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INFORMATION PROCESSING DEVICE, CONTROL METHOD OF THE SAME, STORAGE MEDIUM, AND PRINTING SYSTEM

Abstract

An information processing device obtains information of a printing device that can be registered in the information processing device by searching for printing device registered in a print server and a printing device connected to a local area network to which the information processing device is connected. If the information indicates that the printing device is capable of executing an identification action that assists a user in identifying the printing device, the device presents to the user an indication that the printing device corresponding to the information is capable of executing the identification action. The information processing device causes the printing device to execute the identification action in response to an instruction from the user and registers the printing device in the information processing device in response to an instruction from the user.

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Background/Summary

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to an information processing device, a method for controlling the information processing device, a storage medium, and a printing system.

Description of the Related Art

[0002] Recent years have seen the widespread use of a cloud printing service in which an information processing device transmits a print job to a printing device via a cloud service. The information processing device can also transmit a print job to a printing device that is connected to a local area network to which the information processing device is connected. Japanese Patent Laid-Open No. 2012-133489 describes a method with which an information processing device searches for a printing device via a cloud service or in a local area. The printing device can be used by the information processing device when the printing device is registered in the information processing device.

SUMMARY OF THE INVENTION

[0003] An aspect of the present invention provides a technology for assisting a user in identifying a printing device that can be registered in an information processing device. According to some embodiments, an information processing device comprising: an obtaining unit configured to obtain information of a printing device that can be registered in the information processing device by searching for one or more printing devices registered in a print server and one or more printing devices connected to a local area network to which the information processing device is connected; a presentation unit configured to, in a case where the information indicates that the printing device is capable of executing an identification action that assists a user in identifying the printing device, present to the user an indication that the printing device corresponding to the information is capable of executing the identification action; a request unit configured to cause the printing device to execute the identification action in response to an instruction from the user to cause the printing device selected from one or more presented printing devices to execute the identification action; and a registration unit configured to register the printing device in the information processing device in response to an instruction from the user to register the printing device in the information processing device is provided.

[0004] Further features of the present invention will become apparent from the following description of exemplary embodiments with reference to the attached drawings.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. **1** is a block diagram showing an exemplary configuration of a printing system according to an embodiment.

[0006] FIG. **2** is a block diagram showing an exemplary hardware configuration of a printing device according to an embodiment.

[0007] FIG. **3** is a block diagram showing an exemplary hardware configuration of a computer

according to an embodiment.
[0008] FIG. **4** is a schematic diagram showing an example of a setting screen according to an embodiment.
[0009] FIG. **5** is a sequence diagram showing an example of printing device registration actions according to an embodiment.
[0010] FIG. **6** is a schematic diagram showing an example of a packet according to an embodiment.
[0011] FIG. **7** is a schematic diagram showing an example of a packet according to an embodiment.
[0012] FIG. **8** is a schematic diagram showing an example of a packet according to an embodiment.
[0013] FIG. **9** is a schematic diagram showing an example of a packet according to an embodiment.
[0014] FIG. **10** is a flowchart showing an example of actions of the information processing device according to an embodiment.
[0015] FIG. **11** is a flowchart showing an example of actions of the information processing device according to an embodiment.
[0016] FIG. **12** is a flowchart showing an example of actions of the information processing device according to an embodiment.
[0017] FIG. **13** is a schematic diagram showing an example of a registration screen according to an embodiment.
[0018] FIG. **14** is a sequence diagram showing an example of actions for requesting an identification action according to an embodiment.
[0019] FIG. **15** is a sequence diagram showing an example of actions for requesting an identification action according to an embodiment.
[0020] FIG. **16** is a schematic diagram showing an example of a packet according to an embodiment.
[0021] FIG. **17** is a flowchart showing an example of actions of the printing device according to an embodiment.

DESCRIPTION OF THE EMBODIMENTS

[0022] Hereinafter, embodiments will be described in detail with reference to the attached drawings. Note, the following embodiments are not intended to limit the scope of the claimed invention. Multiple features are described in the embodiments, but limitation is not made to an invention that requires all such features, and multiple such features may be combined as appropriate. Furthermore, in the attached drawings, the same reference numerals are given to the same or similar configurations, and redundant description thereof is omitted.

First Embodiment

Exemplary Configuration of Printing System

[0023] The following describes an exemplary configuration of a printing system **100** according to an embodiment with reference to FIG. **1**. The printing system **100** includes printing devices **101**A and **101**B, a print server **102**, printing devices **103**A and **103**B, and an information processing device **104**, for example. The numbers of respective constituent elements of the printing system **100** are not limited to those shown in FIG. **1**. Also, the printing system **100** may include a constituent element that is not shown in FIG. **1**. The printing system may also be considered to be composed of only some of the constituent elements of the printing system **100**.
[0024] The information processing device **104**, the printing device **103**A, and the printing device **103**B are connected to the same local area network (LAN) **107**. Hereinafter, the printing devices **103**A and **103**B connected to the same LAN **107** to which the information processing device **104** is connected will be collectively referred to as the printing devices **103**. The following description regarding the printing devices **103** applies to both of the printing devices **103**A and **103**B. The printing devices **103** may also be referred to as local printing devices. The LAN **107** may be a wired LAN, a wireless LAN, or a combination of a wired LAN and a wireless LAN. The printing devices **103** may have a multicast domain name system (mDNS) function for announcing information of the printing devices **103** to all communication devices (e.g., the information

