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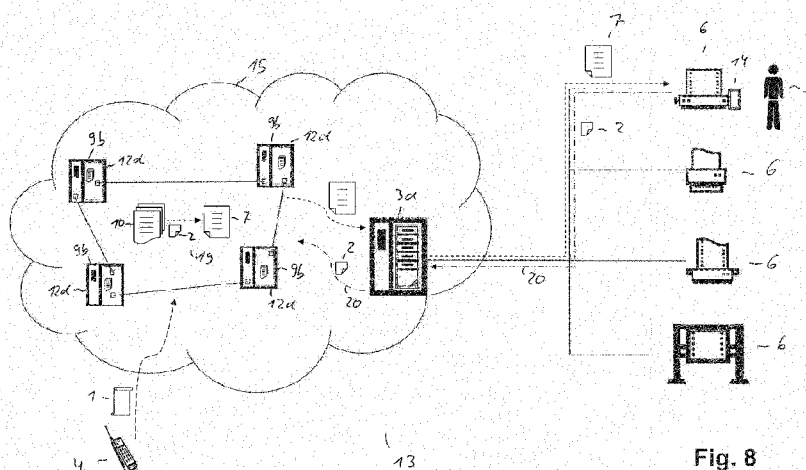


Fig. 8

(57) **Abstract:** The present invention relates to a system and method for printing an electronic document. A processing means, like a print server, is provided for interacting with a mobile device to receive electronic-document-information related to an electronic document. The processing means converts the electronic document into a print-ready-converted electronic document by using the electronic-document-information and a print-related-information, like the selection of a printer or providing necessary finishing options, such as duplex printing. The print-ready-converted electronic document is thereafter stored within a secure print queue on the processing means, including the print server. Using the mobile device the print-ready-converted electronic document may be released by the mobile device for printing on a designated multifunctional device. The mobile device may also be used for initiating a scanning of a hardcopy on a designated multifunctional device. The processing means, the mobile device and the multifunctional device may be part of a network.



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System and Method for Printing

Background of the Invention

5 Description of the related Art

[0001] The present invention relates to a system and a method for printing an electronic document.

10 [0002] Today's computer system infrastructures and communication networks are being more and more combined and merged. Computer systems and communication devices, like Personal Digital Assistants (PDA), mobile phones, laptops, net books or web cell phones share and combine a lot of
15 functionalities and communicate in various ways. Especially the advent of software-based development kits for configuring various mobile device management systems, like Application Programming Interfaces (API), extend tremendous the possible field of application of the mobile devices within different
20 networking environments.

[0003] Currently there is, however, no convenient way for printing or scanning of documents in different networking environments managed by a mobile device. In a commonly used
25 networking environment, print servers are connected to client terminals within the networking environment and the print servers are configured to store and release print jobs to connected multifunctional devices. In addition to directing the print jobs from the client terminals directly to
30 appropriate multifunctional devices, the functionality of the print server may be extended for other uses. For example, it is known to cause the print server to check the identity of a

user accessing the multifunctional device before allowing the user to print on the multifunctional device. Normally the identity of the user is necessary to access the network as a whole, which is often a closed security system and limited to a specific company, department or building. Also the scanning of hardcopies on multifunctional devices requires the direct physical presence of the user in front of the scanning device and therefore the presence and identification of a user within the networking environment.

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[0004] According to US 2004/0001217A1 a print service on a network is provided for mobile computing devices, like PDAs, to print documents. When the user of a mobile device wants to print a document, the mobile device is used to access the print service and send a print request that specifies the location the document on the network in terms of a URL. In response, the print service validates the print request, retrieves the document, renders the document for printing, and prints directly the document as requested by the user.

20

[0005] Also GB 2 429 872 A discloses a method of communication between a mobile device and a printing system. The communication is initiated automatically when the mobile device and the printing system are in proximity. Thus, after initial communication, login and verification is established, a document selection screen is displayed, showing document files stored on the phone mobile device. If the operational status is set by selecting a document, the process moves to sending the document directly to the printer. If no document is selected, the process moves to receiving and saving a document file from the printer, which file represents a hard copy scanned by the printer.

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[0006] EP 0 691 619 A1 discloses a system including a number of workstations and printers coupled in a network, and a number of portable devices carried by users and coupled to
5 the network by infrared link. Each portable device emulates its user's personal satchel for documents. The device is programmed to receive, transmit and store document references or tokens, each of which is associated with an electronic document stored in the database. Documents are distributed
10 from one person to another by transmission of document references or tokens, and a document is sent to a printer by beaming that document's reference or token to an infrared transceiver associated with that printer. The portable device is preferably a handheld computer with a graphical display
15 for enabling the user to transfer documents.

[0007] In comparison with printing from fixed client terminals within the networking environment, it is even harder for users of mobile devices to print documents.
20 Present day mobile devices have only limited resources of hardware and software to store large documents and to render documents in print-ready print jobs, which normally have to be configured for a specific printer. Also mobile devices are often not allowed to communicate directly with client
25 terminals and/or printers and/or scanners within a networking environment for computer security reasons.

[0008] Thus, there is needed an effective and easy way to handle requests for users of mobile devices to print and/or
30 scan documents even if the mobile devices are not connected directly to any multifunctional device within a secure network. The printing and/or scanning managed by the mobile

device should also be possible even, if the mobile device does not have the capacity or software to handle the printing and/or scanning tasks.

5 Summary of the Invention

[0009] In view of the foregoing, herewith a system and a method for printing and scanning a document are disclosed. The system enables mobile devices, such as PDAs or mobile
10 phones, to print and/or scan documents easily also outside the network, like a closed company intranet. Even though the mobile devices are not directly connected to the multifunctional device in the networking environment or do not support the software applications and printer drivers for
15 printing. When the user of the mobile device wants to print and/or scan a document, the mobile device is used to access the company intranet, even from outside, and therefore by access the multifunctional devices for printing and scanning. It will be appreciated that additional networks, such as the
20 Internet or radio telecommunication networks, are combined and can interact with each other. Present computer security systems, like using routers or gateways between different networks or user identification by closed networking environments, are still in use and not by-passed by the
25 disclosed method and system for printing and/or scanning.

[0010] The disclosed system and method provide a processing means for interacting with the mobile device to receive electronic-document-information. Additionally print-
30 related-information, like the selection of a possible printer or providing necessary finishing options, such as duplex printing, may be sent by the mobile device to the processing

means. The processing means, including a print server, converts the electronic document into a print-ready-converted electronic document by using the electronic-document-information and print-related-information. The print-ready-converted electronic document is thereafter stored in a secure print queue on the print server. The processing means may be part of a closed computer network, like a company intranet, and is connected with at least one multifunctional device, which is also part of the networking environment.

Using the mobile device, which may be connected to an interface in connection with the processing means in the network, the print-related-information and the electronic-document-information may be routed from the mobile device to the processing means.

15

[0011] The identity of the user using the mobile device, the electronic-document-information and the print-related-information are checked within the network, especially by the processing means. The identity of the user must be pre-registered within the network, so that only users with already registered identifications may access the network and therefore to the secure print queue on the print server. After the authentication the user has full access the secure print queue on the print server and to all multifunctional devices connected with the processing means.

25

[0012] The electronic-document-information and/or print-related-information may be part of a message, especially of a short message service (SMS) or an electronic mail (email).

The electronic-document-information and/or print-related-information are analysed by the processing means, perhaps including additional file server and/or mail server and/or

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web server. The electronic-document-information may contain the electronic document itself or a link to one of the file servers, where the electronic document is stored.

5 [0013] It will be appreciated that the electronic document is stored in a specific way on several connected processing means, like the archiving of documents within a computer cloud network of file servers. Also the conversion of the electronic document in a print-ready-converted electronic
10 document may be conducted on several processing means, which may also be part of a cloud computing network.

[0014] The print-ready-converted electronic document is stored within the secure print queue on the print server and
15 the user can release the print-ready-converted electronic document from the secure print queue for printing on a designated multifunctional device. The designated multifunctional device may be selected by the mobile device, whereas it will be appreciated that the mobile device has a
20 display, especially a touch screen, for intuitive selecting one of the possible multifunctional devices displayed on the mobile device. The multifunctional device may be selected directly by the user using a user-interface attached to the multifunctional device. Also the status of the different
25 multifunctional devices within the network may be routed to the mobile device. After choosing one specific multifunctional device by the mobile device and/or user-interface the release message of the mobile device and/or user-interface is routed to the processing means and the
30 print server is sending the print-ready-converted electronic document to the designated multifunctional device for printing. Additionally the processing means may prepare the

print-ready-converted electronic document for printing on the designated multifunctional device by combining the relevant print driver with the print-ready-converted electronic document.

5

[0015] According to the present disclosure there is provide a system for printing an electronic document comprising at least one multifunctional device, a processing means, including a print server, which is connected to the multifunctional device and the processing means is configured to process the electronic document for printing on the multifunctional device. A mobile device, which is connectable with the processing means, is configured to initiate the printing of the electronic document.

15

[0016] In terms of the present disclosure the definition initiate imply the sending, the parameterisation, the conversion of the electronic document into a print-ready-converted electronic document and/or the releasing of the print-ready-converted electronic document from a secure print queue on the print server. The electronic format of the electronic document may be a text-based format, like Microsoft® Word-doc or Powerpoint-ppt, or an image file format, like JPEG or TIFF, or even an audio file format, like MPEG.

25

[0017] The electronic-document-information may contain the electronic document and is routed from the mobile device to the processing means. The processing means uses the print-related-information for converting the electronic document into a print-ready-converted electronic document. Afterwards the print-ready-converted electronic document is stored

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within the secure print queue on the print server and is releasable by the user from the secure print queue on the print server for printing on the multifunctional device.

5 [0018] According to a first aspect of the present disclosure the mobile device is accessing within a communication network directly to the processing means. Also the mobile device is sending a release message to the processing means for releasing the print-ready-converted
10 electronic document from the secure print queue on the print server for printing on the multifunctional device.

[0019] The electronic document is preferably part of the electronic-document-information and is routed with the print-
15 related-information as part of a message from the mobile device to the processing means. The processing means uses the electronic-document-information and the print-related-information for converting the electronic document into a print-ready-converted electronic document. Then the print-
20 ready-converted electronic document is stored within the secure print queue on the print server, and is releasable by the user from the secure print queue on the printer server.

[0020] It will be appreciated that the message is analysed
25 and the electronic-document-information and/or the electronic document and/or the print-related-information and/or the selection of the multifunctional device are extracted and used by the processing means. The processing means preferably including a mail server and a document conversion server for
30 converting the electronic document into the print-ready-converted electronic document.

[0021] The address of the recipient of the message may relate to the print-related-information and/or designation of one multifunctional device. The possible addresses of recipient of the message, especially an email, may select the designated multifunctional devices and/or define the finishing options for printing. The address of the recipient may be selected by the mobile device. Therefore the multifunctional device and/or finishing options could be selected very easily and no further print-related-information need to be defined.

[0022] According to another embodiment of the present disclosure the electronic-document-information is routed from the mobile device to the processing means. The processing means uses the electronic-document-information for downloading the electronic document from the processing means, including the file server, and using the print-related-information for converting the electronic document into the print-ready-converted electronic document. Afterwards the print-ready-converted electronic document is stored within the secure print queue on the print server and is releasable by the user from the secure print queue on the print server for printing on the designated multifunctional device.

[0023] It will be appreciated that the electronic-document-information contains a document link to the electronic document stored on at least one processing means, including the file server and print server. By using this electronic-document-information the processing means is configured to retrieve the electronic document from the file server based on the document link. Also the print-related-

information may be pre-defined and stored on the processing means.

[0024] According to another embodiment of the present disclosure the electronic-document-information and the print-related-information are routed from the mobile device and/or by a user-interface to a number of connected processing means defining a network. The network could be an open network, like the internet or a computer cloud network, or a closed network, like a company intranet or a radio communication network, like Bluetooth. The network is used for a coordinated storing, analysing and/or extracting of information from the electronic-document-information and/or the electronic document and/or the print-related-information and/or the selection of the multifunctional device. A number of connected processing means defining the network uses the electronic-document-information and the print-related-information for converting the electronic document within the network into a print-ready-converted electronic document. Afterwards the print-ready-converted electronic document is stored within the secure print queue on the print server in the network and is releasable by the user from the secure print queue on the print server for printing.

[0025] According to another embodiment of the present disclosed system the electronic-document-information and the print-related-information are routed via a router to the processing means, including a file server, and the processing means uses the electronic-document-information for downloading the electronic document from the file server. The processing means is using the print-related-information for converting the electronic document into a print-ready-

converted electronic document. Then the print-ready-converted
electronic document is stored within the secure print queue
on the print server and is releasable by the user from the
secure print queue on the print server. Also the router is
5 used for connecting the first network with a second network
and for accessing the mobile device to the networks. The
router is connected with at least one processing means and
one mobile device and files and information are stored on the
router. Only if the mobile device and/or the processing means
10 accessing the router are authorized to connect to the router,
the information and/or files may be retrieved from the router.
Also files and/or information could not be directly exchange
between the mobile device and the processing means and could
only be forwarded to and stored on the router.

