated into everyday objects and activities. The objective of ubiquitous computing is that users can access any service (such as voice, video or data)
- 15 through any network, anywhere at any time with any device available. It is expected that the users would switch their communication devices according to his surrounding environment during a communication session, as to suit their preferences at the present point of time. For instance, a user uses a mobile phone whenever he or she wants to stay mobile, but would prefer to switch over
- 20 to a desktop PC for executing applications which require higher processing capability. There are also times where user started the session on his or her laptop but decided to switch it over to another device that has bigger screen, so

as to allow a group of people to be able to view the contents of what is available in the laptop.

This is a typical scenario in today's organization, particularly for making slides presentation. However, there are some common pitfalls in such practice such as the need to plug and unplug VGA cable across different laptops for various individual presentations and the unhealthy practice of attaching and detaching USB drives (potentially from various unsecure sources) to and/or from the PC connected to the LCD and/or projector, causing unnecessary virus infection to the computer.

These drawbacks can cause problems and very often delay the presentation session unnecessarily. In certain cases, it even introduces technical issues where no output could be shown on the LCD due to hardware incompatibility or different screen resolutions.

The common solution for this problem would be to first request and collect all slides that would be presented prior to the actual session. This is to ensure all slides will first be properly kept on a single PC that will be eventually connected to the LCD and/or projector. However, this introduces drawbacks where all slides need to be manually saved from the mailbox, followed by proper naming and sorting into appropriate folders and there could be last minute change to the slides, which will cause inconvenience to the ongoing presentation session.

A better approach would be utilizing a centralized server where users could sign in to an online conference either as chairman or normal participants as to access the document. In such online system, it is basically adopting a client/server approach where the signaling control, data or contents must be routed through a centralized storage. The disadvantages of such system wherein a server must be allocated to serve as centralized storage and all client devices must be able to connect the centralized server that may subject to performance and bandwidth issues.

Other device switching solutions found are normally focusing on seam-less transfer of real time session, instead of instant switching and managing of documents across devices with the objectives of resolving the said drawbacks.

Another alternative method is to throw away all the existing (legacy) projectors and replace them with wireless projector. This approach is costly and will introduce performance issues whenever highly animated slides and video are to be presented due to its requirement on CPU processing. For the same performance overhead, it is hence not suitable to run on mobile device.

Patent number US 2007/0033637 discloses a system and method for the selective sharing of an electronic document. The method enables a user to share access to an electronic document stored on a repository on a document

management system. However, the prior art is different over the present invention since there is no introduction of workability with existing projector.

In another example of a patent document, patent number US 2004/00108056 A1
5 discloses a method and system for remote video display through a wireless projector. The present invention is distinguished from the prior art wherein data is transmitted via wired or wireless connection in the present invention. The present invention is also functioning independent of projector's type, and it carries a centralized storage for later processing which is missing from this prior patent.

10

Therefore, there exists a need for a system and method of platform independent device switching, for user to access services e.g voice, video and/or data through any network efficiently from one device to another.

15 **DISCLOSURE OF THE INVENTION**

The present invention aims to provide ubiquitous computing system and method and more particularly to a system and method of platform independent device switching.

20

In a preferred embodiment of the present invention, a system of platform independent device switching comprising a client device for instantly transferring active document to a server device that is connected to a projector across any

network and a server device for supporting instant transfer of document from a remote client device across any access network.

In another preferred embodiment of the present invention, the client device further comprising a Session Module as main coordinator of switching session, a Proxy Module as an intermediate gateway module to interact with active application, a Connection Module for discovering identity and contact address of server device and a Security Module for performing authentication and content encryption before files transmitted over network.

In another preferred embodiment of the present invention, the server device further comprising a Session Module as main coordinator of entire switching session, a Proxy Module for serving as an intermediate gateway to interact with active application, a Connection Module for announcing identity and contact address of the server, a Security Module for performing file authentication and content decryption before any application is invoked to open the uploaded file; and a File Module for storing newly received file into local designated folder on the server device.

