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PRINTING APPARATUS, METHOD OF CONTROLLING THE SAME, AND STORAGE MEDIUM

Abstract

A printing apparatus is operable to function as a local printer that receives a print job from a client terminal and performs printing and is operable to function as a cloud printer that receives a print job from a cloud server and performs printing. The printing apparatus sets whether a predetermined print function is enabled or disabled in a case that the printing apparatus functions as the local printer, adds an attribute for performing a presence notification of the printing apparatus to attribute information of the printing apparatus in a case that the predetermined print function is set to enabled, and notifies the attribute information of the printing apparatus to the cloud server.

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Background/Summary

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a printing apparatus, a method of controlling the same, and a storage medium.

Description of the Related Art

[0002] In a known print service, printing has been realized by a user directly transmitting a print job from a client terminal such as a PC to a printing apparatus that can use the print service. On the other hand, in recent years, a cloud print service using a cloud service provided on the Internet has been proposed.

[0003] When using the cloud print service, the user registers the printing apparatus in the cloud print service from the client terminal. At this time, the printing apparatus registers the printing apparatus together with printer attributes of the printing apparatus in the cloud print service. Then, when executing printing from the client terminal, the client terminal searches for a printing apparatus on the network, and obtains capability information of the printing apparatus from the found printing apparatus. Then, when it is determined based on the capability information that the printing apparatus is compatible with printing from the client terminal, the user of the client terminal transmits a print job to the relevant printing apparatus and causes the printing apparatus to perform printing.

[0004] Japanese Patent Laid-Open No. 2020-35233 describes that in a printing system including an information processing device operated by a user, a printing apparatus, and a server, in a case where a function usable in the printing apparatus is restricted, capability information of the printing apparatus is changed, and the changed capability information is notified to the information processing device.

[0005] In a case where the printing apparatus in the cloud print service described above is compatible with both local printing and cloud printing, a case where a client terminal compatible with the local printing performs printing using the printing apparatus by the cloud printing will be considered. It is known that when a client terminal compatible with the local printing attempts to perform printing using a printing apparatus by the cloud printing, although the printing apparatus is actually compatible with printing by the cloud printing, the client terminal cannot determine whether or not the printing apparatus is compatible with the cloud printing. Therefore, the found printing apparatus cannot be presented by the client terminal to the user as a printing apparatus of printing target.

[0006] In addition, in AirPrint (registered trademark), for example, IPP operation such as IdentifyPrinter is used as a function for allowing a user to know, when the printer to be used is selected by a mobile device of the user, where the selected printer is actually located. When the user operates the mobile device to select a printer and makes a request for an IdentifyPrinter or the like, the requested printer notifies the user of the position of the printer by an identification action operation such as making a sound or turning on a light. However, regarding such a function as well, since the function cannot be determined by the client terminal compatible with the local printing, such a function cannot be presented to the user.

SUMMARY OF THE INVENTION

[0007] Embodiments of the present disclosure eliminate the above-mentioned issues with conventional technology.

[0008] A feature of embodiments of the present disclosure is to provide a technique that can present, to a user, an attribute obtained by making a predetermined print function in local printing enabled in a printing apparatus compatible with both local printing and cloud printing.

[0009] According to embodiments of the present disclosure, there is provided a printing apparatus comprising: one or more controllers including one or more processors and one or more memories, the one or more controllers configured to: be operable to cause the printing apparatus to function as a local printer that receives a print job from a client terminal and performs printing; be operable to cause the printing apparatus to function as a cloud printer that receives a print job from a cloud server and performs printing; set whether a predetermined print function is enabled or disabled in a case that the printing apparatus functions as the local printer; add an attribute for performing a presence notification of the printing apparatus to attribute information of the printing apparatus in a case that the predetermined print function is set to enabled; and notify the attribute information of the printing apparatus to the cloud server.

[0010] According to embodiments of the present disclosure, there is provided a method of controlling a printing apparatus, the method comprising: being operable to cause the printing apparatus to function as a local printer that receives a print job from a client terminal and performs printing; being operable to cause the printing apparatus to function as a cloud printer that receives a print job from a cloud server and performs printing; setting whether a predetermined print function is enabled or disabled in a case that the printing apparatus functions as the local printer; adding an attribute for performing a presence notification of the printing apparatus to attribute information of the printing apparatus in a case that the predetermined print function is set to enabled; and notifying the attribute information of the printing apparatus to the cloud server.

[0011] Further features of the present disclosure will become apparent from the following description of exemplary embodiments with reference to the attached drawings.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate embodiments of the disclosure and, together with the description, serve to explain the principles of the disclosure.

[0013] FIG. 1 is a sequence diagram for describing a flow of processing in cloud printing using a printing system according to an exemplary embodiment.

[0014] FIG. 2 is a diagram for explaining a processing sequence in local printing in which a print job is directly transmitted from a client terminal to a printing apparatus to cause printing.

[0015] FIG. 3 is a configuration diagram of a printing system that realizes cloud printing according to the embodiment.

[0016] FIG. 4 is a block diagram for explaining a hardware configuration of a printing apparatus according to the embodiment.

[0017] FIG. 5 is a functional block diagram for explaining a software configuration of the printing apparatus according to the embodiment.

[0018] FIG. 6 depicts a view illustrating an outer appearance of an operation panel of the printing apparatus according to the embodiment.

[0019] FIG. 7 is a diagram for explaining an example of printer attributes of the printing apparatus according to the embodiment.

[0020] FIG. 8 is a flowchart for explaining processing when an AirPrint-compatible client terminal searches for an AirPrint-compatible printing apparatus via a cloud.

[0021] FIG. 9 is a diagram for explaining a list of printing apparatuses and attributes indicating AirPrint-compatibility in the embodiment.

[0022] FIG. 10 depicts a view illustrating an example of a screen displaying a search result when an AirPrint-compatible client terminal searches for AirPrint-compatible printing apparatuses via a cloud.

[0023] FIG. **11** depicts a view illustrating an example of a UI setting menu screen of the printing apparatus according to a first embodiment.

[0024] FIG. **12** is a diagram for describing a timing at which the printing apparatus according to the first embodiment transmits printer attributes to a cloud print service.

