(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
14 May 2015 (14.05.2015)

WIPO | PCT

(10) International Publication Number
WO 2015/067732 A1

(51) International Patent Classification:
H04L 12/58 (2006.01)

(21) International Application Number:
PCT/EP2014/074005

(22) International Filing Date:
7 November 2014 (07.11.2014)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
13290277.6 11 November 2013 (11.11.2013) EP

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,

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WO 2015/067732 A1

(54) Title: METHOD FOR SHARING A MEDIA FILE WITHIN A GROUP OF DEVICES IN A NETWORK, AND RESPECTIVE SYSTEM

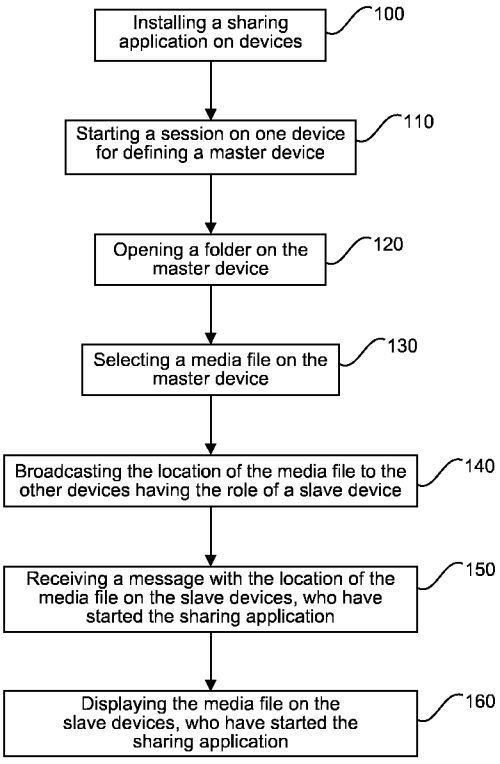


Fig. 6

(57) Abstract: The method for sharing a media file within a group of devices (I1-I6) in a network (N) comprises the steps of: arranging a session for the devices (110); selecting a media file on one of the devices (130); and broadcasting the location of the media file to the other devices (140) or broadcasting the media file to the other devices. In a preferred embodiment, selecting a media file on one of the devices defines that device as a master of the session and defines the other devices as slave devices.

SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

METHOD FOR SHARING A MEDIA FILE WITHIN A GROUP OF DEVICES IN A NETWORK, AND RESPECTIVE SYSTEM

TECHNICAL FIELD

The invention relates to the field of communications devices arranged within a network, e.g. a home network, or connected to the Internet.

BACKGROUND OF THE INVENTION

Home networks have become part of everyday life for many customers. A home network consists of a range of heterogeneous devices, which means that the home network is made up of different kinds of devices. All these devices need to communicate with each other. For this interconnection, multiple solutions are available. The home network uses a mixture of solutions, such as wireless and wired network connections. Combining these devices creates a network that allows users to share information and control devices in the home. Examples of networked devices in the home are for example residential gateways, set-top boxes, TVs, personal computers, tablet PCs, smart phones, network-attached storage (NAS) devices, printers and game consoles.

In software architecture, Publish/Subscribe is a messaging pattern where senders of messages, called publishers, do not program the messages to be sent directly to specific receivers, called subscribers. Instead, published data is multicasted, without knowledge of what, if any, subscribers there may be. Similarly, subscribers subscribe to particular data, and only receive messages that are of interest, without knowledge of what, if any, publishers there are. Devices connected within a Publish/Subscribe-

based network communicate on 'Topics' and value changes of its parameters that are published, to the ones subscribed.

DDS (Data Distribution Service for Real-Time Systems) is a standard governed by the Object Management Group (OMG). It describes a data-centric publish-subscribe middleware that can be used for communications devices to build distributed real-time systems. Since its formal adoption as an OMG standard in the year 2004, it has become a popular technology used in many different industries such as the airline/aviation industry, the automotive industry, the military, etc. Several commercial and open-source implementations of the DDS standard exist.

Sharing photos/images shot with a smartphone or equivalent portable device with a group of physically closed, or remote, people is not easy. Usually, people are crowded around the one who is actually sharing his/her photos manipulating his/her smartphone. Imagine now that instead each people use his own smartphone or equivalent as the display device remotely controlled by the one (let's call the master) who is sharing his/her photos. There is, as of today, no easy and quick way of doing this. For instance this is impossible or very difficult to do that with UPnP/DLNA (Universal Plug and Play/Digital Living Network Alliance) that was designed for operating point to point connection.

File sharing systems for sharing resources among devices within a network or between networks are for example: Email, which has a limited attachment size and requires an Internet-access; USB thumbdrive, which requires USB access for connecting with a device; File Transfer Protocol (FTP) and SAMBA (www.samba.org), which are complicated to setup and not available for some operating systems of network

devices; and Windows based file sharing, which is quite complex to configure.