In another preferred embodiment of the present invention, the platform independent device switching comprises the steps of activating transfer while having an active document being opened by an application running on a device, searching a network for availability of servers that connected with a projector,

selecting a specific server from a list of servers found, entering session pin for authentication, identifying full path name and filename of the active document for the file transmission across the network to the selected server, selecting switching mode, sending both the active file and the preferred switching configuration to the selected server, verifying received file at the selected server; and opening up the received file.

In another preferred embodiment of the present invention, selecting switching mode includes selecting Silent or Instant mode.

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In another preferred embodiment of the present invention, verifying the received file at the selected server includes saving the received file to its local file storage system.

15 In another preferred embodiment of the present invention, opening up the received file further includes using associated application if the Instant switching mode is configured.

The present invention consists of features and a combination of parts hereinafter fully described and illustrated in the accompanying drawings, it being understood that various changes in the details may be made without departing from the scope of the invention or sacrificing any of the advantages of the present invention.

20

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

To further clarify various aspects of some embodiments of the present invention, a more particular description of the invention will be rendered by references to specific embodiments thereof, which are illustrated, in the appended drawings. It is appreciated that these drawings depict only typical embodiments of the invention and are therefore not to be considered limiting of its scope. The invention will be described and explained with additional specificity and detail through the accompanying drawings in which:

FIG.1 illustrates client and server architecture of the system.

FIG.2 illustrates internal architecture of the client system.

FIG.3 illustrates internal architecture of the PPC.

FIG.4 illustrates client flowchart.

FIG.5 illustrates server flowchart.

DETAILED DESCRIPTION OF THE ACCOMPANYING DRAWINGS

Referring now to FIG. 1, the figure shows peer to peer approach of client server architecture (100) of the proposed system. It consists of a plurality of client devices, which belonged to various different users for example Alice (10), Bob (16) and Charlie (15), as well as the PPC (12). It is shown that all the three users
5 could connect to the PPC (12) either by wired (11) or in a wireless manner (17). In this scenario, all three (10, 16, 15) of them need to conduct in sequence their slide presentations using the PPC (12) that is belonged to the chair person of the session.

10 The session must be started by having the PPC (12) to first gets connected to the projector (14) and later announce its presence to the network. Upon making the announcement, all client devices (10, 16, 15) could then start listening, capturing and interpreting the information in the announcement message. The information includes the contact address of the PPC (12) where the client
15 devices (10, 16, 15) could later establish connection for performing device switching.

FIG. 2 shows the internal architecture of the client system (200). The device switching intelligence sits as an application plug-in at the application level (110)
20 and it consists of four modules. The main module is known as the Session Module (112), which is responsible for managing the overall device switching sessions. This includes interacting with the remaining three modules so as to

ensure the application data (or file) could be properly transmitted across the network to the designated PC that connects to the projector.

- The first module the Session Module (112) will interact with is the Visual Studio
- 5 Tools for Office (VSTO) Proxy module, or Visual Basic for application (VBA) Proxy, which serves as an intermediate module to any Office applications such as Word, Powerpoint, Excel, etc. It also serves as the triggering means to activate the entire device switching session, whenever the user issues a command (e.g. pressing a key or clicking a button) on the Office application.
- 10 Upon receiving a command from the Office applications, the Proxy module (111) will first invoke the underlying Session Module (112) which will then initiates a series of steps such as discovering the PPC, authenticate the PPC as well as transmitting the file securely to the PPC.
- 15 The second module the Session Module (112) will communicate next is the Connection Module (CM) (114). CM (114) is responsible for discovering the presence, identity and contact address of the PPC, to eventually establishing connection to the PPC. To ensure secure communication, the third module that is the Security Module (SM) (113) will be involved to perform authentication and
- 20 content encryption before the file gets transmitted over the network.