[0025] FIG. **13** is a flowchart for explaining processing when the printing apparatus according to the first embodiment transmits printer attributes to the cloud print service.

[0026] FIG. **14** is a flowchart for explaining processing when the printing apparatus according to the first embodiment transmits printer attributes to the cloud print service when the AirPrint setting is changed in the printing apparatus.

[0027] FIG. **15** is a flowchart for explaining processing when the printing apparatus according to the first embodiment transmits printer attributes to the client terminal.

[0028] FIG. **16** depicts a view illustrating an example of an identification action setting menu screen of a printing apparatus according to a second embodiment.

[0029] FIG. **17** is a flowchart for explaining processing when the printing apparatus according to the second embodiment transmits printer attributes to the cloud print service.

[0030] FIG. **18** is a flowchart for explaining processing when the printing apparatus according to the second embodiment transmits printer attributes to the cloud print service when the AirPrint setting of the printing apparatus is changed.

[0031] FIG. **19** is a flowchart for explaining processing when the printing apparatus according to the second embodiment transmits printer attributes to the client terminal.

[0032] FIG. **20** depicts a view illustrating another example of the identification action setting menu screen of the printing apparatus according to the second embodiment.

DESCRIPTION OF THE EMBODIMENTS

[0033] Embodiments of the present disclosure will be described hereinafter in detail, with reference to the accompanying drawings. It is to be understood that the following embodiments are not intended to limit the claims of the present disclosure, and that not all of the combinations of the aspects that are described according to the following embodiments are necessarily required with respect to the means to solve the issues according to the present disclosure. Further, in the accompanying drawings, the same or similar configurations are assigned the same reference numerals, and redundant descriptions are omitted.

[0034] FIG. **3** is a configuration diagram of a printing system that realizes cloud printing according to an embodiment.

[0035] A printing apparatus **101** is connected to the Internet **302** via a LAN **301** and a firewall **303**. A client terminal **100** is connected to the Internet **302** via the LAN **301** and a firewall **304**.

[0036] A cloud print service **102** exists on the Internet **302**, and can communicate with the printing apparatus **101** via the LAN **301** and the firewall **303**. Furthermore, the cloud print service **102** can also communicate with the client terminal **100** via the LAN **301** and the firewall **304**.

[0037] In addition, the printing apparatus **101** is connected to the client terminal **100** via the LAN **301**, so that the printing apparatus **101** and the client terminal **100** can directly communicate with each other via the LAN **301**. As described above, the printing apparatus **101** is compatible with both cloud printing and local printing. Note that in FIG. **3**, the firewalls **303** and **304** may not be included in the network.

[0038] FIG. **1** is a sequence diagram for describing a flow of processing in cloud printing using a printing system according to the embodiment.

[0039] It is assumed that the printing apparatus **101** supports a cloud print function and a Web UI function for operating the printing apparatus **101**. Furthermore, it is assumed that the client terminal **100** supports a cloud print client function and a Web UI client for operating the Web UI.

[0040] First, using the Web UI client of the client terminal **100**, the user transmits a registration request **111** for registering the printing apparatus **101** in the cloud print service **102** to the printing apparatus **101** via the Web UI. Upon receiving the registration request **111**, the printing apparatus

101 transmits a registration request **112** for registering the printing apparatus **101** in the cloud print service to the cloud print service **102**. Upon receiving the registration request **112**, the cloud print service **102** transmits a registration request response **113** including a registration URL **130** for cloud print registration to the printing apparatus **101**. When receiving the registration request response **113**, the printing apparatus **101** transmits registration URL screen information **114** including the registration URL **130** to the client terminal **100** via the Web UI.

[0041] When receiving the screen information **114**, the client terminal **100** displays a registration URL **130** on the Web UI client. Next, the user operates the Web UI client of the client terminal **100** to access the displayed registration URL **130**. As a result, the client terminal **100** transmits a registration approval request **115** including a cloud account **131** to the cloud print service **102**. Upon receiving the registration approval request **115**, the cloud print service **102** transmits a registration approval response **116** to the client terminal **100**. Here, the cloud account **131** indicates a user having authority to use the cloud print service **102**, and it is assumed that the user of the client terminal **100** has registered the user account in the cloud print service **102** in advance. Thus, the printing apparatus **101** is ready to be registered in the cloud print service **102**.

[0042] Next, the printing apparatus **101** transmits a registration confirmation request **117** to the cloud print service **102**. Upon receiving the registration confirmation request **117**, the cloud print service **102** transmits a registration confirmation response **118** including a cloud printer ID **132** to the printing apparatus **101**. At this stage, the printing apparatus **101** is registered in the cloud print service **102** for the first time, and the cloud print service **102** is in an available state.

[0043] When the registration to the cloud print service **102** is completed in this way, the printing apparatus **101** then transmits a printer information update request **140** to the cloud print service **102**. The printer information update request **140** includes printer attributes **135** (attribute information) of the printing apparatus **101**. Upon receiving the printer information update request **140**, the cloud print service **102** transmits a printer information update response **141** to the printing apparatus **101**. The capability information of the printing apparatus **101** is registered in the cloud print service **102** in this manner.

[0044] Next, the printing apparatus **101** transmits an event request **123** to the cloud print service **102**. The event request **123** designates a job reception event as a type of event to be requested. Upon receiving the print job using the printing apparatus **101**, the cloud print service **102** that has received the event request **123** notifies the printing apparatus **101** of the occurrence of the event.

[0045] Next, the client terminal **100** transmits a cloud printer information request **142** to the cloud print service **102**. The cloud printer information request **142** includes the cloud account **131** of the user. Upon receiving the cloud printer information request **142**, the cloud print service **102** obtains printer information that the cloud account **131** included therein can use. Then, a cloud printer information response (cloud printer information request) **143** including the cloud printer ID **132** indicating the printer information and the printer attributes **135** are transmitted to the client terminal **100**. Here, the printer attributes **135** are transmitted to the cloud print service **102** by the printing apparatus **101** by the printer information update request **140**.

[0046] Next, in order to start printing, the client terminal **100** transmits a print request **119** including the cloud printer ID **132**, print data **134**, and the cloud account **131** to the cloud print service **102**. Upon receiving the print request **119**, the cloud print service **102** transmits an event response **124** to the printing apparatus **101**. The event response **124** is transmitted as a response to the event request **123**, and a job reception event is designated as a type of event.