Social WEB services such as Wink (http://winktheapp.com/) provide a private sharing service but it is needed to be connected to the Internet and communication flows through a central service that is prone to privacy leaks.

Sharing and remote controlling of a media session is not new. It's been proposed typically as a part of a videoconferencing tool where one can share a slide deck and others can follow remotely the slide show orchestrated by a master. The master is however the only one to control the session. It can give the control to someone else but this must be explicit and therefore precludes easy and natural sharing within a group of people. Moreover, the way such conferencing tools are designed, it is difficult to share media files in an intuitive way, i.e. a user must follow a procedure that could be seen as too complex for easy and quick sharing.

SUMMARY OF THE INVENTION

A method for sharing a media file within a group of devices in a network comprises:

- arranging a session for the devices;
- selecting a media file on one of the devices; and
- broadcasting the location of the media file to the other devices or broadcasting the media file to the other devices.

In a preferred embodiment, selecting a media file on one of the devices defines that device as a master device of the session and defines the other devices as slave devices. The master device hosts for example a HTTP server and the slave

devices are enabled to retrieve the media file through a HTTP command.

In a further aspect of the invention, the session is arranged by using a publish/subscribe mechanism, and the master broadcasts an URL (Universal Resource Locator) of the media file or broadcasts the media file to the slave devices of the session. The master device publishes the media file in particular via publish/subscribe messages, and the slave devices subscribe to the master device to receive the location of the media file or to receive the media file. A media file selected in the session on the master device is automatically displayed on the slave devices.

A system for sharing a media file within a group of devices in a network comprises means for arranging a session for the devices; means for selecting a media file on one of the devices; and means for broadcasting the location of the media file to the other devices or broadcasting the media file to the other devices. In a preferred embodiment, the devices include a media sharing application, and when selecting a media file on one of the devices, the media sharing application defines said device as a master of the session and defines the other devices as slave devices.

In another aspect of the invention, the method and the system provide a session identifier for the session to protect the session. The session identifier is usable advantageously as an encryption key for protecting a wireless LAN/PAN (Local Area Network/Private Area Network).

The invention relies on a point to multi-point paradigm, as provided for example by the publish/subscribe mechanism. The invention allows for example sharing of photos within a

group of people in a very user friendly and efficient way without necessarily being connected to the Internet.

Characteristic features of the invention are:

- The invention applies to photos and any other media.
- The invention does not require any central service repository.
- The invention provides a very simple set-up allowing secure instant sharing of media files within a group of physically closed communications devices.
- The invention does not require a user set-up for assigning the master and slave roles to the devices/user; it is automatic and transparent for the user.

The system allows a group of people to share media files under own control and/or watch photos shared by another one in the group, all using their own device. All users that wish to take part of the instant photo sharing experience do a simple action such as launching an application or pushing a button. It is assumed here that all devices of users are attached to the same network as e.g. a WLAN, home network or Internet, for which devices a session can be established e.g. by using a sharing application utilizing a publish/subscribe mechanism.

The users who wish to enter in a sharing session for sharing a photo or a series of photo/images, through selecting a widget, launch an application to start the session. The user who wishes to share a photo, or a series of photos/images, the master, the device of the master being the master device, through pushing/selecting a dedicated button, engages in selecting a first image among the possible plurality of pictures/images stored in his/her device. Once selected, the corresponding URL (Universal Resource Locator) and possibly the image itself is

broadcast to all other users attached to the session, let's call them the followers, the devices of the followers being the slave devices. Each slave device, if necessary, i.e. in case the master has only sent a URL, retrieves the image through e.g. a HTTP command, assuming the master's device hosts a HTTP server, and displays it on the device's screen of all users.

The master can continue to browse other images or photos, next or previous, the master device continues to send the corresponding URLs (and possibly the images/photos), and the slave devices automatically display the corresponding image.

At any time, a follower can become the master and his device taking the status of a master device and the previous master device becoming a slave device by engaging himself in selecting a photo or image hosted by his/her device which will be displayed to all other devices attached to the session including the previous master device according to the mechanism depicted here before.

Any people previously acting as a master, in the current session, can resume at any time his role by engaging again in selecting "Next" or "Previous". As a consequence, the next or previous image, as a part of his photo/image collection, will be displayed to all other devices attached to the session.

A very user friendly experience is provided therefore for sharing photos, also pieces of media such as images, slides, and document pages among a group of people. The group of people can be geographically gathered or dispersed. They need to be interconnected through a network means, Internet at most, a simple WLAN at least.