Referring now to FIG.3 shows the internal architecture of the PPC (300). It basically shares similar design to the client device (200) except interacting with

an extra component called the File Module (FM) (211). FM (211) is responsible for storing the newly received file into the local designated folder on the PPC. It uses information provided from the Session Module (SM) (215) to perform file management functionality such as to create new folder and rename the file so as
5 to match with the current context of the session.

The rest of the modules are similar to those on the client device. This includes the Connection Module (213) which is responsible for receiving file over the network, and SM (212) to authenticate and decrypt the received file. The SM
10 (212) here plays the same role as on the client device that is to coordinate and manage the entire device switching session plus the management of files on the local file system. Another role of SM (212) here is to ask the Proxy Module (216) to open the uploaded file, which will in turn find the right associated application (210) to read specific uploaded file from the File Storage (214).

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FIG. 4 shows the client flowchart (400) of the present invention. The flow starts (310) with opening slide with associated application (311) and initiate the Slide share (312). The first process of the plug-in is to create a multicast socket on the first available active network (313) as configured on a priority network list by the
20 users. For example, always start with WiFi, then followed by WIMAX and 3G. Next is to start a thread so as to listen for any server IP address announcement packet (314). Upon receiving (315) such packet, a window will pop-up as to allow user to select the right server to join (316). The process continues with

establishing a connection to the selected server (317). Next is to perform the authentication process where the user will be asked for the session pin (318), which is pre-notified by the administrator of the session. Upon successful login, the process continues to retrieve the property of the active file that is currently
5 being opened. This could be done by interacting with the Proxy Module (319). Thereafter, the user will be asked to select the switching mode of the session (320). There are two choices- Silent and Instant. Silent means the selected file will be transmitted and saved directly to the storage of the server, whereas Instant introduces an extra step of opening up the file with the associated
10 application of the PPC. The configuration and file server are sent to the server (321) and the process ends (323) by receiving acknowledgement of delivered configuration and file by the server (322)

FIG.5 shows the server flowchart of the present invention. The process starts
15 (411) where the session administrator will be asked for the session pin (412). This pin must be made known to any other user who intends to participate in the session. This could be done verbally, or through any electronic means such as IM, SMS or Email. Subsequently, the server will create a multitask socket on the first available active network as configured on a proxy network list by the users
20 (414). For example always start with WiFi, then followed by WiMAX and 3G. Next, the server will start a thread to multicast its IP address to the network, and later waits (415) for any incoming client request (416). Whenever there is a new request, the server will request for the session pin from the client (417) so as to

perform authentication (418). The process continues (419) if the authentication is successful, otherwise an error message (420) will be returned to the client.

The next step upon positive authentication is to request and receive the file (421)
5 from the client. The received file will then be verified (422) as to ensure that it is
the right type as indicated by the file extension. Thereafter is to save the file to
the designated folder in the server storage (423). The final step is to check on the
switching mode (424) to determine whether to open the file (425) immediately
with the associated application (for instant switching). The process ends (427)
10 when the user requested to quit (426) the application.

In the foregoing specification, specific embodiments of the present invention
have been described. However, one of ordinary skill in the art will appreciate that
various modifications and changes can be made without departing from the
15 scope of the present invention as set forth in the various embodiments discussed
above and the claims that follow. Accordingly, the specification and figures are to
be regarded in an illustrative rather than a restrictive sense, and all such
modifications are intended to be included within the scope of present invention.
The benefits, advantages, solutions to problems, and any element(s) that may
20 cause any benefit, advantage, or solution to occur or become more pronounced
are not to be construed as a critical, required, or essential features or elements
as described herein.

CLAIMS

1. A system of platform independent device switching comprising:

a client device (200) for instantly transferring active document to a server
5 device that is connected to a projector across any network; and

a server device (300) for supporting instant transfer of document from a
remote client device across any access network.

2. The system according to claim 1 wherein the client device (200) further
10 comprising:

a Session Module (112) as main coordinator of switching session;

a Proxy Module (111) as an intermediate gateway module to interact with
active application ;

a Connection Module (114) for discovering identity and contact address of
15 server device; and

a Securiy Module (113) for performing authentication and content
encryption before files transmitted over network.