processing device **104**) connected to the LAN **107**. The information processing device **104** may search for the printing devices **103** with use of DNS records including a service (SRV) record, a TXT record, a PTR record, etc., of the mDNS function.
[0025] The LAN **107** is connected to the Internet **106** via a relay device **105**. The relay device **105** may be a router device, for example. The relay device **105** may function as a firewall. The information processing device **104** and each printing device **103** can communicate with each other in the LAN **107** (i.e., not via the Internet **106**). The information processing device **104** can communicate with the print server **102** via the LAN **107**, the relay device **105**, and the Internet **106**. Instead of or in addition to this configuration, the information processing device **104** may also be connected to the Internet **106** via a cellular network (e.g., a network that conforms to the fourth generation communication standards (4G) or the fifth generation communication standards (5G)).
[0026] The Internet **106** may be constituted by a combination of a LAN, a wide area network (WAN), a cellular network (e.g., a 4G network or 5G network), a wireless network that conforms to IEEE **802**.**11**, etc., for example. That is to say, any communication scheme may be adopted for the physical layer as long as data can be transmitted and received via the Internet **106**.
[0027] The printing devices **101**A and **101**B are each connected to the Internet **106**. The print server **102** can communicate with the printing devices **101**A and **101**B via the Internet **106**. Hereinafter, the printing devices **101**A and **101**B that can communicate with the print server **102** will be collectively referred to as the printing devices **101**. The following description regarding the printing devices **101** applies to both of the printing devices **101**A and **101**B. The printing devices **101** may also be referred to as remote printing devices.
[0028] The printing devices **101** and **103** have a print function for performing printing based on a print job. The printing devices **101** and **103** may also have at least one of a scanner function and a fax function in addition to the print function. Printing devices that have a plurality of functions as described above may also be called multifunction peripherals (MFPs). Alternatively, the printing devices **101** and **103** may also be single function peripherals (SFPs) that have only the print function. The term “printing” may refer to printing on a sheet-shaped recording medium such as paper or the formation of a three-dimensional object (so-called 3D printing).
[0029] Each printing device **101** may also have a user management function. If the user management function of the printing device **101** is enabled, the printing device **101** requests a user to log in to the printing device **101** to use the functions of the printing device **101**. Each printing device **101** may also have a printing suspension function to prevent a printed product from being taken away by a third party or prevent misprinting. The printing suspension function is a function for temporarily storing a print job in a storage and starting printing in accordance with a print instruction given later from a user, rather than immediately starting printing when the print job is received by the printing device **101**. If the printing suspension function of the printing device **101** is enabled, the printing device **101** performs printing based on a print job corresponding to a user after the user has successfully logged in to the printing device **101**.
[0030] The print server **102** provides a printing service in which the print server **102** transmits a print job generated by the information processing device **104** to any of the printing devices **101** (e.g., the printing device **101**A) in accordance with the print job. For example, the print server **102** provides a logical printer to the information processing device **104** and accepts a print job for the logical printer. The logical printer is a virtual printing device (e.g., a printer object) provided by the print server **102**. The logical printer may also be called a cloud printer. In contrast to the logical printer, physical printing devices such as the printing devices **101** and **103** may also be called physical printers. In the following description, the logical printer and the physical printers will be collectively referred to simply as printers. If a physical printer is connected to the LAN to which the information processing device that gives a print job is also connected, the physical printer may also be called a local printer.
[0031] The print server **102** may be a server in an on-premise environment that is connected to the

Internet **106** or a server in a cloud computing environment (hereinafter simply referred to as cloud). A printing service provided by the print server **102** that is included in the cloud may also be called a cloud printing service. An example of the cloud printing service is Universal Print (registered trademark) provided by Microsoft Corporation. The following describes a case where the print server **102** is included in the cloud. However, the following description also applies to a case where the print server **102** is included in the on-premise environment.

[0032] The print server **102** receives a print job from the information processing device **104** and stores the print job. Thereafter, the print server **102** notifies a printing device **101** that is registered in the print server **102** that the print job has been received. The printing device **101** that has received the notification obtains the print job from the print server **102** and temporarily stores the print job. After a user logs in to the printing device **101**, the printing device **101** starts printing corresponding to the print job stored in the printing device **101** in accordance with an instruction from the user.

[0033] The information processing device **104** provides a print function to a user of the information processing device **104**. The information processing device **104** may be a personal computer (PC), a smartphone, or another device. The information processing device **104** may designate, as an output destination, a physical printer (e.g., the printing device **103**A) that is connected to the LAN **107** to which the information processing device **104** is connected or the logical printer provided by the print server **102**. If the logical printer is designated as the output destination, a physical printer (e.g., the printing device **101**A) associated with the logical printer performs printing. The information processing device **104** that uses the cloud printing service may also be called a client or a client terminal. Printing performed by inputting a print job to the logical printer may also be called cloud printing or remote printing. Printing performed by inputting a print job directly to a physical printer (i.e., in the LAN) may also be called local printing.

Exemplary Hardware Configuration of Printing Device

[0034] The following describes an exemplary hardware configuration of a printing device **200** according to an embodiment with reference to FIG. **2**. The printing device **200** may be used as any of the printing devices **101** and **103**. That is to say, the printing device **200** may function as a local printer or a cloud printer. The printing device **200** may also function as both a local printer and a cloud printer for the information processing device **104**. The printing device **200** may include constituent elements shown in FIG. **2**, but some of the constituent elements may be omitted, or another constituent element may also be included in the printing device **200**. The printing device **200** is a physical printing device, and accordingly, may also be called a physical printer.

[0035] A central processing unit (CPU) **201** is a general-purpose processing circuit that controls actions of the entire printing device **200**. A random-access memory (RAM) **202** is a volatile memory circuit and is used as a temporary storage region such as a work area for processing performed by the CPU **201**. A read only memory (ROM) **203** is a non-volatile memory circuit and stores programs and data used in processing performed by the CPU **201**. A storage device **204** is a non-volatile storage device and stores programs and data (e.g., a print job, image data, and setting information) used in processing performed by the CPU **201**. The storage device **204** may be a hard disk drive (HDD) or a solid state drive (SSD), for example. The storage device **204** may also be called a secondary storage device. Actions of the printing device **200** may be realized by the CPU **201** by executing a program read from the storage device **204** into the RAM **202**. Alternatively, some or all actions of the printing device **200** may be realized by a dedicated processing circuit such as an application specific integrated circuit (ASIC).