[0047] Upon receiving the event response **124**, the printing apparatus **101** transmits a print job request **120** to the cloud print service **102**. In response to the print job request **120**, the cloud print service **102** transmits a print job response **121** including the print data **134** and the cloud account **131** to the printing apparatus **101**. In this way, the printing apparatus **101** executes printing based on the print data **134** included in the received print job response **121**.

[0048] The procedure of the processing in which the client terminal **100** registers the printing

apparatus **101** in the cloud print service **102** and the client terminal **100** causes the printing apparatus **101** to execute printing using the cloud print service **102** has been described above. [0049] FIG. **2** is a diagram for explaining a processing sequence in local printing in which a print job is directly transmitted from the client terminal **100** to the printing apparatus **101** to cause the printing apparatus to perform printing in a case where the client terminal **100** and the printing apparatus **101** are connected to the LAN **301**.

[0050] The client terminal **100** transmits a printer search request **201** to search for printers on the network (LAN **301**). Upon receiving the printer search request **201**, the printing apparatus **101** transmits a printer search response **202** to the client terminal **100**. The client terminal **100** finds the printing apparatus **101** by receiving the printer search response **202**.

[0051] Next, the client terminal **100** transmits a printer information request **203** to the found printing apparatus **101**. When receiving the printer information request **203**, the printing apparatus **101** transmits a printer information response **204** to the client terminal **100**. The printer information response **204** includes printer attributes **212**. As a result, the client terminal **100** can obtain the capability information of the printing apparatus **101**. The capability information also includes information indicating whether or not the printing apparatus is compatible with printing from the **101** client terminal **100**.

[0052] Then, when determining, from the received information, that the printing apparatus **101** is compatible with printing from the client terminal **100**, the client terminal **100** performs control such as displaying the printing apparatus **101** in the printer selection list. In this way, the user of the client terminal **100** can perform an operation of transmitting a print job to the printing apparatus **101**.

[0053] Then, when the user performs an operation of transmitting a print job to the printing apparatus **101**, the client terminal **100** transmits a print request **205** to the printing apparatus **101**. The print request **205** also includes print data **134**. When receiving the print request **205**, the printing apparatus **101** transmits a print response **206** to the client terminal **100**. Then, the printing apparatus **101** prints the print data received in the print request **205**.

[0054] As described above, the printing apparatus **101** can directly receive the print data from the client terminal **100** and print the print data by the local printing.

[0055] FIG. **4** is a block diagram for explaining a hardware configuration of the printing apparatus **101** according to the embodiment of the present invention. A control unit **401** including a CPU **402** controls the operation of the entire printing apparatus **101**. The CPU **402** deploys a control program stored in a ROM **404** in a RAM **403**, and performs various controls such as printing and communication control. The RAM **403** is used as a temporary storage area such as a main memory and a work area of the CPU **402**. A hard disk drive (HDD) **414** stores data, various programs, various information tables, and the like. A printer I/F **406** serves as an interface for outputting an image signal to be printed in a printer unit (printer engine) **407**. Furthermore, a scanner I/F **408** serves as an interface for inputting an image signal from a scanner (scanner engine) **409**. The CPU **402** processes an image signal input from the scanner I/F **408**, and outputs it to the printer I/F **406** as an image signal to be printed. An operation panel I/F **410** connects an operation panel **411** and the control unit **401**. The operation panel **411** includes a display unit having a touch panel function, a keyboard, and the like. A network I/F **412** transmits information to an external device such as the client terminal **100** or the cloud print service **102**, or receives various types of information from the external device. Each unit in the control unit **401** described above is connected via a system bus **405**.

[0056] FIG. **5** is a functional block diagram for explaining a software configuration of the printing apparatus **101** according to the embodiment. Each functional module illustrated in FIG. **5** is realized by the CPU **402** of the printing apparatus **101** deploying the control program stored in the ROM **404** described above in the RAM **403** and executing the control program.

[0057] An operation control module **500** controls the operation panel **411**. The operation control

module **500** displays an operation menu on the operation panel **411** to wait for an instruction input from the user, notifies another functional module of received instruction content, and displays the result thereof on the operation panel **411**. A cloud print service registration control module **501** analyzes the registration request **111** to the cloud print service **102** received from the client terminal **100**, and transmits the registration request **112** to the cloud print service **102**. In this way, registration processing of registering the printing apparatus **101** in the cloud print service **102** is controlled.

[0058] A cloud print control module **502** transfers the print data **134** received from the cloud print service **102** to an image processing module **507**. The image processing module **507** performs processing of rendering a print job into image data for printing. A print processing module **508** controls the printer unit **407** based on the image data rendered by the image processing module **507** to perform print processing.

[0059] A cloud print job information management module **503** manages job information of the printing apparatus **101** and notifies the cloud print service **102**. A cloud print event control module **504** controls processing of transmitting and receiving an event between the printing apparatus **101** and the cloud print service **102**. A cloud print device information management module **505** manages device information of the printing apparatus **101** and notifies the cloud print service **102**.

[0060] A storing module **506** stores designated data in the RAM **403**, the HDD **405**, or the like according to an instruction from another functional module, and reads data stored in the ROM **404**, the RAM **403**, the HDD **405**, or the like. Examples of the data managed by the storing module **506** include ID information for specifying a device and two-dimensional barcode image information.

[0061] Upon receiving the printer search request **201** from the client terminal **100**, a local print search control module **509** controls processing of transmitting the printer search response **202**. A local print control module **510** transfers the print data **134** transmitted from the client terminal **100** in the print request **205** to the image processing module **507**. A local print job information management module **511** manages job information received by the printing apparatus **101** in local printing, and notifies the client terminal **100**. A local print device information management module **512** manages device information of the printing apparatus **101** and notifies the client terminal **100**. In order to notify the presence of the printing apparatus **101**, an identification processing module **513** performs processing such as, for example, making a sound or turning on a light.

[0062] FIG. **6** depicts a view illustrating an outer appearance of the operation panel **411** of the printing apparatus **101** according to the embodiment.