3. The system according to claim 1 wherein the server device (300) further
20 comprising:

a Session Module (215) as main coordinator of entire switching session;

a Proxy Module f(216) or serving s an intermediate gateway to interact
with active application;

a Connection Module(213) for announcing identity and contact address of the server;

a Security Module (212) for performing file authentication and content decryption before any application is invoked to open the uploaded file;

5 and

a File Module (211) for storing newly received file into local designated folder on the server device.

4. The system of platform independent device switching according to claim 1

10 comprises the steps of:

activating transfer while having an active document being opened by an application running on a device;

searching a network for availability of servers that connected with a projector;

15 selecting a specific server from a list of servers found;

entering session pin for authentication;

identifying full path name and filename of the active document for the file transmission across the network to the selected server;

selecting switching mode;

20 sending both the active file and the preferred switching configuration to the selected server;

verifying received file at the selected server; and

opening up the received file.

5. The method according to claim 4 wherein selecting switching mode includes selecting Silent or Instant mode.

5 6. The method according to claim 4 wherein verifying the received file at the selected server includes saving the received file to its local file storage system.

10 7. The method according to claim 4 wherein opening up the received file further includes using associated application if the Instant switching mode is configured.

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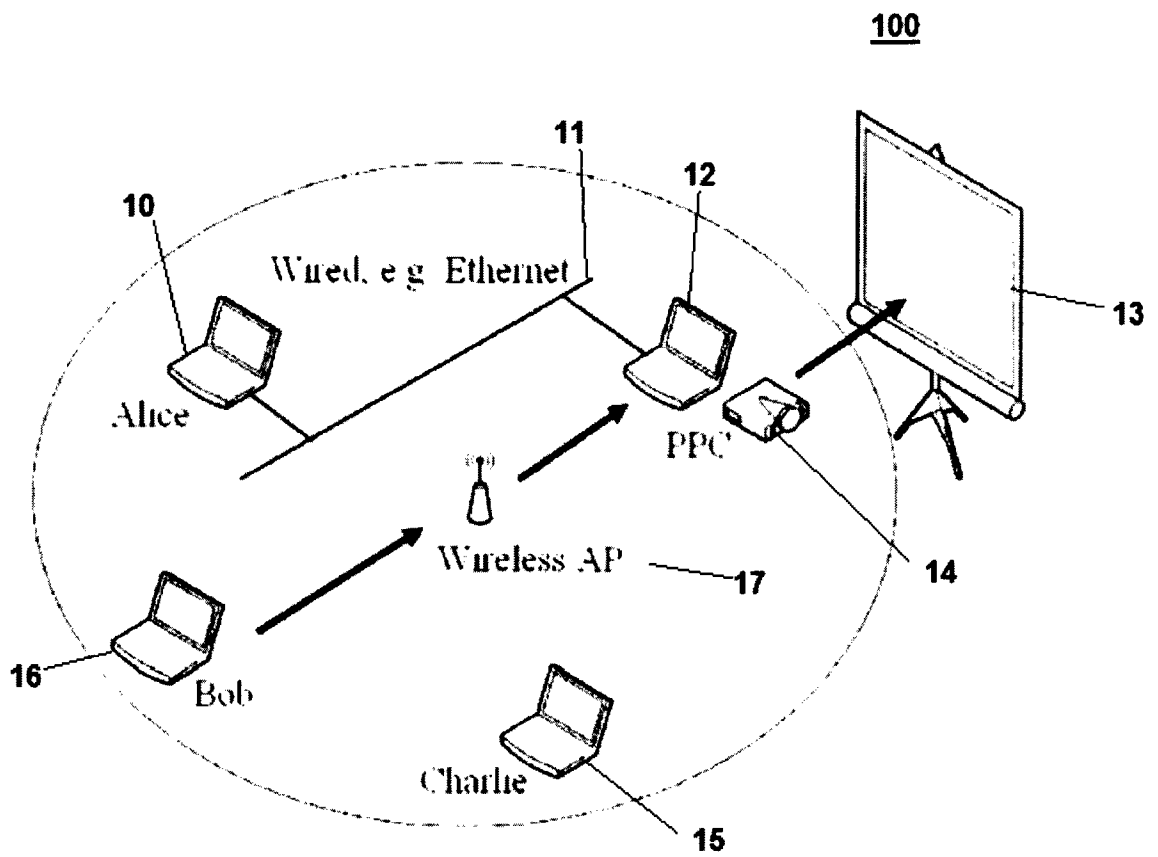