[0036] A printer interface (I/F) **205** is an interface for transmitting signals to a printer engine **220** and receiving signals therefrom. The printer engine **220** performs printing based on signals (e.g., an image signal and a print command) supplied from a control unit **210** via the printer I/F **205**. The printing may be electrophotographic printing in which toner is transferred to paper and fixed thereon, ink-jet printing in which ink is ejected toward paper, or 3D printing.

[0037] A scanner I/F **206** is an interface for transmitting signals to a scanner engine **230** and receiving signals therefrom. The scanner engine **230** supplies a signal (e.g., an image signal) obtained by reading a document to the control unit **210** via the scanner I/F **206**. The CPU **201** may process the image signal supplied from the scanner engine **230** and supply the thus obtained recording image signal to the printer engine **220**. Also, the CPU **201** may generate image data based on the image signal supplied from the scanner engine **230** and transmit the image data to an external device.

[0038] An operation unit I/F **207** is an interface for transmitting signals to an operation unit **240** and receiving signals therefrom. The operation unit **240** is a device that obtains input from a user of the printing device **200** and provides information to the user of the printing device **200**. The operation unit **240** may be constituted by a display panel (e.g., a liquid crystal display), a speaker, a touch panel, a keyboard, a button, a touch screen, a light, a lamp, a buzzer, or a combination of any of these, for example. The operation unit **240** may perform output in accordance with a request from the print server **102** or the information processing device **104**, e.g., display information on the display panel, light or flash the light or the lamp, sound the buzzer or the like, or give audio notification.

[0039] A network I/F **208** is an interface for communicating with devices outside the printing device **200**. The control unit **210** is composed of the CPU **201**, the RAM **202**, the ROM **203**, the storage device **204**, the printer I/F **205**, the scanner I/F **206**, the operation unit I/F **207**, and the network I/F **208**. The constituent elements included in the control unit **210** are each connected to a system bus **209**.

Exemplary Hardware Configuration of Computer

[0040] The following describes an exemplary hardware configuration of a computer **300** according to an embodiment with reference to FIG. **3**. The computer **300** may be used as the information processing device **104** or the print server **102**. The computer **300** may include constituent elements shown in FIG. **3**, but some of the constituent elements may be omitted, or another constituent element may also be included in the computer **300**.

[0041] A CPU **301** is a general-purpose processing circuit that controls actions of the entire computer **300**. A RAM **302** is a volatile memory circuit and is used as a temporary storage region such as a work area for processing performed by the CPU **301**. A ROM **303** is a non-volatile memory circuit and stores programs and data used in processing performed by the CPU **301**. A storage device **304** is a non-volatile storage device and stores programs and data used in processing performed by the CPU **301**. The storage device **304** may be an HDD or an SSD, for example. The storage device **304** may also be called a secondary storage device. Actions of the computer **300** may be realized by the CPU **301** by executing a program read from the storage device **304** into the RAM **302**. Alternatively, some or all actions of the computer **300** may be realized by a dedicated processing circuit such as an ASIC.

[0042] An input I/F **305** is an interface for transmitting signals to an input device **310** and receiving signals therefrom. The input device **310** is a device that obtains input from a user of the computer **300**. The input device **310** may be a keyboard, a touch panel, a microphone, a mouse, or a combination of any of these, for example. An output I/F **306** is an interface for transmitting signals to an output device **320** and receiving signals therefrom. The output device **320** is a device that provides information to the user of the computer **300**. The output device **320** may be a display, a speaker, or a combination of these, for example. A network I/F **307** is an interface for communicating with devices outside the computer **300**. The CPU **301**, the RAM **302**, the ROM **303**, the storage device **304**, the input I/F **305**, the output I/F **306**, and the network I/F **307** are each connected to a system bus **308**. In the example shown in FIG. **3**, the input device **310** and the output device **320** are shown as devices separate from the computer **300**. Alternatively, the computer **300** may include the input device **310** and the output device **320**.

Identification Action Settings in Printing Device

[0043] The following describes a method for performing setting relating to an identification action of the printing device **200** with reference to FIG. **4**. The printing device **200** may be a printing device **101** or a printing device **103**. The identification action of the printing device **200** may be an action for assisting a user of the printing device **200** in identifying the printing device **200**. For example, the identification action may be an action for outputting visual information from the printing device **200**, an action for outputting audio information from the printing device **200**, or an action for outputting both visual information and audio information from the printing device **200**. Visual information may be output by displaying a message on the operation unit **240** of the printing device **200**. Such an identification action is defined as "display" in the Internet Printing Protocol (IPP). Visual information may be output by flashing or lighting a light or a lamp included in the printing device **200**. Such an identification action is defined as "flash" in the IPP. Audio information may be output by sounding a speaker or a buzzer included in the printing device **200** (e.g., outputting a beep sound). Such an identification action is defined as "sound" in the IPP. Audio information may be output by reproducing a predetermined message from the speaker included in the printing device **200**. Such an identification action is defined as "speak" in the IPP. The printing device **200** may be capable of executing a plurality of types of identification actions. For example, the printing device **200** may be capable of executing flash and sound. The printing device **200** may execute the identification action in response to a request from the information processing device **104** or the print server **102** as described later.

[0044] A setting screen **400** shown in FIG. **4** is a screen for obtaining an instruction relating to settings of the identification action of the printing device **200** from the user. The printing device **200** displays the setting screen **400** on the operation unit **240** and obtains a user operation performed on the setting screen **400**. In the example of the setting screen **400**, the printing device **200** is capable of executing flash and sound. Alternatively, the printing device **200** may be capable of executing another type of identification action or may be capable of executing only one type of identification action.

[0045] The setting screen **400** includes a region **401** and a region **402**. The region **401** is a region for obtaining a user instruction relating to settings of the identification action in the case where the printing device **200** functions as a local printer. The region **402** is a region for obtaining a user instruction relating to settings of the identification action in the case where the printing device **200** functions as a cloud printer. The printing device **200** can obtain user instructions independently for the case where the printing device **200** functions as a local printer and the case where the printing device **200** functions as a cloud printer, with use of the setting screen **400**. Alternatively, the printing device **200** may obtain a common user instruction for the case where the printing device **200** functions as a local printer and the case where the printing device **200** functions as a cloud printer.