[0063] A display panel **605** is, for example, a display panel using a liquid crystal display unit or the like. A copy button **601** is a button pressed when performing copying using the printing apparatus **101**, and a copy screen is displayed on the display panel **605** when this button **601** is pressed. A FAX button **602** is a button pressed when performing facsimile communication using the printing apparatus **101**, and a FAX screen is displayed on the display panel **605** when this button **602** is pressed. A scan button **603** is a button pressed when performing scanning using the printing apparatus **101**, and a scan operation screen is displayed on the display panel **605** when this button **603** is pressed. A two-dimensional barcode image or the like is also displayed on the display panel **605**.

[0064] A numeric keypad **608** is used to input numbers and the like. An OK key **607** is used to decide the display content of the display panel **605**, or the like. Up, down, left, and right direction keys **606** are used to select a menu or the like displayed on the display panel **605**. A monochrome copy button **609** and a color copy button **610** are used when executing monochrome copy and color copy, respectively. A stop key **611** is used when stopping the processing. A menu key **612** is used to display a menu screen for setting the printing apparatus **101**. A button **613** is pressed to check the status of the printing apparatus **101**, such as a list of print jobs being received by the printing apparatus **101**.

[0065] FIG. **7** is a diagram for explaining an example of printer attributes of the printing apparatus

101 according to the embodiment.

[0066] The attribute of color-supported is an attribute indicating whether or not the printing apparatus **101** can perform color printing. When this attribute value is “true”, it indicates that color printing is possible, and when this attribute value is “false”, it indicates that color printing is impossible. In the example, “true” is set to indicate that color printing is possible.

[0067] The attribute of media-supported is an attribute indicating paper size information supported by the printing apparatus **101**. The example indicates that A4 paper represented by “iso_a4_210×297 mm” and A3 paper represented by “iso_a3_297×420 mm” are supported.

[0068] The attribute of document-format-supported is an attribute indicating document format information supported by the printing apparatus **101**. The example indicates that a PDF document format represented by “application/pdf” and a JPEG document format represented by “image/jpeg” are supported.

[0069] The attribute of copies-supported is an attribute indicating the number of copies supported by the printing apparatus **101**. The example indicates that the number of copies from the number of copies 1 to the number of copies 99 represented by 1 to 99 is supported.

[0070] The attribute of ipp-features-supported indicates whether or not the printing apparatus **101** supports AirPrint, which is a predetermined print function that is one of the functions in local printing. The example indicates that AirPrint represented by “airprint” is supported.

[0071] The attribute of operations-supported is an attribute indicating the operation of the IPP supported by the printing apparatus **101**. In FIG. 7, since AirPrint is supported, Identify-Printer operation is included as the attribute value.

[0072] The attribute of Identify-actions-supported indicates an identification action operation when the printing apparatus **101** makes a request for the IdentifyPrinter. “Sound” indicates a ringing sound, and “flash” indicates turning on a light (lighted display).

[0073] FIG. 8 is a flowchart for explaining processing when an AirPrint-compatible client terminal **100** searches for AirPrint-compatible printing apparatuses via a cloud. In FIG. 1, this corresponds to processing in which the client terminal **100** sends the cloud printer information request **142** to the cloud print service **102** and receives the cloud printer information response **143** from the cloud print service **102**.

[0074] In step S801, the client terminal **100** transmits the cloud printer information request **142** to the cloud print service **102**. In a case where the client terminal **100** receives the cloud printer information response **143** and determines that the cloud printer information has been obtained in step S802, the processing proceeds step S803, and in a case where it determines that the cloud printer information has not been obtained, the processing ends.

[0075] In step S803 to step S808, the client terminal **100** repeats the processing in step S804 to step S807 for the number of found cloud printers. First, in step S804, the client terminal **100** obtains the printer attributes **135** of the cloud printer included in the cloud printer information response **143** received from the cloud print service **102**. Next, the processing proceeds to step S805, and the client terminal **100** confirms whether the obtained printer attributes **135** include the attribute of ipp-features-supported and the attribute value includes “airprint”. Then, in step S806, the processing proceeds to step S807 in a case that the attribute value includes “airprint” based on the confirmation result in step S805. On the other hand, in a case that there is no ipp-features-supported attribute or airprint is not included, the processing proceeds to step S808. In step S807, the client terminal **100** adds the found printing apparatus as a cloud printer to the AirPrint-compatible printing apparatus list. Then, the processing proceeds to step S808, and the processing from step S803 is repeated for the found cloud printers.

[0076] When the processing for the number of found cloud printers is ended, the processing proceeds to step S809, and the client terminal **100** displays the printing apparatuses included in the AirPrint-compatible printing apparatus list on the operation unit (not illustrated) of the client terminal **100** and presents the printing apparatuses to the user.

[0077] FIG. **9** is a diagram for explaining a list of printing apparatuses and attributes indicating AirPrint-compatibility in the embodiment.

[0078] In the embodiment, it is assumed that two printing apparatuses, whose printing apparatus names are printer A and printer B, are found. Here, it is assumed that printer A does not respond to ipp-features-supported, and printer B responds by setting the attribute “airprint” to the attribute ipp-features-supported.

[0079] FIG. **10** depicts a view illustrating an example of a screen displaying a search result when an AirPrint-compatible client terminal **100** searches for an AirPrint-compatible printing apparatus via a cloud.

[0080] A screen **1001** is a screen showing a result of the search for AirPrint-compatible printing apparatuses in the AirPrint-compatible client terminal **100**. An area **1002** displays printing apparatuses found by the search. The example shows that printer B has been found as an AirPrint-compatible printing apparatus. As explained in FIG. **9**, printer B responds by setting the attribute “airprint” to the printer attribute ipp-features-supported. Therefore, this printer B has been found as an AirPrint-compatible printing apparatus in the AirPrint-compatible client terminal **100**.

[0081] The user can select the printing apparatus displayed in the area **1002**. The detailed information of the printing apparatus selected here is displayed in an area **1003**. In the example, since printer B is selected in the area **1002**, the detailed information of printer B is displayed in the area **1003**. Specifically, an image icon of printer B and an “option and supply” button **1004** for transitioning to a screen for confirming option and supply information of printer B are displayed.