The instant media sharing application is used to share media files, e.g. photos, document pages and slides and control the viewing session among a group of people. The detailed description below focuses on photos but the same described principles apply to any different kind of documents.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention are explained in more detail below by way of example with reference to schematic drawings, which show:

Fig. 1 a publish/subscribe based network including several devices,

Figs. 2-5 a display on a master device for illustrating a photo sharing application, and

Fig. 6 a flow chart illustrating a method for sharing a media file within a group of devices.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

In the following description, a method and a system for sharing a media file within a group of devices in a network is described. For purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the embodiments. It will be evident, however, to one skilled in the art that the present invention may be practiced without these specific details.

The network is for example a publish/subscribe based network, e.g. a home network N including a multitude of devices In, n=1-6, as depicted in figure 1, and an access gateway, e.g. a residential gateway (not shown). The devices In are Internet-enabled devices comprising an IP

address and a MAC (Media Access Control) address and are for example personal computers, laptops, tablet PCs and/or smartphones. Under media file it is understood in this context any multimedia file, e.g. audio, video or still picture file, or a video or an audio stream, e.g. from a webcam or a microphone.

In a preferred embodiment, the method provides a user of a master device the capability to share a media file, e.g. a photo, hosted by his/her master device, and control the sharing with a group of remote slave devices, wherein all media devices, the master device and the slave devices, are attached to a same media session.

The system comprises in a preferred embodiment means to activate an instant media sharing session, through e.g. launching a dedicated application or a service, the means to select a first media, e.g. a photo or a document; means to browse a media library and select a next media from the media library, e.g. next photo or page, previous photo or page; and means to send the media information set as a Uniform Resource Locator (URL), the identity of the origin and possibly the media, e.g. a photo, itself, if advantageous*, corresponding to said selected first media or next media to all slave media devices. All slave devices provide the capability to receive and display the selected first media and next media and comprise: a user means to activate the instant media sharing session, through e.g. launching a dedicated application or service; means to receive the media information set: means to possibly download the media from the master device if necessary*; means to display the media allowing the users of the slave devices to manipulate locally the received photo, e.g. zoom, or save; means to display the origin media device owner's name; wherein any slave device attached to the same media session can become the master device at any time and

consequently having the previous master device becoming a remote slave device.

* In some cases, it may be advantageous to send the media, e.g. the photo, a page or a slide, itself in addition to the URL of the file to be shared. This is the case when the origin device is attached to a network wherein a server cannot be reached, i.e. a server behind a firewall. This is also the case when there is a big group and multicast may be appropriate and possible. However this could also be precluded allowing only devices capable of reaching the origin device's server. This decision can be a consequence of a particular set-up, i.e. never, or automatic, e.g. when operating a publish/subscribe (pub/sub) protocol, the complexity of the underlying networking layers is hidden and publishing an image should always reach subscribers however and wherever they are connected.

Switching automatically from origin: master to remote: slave

The status of "master", or "origin", is automatically assigned to a device where the media comes from and must be shared with the other "remote" devices attached to the session. Similarly, the status "slave" is automatically assigned to the devices which receive and display the media coming out from the master device.

The status changes automatically depending on who is selecting a media to be shared. Assuming user 1 and user 2 having their own smartphone as device 1 and device 2, respectively, and a TV set they both share, called device 3. User 1 initiates the session on his smartphone and the TV set and user 2 does the same with his own device 2. User 1 selects a media, e.g. a photo, to be shared on his device: then device 1 is the origin or master device and

device 2 and device 3 are slave or remote devices. User 1 continues with the next photo, e.g. swiping out left.

It is noted that when selecting the next photo, user 1 or more exactly device 1 may want to be sure that device 2 and device 3 have got it. The network may delay somehow significantly the media transmission. Although this may be managed by the users themselves, i.e. the followers indicate to the master that the got the photo/image, it is a further embodiment for having a feedback signal going back from remote/slave devices to the origin/master device indicating the complete display. This is particularly important if slave devices of users are far away from the user of the master device.

At any time, user 2 desires to show one of his media too, e.g. a photo, and selects one providing a change in the device 2 status that is now the new origin/master device whereas device 1 as well as device 3 having the status remote/slave. User 1 or more exactly device 1 will display the photos received from device 2/user 2 until user 1 resumes his sharing operation.

At any time, indeed, user 1 can resume his sharing operation by simply selecting a new media or simply the next one, e.g. swiping out his screen or clicking on next or previous, providing a change again in the device's status. Device 1 becomes again origin/master and device 2, and also device 3, become remote/slave.

And so on. This working can be done with an unlimited number of devices. Synchronization being operated by the user themselves and/or assisted by the feedback mechanism detailed in the note above.

Instant Sharing Session Identifier

In a particular embodiment, it is wanted to protect an instant sharing session in a way that only a well-known group of people can share and/or exchange photos: the notion of a session identifier is introduced.