[0046] The region **401** includes a region **403** for obtaining a user instruction relating to a setting of flash, and a region **404** for obtaining a user instruction relating to a setting of sound. The region **402** includes a region **405** for obtaining a user instruction relating to a setting of flash, and a region **406** for obtaining a user instruction relating to a setting of sound. The region **403** may include a label showing the type of the identification action, a button for obtaining a user instruction to enable the identification action, and a button for obtaining a user instruction to disable the identification action. The two buttons included in the region **403** may be alternatively selectable. A graphic object other than the buttons (e.g., a check box or a pull-down list) may also be used to obtain user instructions. Each of the regions **404** to **406** may have a configuration similar to the configuration of the region **403**. In response to a button **407** being pressed by the user in a state where "enable" or "disable" is selected in the regions **403** to **406**, the printing device **200** stores settings in the regions **403** to **406** (i.e., whether the respective identification actions are enabled or disabled) in the storage device **204** and uses the settings in actions performed later. The printing device **200** can obtain user instructions individually for the plurality of identification actions that

can be executed, with use of the setting screen **400**. Alternatively, the printing device **200** may obtain a common user instruction for the plurality of identification actions that can be executed.
[0047] If a specific type of identification action (e.g., flash) is enabled, the printing device **200** may execute the identification action in accordance with a request from an external device (e.g., the print server **102** or the information processing device **104**, the same applies hereinafter). Also, if a specific type of identification action is enabled, the printing device **200** may notify the external device that the printing device **200** can execute the identification action. If a specific type of identification action is disabled, the printing device **200** may reject execution of the identification action requested from the external device. Also, if a specific type of identification action is disabled, the printing device **200** may be configured so as not to notify the external device that the printing device **200** can execute the identification action. For example, the printing device **200** may notify the external device that the printing device **200** cannot execute the identification action or notify the external device of nothing about this identification action.
[0048] If it is prescribed that a specific type of identification action is not executed in a default state, the printing device **200** may prevent a button for enabling the identification action from being selected. For example, the printing device **200** may hide or gray out the button for enabling the identification action so that the button cannot be selected.
Printing Device Registration Action
[0049] The following describes actions for registering a printing device **101** in the print server **102** with reference to FIG. **5**. The actions shown in FIG. **5** may be started in response to a user of the printing device **101** giving an instruction to start registration of the printing device **101** with use of the operation unit **240** of the printing device **101**, for example. Once the printing device **101** is registered in the print server **102**, the printing device **101** can be used as a cloud printer by the information processing device **104**. Actions of the printing device **101** may be realized by the CPU **201** of the printing device **101** by executing a program read into the RAM **202** of the printing device **101**, for example. Actions of the print server **102** may be realized by the CPU **301** of the print server **102** by executing a program read into the RAM **302** of the print server **102**, for example. An action that is not shown in FIG. **5** may also be executed to register the printing device **101** in the print server **102**.
[0050] In step S**501**, the printing device **101** transmits a device registration request to the print server **102**. The device registration request may be a request for the print server **102** to register the printing device **101**. The destination of the device registration request, which is the print server **102**, may be designated by the user. In step S**502**, the print server **102** processes the device registration request and transmits a device registration response to the printing device **101**. The device registration response may be a response to the device registration request.
[0051] The device registration request and the device registration response may be transmitted with use of packets that conform to the IPP. Examples of such packets will be described with reference to FIG. **6**. A packet **600** is an example of a packet that is transmitted as the device registration request. The packet **600** includes operation information and attribute information. The operation information is information indicating the content of an executed operation. The attribute information is information indicating attributes relating to the executed operation. The same also applies to operation information and attribute information of other packets described later. In the packet **600**, the operation information is represented by “Operation”. The operation information included in the packet **600** has a value indicating that the executed operation is the device registration request. In the packet **600**, the attribute information is represented by “Requested-attributes”. The attribute information included in the packet **600** includes manufacturer information and model information. The attribute information may vary for each printing device **101** that transmits the packet **600**.
[0052] A packet **601** is an example of a packet that is transmitted as the device registration response to the packet **600**. The packet **601** includes operation information, status information, and attribute

information. The status information is information indicating the status of an executed operation. The same also applies to status information of other packets described later. In the packet **601**, the operation information is represented by “Operation”. The operation information included in the packet **601** has a value indicating that the executed operation is the device registration response. In the packet **601**, the status information is represented by “Status Code”. The status information included in the packet **601** has a value indicating that the printing device **101** that has transmitted the device registration request has been successfully registered. If the print server **102** succeeded in registering the printing device **101** in response to the device registration request, the print server **102** transmits a device registration response having such a value to the printing device **101**. In the packet **601**, the attribute information is represented by “Attribute”. The attribute information included in the packet **601** includes identification information issued to the printing device **101** by the print server **102**. The identification information may vary for each printing device **101** that is registered in the print server **102**.

[0053] In step S**503**, the printing device **101** transmits an ability obtaining request to the print server **102**. The ability obtaining request may be a request to obtain ability information registered in the print server **102** with respect to the printing device **101** from the print server **102**. The destination of the ability obtaining request, which is the print server **102**, may be the print server **102** in which the printing device **101** has been registered. In step S**504**, the print server **102** processes the ability obtaining request and transmits an ability obtaining response to the printing device **101**. The ability obtaining response may be a response to the ability obtaining request. The ability obtaining response may indicate the ability information registered in the print server **102** with respect to the printing device **101**.

[0054] The ability obtaining request and the ability obtaining response may be transmitted with use of packets that conform to the IPP. Examples of such packets will be described with reference to FIGS. **7** and **8**. A packet **700** is an example of a packet that is transmitted as the ability obtaining request. The packet **700** includes operation information and attribute information. In the packet **700**, the operation information is represented by “Operation”. The operation information included in the packet **700** has a value indicating that the executed operation is the ability obtaining request. In the packet **700**, the attribute information is represented by “Requested-attributes”. The attribute information included in the packet **700** has a value indicating that what is requested is URI information indicating the location where the ability information of the printing device **101** is stored.