[0082] Examples of the present disclosure based on the above premise will be described with reference to a first embodiment and a second embodiment. First, the first embodiment will be described.

First Exemplary Embodiment

[0083] FIG. **11** depicts a view illustrating an example of a UI setting menu screen of the printing apparatus **101** according to the first embodiment.

[0084] A network setting menu shown on a menu screen **1101** is displayed on the operation panel **411** of the printing apparatus **101**. AirPrint setting **1102** can set AirPrint, which is a type of local printing to be enabled or disabled. When this setting **1102** is turned ON, the printing apparatus **101** operates as an AirPrint-compatible printing apparatus. UniversalPrint setting **1103** can set UniversalPrint, which is a type of cloud printing to be enabled or disabled. When this setting **1103** is turned ON, the printing apparatus **101** operates as a UniversalPrint-compatible printing apparatus. In FIG. **11**, AirPrint is set to be enabled and Universal Print is set to be enabled. Therefore, in this case, the printing apparatus **101** is a printing apparatus that is compatible with both local printing and cloud printing. Note that the contents set in the UI setting menu screen **1101** are stored in the HDD **414** and referred to in the processing to be described later.

[0085] FIG. **12** is a diagram for describing a timing at which the printing apparatus **101** according to the first embodiment transmits printer attributes to the cloud print service **102**.

[0086] There are the following six timings as the timing at which the printing apparatus **101** transmits the printer attributes to the cloud print service **102**.

[0087] A first timing **1201** is when registration of the printing apparatus **101** in the Universal Print is completed. This is the timing of the printer information update request **140** in the processing sequence of cloud printing described in FIG. **1**. The processing of the printing apparatus **101** at this time will be described later with reference to the flowchart of FIG. **13**.

[0088] A second timing **1202** is when the printing apparatus **101** is activated in a state where the printing apparatus **101** is registered in the Universal Print. The processing of the printing apparatus **101** at this time will be described later with reference to the flowchart of FIG. **13**.

[0089] A third timing **1203** is when the Universal Print setting is changed from OFF to ON. The processing of the printing apparatus **101** at this time will be described later with reference to the flowchart of FIG. **13**.

[0090] A fourth timing **1204** is when the AirPrint setting is changed in a state where the printing apparatus **101** is registered in the Universal Print. The processing of the printing apparatus **101** at this time will be described later with reference to the flowchart of FIG. **14**.

[0091] A fifth timing **1205** is when the configuration information of the printing apparatus **101** is changed. For example, the paper size set in the printing apparatus **101** is changed from A3 to A4.

[0092] A sixth timing **1206** is when the state information of the printing apparatus **101** is changed. For example, a no-paper error occurs in the printing apparatus **101**.

[0093] FIG. **13** is a flowchart for explaining processing when the printing apparatus **101** according to the first embodiment transmits the printer attributes **135** to the cloud print service **102**. This is processing when the printing apparatus **101** transmits the printer information update request **140** to the cloud print service **102** in the processing sequence of cloud printing in FIG. **1**. Note that the processing described in the flowchart of FIG. **13** is realized by the CPU **402** of the printing apparatus **101** executing a program deployed in the RAM **403** and functioning as the functional module illustrated in FIG. **5**.

[0094] First, in step **S1301**, the CPU **402** obtains printing apparatus information by functioning as the cloud print device information management module **505**. This printing apparatus information is obtained from the printer unit **407** via the printer I/F **406**. Next, the processing proceeds to step **S1302**, where the CPU **402** functions as the cloud print device information management module **505**, and generates the printer attributes **135** from the printing apparatus information obtained in step **S1301**. The printer attributes **135** are encoded in a data format defined by the Internet Printing Protocol (IPP) or the like for transmission to the cloud print service **102**. Next, the processing proceeds to step **S1303**, where the CPU **402** functions as the storing module **506** and obtains the AirPrint setting **1102** stored in the HDD **414**. Then, the processing proceeds to step **S1304**, where the CPU **402** functions as the cloud print device information management module **505**, and determines whether or not AirPrint is enabled in the AirPrint setting **1102** obtained in step **S1303**. Here, the processing proceeds to step **S1305** in a case that it is determined that AirPrint is enabled, and the processing proceeds to step **S1306** in a case that it is determined that AirPrint is disabled.

[0095] In step **S1305**, the CPU **402** functions as the cloud print device information management module **505**, and sets the attribute value “airprint” to the attribute of ipp-features-supported in the printer attributes **135**. Furthermore, the attribute value “Identify-Printer” is set to the attribute operations-supported. Furthermore, the attribute value “sound, flash” is set to the attribute of Identify-actions-supported. Then, the processing proceeds to step **S1306**, where the CPU **402** functions as the cloud print device information management module **505** and transmits the generated printer attributes **135** to the cloud print service **102**.

[0096] According to this processing, when the AirPrint setting **1102** is set to ON in the network setting screen of FIG. **11**, the printing apparatus **101** can set printer attributes corresponding thereto and notify the cloud print service **102** of the printer attributes.

[0097] FIG. **14** is a flowchart for explaining processing when the printing apparatus **101** transmits the printer attributes to the cloud print service **102** when the AirPrint setting is changed in the printing apparatus **101** according to the first embodiment. Note that the processing described in the flowchart of FIG. **14** is realized by the CPU **402** of the printing apparatus **101** executing a program deployed in the RAM **403** and functioning as the functional module illustrated in FIG. **5**.

[0098] In step **S1401**, the CPU **402** functions as the storing module **506**, and obtains the AirPrint setting **1102** stored in the HDD **414**. Next, the processing proceeds to step **S1402**, where the CPU **402** functions as the cloud print device information management module **505**, and determines whether AirPrint is enabled in the AirPrint setting **1102** obtained in step **S1401**. Here, in a case that it is determined that AirPrint is enabled, that is, changed from disabled to enabled, the processing proceeds to step **S1403**, and in a case that it is determined that AirPrint is disabled, that is, changed from enabled to disabled, the processing proceeds to step **S1404**.

[0099] In step **S1403**, the CPU **402** functions as the cloud print device information management

module **505**, and sets the attribute of **ipp-features-supported** and the attribute value “airprint” in the printer attributes **135**. Furthermore, the attribute value “Identify-Printer” is set to the attribute **operations-supported**. Furthermore, the attribute value “sound, flash” is added to the attribute **Identify-actions-supported**, and the processing proceeds to step **S1405**.