15

[0026] It will appreciate that the print-related-
information are part of a release message sent by a second
mobile device. The electronic format of the print-ready-
converted electronic document contains PostScript (PS),
20 Printer Command Language (PCL), Page Description Language
(PDL), Portable Document Format (PDF) or Page Description
Markup Language (PDML). Also the user may access the
processing means by means of a second mobile device and/or by
means of a user-interface of the multifunctional device to
25 the secure print queue on the print server.

[0027] According to another aspect of the present
embodiment at least one multifunctional device is configured
to process a hardcopy for scanning on the multifunctional
30 device and the user may access the processing means by means
of the mobile device and/or by means of the user-interface of

the multifunctional device to initiate the scanning of the hardcopy on the multifunctional device.

[0028] According to another embodiment of the present disclosure a method for printing the electronic document on at least one multifunctional device is disclosed, which is connected to the processing means, including the print server. The processing means is configured to process the electronic document for printing on the multifunctional device. Also the mobile device, which is connectable with the processing means, is configured to initiate the printing of the electronic document. The disclosed method comprising the steps of initiating a communication between the mobile device and the processing means and routing from the mobile device the electronic-document-information related to the electronic document to the processing means. After that the electronic-document-information and the print-related-information are used for converting the electronic document into the print-ready-converted electronic document, the print-ready-converted electronic document is stored within the secure print queue on the print server. After that the print-ready-converted electronic document are released from the secure print queue on the print server for printing on the multifunctional device in case the user accesses to the processing means and releases the print-ready-converted electronic document for printing.

[0029] According to a preferred embodiment of the disclosed method at least one of multifunctional devices is configured to scan a hardcopy and the processing means is configured to process the hardcopy for scanning on the multifunctional device. In case the mobile device and/or the user-interface

are connected to the processing means the user may route from the mobile device and/or the user-interface a scan-related-information to the processing means. When the user accessing the processing means by the mobile device and/or the user-
5 interface, the hardcopy is scanned on the multifunctional device.

[0030] The present invention also provides a program that, when executed by a system for printing, causes the system for
10 printing to perform the steps of a method for printing and scanning. The present invention provides also a computer-readable storage medium having computer-executable instructions to perform steps for providing a method for printing and scanning.

15

[0031] Preferably a system for printing the electronic document comprising, at least one multifunctional device, a processing means, including a print server, which is
connected to the multifunctional device, and a mobile device,
20 which is connectable with the processing means. The mobile device is configured to initiate the printing of the electronic document with a text-based format, like Microsoft® Word-doc format, a images file format, JPEG or TIFF, or even an audio file format, like MPEG, wherein when the mobile
25 device is connected to the processing means, including the print server. A user may route from the mobile device an electronic-document-information related to the electronic document to the processing means and the processing means uses the electronic-document-information and the print-
30 related-information for converting the electronic document into a print-ready-converted electronic document. Afterwards the print-ready-converted electronic document is stored

within a secure print queue on the print server and in case the user has access the processing means the print-ready-converted electronic document is releasable by the user from the secure print queue on the print server for printing on
5 the multifunctional device. Additionally the electronic document is part or separate of the electronic-document-information.

[0032] The electronic-document-information and/or the
10 print-related-information are routed as part of the message, like short message service (SMS) or electronic mail (email), from the mobile device to the processing means. Also it will be appreciated that the electronic-document-information, the print-related-information and/or the electronic document are
15 routed as part of the message from the mobile device via at least one processing means, including the file server to the processing means, including the print server. In case of a number of processing means, including file servers, these file servers may be connected as a computer cloud network for
20 storing and retrieving documents within a widespread networking environment. In addition the electronic-document-information contains a document link to the electronic document stored on at least one processing means or within a network with a number of processing means, including file
25 servers, like a computer cloud network. The processing means is configured to retrieve the electronic document from the file server based on the document link.

[0033] In a preferred embodiment the electronic-document-
30 information and/or the electronic document and the print-related-information are part of an electronic mail and the electronic mail as part of the message is routed by the

mobile device to an address of the electronic mail relating to the processing means, including especially a mail server. Also the electronic mail message is relating to the electronic-document-information and/or to the print-related-information and the electronic mail is routed as a message by the mobile device to the processing means.

[0034] In this embodiment no document link is needed because all necessary information about the storage location of the document is within the address of the recipient of the message. Alternatively the address of the electronic mail message relating to the multifunctional device and the electronic mail message is routed by the mobile device to the processing means, including the print server, and after the conversion the related print-ready-converted electronic document is printed on the multifunctional device. Also the print-related-information, like the selection of a printer and/or the setting of finishing options for the printing, like duplex printing or paper orientation, may be defined by the address of the recipient.

[0035] By way of example, the message is analysed and the electronic-document-information and/or the electronic document and/or the print-related-information and/or the selection of the multifunctional device are extracted and used by the processing means, including a document conversion server or the print server, for the conversion of the electronic document into the print-ready-converted electronic document. The processing means is used for analysing and extracting of information about the electronic-document-information and/or the electronic document and/or the print-related-information and/or the selection of the

multifunctional device and the extracted electronic-document-information and/or the extracted electronic document and/or the extracted print-related-information and/or the extracted selection of the multifunctional device are used by the
5 processing means for the conversion of the electronic document into the print-ready-converted electronic document. After that the processing means routes the print-ready-converted electronic document to the secure print queue on the print server.

10

[0036] It will be appreciated that the number of connected processing means, including file servers, are used for a coordinated analysing and extracting of information about the electronic-document-information and/or the electronic
15 document and/or the print-related-information and/or the selection of the multifunctional device. The extracted electronic-document-information and/or the extracted electronic document and/or the extracted print-related-information and/or the extracted selection of the
20 multifunctional device are used by the number of connected processing means, including file servers and the print server, for the conversion of the electronic document into the print-ready-converted electronic document. The print-ready-converted electronic document is routed to the secure print
25 queue on the print server. The connected processing means defining a computer cloud network ensuring the coordinated analysing and extracting of information from the address of the message relating to the multifunctional device for printing the print-ready-converted electronic document on the
30 multifunctional device. Preferably the electronic format of the print-ready-converted electronic document contains PostScript (PS), Printer Command Language (PCL), Page

Description Language (PDL), Portable Document Format (PDF) or Page Description Markup Language (PDML).

[0037] It may be preferable that a number of
5 multifunctional devices are connected with secure print queue on the processing means, including the print server and the user may select a specific multifunctional device of the number of multifunctional devices for printing a selected
10 print-ready-converted electronic document on the designated multifunctional device. The user may access the processing means by means of a second mobile device and/or by means of a user-interface attached to one of the multifunctional devices to the secure print queue on the print server. Preferably the mobile device and/or the user-interface of the
15 multifunctional device are connected by a wireless link to the processing means and the user must be authenticated on the mobile device and/or the user-interface of the multifunctional device for accessing the secure print queue on the print server.

20

[0038] The user is authenticated for accessing the processing means by means of a security token, especially a hardware security token or an USB token. Also the user may access the processing means for releasing the print-ready-
25 converted electronic document from the secure print queue when a connection between the processing means and the mobile device and/or the user-interface of the multifunctional device is established. The mobile device may be configured to allow the user to interact with the processing means.
30 Preferably when the user is identified for accessing the secure print queue on the print server, the user is allowed to route and/or release from the secure print queue on the

print server the print-ready-converted electronic document. Additionally the user may also be allowed to select the multifunctional device for printing the print-ready-converted electronic document. Also the mobile device may access
5 within a communication network, like a universal mobile telecommunications system (UMTS) or a global system for mobile communications (GSM), or within a radio communication network, like the use of devices based on the standard IEEE 802.11 (WiFi) or the use of devices based on the standard
10 IEEE 802.15.1 (Bluetooth). The necessary router may define a gateway to the internet or be a mail server, a fax server or a printer proxy for connecting to the computer cloud network. The router or gateway acts in that way, that requests, messages, including electronic-document-information and/or
15 the electronic document and/or the print-related-information and/or the selection of the multifunctional device, or status information from the mobile device are stored on the router. The processing means is then accessing the router and retrieving the documents, requests or information, especially
20 after checking the user identification related to the documents, information and/or messages. Also the mobile device is conducted to retrieve documents, requests or information from the storage of the router, if the mobile device is authorized for accessing the router.

25

[0039] It will be appreciated that the mobile device contains an application programming interface (API), which is configured to interact with the number of connected processing means via the router and defining a proxy or
30 gateway with the processing means. The mobile device contains an application programming interface (API), which is configured to interact with the secure print queue on the

print server by use of a direct connection within the communication network, like a WIFI-link or Bluetooth-link, perhaps even with a user authentication. The mobile device may also contain an application programming interface (API),
5 which is configured to make, change and/or delete the electronic-document-information and/or the print-related-information on the mobile device. Preferably the router is synchronized with the information about the secure print queue on the processing means, including the print server. In
10 case the mobile device is connected with the router the mobile device may be updated by a status message with information about the secure print queue on the print server.

[0040] The use of different communication networks routers
15 are used between different communication networks is preferred. In another embodiment at least one of the multifunctional devices is configured to scan a hardcopy and the processing means is configured to process the hardcopy for scanning on the multifunctional device. In case the
20 mobile device and/or the user-interface are connected to the processing means the user may route from the mobile device and/or the user-interface a scan-related-information to the processing means and/or multifunctional device. In case the user has access the processing means by the mobile device
25 and/or the user-interface the hardcopy is scanned on the multifunctional device.

[0041] Also a method for printing an electronic document on at least one multifunctional device is disclosed, whereas
30 the multifunctional device is connected to a processing means and the processing means is configured to process the electronic document for printing on the multifunctional

device. Also the mobile device is configured to initiate the printing of the electronic document, comprising the steps of initiating a communication between the mobile device and the processing means and routing from the mobile device the
5 electronic-document-information to the processing means, including the print server. After that using the electronic-document-information and the print-related-information for converting the electronic document into a print-ready-converted electronic document and storing the print-ready-converted electronic document within the secure print queue
10 on the print server. Then releasing the print-ready-converted electronic document from the secure print queue on the print server for printing on the multifunctional device in case a user accesses to the processing means and releases the print-ready-converted electronic document for printing on the
15 multifunctional device. The electronic-document-information, the print-related-information and/or the electronic document may be routed as a message from the mobile device to the processing means.

20

[0042] It will be appreciated that the message, especially an electronic mail (email) message, is analysed and information about the electronic-document-information and/or the electronic document and/or the print-related-information
25 and/or the selection of the multifunctional device are extracted from the message. After the extraction of relevant information from the message the extracted electronic-document-information and/or the extracted electronic document and/or the extracted print-related-information and/or the
30 extracted selection of the multifunctional device are used by the processing means for the conversion of the electronic document into the print-ready-converted electronic document.

Preferably the electronic format of the print-ready-converted electronic document contains PostScript (PS), Printer Command Language (PCL), Page Description Language (PDL), Portable Document Format (PDF) or Page Description Markup Language (PDML).

[0043] In case the mobile device and/or the user-interface of the multifunctional device is connected to the processing means the user must be authenticated on the mobile device and/or on the user-interface attached to the multifunctional device for accessing the secure print queue on the print server. Additionally information about the secure print queue on the print server are synchronized with a router and in case the mobile device is connected with the router the mobile device may be updated with information about the secure print queue and/or the printer status. The costs for the printing of every print-ready-converted electronic document on the multifunctional device may be determined and the costs may be charged to a specific cost-centre account.

[0044] In another preferred embodiment the processing means is additionally configured to process a hardcopy for scanning on the multifunctional device. Also the mobile device is configured to initiate the scanning of the hardcopy on the multifunctional device.

[0045] Additionally a program is disclosed that, when executed by the system for printing according to the above mentioned disclosure, causes the system for printing to perform a method for printing and scanning. In addition a computer-readable storage medium having computer-executable

instructions to perform steps for providing a method for printing and scanning.