[0055] A packet **701** is an example of a packet that is transmitted as the ability obtaining response to the packet **700**. The packet **701** includes operation information, status information, and attribute information. In the packet **701**, the operation information is represented by “Operation”. The operation information included in the packet **701** has a value indicating that the executed operation is the ability obtaining response. In the packet **701**, the status information is represented by “Status Code”. The status information included in the packet **701** has a value indicating that the ability information of the printing device **101** that has transmitted the ability obtaining request has been successfully obtained. If the print server **102** succeeded in obtaining the ability information of the printing device **101** in response to the ability obtaining request, the print server **102** transmits an ability obtaining response having such a value to the printing device **101**. In the packet **701**, the attribute information is represented by “Attribute”. The attribute information included in the packet **701** includes the URI information indicating the location where the ability information of the printing device **101** is stored. If the ability information registered with respect to the printing device **101** does not include the URI information, the print server **102** need not include the URI information in the attribute information of the ability obtaining response.

[0056] A packet **702** is another example of a packet that is transmitted as the ability obtaining response to the packet **700**. The packet **702** includes operation information and status information. The packet **702** differs from the packet **701** in the status information. The status information

included in the packet **702** has a value indicating a failure to obtain the ability information of the printing device **101** that has transmitted the ability obtaining request and the reason for the failure. If the print server **102** failed to obtain the ability information of the printing device **101** in response to the ability obtaining request, the print server **102** transmits an ability obtaining response having such a value to the printing device **101**.

[0057] A packet **800** is another example of a packet that is transmitted as the ability obtaining request. The packet **800** includes operation information and attribute information. The packet **800** differs from the packet **700** in the attribute information. The attribute information included in the packet **800** has a value indicating that what is requested is information indicating types of identification actions that can be executed by the printing device **101** and a default identification action.

[0058] A packet **801** is an example of a packet that is transmitted as the ability obtaining response to the packet **800**. The packet **801** includes operation information, status information, and attribute information. The packet **801** differs from the packet **701** in the attribute information. The attribute information included in the packet **801** has a value indicating the types of identification actions that can be executed by the printing device **101** and the default identification action. The attribute information included in the packet **801** indicates that the printing device **101** can execute flash and sound, and the default identification action is sound.

[0059] A packet **802** is another example of a packet that is transmitted as the ability obtaining response to the packet **800**. The packet **802** includes operation information and status information. The packet **802** differs from the packet **701** in that the packet **802** does not include the attribute information. If the print server **102** succeeded in obtaining the ability information of the printing device **101** in response to the ability obtaining request but the ability information does not include information regarding identification actions, the print server **102** transmits an ability obtaining response that does not include attribute information to the printing device **101**.

[0060] Through the steps S**503** and S**504** described above, the printing device **101** can confirm whether or not the printing device **101** has been registered in the print server **102** and confirm information of the printing device **101** registered in the print server **102**. The printing device **101** may use another method for the confirmation.

[0061] In step S**505**, the printing device **101** transmits an ability registration request to the print server **102**. The ability registration request may be a request to register the ability of the printing device **101** in the print server **102**. The destination of the ability registration request, which is the print server **102**, may be the print server **102** in which the printing device **101** has been registered. In step S**506**, the print server **102** processes the ability registration request and transmits an ability registration response to the printing device **101**. The ability registration response may be a response to the ability registration request.

[0062] The ability registration request and the ability registration response may be transmitted with use of packets that conform to the IPP. Examples of such packets will be described with reference to FIG. **9**. A packet **900** is an example of a packet that is transmitted as the ability registration request. The packet **900** includes operation information and attribute information. In the packet **900**, the operation information is represented by “Operation”. The operation information included in the packet **900** has a value indicating that the executed operation is the ability registration request. In the packet **900**, the attribute information is represented by “Requested-attributes”. The attribute information included in the packet **900** includes ability information that is to be registered by the printing device **101** in the print server **102**.

[0063] The attribute information included in the packet **900** includes an attribute value “identify-actions-supported”. This attribute value indicates types of identification actions that can be executed by the printing device **101**. For example, the printing device **101** includes, in this attribute value, types of enabled identification actions among identification actions supported by the printing device **101**. The packet **900** indicates that the printing device **101** can execute display, flash, sound,

and speak, for example. If the printing device **101** can execute only flash and sound, this attribute value is “flash, sound”. The attribute information included in the packet **900** includes an attribute value “identify-actions-default”. This attribute value indicates a default (e.g., recommended) identification action. The printing device **101** determines the identification actions included in the attribute values “identify-actions-supported” and “identify-actions-default” in accordance with settings designated by the user with use of the setting screen **400** and stored in the storage device **304**, for example. If the printing device **101** does not obtain designation from the user to enable or disable identification actions, the printing device **101** may include all identification actions supported by the printing device **101** in the attribute information of the ability registration request.
[0064] A packet **901** is another example of a packet that is transmitted as the ability registration request. The packet **901** includes operation information and attribute information. The packet **901** differs from the packet **900** in the attribute information. The attribute information included in the packet **901** does not include the attribute values “identify-actions-supported” and “identify-actions-default”. If there is no enabled identification action or no identification action is supported, the print server **102** transmits such an ability registration request to the printing device **101**.
[0065] Upon receiving the ability registration request, the print server **102** stores ability information included in the ability registration request in the storage device **304** in association with the printing device **101** that has transmitted the ability registration request. This ability information may also be transmitted to the information processing device **104** in response to a request from the information processing device **104** as described later.
[0066] A packet **902** is an example of a packet that is transmitted as the ability registration response to the packets **900** and **901**. The packet **902** includes operation information and status information. In the packet **902**, the operation information is represented by “Operation”. The operation information included in the packet **902** has a value indicating that the executed operation is the ability registration response. In the packet **902**, the status information is represented by “Status Code”. The status information included in the packet **902** has a value indicating that the ability information of the printing device **101** that has transmitted the ability registration request has been successfully registered. If the print server **102** succeeded in registering the ability information of the printing device **101** in response to the ability registration request, the print server **102** transmits an ability registration response having such a value to the printing device **101**. On the other hand, if the print server **102** failed to register the ability information of the printing device **101** in response to the ability registration request, the print server **102** may transmit an ability registration response having a value indicating the failure to the printing device **101**.
[0067] The printing device **101** may execute step S**505** again in response to a change in the ability information of the printing device **101**, e.g., if settings regarding the identification actions are changed with use of the setting screen **400**, for example. Thus, the ability information of the printing device **101** stored in the print server **102** is updated.