One of the people belonging to a group decides to establish a protected sharing session. It can be the master, i.e. the person who first decided to share his/her photos, or any other person in the group.

First, The initiator initiates first the sharing session by choosing a session identifier which has to be communicated to the others.

Second, the initiator is offered a means to create the protected sharing session, through e.g. “Group” and then “Create” buttons on his device via which the session identifier is entered. All other group members can then select “Group” and then “Init” and enter the session identifier. The protected sharing session for the group is then established.

Whenever the initiator judges that the session is over, it can disable the protected sharing session through e.g. selecting “Group” and then “Destroy”.

The notion of the session identifier can be attached to any content protection means as an image encryption or network packet payload encryption as described in the next section.

Establishing a temporary WLAN/PAN

In a particular embodiment the notion of an instant sharing session with the notion of a wireless LAN/PAN (Local Area Network/Private Area Network) is coupled. The session

identifier is then used as an encryption key for protecting the WLAN/PAN connection.

The initiator of the sharing session selects “Network” and then “Create” and enters a session identifier. All other group members can then select “Network” and then “Init” and enter the session identifier.

The wireless network is then established. Whenever the initiator judges that the session is over, it can disable the network selecting “Network” and then “Destroy”.

Further Embodiments

A preferred embodiment of the method for sharing a media file within a group of devices in a network is explained now with regard to figures 2-5, being applied for sharing photos between several mobile devices. The sharing application is called here “QeoPhotos”. On all of the devices between which the photos have to be shared, the sharing application has to be installed. Further, on one: the master device, or advantageously on all of the devices between which the photos are shared, a web server, e.g. a HTTP server, is installed or embedded as a part of the sharing application. For Android devices, for example, a kWS Android Web Server can be used. The sharing application uses for example a publish/subscribe mechanism for sending of messages.

Then, before starting a photo sharing session, the sharing application has to be started on the devices which want to participate in the session. The sharing application provides a web view and buttons “Gallery”, “Next” and “Prev” after being started on a device, as depicted in figure 2. A user, who wants to share his photos, the leader, clicks on a “Gallery” button G, as displayed by the

sharing application on the display of his device. The other users have nothing to do on their devices, the slave devices, after they have started the sharing application on their device.

The user who wants to share images/pictures, is the master of the photo sharing session and his device the master device. To share a photo, the master clicks on the "Gallery", button G, which in turn shows a selection of his photos, as included in the "Gallery" folder, on the display of his device, figure 3. The master then selects a photo he wants to share, e.g. by pushing on a photo with a finger. All devices included in the photo sharing session, the master device as well as the slave devices, get the photo displayed on the display/screen of their devices, figure 4. Zooming or unzooming may be applied by the users.

Another photo can be selected by the master by touching the a "Next" button Ne or a "Prev" button Pr to show the next or the previous photo as included in the gallery folder, figure 5. By selecting the "Gallery" button G, the photos as included in the "Gallery" folder are again displayed, figure 2, and the master can select any other photo by pushing on a respective photo.

The method for sharing a media file within a group of devices within a network is further illustrated with regard to a flow-chart depicted in figure 6. In a first step 100, the sharing application is installed on the devices between which a media file has to be shared. The sharing application includes for example a HTTP web server, so that the master device can act as a media file server and the slave devices can get the media file via a HTTP command. The location of the media file on the master device is send by the master device as a message by using a publish/subscribe mechanism, for example DDS.

A session for sharing photos for instance is started by starting the sharing application on one of the devices, step 110. The sharing application is for example an Android application on a mobile device. The sharing application is then started by clicking on the application on the display of that mobile device. A user of the mobile device, who wants to share his photos with other persons, selects a photo on his device for example by opening a picture folder, step 120, and selecting one of the photos as included in the picture folder, step 130. The device on which the photo is selected, is defined then as the master device of the photo sharing session. The location of the photo is broadcasted to the other devices of the network, e.g. the URL of the photo, step 140, or the photo is broadcasted to the other devices, when selecting the photo. All users, who have started the sharing application on their device, will receive then the message including the location of the photo on the master device, or receive a message including the photo, step 150. The photo is displayed then by the sharing application on the display of the respective devices, step 160.

The user of the master device can continue then by selecting further photos on his device, in response to which the sharing application immediately sends a message with the location of the picture on the master device to the other devices, or sends a message including the picture to the other devices of the network. The sharing application of the other devices display then the picture on the screen of the respective devices, when receiving the message, or the photo.

Also other embodiments of the invention may be utilized by one skilled in the art without departing from the scope of the present invention. Instead of DDS, also any other data-

centric publish-subscribe middleware can be used to provide a publish/subscribe based network. The invention resides therefore in the claims herein after appended.