[0100] On the other hand, in step **S1404**, the CPU **402** functions as the cloud print device information management module **505**, and deletes the attribute value “airprint” from the attribute **ipp-features-supported** of the printer attributes **135**. Furthermore, “Identify-Printer” operation is deleted from the attribute **operations-supported**, and the processing proceeds to step **S1405**. In step **S1405**, the CPU **402** functions as the cloud print device information management module **505**, transmits the generated printer attributes **135** to the cloud print service **102**, and ends this processing.

[0101] According to this processing, when the AirPrint setting is changed in a state where the printing apparatus **101** is registered in Universal Print, the printing apparatus **101** can notify the cloud print service **102** of the printer attributes corresponding to the change.

[0102] FIG. **15** is a flowchart for describing processing when the printing apparatus **101** according to the first embodiment transmits the printer attributes **212** to the client terminal **100**. This is processing when the printing apparatus **101** transmits the printer information response **204** in the processing sequence diagram of local printing in FIG. **2**. Note that the processing described in the flowchart of FIG. **15** is realized by the CPU **402** of the printing apparatus **101** executing a program deployed in the RAM **403** and functioning as the functional module illustrated in FIG. **5**.

[0103] In step **S1501**, the CPU **402** functions as the local print device information management module **512**, and obtains the printing apparatus information. This printing apparatus information is obtained from the printer unit **407** via the printer I/F **406**. Next, the processing proceeds to step **S1502**, where the CPU **402** functions as the local print device information management module **512**, and generates the printer attributes **212** from the obtained printing apparatus information. The printer attributes **212** are encoded in a data format defined by IPP or the like for transmission to the client terminal **100**. Next, the processing proceeds to step **S1503**, where the CPU **402** functions as the storing module **506** and obtains the AirPrint setting **1102** stored in the HDD **414**.

[0104] In step **S1504**, the CPU **402** functions as the local print device information management module **512**, and determines whether or not AirPrint is enabled in the AirPrint setting **1102** obtained in step **S1503**. Here, in a case that it is determined that AirPrint is enabled, the processing proceeds to step **S1505**, and in a case that it is determined that AirPrint is disabled, the processing proceeds to step **S1506**. In step **S1505**, the CPU **402** functions as the local print device information management module **512**, and sets the attribute value “airprint” to the attribute **ipp-features-supported** in the printer attributes **212**. Furthermore, the attribute value “Identify-Printer” is set to the attribute **operations-supported**. Furthermore, the attribute value “sound, flash” is set to the attribute **Identify-actions-supported**, and the processing proceeds to step **S1506**. In step **S1506**, the CPU **402** functions as the local print device information management module **512**, and transmits the generated printer attributes **212** to the client terminal **100**.

[0105] According to this processing, in a case where AirPrint is set in the printing apparatus information, the printing apparatus **101** is able to transmit the printer attributes **212** corresponding thereto to the client terminal **100**.

[0106] As described above, according to the first embodiment, in a case that a printing apparatus compatible with local printing and cloud printing supports AirPrint, a request for printer information from the AirPrint-compatible client terminal can be responded. Specifically, in either the local printing or the cloud printing, it is possible to notify the user of the identification action operation of the printing apparatus by “Identify-Printer” operation from the client terminal.

Second Exemplary Embodiment

[0107] Next, a second embodiment will be described below. The Identify-Printer operation in the first embodiment is the same notification method for both the local print device and the cloud print

device, and thus cannot be distinguished. Therefore, in the second embodiment, an example in which the local printing and the cloud printing can be distinguished by changing the notification method will be described. Specific examples will be described below. Note that the configuration of the printing system according to the second embodiment, the hardware configuration of the printing apparatus **101**, and the like are similar to those of the first embodiment described above, and thus the description thereof will be omitted.

[0108] FIG. **16** depicts a view illustrating an example of an identification action setting menu screen of the printing apparatus **101** according to the second embodiment of the present invention. This screen is displayed on the operation panel **411**.

[0109] On this identification action setting screen, it is possible to perform setting on each commanded identification action for the printing apparatus **101**, and it is possible to set whether a flash setting **1601** for “flash” is enabled/disabled and whether a sound setting **1602** for “sound” is enabled/disabled when functioning as the local printer. Similarly, validity/invalidity of a flash setting **1603** for “flash” and a sound setting **1604** for “sound” when functioning as a cloud printer can also be set, and all settings on this screen are confirmed by an OK button **1605**. The settings on the menu screen are stored in the HDD **414** and referred to in processing to be described later.

[0110] In FIG. **16**, in the local printing, the setting for “flash” is set to be disabled, and the setting for “sound” is set to be enabled. In the cloud printing, the setting for “flash” is set to be enabled and the setting for “sound” is set to be disabled.

[0111] According to the identification action and the state of the printing apparatus **101** set in this manner, the transmission of the printer attributes to the cloud print service **102** by the printing apparatus **101** compatible with cloud printing to be described later and the printer information response by the printing apparatus **101** compatible with local printing are changed.

[0112] In addition, as an initial state of the printing apparatus **101**, for example, in a case where an action of sound is not performed when functioning as a cloud printer, an option of the corresponding sound setting **1604** may not be displayed or may be grayed out so as not to be selectable.

[0113] In addition, in a case where it is not desired to change the identification action between the case of the cloud printer and the case of the local printer, for example, enabled/disabled may be provided for the identification action setting as illustrated in FIG. **20**.

[0114] FIG. **20** depicts a view illustrating another example of the identification action setting menu screen of the printing apparatus **101** according to the second embodiment.

[0115] On this screen, it is possible to set whether to make the change in the identification action enabled or disabled between the case of the cloud printer and the case of the local printer as the identification action setting, where the change in the identification action is set to be disabled in FIG. **20**. When set to be disabled, the printing apparatus **101** notifies the common attribute of Identify-actions-supported in both cases of functioning in a cloud printer and functioning as a local printer.