Printing Device Registration Action

[0068] The following describes actions performed by the information processing device **104** to search for printers that can be registered in the information processing device **104** and register a printer designated by the user in the information processing device **104** with reference to FIG. **10**. The actions shown in FIG. **10** may be started in response to an instruction given from the user of the information processing device **104** with use of the input device **310** of the information processing device **104** to start a search for printers, for example. A printer that is registered in the information processing device **104** can be used by the information processing device **104**. The actions of the information processing device **104** may be realized by the CPU **301** of the information processing device **104** by executing a program read into the RAM **302** of the information processing device **104**, for example. An action that is not shown in FIG. **10** may also be executed to register a printer in the information processing device **104**.
[0069] In step S**1001**, the information processing device **104** searches for printers that can be

registered in the information processing device **104** and generates a list including information of found printers. The information processing device **104** may search for only local printers, only cloud printers, or both local printers and cloud printers. The type of printers to be searched for may be designated by the user or set in the information processing device **104** in advance. In the case where the information processing device **104** searches for both local printers and cloud printers, the information processing device **104** may search for either local printers or cloud printers first, or may search for local printers and cloud printers in parallel.

[0070] The following describes a method with which the information processing device **104** searches for cloud printers that can be registered in the information processing device **104** and generates a list including information of found cloud printers with reference to FIG. **11**. As described above, cloud printers may be the printing devices **101** registered in the print server **102**. The method shown in FIG. **11** may be executed as a part of step S**1001**.

[0071] In step S**1101**, the information processing device **104** requests the print server **102** to provide information of cloud printers that can be registered in the information processing device **104**. In response to this request, the print server **102** provides information of cloud printers that can be registered in the information processing device **104**. The cloud printers that can be registered in the information processing device **104** may be all printers registered in the print server **102**. Alternatively, the cloud printers that can be registered in the information processing device **104** may be printers for which the information processing device **104** has the right to use, among printers registered in the print server **102**.

[0072] In step S**1102**, the information processing device **104** determines whether or not information of cloud printers has been obtained. Upon determining that information of cloud printers has been obtained (YES in step S**1102**), the information processing device **104** proceeds to step S**1103**, otherwise (NO in step S**1102**) ends the processing.

[0073] In step S**1103**, the information processing device **104** generates a list including the information of cloud printers obtained from the print server **102**. If a cloud printer whose information has been obtained from the print server **102** has already been registered in the information processing device **104**, the information processing device **104** need not include the cloud printer in the list.

[0074] In step S**1104**, the information processing device **104** selects one cloud printer for which processing in the following steps S**1105** to S**1107** has not been performed, from the cloud printers included in the list generated in step S**1103**. In step S**1105**, the information processing device **104** obtains attribute information of the selected cloud printer. The attribute information may be obtained by transmitting and receiving packets that conform to the IPP. The attribute information of the cloud printer may include ability information of the cloud printer. If the cloud printer can execute an identification action, the ability information of the cloud printer may include the type of the identification action that can be executed by the cloud printer.

[0075] In step S**1106**, the information processing device **104** determines whether or not the selected cloud printer can execute an identification action. Upon determining that the selected cloud printer can execute an identification action (YES in step S**1106**), the information processing device **104** proceeds to step S**1107**, otherwise (NO in step S**1106**) proceeds to step S**1108**.

[0076] If the attribute information indicating supported operation information (operations-supported) of the cloud printer includes information of an identification action (identify-actions-supported), the information processing device **104** may determine that the cloud printer can execute the identification action. If the attribute information indicating supported operation information (operations-supported) of the cloud printer does not include information of an identification action (identify-actions-supported), the information processing device **104** may determine that the cloud printer cannot execute the identification action. If a printing device **101** supports an identification action and the identification action is enabled, it is determined that a cloud printer associated with the printing device **101** can execute the identification action. If the printing device **101** does not

support an identification action or the printing device **101** supports the identification action but the identification action is disabled, it is determined that the cloud printer associated with the printing device **101** cannot execute the identification action.

[0077] In step S**1107**, the information processing device **104** adds information indicating the type of the identification action that can be executed by the selected cloud printer to the list.

[0078] In step S**1108**, the information processing device **104** determines whether or not the processing in steps S**1105** to S**1107** has been executed for all of the cloud printers included in the list generated in step S**1103**. Upon determining that the processing has been executed for all of the cloud printers (YES in step S**1108**), the information processing device **104** ends the processing, otherwise (NO in step S**1108**) returns to step S**1104**.

[0079] The following describes a method with which the information processing device **104** searches for local printers that can be registered in the information processing device **104** and generates a list including information of found local printers with reference to FIG. **12**. The method shown in FIG. **12** may be executed as a part of step S**1001**.

[0080] In step S**1201**, the information processing device **104** searches for local printers that are connected to the LAN **107** to which the information processing device **104** is connected, with use of mDNS. In step S**1202**, the information processing device **104** determines whether or not local printers have been found. Upon determining that local printers have been found (YES in step S**1202**), the information processing device **104** proceeds to step S**1203**, otherwise (NO in step S**1202**) ends the processing.

[0081] In step S**1203**, the information processing device **104** generates a list including information of the found local printers. If a found local printer has already been registered in the information processing device **104**, the information processing device **104** need not include the local printer in the list.