Brief Description of the Drawings

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[0046] While the appended claims set forth the features of the present invention with particularity, the invention, together with its objects and advantages, may be best understood from the following detailed description taken in
10 conjunction with the accompanying drawings of which:

[0047] Fig. 1 shows parts of a system for printing and scanning in first embodiment of the present invention;

15 [0048] Fig. 2 shows hardware of an MFP;

[0049] Fig. 3 shows hardware of a mobile phone;

[0050] Fig. 4 shows print server hardware;

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[0051] Fig. 5 shows a processing means, including a print server, connected to a mobile device, whereas the print server is connected to a plurality of multifunctional devices;

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[0052] Fig. 6 shows the mobile device connected with the processing means by two networks, whereas a message from the mobile device is analysed by the processing means, including a document conversion server;

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[0053] Fig. 7 shows the mobile device connected with the processing means via one network, whereas the electronic

document is stored on the processing means, including a file server, and the electronic-document-information contains a document link to the electronic document on the file server;

5 [0054] Fig. 8 shows a cloud computing network defined by a number of processing means, whereas the electronic document is stored and converted within the cloud computing network;

[0055] Fig. 9 shows a system for printing with two
10 combined networks;

[0056] Fig. 10 shows a system for printing and scanning, whereas the electronic document is stored and converted within the cloud computing network defined by a number of
15 processing means;

[0057] Fig. 11 shows a Unified Modeling Language (UML)-sequence diagram of the disclosed method for printing, which makes use of the mobile device and of the processing means, including the print server, the file server and the
20 documentation conversion server.

Detailed Description of preferred Embodiments

25 [0058] Turning to the drawings, wherein like reference numerals refer to like elements, the invention is illustrated as being implemented in a suitable computing environment. Although not required, the disclosed invention will be described in the general context of computer-executable
30 instructions, such as program modules, being executed by a processing means and/or by a personal computer. Generally, program modules include routines, programs, objects,

components, data structures, etc. that performs particular tasks or implement particular abstract data types. Moreover, those skilled in the art will appreciate that the invention may be practiced with other computer system networks and/or
5 system components, including hand-held devices, multi-processor systems, microprocessor-based or programmable consumer electronics, network-PCs, minicomputers, mainframe computers, and the like.

10 [0059] The invention may be practiced in distributed computing environments where tasks are performed by remote processing means that are linked through a network. In the distributed computing environment, program modules and/or data and/or files may be located in both local and remote
15 memory storage devices. Especially the distributed storing and retrieving of electronic data and files within a cloud computing network defined by a number of processing means is envisaged.

20 [0060] Fig. 1 shows a system 13 for printing and scanning of the first embodiment. The system 13 for printing and scanning comprises a multifunction peripheral (MFP) 6 and a mobile device 4. The multifunction peripheral 6 has an associated processing means 3h in form of a print server 3h,
25 as will be explained in more detail below.

[0061] Fig. 2 shows the hardware configuration of the multifunction peripheral 6. The multifunction peripheral 6 comprises a CPU 37, a ROM 38, a hard disk drive 39, and a RAM
30 40. These components are standard hardware components for computers and other devices and perform their usual functions. The multifunction peripheral 6 further comprises a display

unit 41, an operation unit 42, a communication control unit 43, an image reader 44, a recording unit 45, an image memory 46, an image processing unit 47, an authentication unit 48, a card reader 49 and an I/O control unit 50. The display unit
5 41 is a touch-screen LCD display provided on the multifunction peripheral 6 to allow a user to make selections and view information on the multifunctional device 6. The operation unit 42 is a keypad and other buttons to allow a user to enter settings and other information to the
10 multifunction peripheral 6. The communication control unit 43 is provided to allow the multifunctional device 6 to communicate over a LAN with the print server 3h (not shown in Fig. 2) especially with the print server 3h,11. The multifunctional device 6 may be also a scanner that allows
15 scanning of documents. The recording unit 45, shown in Fig. 2, represents parts of the multifunctional device 6 dedicated to printing. The recording unit 45 functions to print image data onto a recording medium and output the recording medium for collection by a user. The image memory 46 is a memory
20 provided for storage of image data during scanning by the image reader 44 or printing by the recording unit 45. The image-processing unit 47 represents various application specific integrated circuits (ASIC) provided in the multifunctional device 6 in order to increase the speed of
25 certain image processing operations, such as conversion of scanned R,G,B data into C,M,Y,K data during a copying operation. The authentication processing unit 48 is provided in order to authenticate user details received from the card reader 49. Data from the card reader 49 is received at the
30 authentication unit 48 via the I/O control unit 50. The authentication unit 48 may be implemented by software run using the CPU 37 and RAM 40 rather than as a separate

hardware component. The components 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50 described above are interconnected via a system bus 51.

5 [0062] The multifunctional device 6 runs an operating system. In this particular embodiment the operating systems is the Multifunctional Embedded Application Platform (MEAP) operating system provided on multifunctional device devices sold by Canon (RTM). The operating system allows the running
10 of JAVA applications and also includes a web interface.

[0063] Fig. 3 shows the hardware configuration of the mobile device 4. The mobile phone 4 comprises a control unit 52 connected to a digital signal processing unit 53. The
15 control unit 52 controls operation of a display unit 54, an operation unit 55, a camera unit 56, an external I/F 57, a wireless communication unit 58 and a power supply unit 59. The display unit 54 comprises an LCD display for displaying information to a user of the phone 4. The operation unit 55
20 comprises a keypad and other operation buttons to allow a user to make inputs into the mobile phone 4. The camera unit 56 is a camera that is integrated into the phone 4 to allow a user to take pictures and to collect visual information. The external I/F 57 is a port provided in the mobile phone 4 to
25 allow the mobile phone 4 to communicate with other devices. In particular the external I/F 57 allows the mobile phone 4 to be connected to a computer for the purposes of synchronizing data (contact details, calendar entries etc.) stored on the mobile phone 4 with data stored on the computer.
30 The wireless communication unit 58 provides support for various wireless services. In particular the wireless communication unit 58 provides support for Wi-Fi

communication and Bluetooth communication. The wireless communication unit 58 is connected to an antenna. The power supply unit 59 includes a battery and a mechanism for charging the battery from an external power supply.

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[0064] The digital signal processing unit 53 is connected to an audio input unit 60, an audio output unit 61, and an RF input/output unit 62. The audio input unit 60 is an analogue to digital processor for receiving and converting audio signals from a microphone 63. The audio output unit 61 is a digital to analogue processor for receiving and converting digital signals into an analogue output to be output by a speaker 64. The RF input/output unit 62 is connected to an antenna 65 and is used to allow the mobile phone 4 to communicate with a local mobile phone station. The audio input unit 60, audio output unit 61, digital signal processing unit 53 and RF input/output unit 62 allow the mobile phone 4 to operate as a portable telephone. The mobile phone 4 is a so called 'smart phone' in this embodiment and runs Google (RTM) Android (RTM) operating system.

[0065] The print sever 3h comprise typical server hardware exemplified by Fig. 4. The server hardware includes a CPU 37, a RAM 40, a hard disk drive 40 and a network I/O 50. The network I/O 50 allows the print server 3h including web server functionality to communicate over a LAN. The print server 3h is storing print-ready-converted electronic document 7 in a print queue. The print server 3h is also connected with the multifunctional device 6 and conducted to manage and proceed print jobs in different formats within the print queue for the multifunctional device 6.

[0066] As mentioned in Fig. 1 the multifunctional device 6 and the print server 3h are associated via a network 15,16 (not shown in Fig. 1) with each other. In particular shown in Fig. 1, a web application is run on the print server 3h in order to control operations on the multifunctional device 6. Installed on the multifunctional device 6 is a web browser (not shown in Fig. 1) which receives HTML web pages to be displayed to a user from the presentation logic (not shown in Fig. 1). Also installed on the multifunctional device 6 is a service interface (not shown in Fig. 1) to allow the business logic of the print server 3h (not shown in Fig. 1) to access various services of the multifunctional device 6. For example, the business logic of the print server 3h may send commands to the service interface to cause the scanner 6 to perform a scanning operation or to cause the multifunctional device to print a print job.

[0067] Fig. 5 is a schematic diagram showing an exemplary embodiment of the processing means 3a,12a connected to a mobile device 4. The processing means 3a,12a in this embodiment is a print server 3a with a document conversion server 12a combined on one server. It will be appreciate that the print server 3a and the document conversion server 12a are different servers. Alternatively it will be appreciate that the print server 3a may have document conversion 12a functionalities or the document conversion server 12a may contain print server 3a functionalities. The print server 3a is also connected with a number of multifunctional devices 6. The print server 3a, the multifunctional devices 6 and the mobile device 4 are linked together by a wired or by a wireless connection. Mobile devices 4 may include Personal Digital Assistant (PDA), a mobile phone, a laptop, a computer

hand-held device, a microprocessor-based or programmable consumer electronic device, a network-PC, a minicomputer, a web cell phone or the like. The mobile device 4 is configured to initiate the printing of an electronic document 10 on the
5 multifunctional device 6.

[0068] A user 5 of the mobile device 4 and routes an electronic-document-information 1 containing the electronic document 10 and a print-related-information 2 to the print
10 server 3a after a connection is established. In the described embodiment of Fig. 5 the mobile device 4 is a computer laptop. The electronic-document-information 1 may contain additional information about the electronic document 10, like the file name, the file size and/or the file format. The print-
15 related-information 2 may also contain information about the electronic document 10, such as the file format and/or information or parameters about the selection of the multifunctional device 6 and/or the finishing options, such as duplex printing, paper size or paper orientation, for the
20 printing of a print-ready-converted electronic document 7 on the designated multifunctional device 6. The multifunctional device 6 may be a multifunctional office colour printer, for example the Canon iRC5185i having a variety of functions including printing, copying, faxing, scanning and sending
25 functions and files within the networking environment.

[0069] The mobile device 4 and the printer server 3a with the document conversion server functionality 12a are directly linked without any need for a router or gateway. The
30 print-related-information 2 and the electronic-document-information 1 and the electronic document 10 are transmitted to the print sever 3a. The print-related-information 2 and/or

the electronic-document-information 1 and/or the electronic document 10 may in combination define a job ticket with all relevant information about the electronic document 10, the associated print-ready-converted electronic document 7 and/or perhaps additional company/office information. Such a job ticket may also contain information about the printing status 21 of the print-ready-converted electronic document 7. The job ticket is commonly used for the monitoring of the status of the printing within a company from the document receiving until the accounting or delivery of the printed hardcopies to the customer.

[0070] By way of example, in the disclosed embodiment of Fig. 5 the print server 3a receives the electronic-document-information 1 and electronic document 10 and print-related-information 2. The document conversion server functionality 12a on the print server 3a is also converting 19 the electronic document 10 into the print-ready-converted electronic document 7, for example PDF. In case the multifunctional device 6 must be supported by a specific printer driver the print server 3a combines the print-ready-converted electronic document 7 with the relevant printer driver when the print-ready-converted electronic document 7 is released from the secure print queue on the print server 3a by a release message 20 of the mobile device 4. The path of the release message 20 from the mobile device 4 is depicted in Fig. 5 by the 2-dotted and dashed line.

[0071] Based on the release message 20 from the mobile device 4, the print-ready-converted electronic document 7 is sent by the print server 3a to the designated multifunctional device 6 and printed. It will be appreciated that the status

of the multifunctional device 6 and/or the printing status of the print-ready-converted electronic document 7 is forwarded as a status message 21 to the mobile device 4. In case the mobile device 4 contains a display the status message 21 may be visualized on the mobile device 4. The paths of the status messages 21 from the multifunctional devices 6 to the mobile device 4 are depicted in Fig. 5 by 1-dotted and dashed lines. Therefore the user 5 of the mobile device 4 is continually informed about the printing of the electronic document 10 initiated by him or her.

[0072] Fig. 6 is a diagram illustrating another embodiment of a system 13 for printing. An email message 8 is sent by the mobile device 4 via a first network 15 to a mail server 11 within a second network 16, such as a local area network (LAN). The processing means 3b,11,12b in this embodiment are a print server 3b, a mail server 11 and a separate document conversion server 12b. Generally the second network 16 is protected by a security system and contains a firewall and individual user authentication tools. According to Fig 6 the email message 8 contains the electronic document 10 to be printed, the electronic-document-information 1 and the print-related-information 2 and the release message 20. Alternatively the print-related-information 2 and/or release message 20 may be generated by a terminal within one of the networks 15,16 or by web-based applications making use of different print processing methods, such as the internet printing protocol (IPP).

[0073] In a preferred embodiment in accordance with the disclosed invention the address of the recipient of the message 8, especially a short message service (SMS) or an

electronic mail (email) within one and/or more networks
15,16), is used to splits or convert at least parts of the
print-related-information 2. The address of the recipient
defines the selection of a specific multifunctional device 6
5 and/or defines possible printing and finishing options, such
as duplex printing, paper size or paper orientation. Once the
email message 8 is received by the mail server 11 the address
of the recipient, e.g. "printer2.duplex.A5@company.com", is
analyzed and forwarded as the print-related-information 2 to
10 the document conversion server 12b. The body of the message 8
contains the electronic document 10 or a document link for
uploading the electronic document 10 from another location
within the network 15. After that the relevant print-ready-
converted electronic document 7 with the selected finishing
15 options is released to the designated multifunctional device
6. Also the sender of the email message 8, identified in the
message header, could be analysed and compared with an
internal look-up table to ensure a clear authentication of
the user 5 sending the message 8. In the preferred embodiment
20 of Fig. 6 the conversion 19 into a print-ready-converted
electronic document 7 is done by a document conversion server
12b, which forwarded the print-ready-converted electronic
document 7 to the secure print queue on the print server 3b.