Claims

1. Method for sharing a media file within a group of devices (I1-I6) in a network (N), **comprising**

arranging a session for the devices (110),

selecting a media file on one of the devices (130), and

broadcasting the location of the media file to the other devices (140) or broadcasting the media file to the other devices.

2. Method according to claim 1, wherein selecting a media file on one of the devices defines said device as a master device of the session and defines the other devices as slave devices.

3. Method according to claim 2, wherein the master device hosts a HTTP server and wherein the slave devices are enabled to retrieve the media file through a HTTP command.

4. Method according to claim 2 or 3, comprising the master broadcasting an URL (Universal Resource Locator) of the media file or broadcasting the media file to the slave devices of the session.

5. Method according to claim 2, 3 or 4, wherein a slave device is taking the status of a master by selecting a media file hosted on said device, which media file in turn will be displayed instantly to all the other devices included in the session including the previous master.

6. Method according to one of the preceding claims 2-5, wherein a media file selected in the session by the master is automatically displayed on the slave devices, and any device previously acting as a master in the current

session, can resume to be a master at any time by selecting a next or previous media file.

7. Method according to one of the preceding claims, wherein the session is arranged by using a publish/subscribe mechanism, e.g. a Data Distribution Service for Real-Time Systems (DDS).

8. Method according to claim 7, wherein the devices include a sharing application for starting the publish/subscribe mechanism and wherein starting the sharing application, e.g. by pushing a button, starts the session via the publish/subscribe mechanism.

9. Method according to claim 7 or 8, wherein the master device publishes the media file via the publish/subscribe mechanism, and wherein the slave devices subscribe to the master device to receive the location of the media file or to receive the media file.

10. Method according to one of the preceding claims, wherein the network (N) is a home network or the Internet.

11. System for sharing a media file within a group of devices (I1-I6) in a network (N), **comprising**

means for arranging a session for the devices,

means for selecting a media file on one of the devices, and

means for broadcasting the location of the media file to the other devices or broadcasting the media file to the other devices.

12. System according to claim 11, wherein the devices include a media sharing application, and when selecting a media file on one of the devices, the media sharing application defines said device as a master of the session

and defines the other devices as slave devices, e.g. by using a publish/subscribe mechanism.

13. System according to claim 12, wherein the master device hosts a HTTP server and wherein the slave devices are enabled to retrieve the media file through a HTTP command.

14. System according to claim 12 or 13, wherein the media sharing application of the master broadcasts an URL (Universal Resource Locator) of the media file or broadcasts the media file to the slave devices of the session.

15. System according to claim 12, 13 or 14, wherein a slave device is taking the status of a master by selecting a media file hosted on said device, which media file in turn will be displayed instantly to all the other devices included in the session including the previous master.

16. System according to one of the preceding claims 12-15, wherein a media file selected in the session by the master is automatically displayed on the slave devices, and any device previously acting as a master in the current session, can resume to be a master at any time by selecting a next or previous media file.

17. System according to one of the preceding claims 12-16, wherein the session is arranged by the media sharing application for each of said devices by using a publish/subscribe mechanism, e.g. DDS.

18. System according to one of the preceding claims 12-16, wherein starting the media sharing application starts the publish/subscribe mechanism and when starting the media

sharing application, e.g. by pushing a button, the session is started via the publish/subscribe mechanism.

19. System according to one of the preceding claims 11-18, wherein the devices are tablet PCs, smart phones, notebooks or smart TVs.

20. System according to one of the preceding claims 11-19, wherein the network is a home network or the Internet.

21. System according to one of the preceding claims 11-20, providing a session identifier for the session to protect the session.

22. System according to claim 21, wherein the session identifier is usable as an encryption key for protecting a wireless LAN/PAN (Local Area Network/Private Area Network).

23. Method according to one of the preceding claims 2-10, comprising

installing a sharing application on the devices (100),

receiving a message with the location of the media file on the slave devices (150), and/or

displaying the media file on the slave devices (160).

24. Method according to one of the preceding claims 2-10 and 23, comprising

providing a session identifier for the session to protect the session.

25. Method according to claim 24, wherein the session identifier is usable as an encryption key for protecting a wireless LAN/PAN.