[0116] FIG. **17** is a flowchart for explaining processing when the printing apparatus **101** according to the second embodiment transmits the printer attributes **135** to the cloud print service **102**. This is processing when the printing apparatus **101** transmits the printer information update request **140** to the cloud print service **102** in the processing sequence of cloud printing in FIG. **1**. Note that the processing described in the flowchart of FIG. **17** is realized by the CPU **402** of the printing apparatus **101** executing a program deployed in the RAM **403** and functioning as the functional module illustrated in FIG. **5**. In addition, in FIG. **17**, since the processing in steps **S1701** to **S1703** are the same as those in steps **S1301** to **S1303** in FIG. **13**, the description thereof will be omitted.

[0117] In a case that it is determined in step **S1704** that the AirPrint setting **1102** is turned on, that is, AirPrint is enabled, the processing proceeds to step **S1705**, and in a case that it is determined that AirPrint is disabled, the processing proceeds to step **S1707**. In step **S1705**, the CPU **402** functions as the storing module **506**, and obtains the identification action setting stored in the HDD

414. Here, since the printer information of the cloud print service **102** is to be updated, the set value of the cloud printer is obtained.

[0118] In the second embodiment, as illustrated in FIG. **16**, since the flash setting **1603** is set to be enabled when functioning as a cloud printer, “flash” is added in the next sequence. Then, the processing proceeds to step **S1706**, where the CPU **402** functions as the cloud print device information management module **505**, and sets the attribute value “airprint” of the attribute of ipp-features-supported in the printer attributes **135**. Furthermore, the attribute value “Identify-Printer” is set to the attribute operations-supported. Furthermore, the attribute value “flash” is added to the attribute Identify-actions-supported, and the processing proceeds to step **S1707**. In step **S1707**, the CPU **402** functions as the cloud print device information management module **505**, and transmits the generated printer attributes **135** to the cloud print service **102**.

[0119] According to this processing, the printing apparatus **101** can notify the cloud print service **102** of the printer attributes corresponding to the setting for each identification action set on the screen of FIG. **16**.

[0120] FIG. **18** is a flowchart for explaining processing when the printing apparatus **101** transmits the printer attributes to the cloud print service **102** when the AirPrint setting of the printing apparatus **101** according to the second embodiment is changed. Note that the processing described in the flowchart of FIG. **18** is realized by the CPU **402** of the printing apparatus **101** executing a program deployed in the RAM **403** and functioning as a functional module illustrated in FIG. **5**. Note that the processing in step **S1801** is the same as that in step **S1401** in FIG. **14** described above, and thus the description thereof will be omitted.

[0121] In step **S1802**, the CPU **402** determines whether AirPrint is enabled in the AirPrint setting **1102**, and the processing proceeds to step **S1803** in a case that it is determined that AirPrint is enabled, and the processing proceeds to step **S1805** in a case that it is determined that AirPrint is disabled, that is, the AirPrint setting has been changed from enabled to disabled. In step **S1803**, the CPU **402** functions as the storing module **506**, and obtains the identification action setting stored in the HDD **414**. Here, since the printer information of the cloud print service **102** is to be updated, the set value of the cloud printer is obtained.

[0122] In the second embodiment, as illustrated in FIG. **16**, since the flash setting is enabled when functioning as a cloud printer, an attribute value “flash” is added in the next sequence. Then, in step **S1804**, the CPU **402** functions as the cloud print device information management module **505**, and sets the attribute value “airprint” of the attribute ipp-features-supported in the printer attributes **135**. Furthermore, the attribute value “Identify-Printer” is set to the attribute operations-supported. Furthermore, the attribute value “flash” is added to the attribute Identify-actions-supported, and the processing proceeds to step **S1806**.

[0123] When the AirPrint setting is changed from enabled to disabled, the CPU **402** functions as the cloud print device information management module **505** in step **S1805**, and deletes the attribute value “airprint” from the attribute ipp-features-supported of the printer attributes **135**. Furthermore, the “Identify-Printer” operation is deleted, and the processing proceeds to step **S1806**. In step **S1806**, the CPU **402** functions as the cloud print device information management module **505**, and transmits the generated printer attributes **135** to the cloud print service **102**.

[0124] According to this processing, when the AirPrint setting of the printing apparatus **101** is changed, the printing apparatus **101** can notify the cloud print service **102** of the printer attributes corresponding to the setting for each identification action set on the screen of FIG. **16**.

[0125] FIG. **19** is a flowchart for explaining processing when the printing apparatus **101** according to the second embodiment transmits the printer attributes to the client terminal **100**. This is processing when the printing apparatus **101** transmits the printer information response **204** in the processing sequence diagram of local printing in FIG. **2**. Note that the processing described in the flowchart of FIG. **19** is realized by the CPU **402** of the printing apparatus **101** executing a program deployed in the RAM **403** and functioning as the functional module illustrated in FIG. **5**. Note that

the processing in steps S1901 to S1903 are the same as the processing in steps S1501 to S1503 in FIG. 15 described above, and thus the description thereof will be omitted.

[0126] In step S1904, the CPU 402 determines whether AirPrint is set to be enabled in the AirPrint setting 1102, and the processing proceeds to step S1905 in a case that it is determined that AirPrint is set to be enabled, and the processing proceeds to step S1907 in a case that it is determined that AirPrint is set to be disabled. In step S1905, the CPU 402 functions as the storing module 506, and obtains the identification action setting stored in the HDD 414. Here, since it is a response of the printer information in the local printing, the set values of the local printer are obtained.

[0127] In the second embodiment, as illustrated in FIG. 16, since the sound setting is set to be enabled when functioning as a local printer, the attribute value “sound” is added in the next sequence. Then, the processing proceeds to step S1906, where the CPU 402 functions as the local print device information management module 512, and sets the attribute value “airprint” of the attribute ipp-features-supported in the printer attributes 212. Furthermore, the attribute value “Identify-Printer” is set to the attribute operations-supported. Furthermore, an attribute value “sound” is added to the attribute Identify-actions-supported. Then, the processing proceeds to step S1907, where the CPU 402 functions as the local print device information management module 512 and transmits the generated printer attributes 212 to the client terminal 100.

[0128] According to this processing, when AirPrint is set in the printing apparatus information, the printing apparatus 101 can notify the client terminal 100 of the printer attributes 212 corresponding to the setting for each identification action set on the screen of FIG. 16.