25 [0074] According to the embodiment disclosed in Fig. 6,
the print-ready-converted electronic document 7 is released
by the release message 20 within the email message 8. A
connection between the mobile device 4 for transmitting the
release message 20 and the print server 3b may be proceeded
30 by a telephone network, such as a universal mobile
telecommunication system (UMTS) or a global system for mobile
communications (GMS), or a radio communication network,

including a wireless local area network (WLAN) based on the standard IEEE 802.11 (WiFi) or on the standard IEEE 802.15.1 (Bluetooth). Also a direct wired connection between the mobile device 4 and the print server 3b and/or the mail server 11 and/or the document conversion server 12b and/or to the designated multifunctional device 6 is envisaged. The mobile device 4 displays a list of network-based multifunctional devices 6, which may be selected by the user 5 on the mobile device 4. The information about the designated multifunctional device 6 is sent with the release message 20 to the print server 3b, which triggers the further release of the print-ready-converted electronic document 7 to the designated multifunctional device 6. If necessary the print server 3b may also prepare the print-ready-converted electronic document 7 for printing on a multifunctional device 6, which needs a specific printer driver for printing.

[0075] The user 5 will be identified by analyzing the sender of the message 8, especially the email or SMS sender. The sender information in the email message 8 will be compared with user information that may be taken directly from a standard database within the company network 15,16 or could be extracted from a look-up table that would allow the user 5 to associate more than one address to his or her account. Also the user could be indentified during a login on the mobile device 4. Additionally the user 5 may be identified within the system 13 based on a password associated with a username, a proximity card, a fingerprint, an access card or even by the recognition of the user's actual voice and speech pattern compared with an already stored voice and speech pattern of the user 5.

[0076] For example, the user 5 would be known in one of the networks 15,16 to have the company email address jsmith@company.com used within the email message 8. The look-up table would also store that user 5 has one private
5 email address which he might use to initiate a printing within the company network 16, like joesmith@mail.eu. If the email message 8 from the mobile device 4 is any of these two email addresses, then the system 13 will assign the user 5 as the owner of the electronic document 10. Any messages 8
10 received from an unknown sender email account will be treated as spam and automatically deleted. A similar procedure is envisaged for other message-formats, like SMS, in which case the sender identification is adapted suitably by those skilled in the art. For example, checking the sender mobile
15 number is possible for user authentication in case of using SMS messages 8.

[0077] As the email attachment is in the secure print queue on the printer server 3b as a print-ready-converted
20 electronic document 7, e.g. PDF, the user 5 can release this print-ready-converted electronic document 7 from the secure print queue on the print sever 3b from any accessible mobile device 4 in the network 15,16. The mobile device 4 that releases the print job 7 does not need to be the same device
25 that sent the electronic document 10 to the mail server 11. In the embodiment of Fig. 6 the release message 20 is part of the email message 8. The user 5 may also release the print-ready-converted electronic document 7 along with any other print-ready-converted electronic documents 7 relating to him
30 or her that may be already in the secure print queue on the print server 3b.

[0078] Referring to Fig. 7 there is shown schematically another embodiment of the system 13 for printing with one network 15 and the processing means 3c,9a,12c. The processing means 3c,9a,12c is defined by a document conversion server 12c, one print server 3c and a file server 9a. The electronic document 10 is stored on the file server 9a and may be pulled by the print server 3c on the basis of a document link within the electronic-document-information 1 sent by the mobile device 4.

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[0079] In the disclosed embodiment of Fig. 7 the mobile device 4 is a voice recording and/or speech recognition device. These kinds of mobile devices 4 need no keyboard and have the capability to convert speech patterns of the user 5 into machine-readable information and parameters. According to Fig. 7 these recognized speech patterns are converted into electronic-document-information 1 and sent within the network 15. The electronic-document-information 1 is dictated into the mobile device 4. The user 5 needs to know the storage location of the electronic document 10 on a known file server 9a. The user 5 may dictate the following document link, e.g. "Server4:\mydocs\patent.doc", which may be used directly as machine-readable electronic-document-information 1 within the system 13.

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[0080] Alternatively the print-related-information 2 and/or the electronic document 10 could be dictated by the user 5 into the mobile device 4, like an electronic Dictaphone with speech recognition or just a normal mobile telephone, and be converted into machine-readable information. The release of the print-ready-converted electronic document 7 from the print server 3c may be also initiated by means of

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the voice and speech recognition of the mobile device 4. The speech patterns of the voice of the user 5 are analyzed and converted into machine-readable information and/or parameter settings. The speech recognition and/or voice-based user authentication may also be conducted on the document conversion server 12c, the print server 3c, the file server 9a or on one of the network 15 components.

[0081] In case the electronic document 10 is stored on the file server 9a the address of recipient of the message 8 relates to the electronic-document-information 1 and may defining the document link to the electronic document 10 on the file server 9a. In case of an email message 8 the mail server 11, as part of the document conversion server 12c, is analyzing the address of the recipient, like "server4-patent.doc@company.com", and forwarding this electronic-document-information 1 to the document conversion server 12c. According to the received document link the document conversion server 12c is configured to download the relevant electronic document 10, in this example "patent.doc", from the relevant file server 9a, in this example "server4". The downloaded electronic document 10 is then converted into a print-ready-converted electronic document 7.

[0082] The electronic-document-information 1 is sent via the network 15 to the designated file server 9a and contains the document link to the electronic document 10 stored on the file server 9a. After that, the electronic document 10 is pushed by the file server 9a to the document conversion server 12c and afterwards to the printer server 3c. Alternatively the electronic-document-information 1 is sent to document conversion server 12c, which uses the electronic-

document-information 1 for pulling the electronic document 10 from the file server 9a via the network 15.

[0083] Within the disclosed embodiment of Fig. 7 the print-related information 2 is stored on the document conversion server 12c. After the conversion 19 on the document conversion server 12c the print-ready-converted electronic document 7 is sent to the print server 3c and stored within the secure print queue.

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[0084] According to Fig. 7 the user identification for releasing the print-ready-converted electronic document 7 from secure print queue on the print server 3c is initiated by the mobile device 4 as a hardware security token 4, such as a pager or a RSA authentication token of the EMC Corporation. The mobile device 4 accesses the network 15 and generating a security number, which is compared with a second security number generated within the network 15. If both security numbers are identical the hardware security token 4 is accepted within the network 15 and the designated user 5 is allowed to access to retrieve his or her related electronic documents 10, electronic-document-information 1 and/or print-related-information 2 and/or scan-related-information 18. According to the embodiment illustrated in Fig. 7 the authentication of the hardware security token 4 within the network 15 causes also the sending of the release message 20 for the print-ready-converted electronic document 7 of the related user 5. The print server 3c receives the release message 20 and sends the print-ready-converted electronic document 7 to the designated multifunctional device 6 for printing.

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[0085] Fig. 8 illustrates the retrieving of an electronic document 10 from a computer cloud network 15 initiated by the sending of the electronic-document-information 1 by means of the mobile device 4. The processing means 3d,9b,12d have the capability of storing and converting 19 of the electronic document 10 and defining a computer cloud network 15. According to this embodiment of Fig. 8 the processing means 3d,9b,12d is defined by a print server 3d and a array of file servers 9b with a document conversion server 12d functionalities.

[0086] The user 5 may access a user-interface 14 of the multifunctional device 6 and may send the release message 20 and the print-related-information 2 to the computer cloud network 15 for conversion the electronic document 10 into the print-ready-converted electronic document 7. Within the computer cloud network 15, defined by the file servers 9b, the electronic document 10 is converted into the print-ready-converted electronic document 7.

[0087] After the conversion 19 within the computer cloud network 15 the print-ready-converted electronic document 7 is stored within the secure print queue on the computer-cloud-based print server 3d. The print-ready-converted electronic document 7 may be released by means of a release message 20 from the user-interface 14 and be pulled by the designated multifunctional device 6 for printing. The file servers 9b may be also part of the computer cloud network 15. The functions could also be provided by an array of servers, like an array of print servers 3d for ensuring the print server 3d functionality.

[0088] Fig. 9 is a schematic diagram showing another exemplary embodiment of the system 13 with two different communication networks 15,16. The communication and computer system networks 15,16 may be different, for example a first (telephone) network 15 and a second (radio communication) network 16, such as Bluetooth. The networks 15,16 are separated by routers 17a,17b or gateways. Especially internet gateways are provided between the internet and an internal network, which control the security access and within the relevant network 15,16. The router 17a,17b between two networks 15,16 also converts the different communication protocols used in each network 15,16. The electronic-document-information 1 is sent by means of a first mobile device 4 to a first router 17a. The first router 17a controls the identification of the user 5 within the first network 15. The electronic document 10 is stored on one of a number of connected file servers 9c defining the computer cloud network 15. The electronic document 10 is pushed or pulled from the first network 15 to the second network 16. A second router 17b is used for the re-authentication of the user 5 within the second network 16.

[0089] The print-related-information 2 is combined with the release message 20 of a second mobile device 4. The electronic document 10 and the print-related-information 2 are converted by the document conversion server 12e functionality on the print server 3e into the print-ready-converted electronic document 7 and the print-ready-converted electronic document 7 is stored within the secure print queue of the print server 3e. The user 5 may use the second mobile device 4 for sending the release message 20 to the print server 3e with the document conversion server 12e

functionality. According to Fig. 9 the second mobile device 4 is located within the second network 16 and accesses the second router 17b to transmit the release message 20 to the print server 3e. After that the print server 3e pushes the
5 print-ready-converted electronic document 7 to the designated multifunctional device 6.

[0090] A status message 21 indicates the status of the multifunctional device 6 and/or the printing of the released
10 print-ready-converted electronic document 7 on the designated multifunctional device 6 may be sent to the print server 3e and/or file servers 9c. The print server 3e and/or file servers 9c may share the status message 21 with the second router 17b, whereas the second router 17b allowing the access
15 the status message 21 by the first mobile device 4 from the first network 15 and the first router 17a and/or by the second mobile device 4. Therefore at least one of the mobile devices 4 may display the actual status of the printer 6 and/or printing status about the released print-ready-
20 converted electronic document 7 on the designated multifunctional device 6 based on the status message 21.

[0091] Turning now to Fig. 10, another preferred embodiment of a system 13 with scanning and printing
25 functionality is illustrated. A hardcopy is scanned on the designated multifunctional device 6, such scanning of the hardcopy may be initiated on the designated multifunctional device 6 by receiving scan-related-information 18 from the mobile device 4 or from the user-interface 14. In Fig. 10 the
30 scan-related-information 18 is entered into the user-interface 14 of the multifunctional device 6 by the user 5. Afterwards the scan-related-information 18 and the hardcopy

scan 22 are forwarded to the the print server 3f. The
hardcopy scan 22 is analyzed and/or converted 32 into an
electronic document 10 on the print server 3f. Text based
recognition methods, such as optical character recognition
5 (OCR), and/or graphic-based recognition methods and/or
pattern recognition methods could be used for analyzing the
scanning and converting 32 of the hardcopy scan 22 into the
electronic document 10.

10 [0092] The electronic document 10 based on the hardcopy
scan 22 is routed via the print server 3f to the computer
cloud network 15 and stored within the computer cloud network
15 defined by file servers 9d with document conversion server
12f functionalities. The electronic-document-information 1 in
15 this embodiment is a document link referring to the
electronic document 10. Because of that the electronic-
document-information 1 may be used by the mobile device 4 to
initiate and release printing of the previously scanned
electronic document 10 stored within the computer cloud
20 network 15. The electronic document information 1 can also be
used by the mobile device 4 to release such an electronic
document 1 to the multifunctional device 6. Also the print-
related-information 2 is sent by the mobile device 4 or by
the user-interface 14 to the computer cloud network 15. The
25 electronic document 10 is retrieved from the file servers 9d
within the computer cloud network 15 and converted into the
print-ready-converted electronic document 7. The print-
related-information 2 also designates one of the
multifunctional devices 6 for printing, which may be a
30 different multifunctional device 6 from that provide the
scanned hardcopy.

[0093] The print-ready-converted electronic document 7 is routed to the secure print queue on the print server 3f and released to the designated multifunctional device 6 based on the release message 20 of the mobile device 4. After that the print-ready-converted electronic document 7 is stored within the secure print queue and is pulled by the multifunctional device 6 for printing.