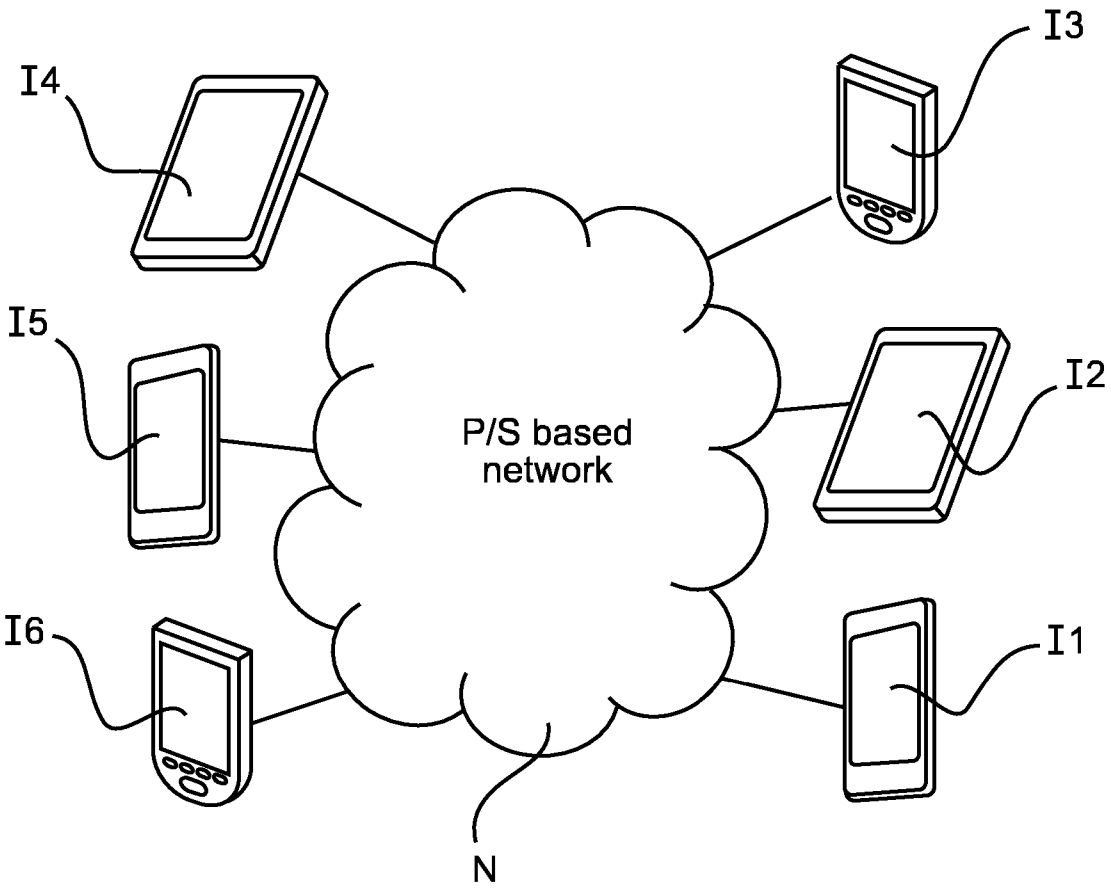


Fig. 1

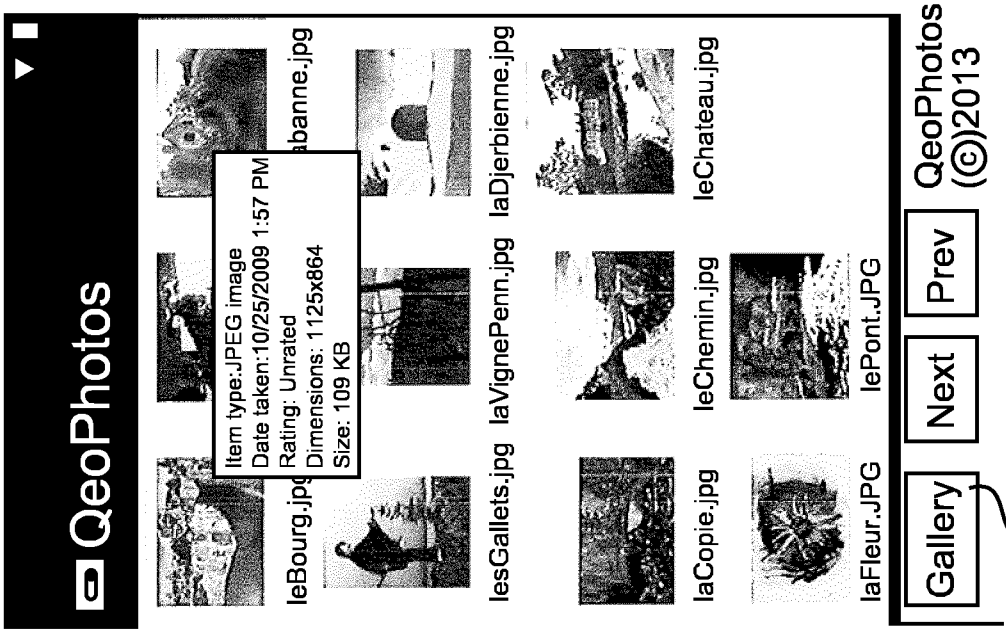

QeoPhotos
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laCopie.jpg
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Gallery
Next
Prev
QeoPhotos (©)2013
6