[0082] Processing in steps S**1204** to S**1208** is the same as the processing in steps S**1104** to S**1108**, except that targets of the processing are local printers, and therefore, redundant descriptions thereof are omitted.

[0083] Referring back to FIG. **10**, in step S**1002**, the information processing device **104** presents to the user a screen including the list of printers that can be registered. The list of printers that can be registered may be a combination of a list of cloud printers generated based on a search result obtained through the actions shown in FIG. **11** and a list of local printers generated based on a search result obtained through the actions shown in FIG. **12**. The list need not include printers that have already been registered in the information processing device

[0084] The following describes an example of a registration screen **1300** including the list of printers that can be registered in the information processing device **104** with reference to FIG. **13**. The information processing device **104** displays the registration screen **1300** on the output device **320** (e.g., a display) of the information processing device **104** and obtains a user operation performed on the registration screen **1300** with use of the input device **310**. The registration screen **1300** may also be used to obtain an instruction from the user to register a printer in the information processing device **104**. The registration screen **1300** may also be used to obtain an instruction from the user to cause a printer to execute an identification action.

[0085] The registration screen **1300** includes regions **1301** to **1304**. Each of the regions **1301** to **1304** is a region for displaying information of a printer that can be registered in the information processing device **104** and obtaining a user instruction to the printer.

[0086] The information processing device **104** may display information of a cloud printer that is associated with the printing device **101**A in the region **1301**, for example. The region **1301** includes an icon representing a printer, information of the manufacturer and the model of the printer, a label (“Cloud Printer”) indicating that the printer is a cloud printer, and buttons **1305** and **1306** for obtaining instructions to execute identification actions. The information processing device **104** may register the cloud printer associated with the printing device **101**A in response to the icon in the

region **1301** being pressed by the user.
[0087] In the following description, it is assumed that information of the printing device **101**A indicates that the printing device **101**A can execute sound and flash as identification actions. In this case, the information processing device **104** presents to the user an indication that the printing device **101**A can execute the identification actions. Furthermore, the information processing device **104** presents to the user the types of identification actions that can be executed by the printing device **101**A.
[0088] Specifically, if the printing device **101**A can execute sound, the information processing device **104** may include the button **1305** in the region **1301**. The button **1305** is a graphic object for obtaining a user instruction to cause the cloud printer to execute sound as an identification action. The button **1305** is provided with a label "sound". If the printing device **101**A can execute flash, the information processing device **104** may include the button **1306** in the region **1301**. The button **1306** is a graphic object for obtaining a user instruction to cause the cloud printer to execute flash as an identification action. The button **1306** is provided with a label "flash".
[0089] As described above, the information processing device **104** presents to the user an indication that the printing device **101**A can execute identification actions by including the buttons **1305** and **1306** in the region **1301**. Furthermore, the information processing device **104** presents to the user an indication that the printing device **101**A can execute the specific type of identification action (in this example, sound) by providing the button **1305** with the label "sound". Similar can be said for the button **1306**.
[0090] The region **1302** may show information of a cloud printer associated with the printing device **101**B, for example. The region **1302** may be similar to the region **1301**, except that the printing device **101**B can execute only flash as an identification action.
[0091] The region **1303** may show information of the printing device **103**A found as a local printer, for example. The region **1303** may include a label ("Printer") indicating that the printer is a local printer. The other aspects of the region **1303** may be similar to those of the region **1301**.
[0092] The region **1304** may show information of the printing device **103**B found as a local printer, for example. The region **1304** may include the label ("Printer") indicating that the printer is a local printer. The other aspects of the region **1304** may be similar to those of the region **1302**.
[0093] Referring back to FIG. **10**, in step S**1003**, the information processing device **104** determines whether or not an instruction to cause a printer to execute an identification action has been obtained from the user. The instruction to cause a printer to execute an identification action will be referred to as an identification action instruction. Upon determining that the identification action instruction has been obtained (YES in step S**1003**), the information processing device **104** proceeds to step S**1004**, otherwise (NO in step S**1003**) proceeds to step S**1005**. As described above, the identification action instruction can be obtained with use of the buttons **1305**, **1306**, etc., in the registration screen **1300**, for example. The identification action instruction may include designation of a printer that is to execute an identification action and designation of the type of identification action to be executed by the printer. Alternatively, the identification action instruction may include only designation of a printer that is to execute an identification action, without including designation of the type of identification action to be executed by the printer. In this case, the information processing device **104** may request the designated printer to execute a default identification action. For example, the registration screen **1300** may include a button for obtaining an instruction to cause the printer to execute the default identification action, instead of or in addition to the buttons **1305** and **1306**.
[0094] In step S**1004**, the information processing device **104** causes the printer designated by the user to execute the identification action. If the printer designated by the user is a cloud printer, the information processing device **104** requests the print server **102** to cause the printer to execute the identification action. If the printer designated by the user is a local printer, the information processing device **104** requests the printing device **103** functioning as the local printer to execute