[0094] Referring to Fig. 11, an UML-sequence diagram illustrates another preferred embodiment of the disclosed method for printing. The system 13 for printing in this embodiment contains a mobile device 4, a router 17a, a print server 3g, a file server 9e, a document conversion server 12g and a printer as a multifunctional device 6. The print server 3g functionality may also be conducted by a number of connected processing means 3g,9e,12g, including print servers 3g, and acting as a computer network 15 (not shown in Fig. 11), especially a computer cloud network 15. The mobile device 4 sends a request for authentication 23 to the designated router 17a. The router 17 makes a security check based on the request 23 and in case of a successful user identification an acknowledge 24 is sent in response to the mobile device 4. At the same time the user 5 is also logged on the print server 3g within the networking environment, like an intranet, protected by the router 17a.

[0095] According to the preferred embodiment of Fig. 11, the electronic-document-information 1 and the print-related-information 2 are sent by the mobile device 4 to the router 17, whereas the router 17 routes 27 the electronic-document-information 1 and the print-related-information 2 to the print server 3g. A message 8 (not shown in Fig. 11)

containing the electronic-document-information 1 and the print-related-information 2 must be sent by the mobile device 4 and be converted into the communication protocol used within the network 15.

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[0096] Based on the electronic-document-information 1 the print server 3g sends a request 28 to the file server 9e to pull the electronic document 10 from the file server 9e. After the user authentication and the retrieving of the electronic document 10 within the file system of the file server 9e, the file server 9e sends 29 the electronic document 10 to the print server 3g. The print server 3g checks 30 all available information, like the electronic document 10 in relation with the print-related-information 2, and after that routes 31 the electronic document 10, for example a TIFF-file commonly used as a scanned file format, to the document conversion server 12g.

[0097] The document conversion server 12g converts 32 the document format, for example from the TIFF-format to Microsoft® word-format by use of OCR-technologies, and sends 33 the format converted document to the print server 3g. The print server 3g then converts 19 the format-converted document into a print-ready-converted electronic document 7 considers the print-related-information 2. At the same time a status message 21 is sent via the router 17 to the mobile device 4. Also the print server 3g requests 34 the printer status of the multifunctional device 6, perhaps even of other multifunctional devices 6 within the network 15. After receiving the printer status message 21 the print server 3g routes the status message 21 via the router 17a to the mobile device 4. One of the multifunctional devices 6 may be

designated by means of the mobile device 4 and the printer selection 35 is routed via the router 17a to the print server 3g. Based on this information the print server 3g selects 35 the designated multifunctional device 6.

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[0098] The mobile device 4 generates the release message 20 by selecting the printing of the electronic document 10 and routing the release message 20 via the router 17 to the print server 3g. The printer server 3g processes the print-ready-converted electronic document 7 by combining 36 it with the relevant printer driver for the designated multifunctional device 6. This step 36 is not necessary if a universal printer driver is used within the network 15. After that the print-ready-converted electronic document 7 is pushed to the designated multifunctional device 6 for printing based on the release message 20. Additionally the device status of the designated multifunctional device 6 may be routed as a status message 21 via the print server 3g and via the router 17 to the mobile device 4.

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[0099] It will be appreciated that the processing means be defined by a combination of print server 3a, 3b, 3c, 3d, 3e, 3f, 3g, 3h, document conversion server 12a, 12b, 12c, 12d, 12e, 12f, 12g and/or file servers 9a, 9b, 9c, 9d, 9e. Alternatively it will be appreciate that print server 3a, 3b, 3c, 3d, 3e, 3f, 3g, 3h, document conversion server 12a, 12b, 12c, 12d, 12e, 12f, 12g and/or file servers 9a, 9b, 9c, 9d, 9e may conduct print server 3a, 3b, 3c, 3d, 3e, 3f, 3g, 3h, document conversion server 12a, 12b, 12c, 12d, 12e, 12f, 12g and/or file servers 9a, 9b, 9c, 9d, 9e. functionalities.

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Reference Numerals

1	electronic-document-information
2	print-related-information
3a to 3h	print server
4	mobile device
5	user
6	multifunctional device
7	print-ready-converted electronic document
8	message
9a to 9e	file server
10	electronic document
11	mail server
12a to 12g	document conversion server
13	system for printing
14	user-interface
15	first network
16	second network
17a, 17b	router
18	scan-related-information
19	document conversion
20	release message
21	status message
22	hardcopy scan
23	requesting identification
24	responding acknowledge
25	user identification
26	sending information
27	sending information
28	requesting electronic document
29	sending electronic document

30 comparing information
31 sending electronic document
32 scan format conversion
33 sending format converted document
34 requesting printer status
35 selecting printer
36 selecting and combining with printer driver
37 central processing unit (CPU)
38 read only memory (ROM)
39 hard disk drive
40 random access memory (RAM)
41 display unit
42 operation unit
43 communication control unit
44 image reader
45 recording unit
46 image memory
47 image processing unit
48 authentication processing unit
49 card reader
50 I/O control unit
51 system bus
52 control unit
53 digital signal processing unit
54 display unit
55 operation unit
56 camera unit
57 external I/F
58 wireless communication unit
59 power supply unit
60 audio input uni

61	audio out punt unit
62	RF input/output unit
63	microphone
64	speaker
65	antenna

Claims

1. A system (13) for printing an electronic document (10) comprising:
- 5 • at least one multifunctional device (6),
 - a processing means (3a,12a), including a print server (3a), which is connected to the multifunctional device (6), the processing means (3a,12a) being configured to process the electronic document (10)
 - 10 for printing on the multifunctional device (6),
 - a mobile device (4), connectable with the print server (3a) is configured to initiate the printing of the electronic document (10),
- wherein electronic-document-information (1) containing
- 15 the electronic document (10) and print-related-information (2) are routed from the mobile device (4) to the processing means (3a,12a) and the processing means (3a,12a) uses the print-related-information (2) for converting (19) the electronic document (10) into a
- 20 print-ready-converted electronic document (7) and the print-ready-converted electronic document (7) is stored within a secure print queue on the print server (3a) and is releasable by the user (5) from the secure print queue on the print server (3a) for printing on the
- 25 multifunctional device (6).
2. A system (13) for printing according to claim 1, wherein the mobile device (4) has directly access to the processing means (3a,12a) within a communication network.

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3. A system (13) for printing according to claim 1 or 2, wherein the mobile device (4) is configured to send a release message (20) to the processing means (3a,12a) to release the print-ready-converted electronic document (7) from the secure print queue on the print server (3a) for printing on the multifunctional device (6).
4. A system (13) for printing an electronic document (10) comprising:
- at least one multifunctional device (6),
 - a processing means (3b,9b,11,12b), including a print server (3b), which is connected to the multifunctional device (6), the processing means (3b,9b,11,12b) being configured to process an electronic document (10) for printing on the multifunctional device (6),
 - a mobile device (4), connectable with the processing means (3b,9b,11,12b) and configured to initiate the printing of the electronic document (10),
- wherein the electronic document (10), electronic-document-information (1) and print-related-information (2) are routed as part of a message (8) from the mobile device (4) to the processing means (3b,9b,11,12b) and the processing means (3b,9b,11,12b) uses the print-related-information (2) for converting (19) the electronic document (10) into a print-ready-converted electronic document (7) and the print-ready-converted electronic document (7) is stored within the secure print queue on the print server (3b) and is releasable by the user (5) from the secure print queue on the print

server (3b) for printing on the multifunctional device (6).

5. A system (13) for printing according to claim 4, wherein
5 the message (8) is analysed and the electronic-document-information (1) and/or the electronic document (10) and/or the print-related-information (2) and/or the selection of the multifunctional device (6) are extracted and used by the processing means
10 (3b,9b,11,12b), including a mail server (11) and a document conversion server (12b), for the converting (19) the electronic document (10) into the print-ready-converted electronic document (7).
- 15 6. A system (13) for printing according to claim 4 or 5, wherein an address of a recipient of the message (8) is changed in dependence upon the print-related-information (2) and/or designation of one multifunctional device (6).
- 20 7. A system (13) for printing an electronic document (10) comprising:
- at least one multifunctional device (6),
 - a processing means (3c,9a,12c), including a print server (3c) and a file server (9a), which is
25 connected to the multifunctional device (6) and the processing means (3c,9a,12c) being configured to process the electronic document (10) for printing on the multifunctional device (6),
 - a mobile device (4), connectable with the processing
30 means (3c,9a,12c) and configured to initiate the printing of the electronic document (10),

wherein electronic-document-information (1) is routed from the mobile device (4) to the processing means (3c,9a,12c) and the processing means (3c,9a,12c) uses the electronic-document-information (1) for downloading the electronic document (10) from the file server (9a) and using print-related-information (2) for converting (19) the electronic document (10) into a print-ready-converted electronic document (7) and the print-ready-converted electronic document (7) is stored within the secure print queue on the print server (3c) and is releasable by the user (5) from the secure print queue on the print server (3c) for printing on the multifunctional device (6).

8. A system (13) for printing according to claim 7, wherein the electronic-document-information (1) contains a document link to the electronic document (10) stored on the file server (9a) and is configured to retrieve the electronic document (10) from the file server (9a) based on the document link.

9. A system (13) for printing according to claim 7 or 8, wherein the print-related-information (2) are pre-defined and stored on the processing means (3c,9a,12c).

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10. A system (13) for printing an electronic document (10) comprising:

- at least one multifunctional device (6),
- a processing means (3d,9c,12d), including a print server (3d), which is connected to the

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multifunctional device (6) within a network (15) and is configured to process the electronic document (10) for printing on the multifunctional device (6),

- a mobile device (4), connectable with the network (15) and the mobile device (4) being configured to initiate the printing of the electronic document (10),

wherein electronic-document-information (1) and print-related-information (2) are routed from the mobile device (4) and/or by an user-interface (14) to the processing means (3d,9c,12d) and a number of connected processing means (3d,9c,12d) defining a network (15) and are used for a coordinated storing, analysing and/or extracting of information about the electronic-document-information (1) and/or the electronic document (10) and/or the print-related-information (2) and/or the selection of the multifunctional device (6) and the number of connected processing means (3d,9c,12d) uses the electronic-document-information (10) and the print-related-information (2) for converting (19) the electronic document (10) within the network (15) into a print-ready-converted electronic document (7) and the print-ready-converted electronic document (7) is stored within the secure print queue on the print server (3d) in the network (15) and is releasable by the user (5) from the secure print queue on the print server (3d) in the network (15) for printing on the multifunctional device (6).

11. A system (13) for printing an electronic document (10) comprising:
- at least one multifunctional device (6),

- a processing means (3e,9c,12e), including a print server (3e) and at least one file server (9c), which is connected to the multifunctional device (6) within a network (15) and is configured to process the electronic document (10) for printing on the multifunctional device (6),
 - a mobile device (4), connectable with the network (15) and the mobile device (4) being configured to initiate the printing of the electronic document (10),
- wherein the electronic-document-information (1) and the print-related-information (2) are routed via a router (17) to the processing means (3e,9c,12e) and the processing means (3e,9c,12e) uses the electronic-document-information (1) for retrieving the electronic document (10) from the file server (9c) and using the print-related-information (2) for converting (19) the electronic document (10) into a print-ready-converted electronic document (7) and the print-ready-converted electronic document (7) is stored within the secure print queue on the print server (3e) and is releasable by the user (5) from the secure print queue on the print server (3e) for printing on the multifunctional device (6).
12. A system (13) for printing according to claim 11, wherein said router (17a,17b) is used for connecting the first network (15) with a second network (16) and for providing the mobile device (4) with access to the networks (15,16).
13. A system (13) for printing according to claim 11 or 12, wherein the mobile device (4) sends the electronic-

document-information (1) and the print-related-information (2) are part of a release message (20) sent by a second mobile device (4).

- 5 14. A system (13) for printing according to any of claims 1 to 13, wherein the format of the print-ready-converted electronic document (7) is PostScript (PS), Printer Command Language (PCL), Page Description Language (PDL), Portable Document Format (PDF) or Page Description Markup Language (PDML).
- 10
15. A system (13) for printing according to any of claims 1 to 14, wherein the user (5) accesses the processing means
- 15 (3a, 3b, 3c, 3d, 3e, 3f, 9a, 9b, 9c, 9d, 11, 12a, 12b, 12c, 12d, 12e, 12f) by means of additional mobile devices (4) and/or by means of a user-interface (14) of the multifunctional device (6) as so to release the print-ready-converted electronic document (7) for the secure print queue on
- 20 the print server (3a, 3b, 3c, 3d, 3e, 3f).
16. A system (13) for printing according to any of claims 1 to 15, wherein at least on multifunctional device (6) is configured to process a hardcopy for scanning on the
- 25 multifunctional device (6) and the user (5) accesses the processing means
- (3a, 3b, 3c, 3d, 3e, 3f, 9a, 9b, 9c, 9d, 11, 12a, 12b, 12c, 12d, 12e, 12f) by means of the mobile device (4) and/or by means of a user-interface (14) of the multifunctional device (6)
- 30 so as to initiate the scanning of the hardcopy on the multifunctional device (6).