FIGURE 1

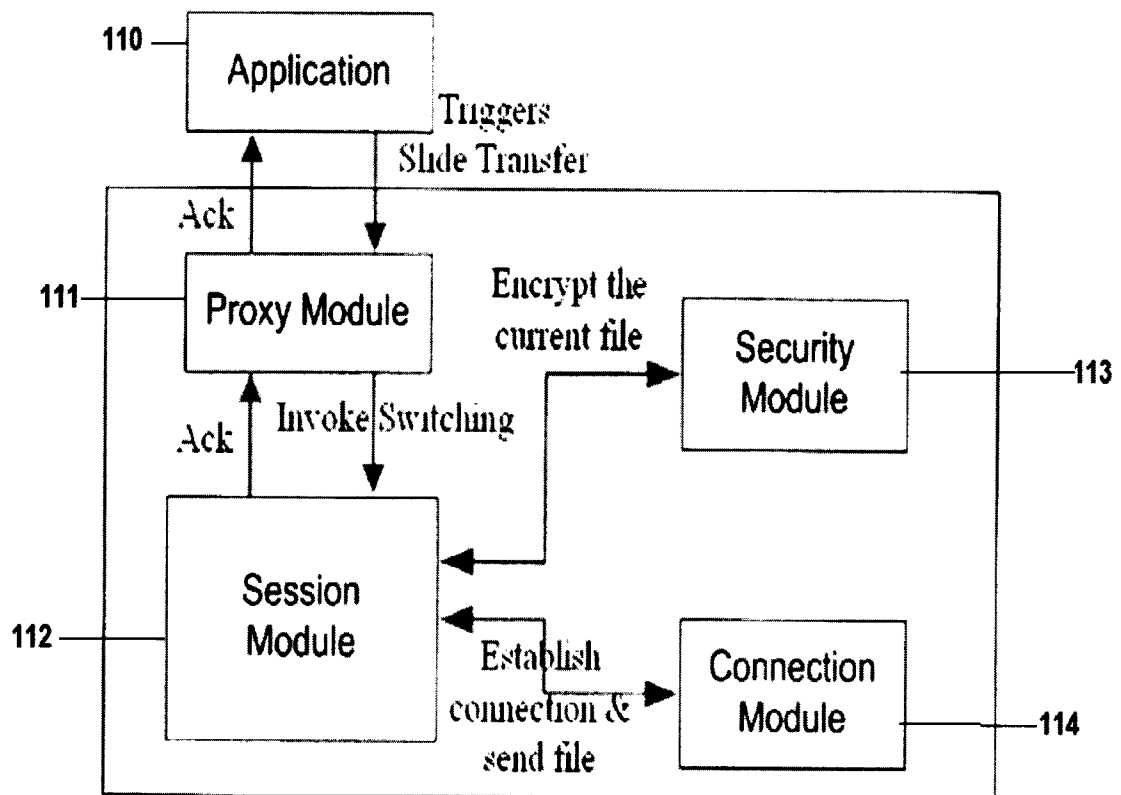
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FIGURE 2