Fig. 3

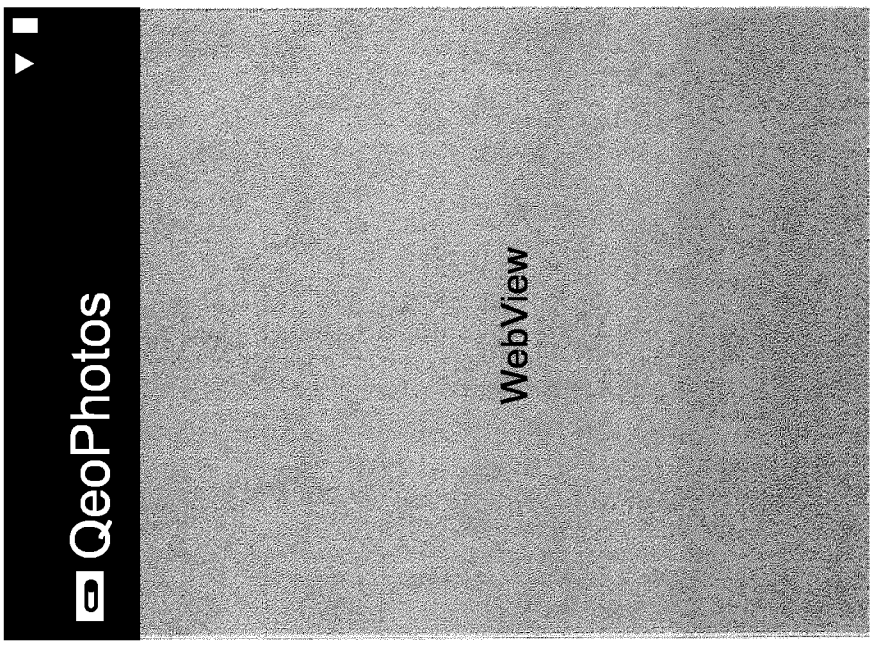

QeoPhotos
WebView
Gallery
Next
Prev
QeoPhotos (©)2013
6

Fig. 2


QeoPhotos
Gallery
Next
Prev
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G

Fig. 5

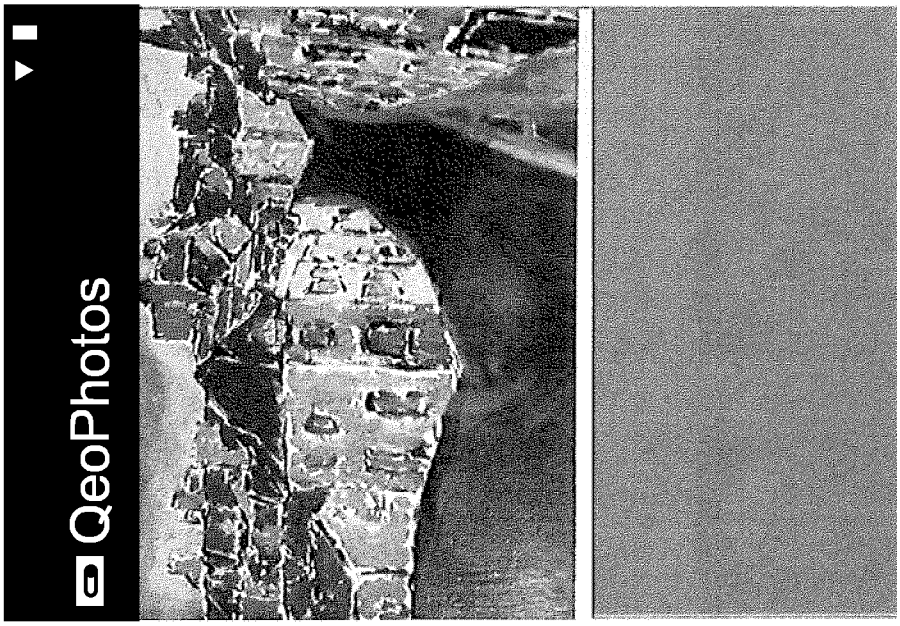

QeoPhotos
Gallery
Next
Prev
QeoPhotos (©)2013
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Pr