17. A method for printing an electronic document (10) on at least one multifunctional device (6), which is connected to a processing means (3a, 3b, 3c, 3d, 3e, 3f, 3g, 9a, 9b, 9c, 9d, 11, 12a, 12b, 12c, 12d, 12e, 12f, 12g), including a print server (3a, 3b, 3c, 3d, 3e, 3f), and the processing means (3a, 3b, 3c, 3d, 3e, 3f, 3g, 9a, 9b, 9c, 9d, 11, 12a, 12b, 12c, 12d, 12e, 12f, 12g) is configured to process the electronic document (10) for printing on the multifunctional device (6) and a mobile device (4), which is connectable with the processing means (3a, 3b, 3c, 3d, 3e, 3f, 3g, 9a, 9b, 9c, 9d, 11, 12a, 12b, 12c, 12d, 12e, 12f, 12g) and the mobile device (4) is configured to initiate the printing of the electronic document (10), comprising the steps of:
- initiating (23, 24, 25) a communication between the mobile device (4) and the processing means (3a, 3b, 3c, 3d, 3e, 3f, 3g, 9a, 9b, 9c, 9d, 11, 12a, 12b, 12c, 12d, 12e, 12f, 12g),
 - routing (26, 27, 28) from the mobile device (4) an electronic-document-information (1) related to the electronic document (10) to the processing means (3a, 3b, 3c, 3d, 3e, 3f, 3g, 9a, 9b, 9c, 9d, 11, 12a, 12b, 12c, 12d, 12e, 12f, 12g),
 - using the electronic-document-information (1) and a print-related-information (2) for converting (19, 32, 36) the electronic document (10) into a print-ready-converted electronic document (7), and
 - storing the print-ready-converted electronic document (7) within a secure print queue on the print server (3a, 3b, 3c, 3d, 3e, 3f), and

5 • releasing (20,35) the print-ready-converted
 electronic document (7) from the secure print queue
 on the print server (3a,3b,3c,3d,3e,3f) for printing
 on the multifunctional device (6) in case a user (5)
 accesses (20,35) to the print server
 (3a,3b,3c,3d,3e,3f) and releases (20,35) the print-
 ready-converted electronic document (7) for printing
 on the multifunctional device (6).

10 18. A method for printing and scanning according to claim
 17 , wherein at least one of multifunctional device (6)
 is configured to scan a hardcopy and the processing
 means
 (3a,3b,3c,3d,3e,3f,3g,9a,9b,9c,9d,11,12a,12b,12c,12d,12e
 15 ,12f,12g), including the print server
 (3a,3b,3c,3d,3e,3f), is configured to process the
 hardcopy for scanning on the multifunctional device (6)
 and in case the mobile device (4) and/or the user-
 interface (14) is connected to the processing means
 20 (3a,3b,3c,3d,3e,3f,3g,9a,9b,9c,9d,11,12a,12b,12c,12d,12e
 ,12f,12g) the user (5) may route from the mobile device
 (4) and/or the user-interface (14) a scan-related-
 information to the processing means
 (3a,3b,3c,3d,3e,3f,3g,9a,9b,9c,9d,11,12a,12b,12c,12d,12e
 25 ,12f,12g) and in case the user (5) has access the
 processing means
 (3a,3b,3c,3d,3e,3f,3g,9a,9b,9c,9d,11,12a,12b,12c,12d,12e
 ,12f,12g) by the mobile device (4) and/or the user-
 interface (14) the hardcopy is scanned on the
 30 multifunctional device (6).

19. A method for printing and scanning according to claim 17 or 18 executed by a system (13) according to any of claims 1 to 16.
- 5 20. A program that, when executed by a system (13) for printing according to any of claims 1 to 16, causes the system (13) for printing to perform a method for printing and scanning according to any of claims 17 to 19.
- 10 21. A computer-readable storage medium having computer-executable instructions to perform steps for providing a method for printing according to any of claims 17 to 19.