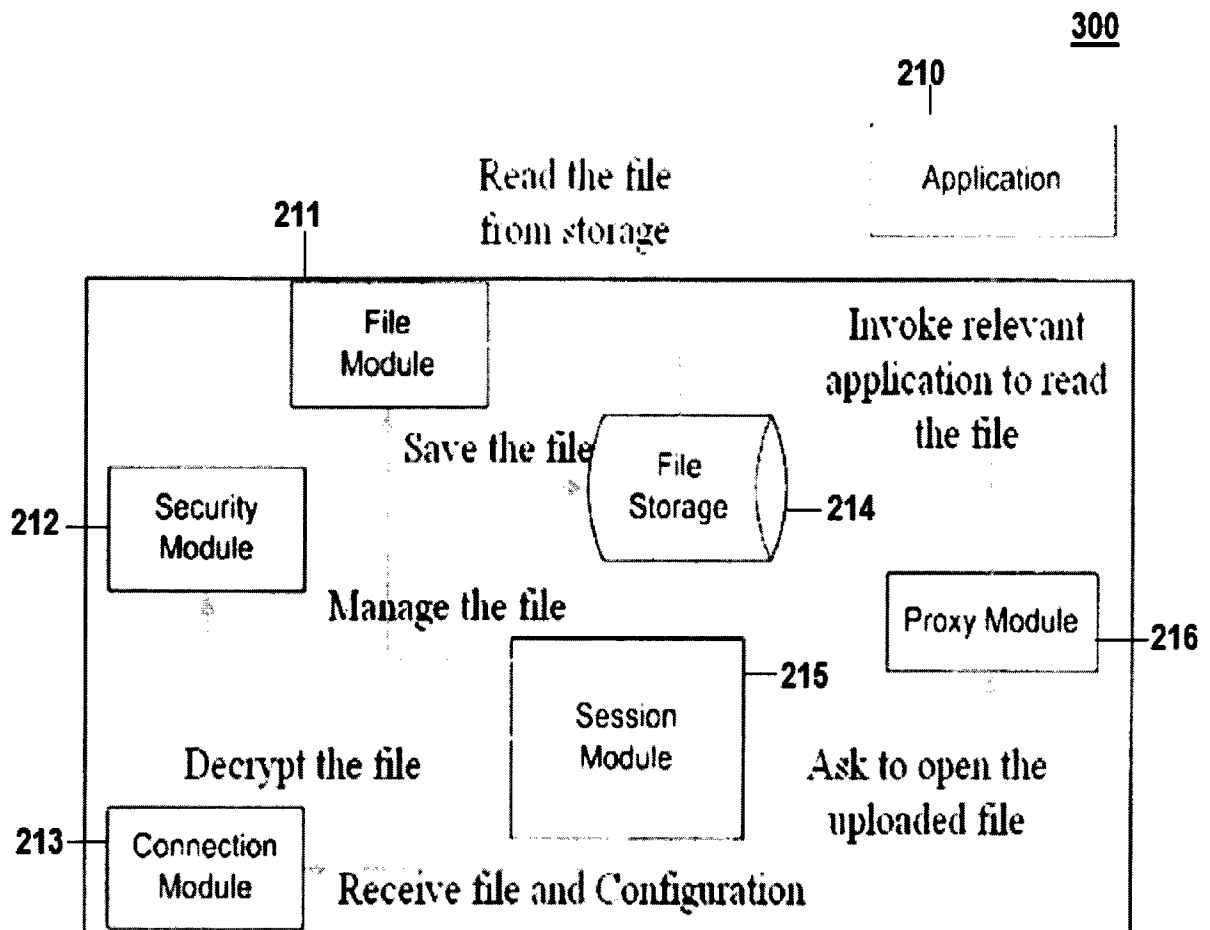


FIGURE 3

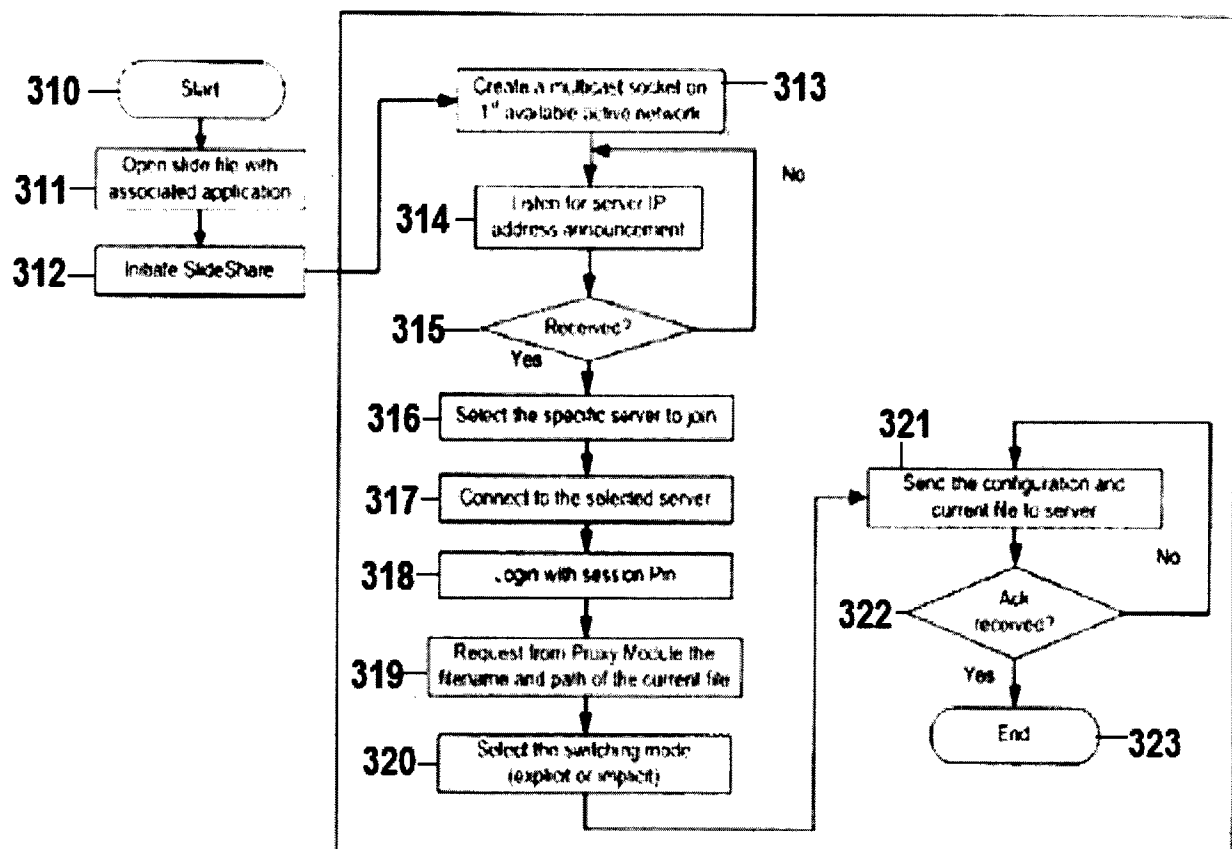
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FIGURE 4