Fig. 4

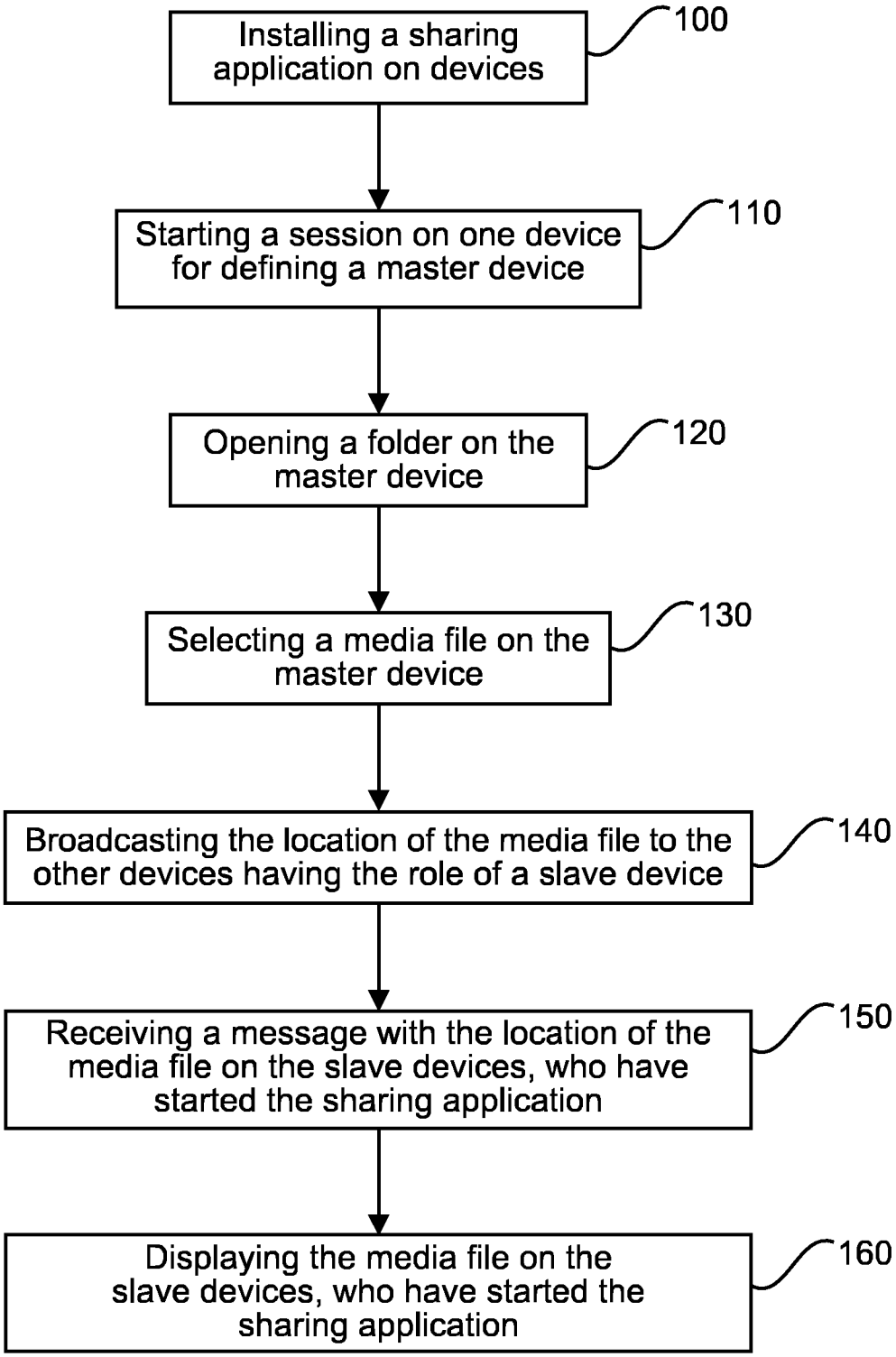

Installing a sharing application on devices
100
Starting a session on one device for defining a master device
110
Opening a folder on the master device
120
Selecting a media file on the master device
130
Broadcasting the location of the media file to the other devices having the role of a slave device
140
Receiving a message with the location of the media file on the slave devices, who have started the sharing application
150
Displaying the media file on the slave devices, who have started the sharing application
160

Fig. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2014/074005

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04L12/58
ADD.

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)
G06F H04L

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)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 550 968 A1 (NOKIA CORP [FI]) 6 July 2005 (2005-07-06)	1,11
Y	column 1, paragraph 1 - column 30, paragraph 123	2-10, 12-25

X	US 2013/110890 A1 (BAILOR JONATHAN [US]) 2 May 2013 (2013-05-02)	1,11
Y	page 1, paragraph 1 - page 12, paragraph 110	2-10, 12-25

X	US 2007/168490 A1 (KENT LARRY [US] ET AL KENT JR LARRY G [US] ET AL) 19 July 2007 (2007-07-19)	1,11
Y	page 1, paragraph 5 - page 6, paragraph 71	2-10, 12-25

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 January 2015	23/01/2015

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2014/074005

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US 2007168490 A1	19-07-2007	NONE	