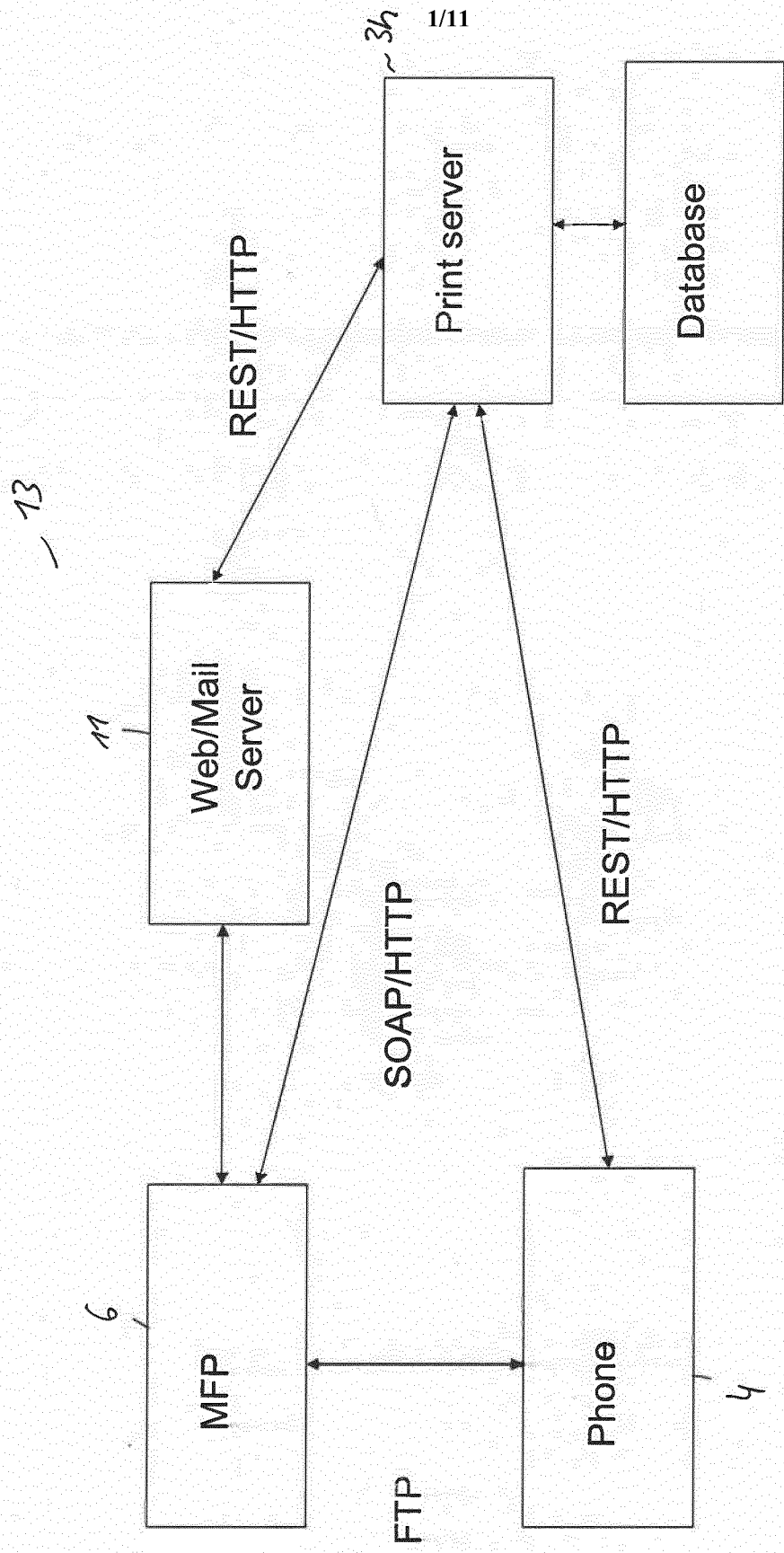


Fig. 1

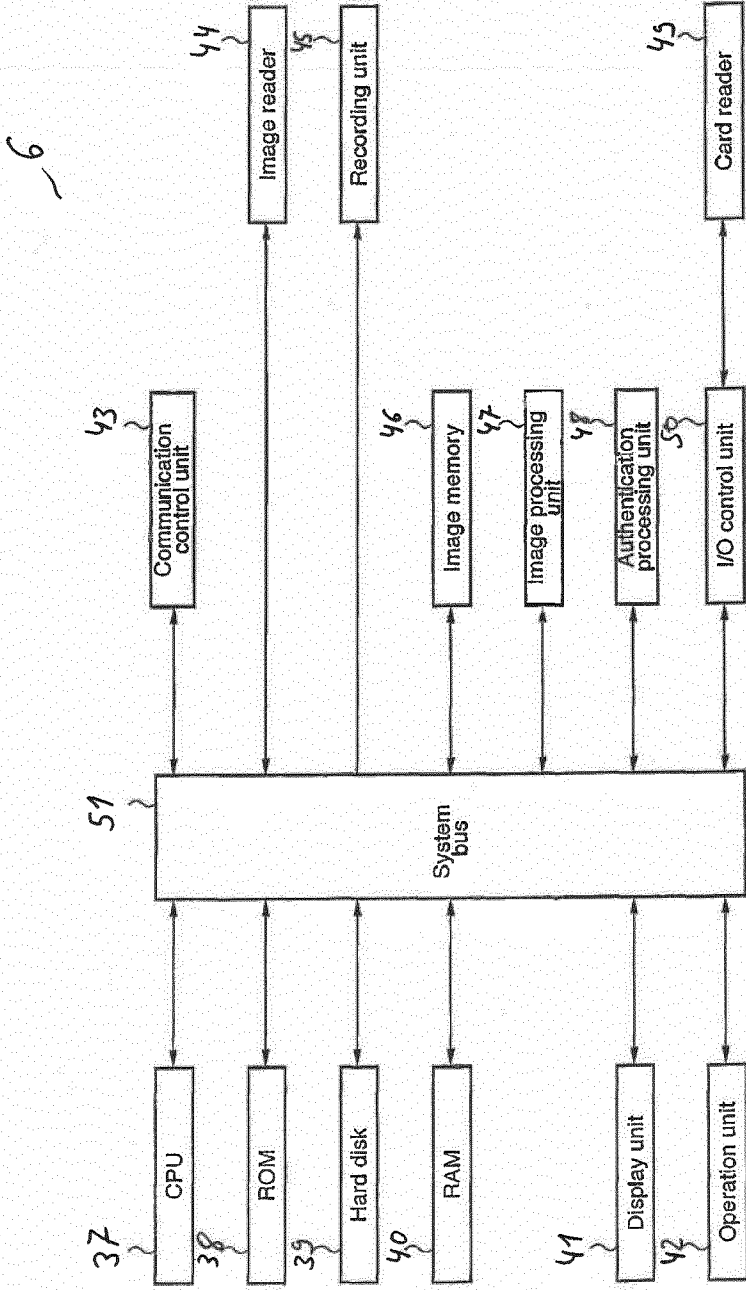


Fig. 2

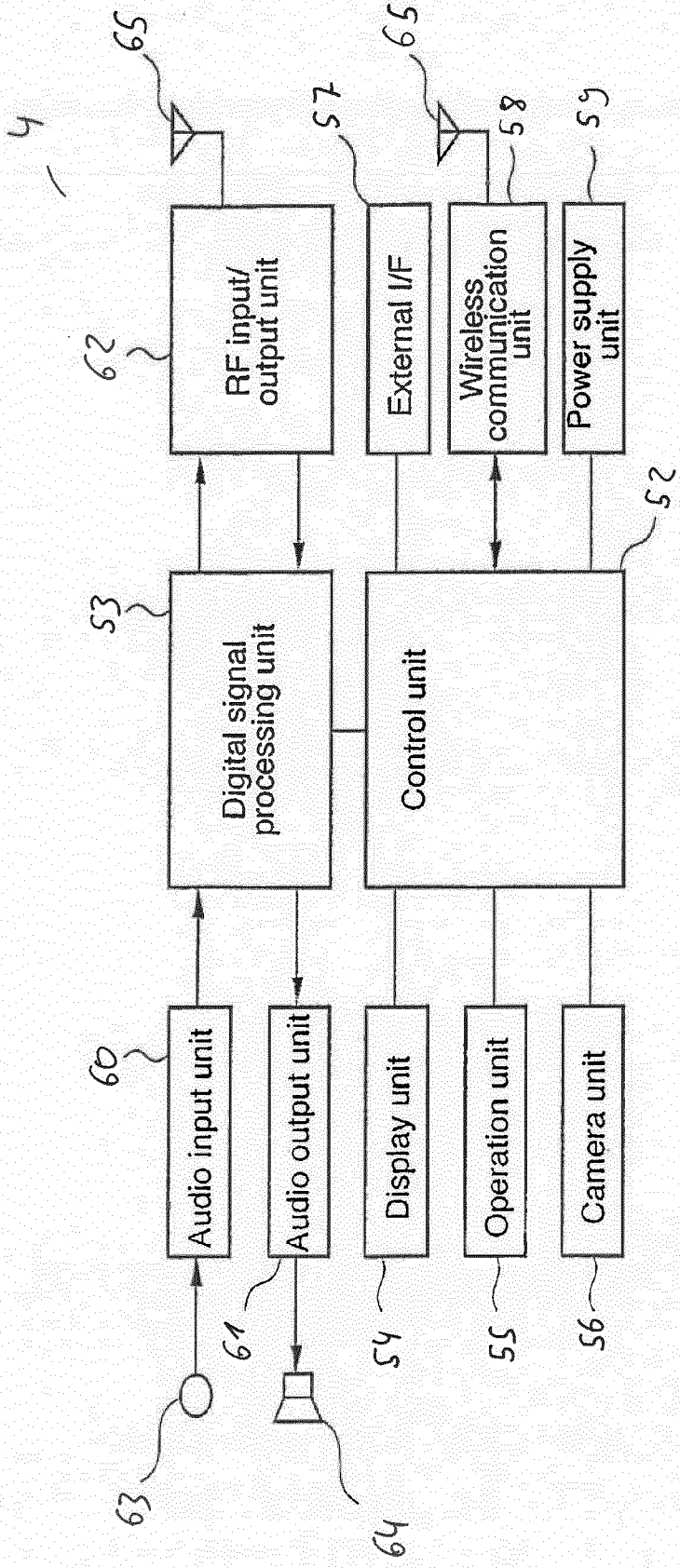


Fig. 3

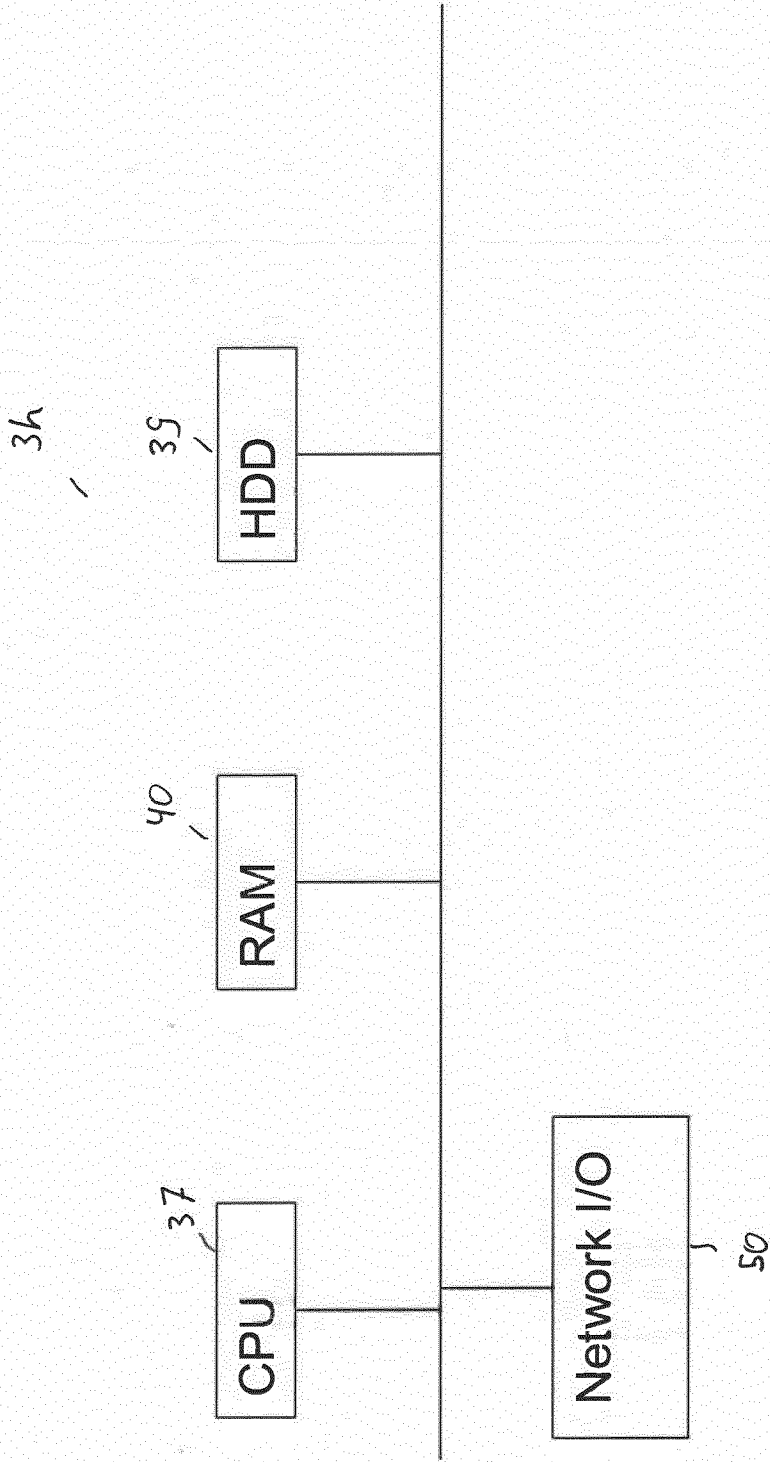


Fig. 4

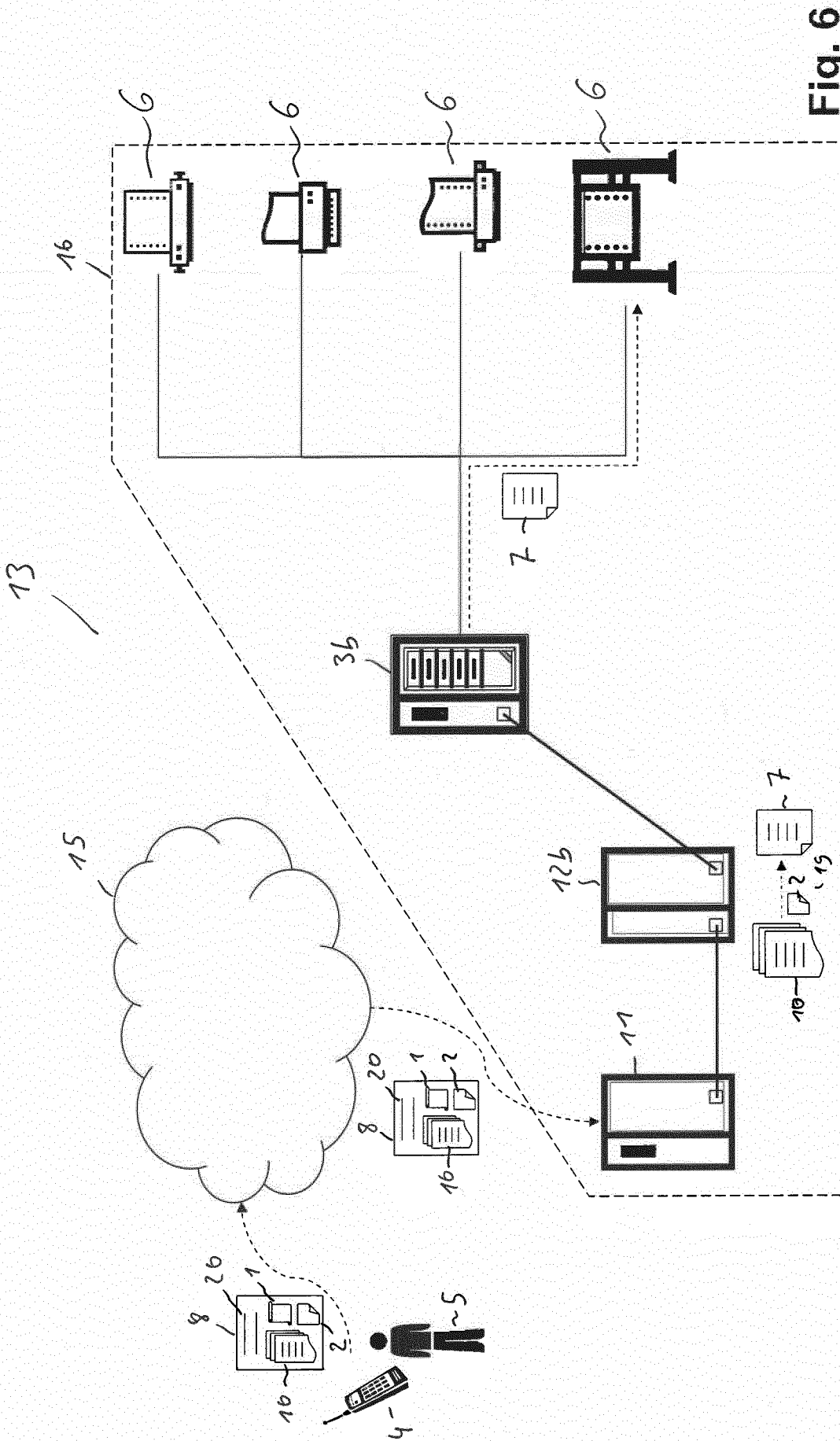


Fig. 6

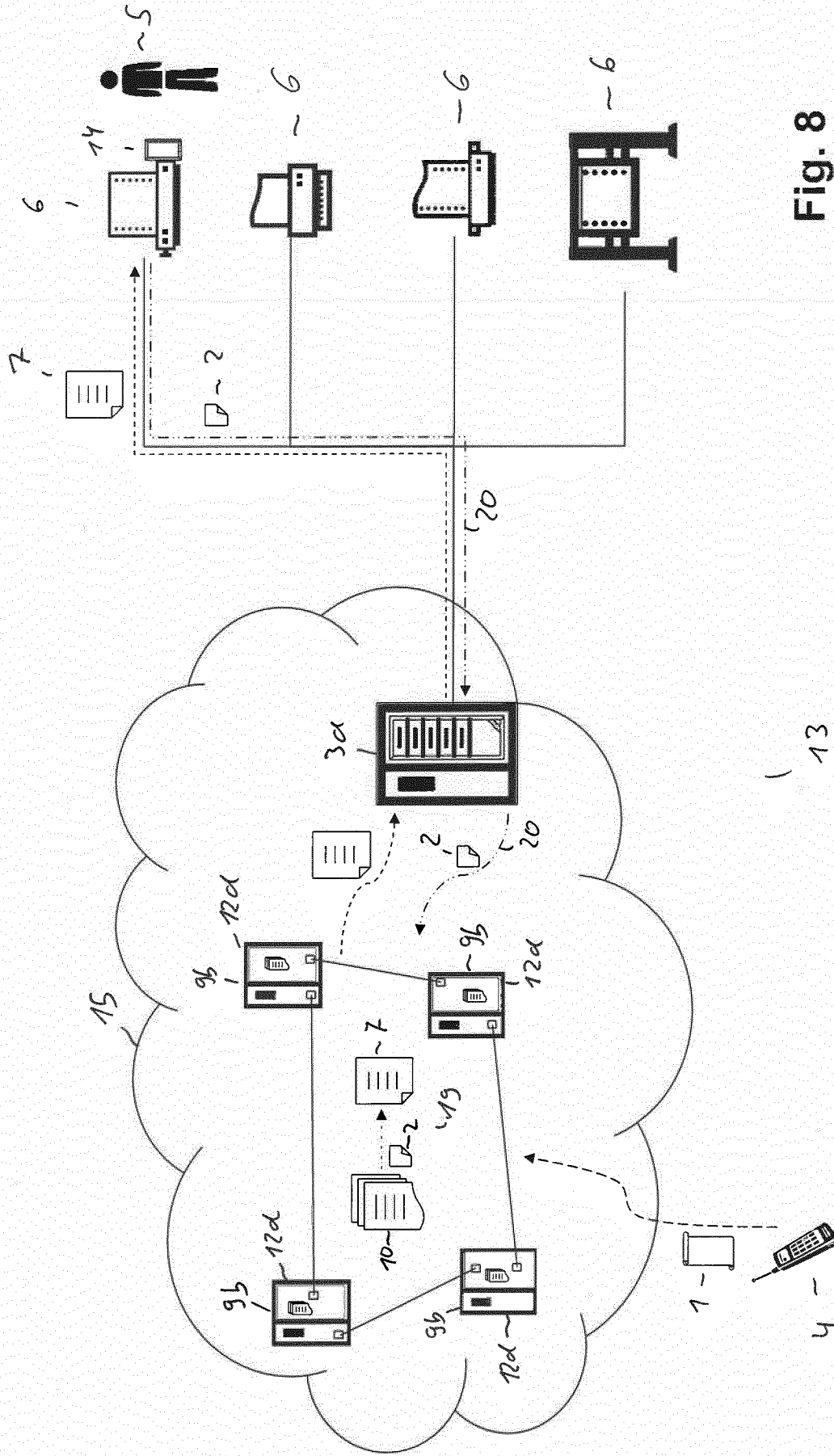


Fig. 8

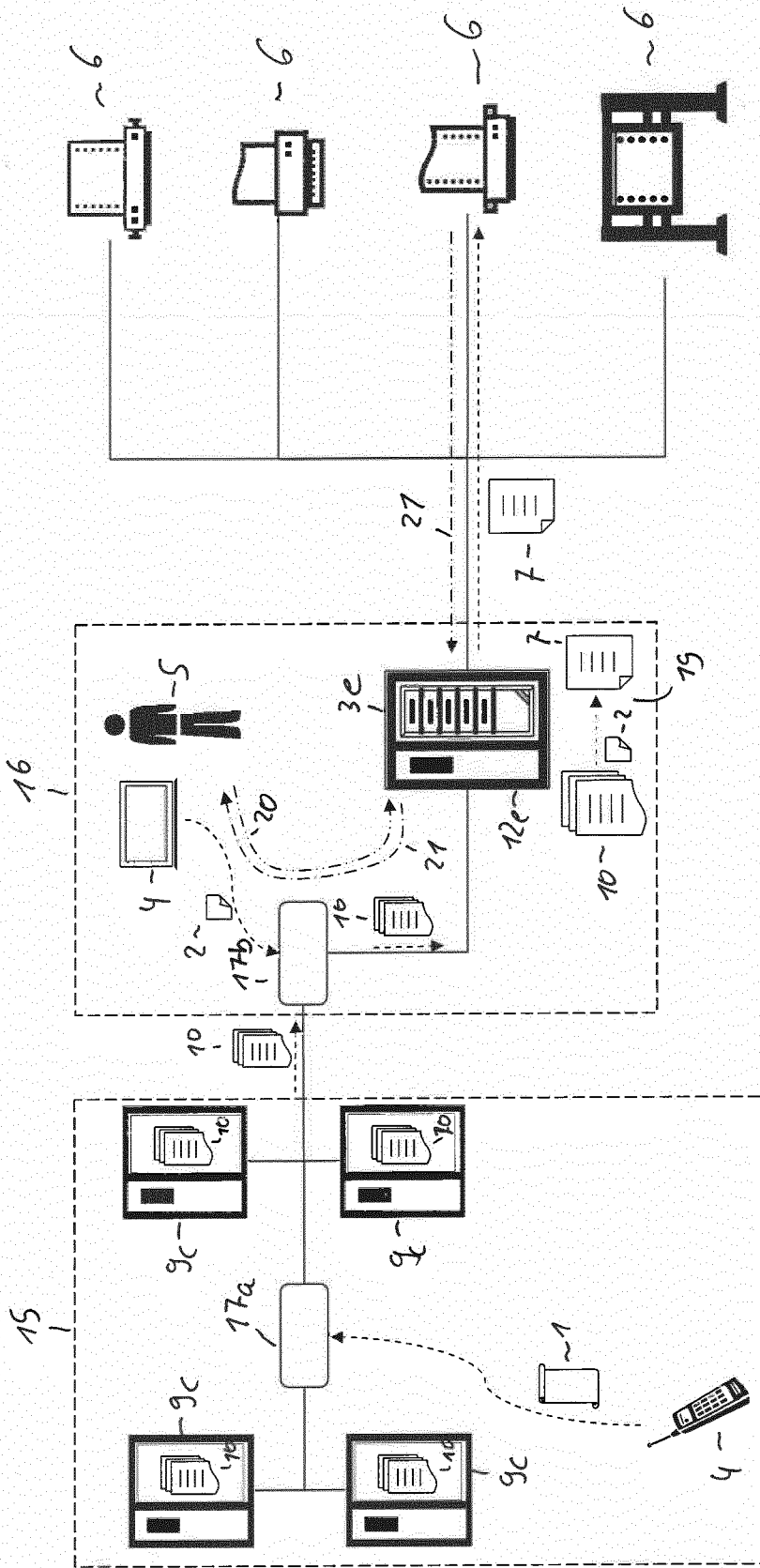


Fig. 9

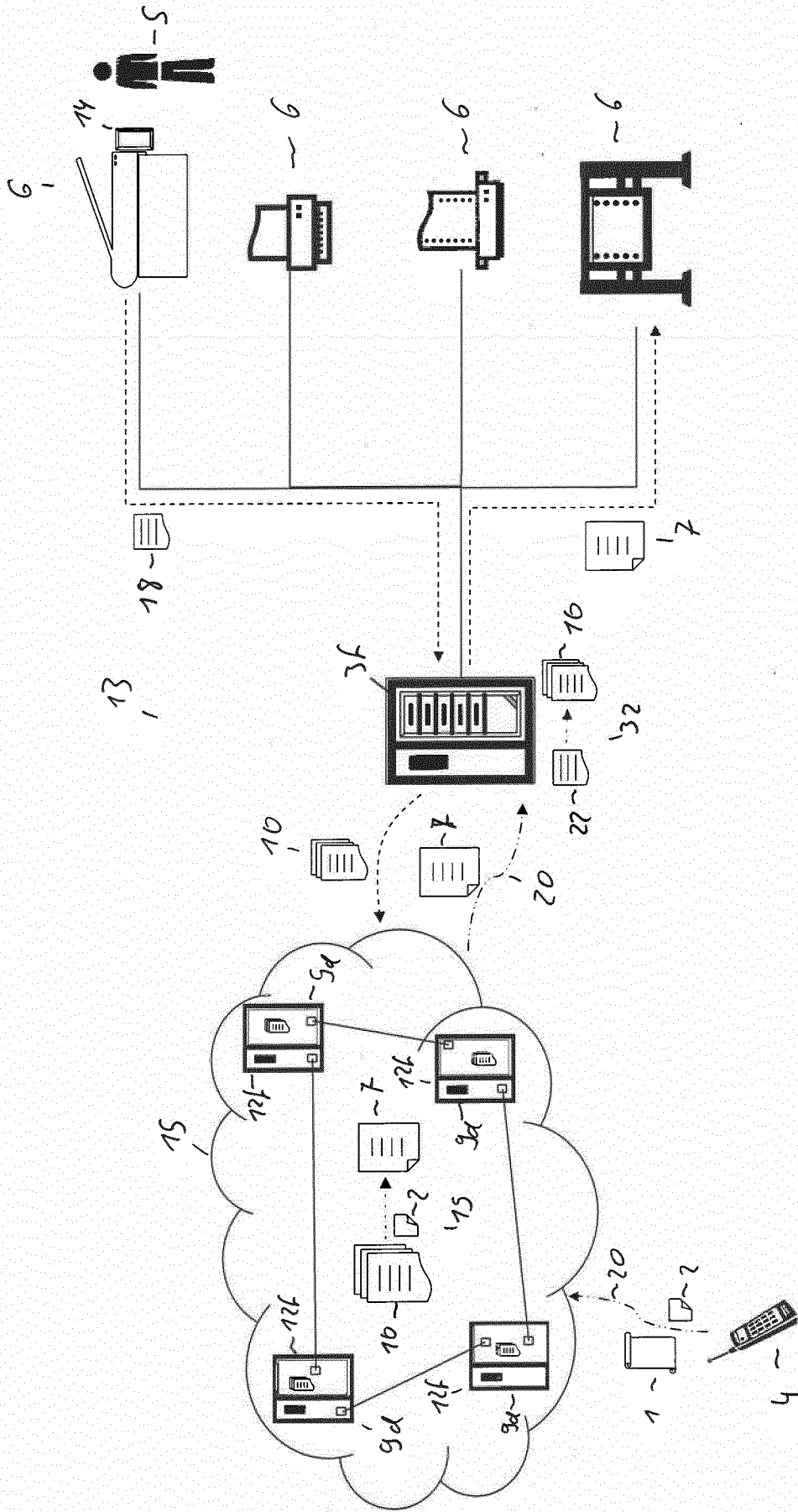


Fig. 10

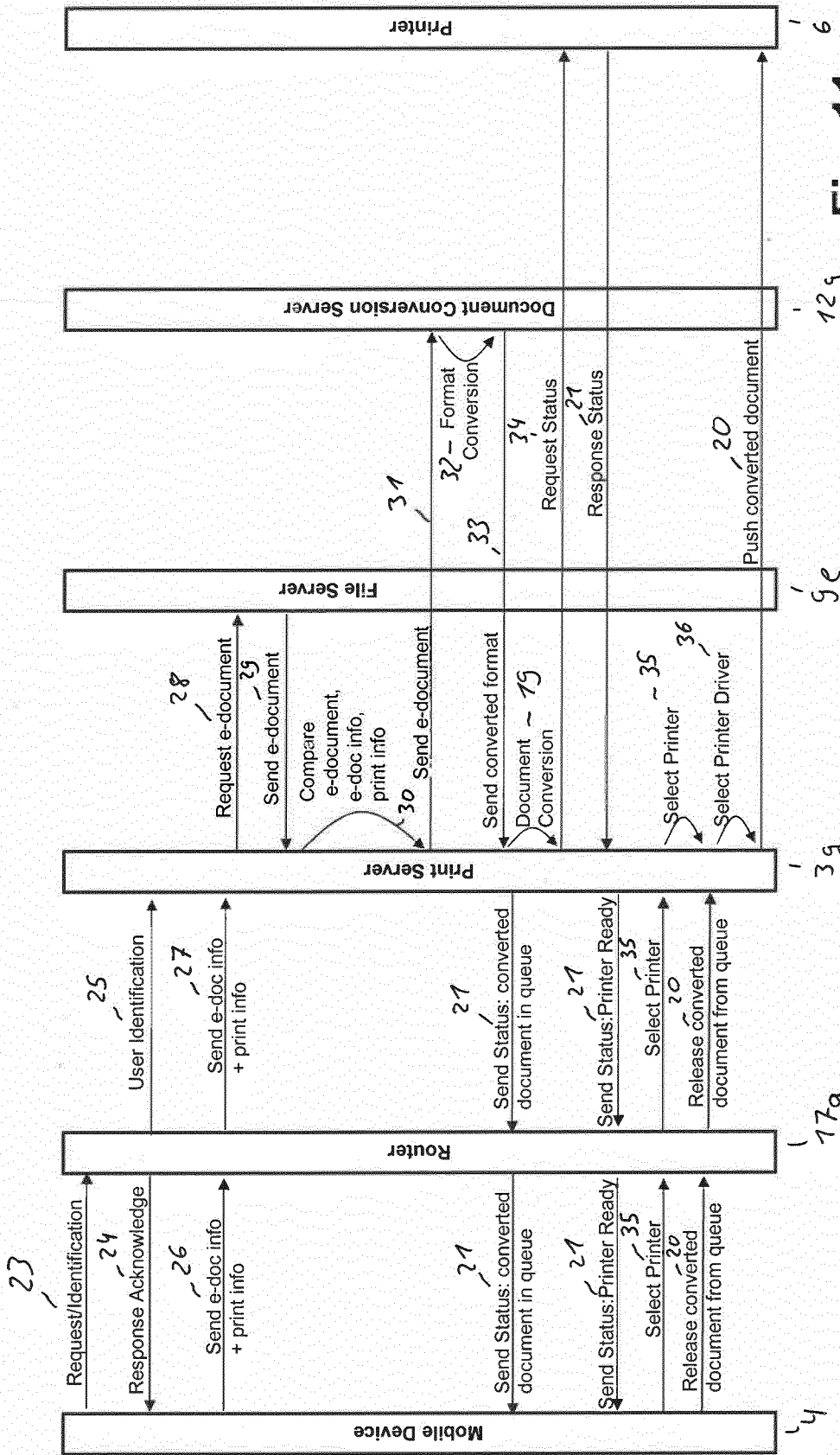


Fig. 11

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2011/067551

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06F3/12
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

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 practical, 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	US 2008/155152 A1 (KEENEY RICHARD A [US] ET AL) 26 June 2008 (2008-06-26) the whole document	1-21
X	EP 1 276 042 A2 (HEWLETT PACKARD CO [US]) 15 January 2003 (2003-01-15) paragraph [0001] - paragraph [0030] figures 1-2	1-3,7,8, 11,13, 14,17, 20,21
A	WO 2004/079561 A1 (ELECTRONICS FOR IMAGING INC [US]) 16 September 2004 (2004-09-16) page 6, line 4 - page 14, line 11 figures 1-10	1-4,7, 10-13, 15,17-21

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
- "E" earlier document but published on or after the international filing date
- "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)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "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 16 December 2011	Date of mailing of the international search report 27/12/2011
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Simigliani, V
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2011/067551

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2008155152	A1	26-06-2008	NONE
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			US 2004185882 A1 23-09-2004
			WO 2004079561 A1 16-09-2004