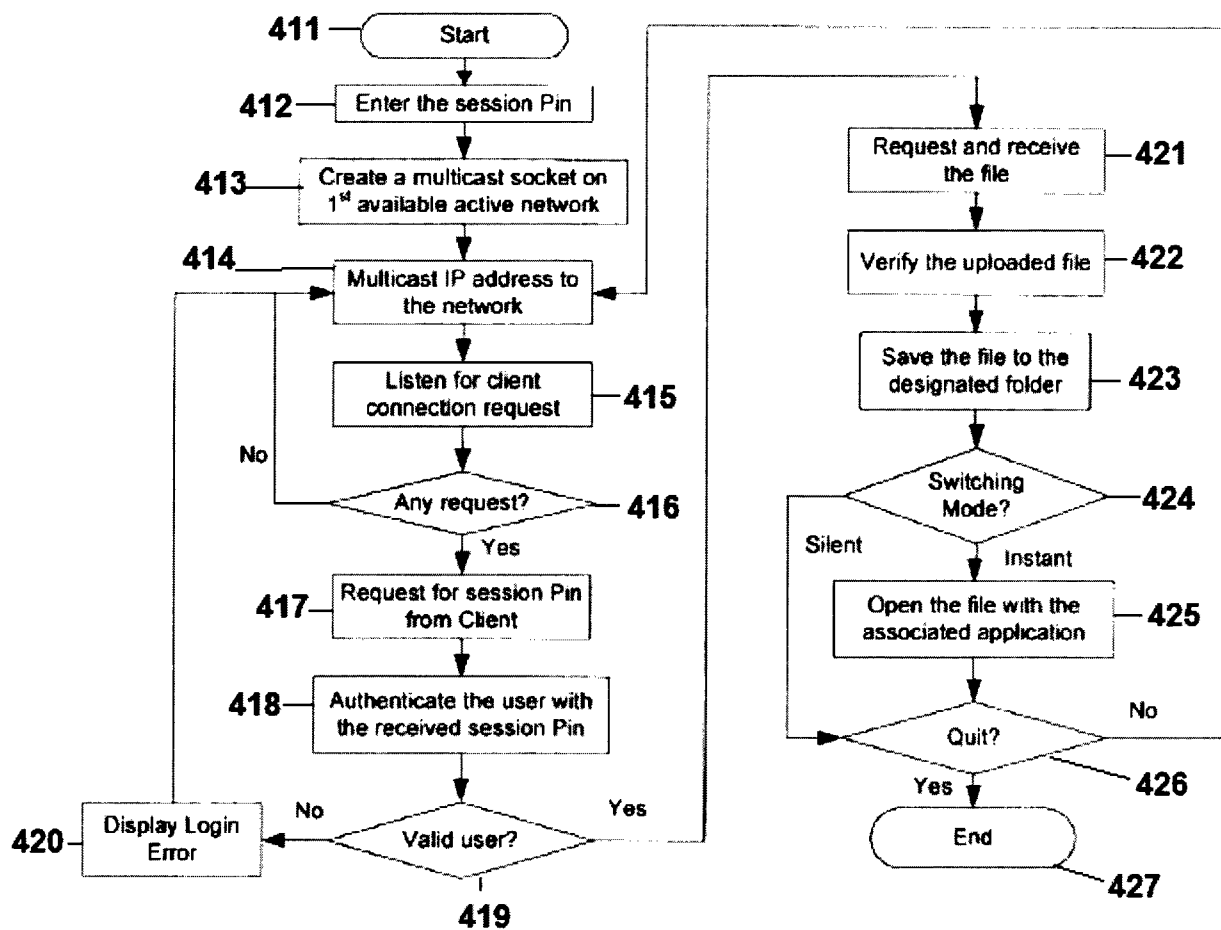
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FIGURE 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/MY2011/000142

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

G06F 13/00 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EPODOC (Keywords: projector+, remot+, network+, internet+, server+, gateway+, intermediate+)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6735616 B1 (THOMPSON et al.) 11 May 2004 Figures 1-2; Column 4 lines 62 – Column 5 line 11; Column 5 lines 46-55; Column 6 lines 8-22, 30-36; Column 12 lines 18-23	1-3
X	US 2005/0043973 A1 (CHILDERS) 24 February 2005 Figure 1; Paragraphs [0026], [0029], [0031], [0034]-[0036], [0039]-[0040]	1, 4-7
A	US 6760045 B1 (QUINN et al.) 6 July 2004	1-7
A	US 6437786 B1 (YASUKAWA) 20 August 2002	1-7



Further documents are listed in the continuation of Box C



See patent family annex

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/MY2011/000142

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member	
US	6735616	NONE	
US	2005043973	NONE	
US	6760045	NONE	
US	6437786	JP	2000023148
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.			
END OF ANNEX			