[0129] As described above, according to the second example, a printing apparatus supporting AirPrint is able to notify a user of a set identification action in response to a request for Identify-Printer operation from an AirPrint-compatible client terminal in both local printing and cloud printing.

Other Embodiments

[0130] Embodiments of the present disclosure can also be realized by a computer of a system or apparatus that reads out and executes computer executable instructions (e.g., one or more programs) recorded on a storage medium (which may also be referred to more fully as a ‘non-transitory computer-readable storage medium’) to perform the functions of one or more of the above-described embodiments and/or that includes one or more circuits (e.g., application specific integrated circuit (ASIC)) for performing the functions of one or more of the above-described embodiments, and by a method performed by the computer of the system or apparatus by, for example, reading out and executing the computer executable instructions from the storage medium to perform the functions of one or more of the above-described embodiments and/or controlling the one or more circuits to perform the functions of one or more of the above-described embodiments. The computer may comprise one or more processors (e.g., central processing unit (CPU), micro processing unit (MPU)) and may include a network of separate computers or separate processors to read out and execute the computer executable instructions. The computer executable instructions may be provided to the computer, for example, from a network or the storage medium. The storage medium may include, for example, one or more of a hard disk, a random-access memory (RAM), a read only memory (ROM), a storage of distributed computing systems, an optical disk (such as a compact disc (CD), digital versatile disc (DVD), or Blu-ray Disc (BD) TM), a flash memory device, a memory card, and the like.

[0131] While the present disclosure includes exemplary embodiments, it is to be understood that the disclosure is not limited to the disclosed exemplary embodiments. The scope of the following claims is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures and functions.

[0132] This application claims the benefit of Japanese Patent Application No. 2024-022203, filed Feb. 16, 2024, which is hereby incorporated by reference herein in their entirety.

Claims

1. A printing apparatus comprising: one or more controllers including one or more processors and one or more memories, the one or more controllers configured to: be operable to cause the printing apparatus to function as a local printer that receives a print job from a client terminal and performs printing; be operable to cause the printing apparatus to function as a cloud printer that receives a print job from a cloud server and performs printing; set whether a predetermined print function is enabled or disabled in a case that the printing apparatus functions as the local printer; add an attribute for performing a presence notification of the printing apparatus to attribute information of the printing apparatus in a case that the predetermined print function is set to enabled; and notify the attribute information of the printing apparatus to the cloud server.
2. The printing apparatus according to claim 1, wherein the one or more controllers is further configured to set the attribute for performing the presence notification of the printing apparatus in each case of that the printing apparatus functions as the local printer and that the printing apparatus functions as the cloud printer.
3. The printing apparatus according to claim 2, wherein, in the adding of the attribute for performing the presence notification of the printing apparatus to the attribute information of the printing apparatus, the one or more controllers is further configured to: add the set attribute to the attribute information of the printing apparatus depending on whether the printing apparatus functions as the local printer or functions as the cloud printer.
4. The printing apparatus according to claim 1, wherein the attribute for performing the presence notification of the printing apparatus includes a ringing sound or a lighted display.
5. The printing apparatus according to claim 1, wherein, in the notifying the attribute information of the printing apparatus to the cloud server, the one or more controllers is configured to: notify the client terminal in a case that the printing apparatus functions as the local printer, and notify the cloud server in a case that the printing apparatus functions as the cloud printer.
6. The printing apparatus according to claim 1, wherein, in the notifying the attribute information of the printing apparatus to the cloud server, the one or more controllers notifies the cloud server of the attribute information at a timing at which the printing apparatus has been registered as the cloud printer.
7. The printing apparatus according to claim 1, wherein, in the notifying the attribute information of the printing apparatus to the cloud server, the one or more controllers notifies the cloud server of the attribute information at a timing at which the printing apparatus is activated in a state in which the printing apparatus is registered as the cloud printer.
8. The printing apparatus according to claim 1, wherein, in the notifying the attribute information of the printing apparatus to the cloud server, the one or more controllers notifies the cloud server of the attribute information is at a timing at which a function as the cloud printer is set to be enabled.
9. The printing apparatus according to claim 1, wherein, in the notifying the attribute information of the printing apparatus to the cloud server, the one or more controllers notifies the cloud server of the attribute information is at a timing at which a setting of the predetermined print function is changed.
10. The printing apparatus according to claim 1, wherein, in the notifying the attribute information of the printing apparatus to the cloud server, the one or more controllers notifies the cloud server of the attribute information is at a timing at which configuration information of the printing apparatus changes.
11. The printing apparatus according to claim 1, wherein, in the notifying the attribute information of the printing apparatus to the cloud server, the one or more controllers notifies the cloud server of the attribute information is at a timing at which state information of the printing apparatus changes.
12. The printing apparatus according to claim 1, wherein, in the notifying the attribute information

of the printing apparatus to the cloud server, the one or more controllers is further configured to notify the attribute information to the client terminal in response to a request from the client terminal.

13. The printing apparatus according to claim 1, wherein the predetermined print function is a print function by AirPrint.

14. A method of controlling a printing apparatus, the method comprising: being operable to cause the printing apparatus to function as a local printer that receives a print job from a client terminal and performs printing; being operable to cause the printing apparatus to function as a cloud printer that receives a print job from a cloud server and performs printing; setting whether a predetermined print function is enabled or disabled in a case that the printing apparatus functions as the local printer; adding an attribute for performing a presence notification of the printing apparatus to attribute information of the printing apparatus in a case that the predetermined print function is set to enabled; and notifying the attribute information of the printing apparatus to the cloud server.

15. A non-transitory computer-readable storage medium for storing a program for causing a processor to execute a method of controlling a printing apparatus, the method comprising: being operable to function as a local printer that receives a print job from a client terminal and performs printing; being operable to function as a cloud printer that receives a print job from a cloud server and performs printing; setting whether a predetermined print function is enabled or disabled in a case that the printing apparatus functions as the local printer; adding an attribute for performing a presence notification of the printing apparatus to attribute information of the printing apparatus in a case that the predetermined print function is set to enabled; and notifying the attribute information of the printing apparatus to the cloud server.