the identification action.
[0095] In step S**1005**, the information processing device **104** determines whether or not an instruction to register the printer in the information processing device **104** has been obtained from the user. The instruction to register the printer in the information processing device **104** will be referred to as a printer registration instruction. Upon determining that the printer registration instruction has been obtained (YES in step S**1005**), the information processing device **104** proceeds to step S**1006**, otherwise (NO in step S**1005**) proceeds to step S**1007**. As described above, the printer registration instruction can be obtained with use of an icon of the printer in the registration screen **1300**, for example. The printer registration instruction may include designation of the printer to be registered.
[0096] In step S**1006**, the information processing device **104** registers the printer designated by the user in the information processing device **104**. Thereafter, the information processing device **104** can input a print job to the registered printer.
[0097] In step S**1007**, the information processing device **104** determines whether or not an instruction to end the registration processing has been obtained from the user. The instruction to end the registration processing will be referred to as a registration end instruction. Upon determining that the registration end instruction has been obtained (YES in step S**1007**), the information processing device **104** ends the processing, otherwise (NO in step S**1007**) returns to step S**1003**.
[0098] In the method described above, the information processing device **104** registers one or more printers in the information processing device **104** in response to printer registration instructions until the information processing device **104** obtains the registration end instruction. Alternatively, the information processing device **104** may obtain a printer registration instruction for a printer, and end the method shown in FIG. **10** upon registering the printer.
Identification Action of Cloud Printer
[0099] The following describes a method with which the information processing device **104** causes a cloud printer to execute an identification action in step S**1004** with reference to FIG. **14**. The information processing device **104** executes the method shown in FIG. **14** in the case where the printer designated in the identification action instruction is a cloud printer.
[0100] In step S**1401**, the information processing device **104** transmits to the print server **102** a request to cause the cloud printer to execute an identification action. The request to cause the cloud printer to execute an identification action will be referred to as an identification action request. The identification action request may include designation of the printer that is to execute an identification action and designation of the type of identification action to be executed by the printer. The printer that is to execute an identification action may be a printer designated by the user with use of the registration screen **1300**. The type of identification action to be executed by the printer may be a type of identification action designated by the user with use of the registration screen **1300**. For example, when the button **1305** is pressed by the user, execution of sound by the printer shown in the region **1301** is designated. If the user has not designated the type of identification action, the information processing device **104** need not include designation of the type of identification action to be executed in the identification action request.
[0101] In step S**1402**, upon receiving the identification action request, the print server **102** transmits a request for execution of the identification action to the printing device **101** associated with the cloud printer designated in the identification action request. The request for execution of the identification action will be referred to as an identification action execution request. The identification action execution request may include designation of the type of identification action to be executed. If the type of identification action to be executed is not designated in the identification action request, the print server **102** need not include designation of the type of identification action to be executed in the identification action execution request.
[0102] Upon receiving the identification action execution request, the printing device **101** executes

the identification action in step S**1403**. If the type of identification action is designated in the identification action execution request, the printing device **101** executes the designated identification action. For example, if sound is designated in the identification action execution request, the printing device **101** outputs a sound (e.g., a beep sound) with use of a speaker. If the type of identification action is not designated in the identification action execution request, the printing device **101** executes a default identification action. Thus, the information processing device **104** may cause the printing device **101** to execute a specific type of identification action.
[0103] After executing the identification action or failing to execute the identification action, the printing device **101** transmits an identification action execution response to the print server **102** in step S**1404** as a response to the identification action execution request. The identification action execution response may include an execution status (success or failure) of the identification action.
[0104] After receiving the identification action execution response, the print server **102** transmits an identification action response to the information processing device **104** in step S**1405** as a response to the identification action request. The identification action response may include the execution status (success or failure) of the identification action included in the identification action execution response.
[0105] If the execution status of the identification action included in the identification action response indicates that the printing device **101** has executed the identification action, the information processing device **104** may present to the user an indication that the identification action has been executed, in step S**1406**. For example, the information processing device **104** may present to the user an indication that the printing device **101** has executed the identification action by changing the manner of display of a graphic object for obtaining an instruction to cause the printing device **101** to execute the identification action. For example, if the information processing device **104** has received an identification action response that includes a notification indicating that sound was successfully executed after the printing device **101**A was caused to execute sound in response to the button **1305** being pressed by the user, the information processing device **104** may change the manner of display of the button **1305**. The manner of display of the button **1305** may be changed by causing the button **1305** to flash. This enables the user to recognize that the identification action is executed by the designated printer. Another method may also be used to notify the user that the designated printer has executed the identification action. On the other hand, if the information processing device **104** has received an identification action response that includes a notification indicating a failure to execute the identification action, the information processing device **104** may notify the user of the failure.
[0106] After causing the designated printer to execute the identification action, the user confirms that a printer in the vicinity of the user is executing the identification action. After confirming that the printer executing the identification action is the printer that the user wants to register, the user may register the printer. Thus, the user can register the intended printer in the information processing device **104**. The printing device **101** may automatically end the identification action after executing the identification action for a predetermined period of time. Alternatively, the printing device **101** may end the identification action in response to an instruction from the user. The instruction from the user may be given via the information processing device **104** or with use of the operation unit **240** of the printing device **101**.
Identification Action of Local Printer
[0107] The following describes a method with which the information processing device **104** causes a local printer to execute an identification action in step S**1004** with reference to FIG. **15**. The information processing device **104** executes the method shown in FIG. **15** in the case where the printer designated in the identification action instruction is a local printer.
[0108] In step S**1501**, the information processing device **104** transmits an identification action execution request to the printing device **103** that operates as the printer designated by the user with use of the registration screen **1300**. As described above, the identification action execution request

is a request for execution of an identification action. The identification action execution request may include designation of the type of identification action to be executed. The type of identification action to be executed by the printer may be a type of identification action designated by the user with use of the registration screen **1300**. If the user has not designated the type of identification action, the information processing device **104** need not include designation of the type of identification action to be executed in the identification action execution request.

[0109] In step S**1502**, the printing device **103** executes the identification action similarly to step S**1403**. After executing the identification action or failing to execute the identification action, the printing device **103** transmits an identification action execution response to the print server **102** in step S**1503** as a response to the identification action execution request. The identification action execution response may include an execution status (success or failure) of the identification action. In step S**1504**, the information processing device **104** may present to the user an indication that the printing device **103** has executed the identification action similarly to step S**1406**.

[0110] After causing the designated printer to execute the identification action, the user confirms that a printer in the vicinity of the user is executing the identification action. After confirming that the printer executing the identification action is the printer that the user wants to register, the user may register the printer. Thus, the user can register the intended printer in the information processing device **104**.

[0111] The identification action execution request and the identification action execution response may be transmitted with use of packets that conform to the IPP. Examples of such packets will be described with reference to FIG. **16**. A packet **1600** is an example of a packet that is transmitted as the identification action execution request. The packet **1600** includes operation information and attribute information. In the packet **1600**, the operation information is represented by “Operation”. The operation information included in the packet **1600** has a value indicating that the executed operation is the identification action execution request. In the packet **1600**, the attribute information is represented by “Requested-attributes”. The attribute information included in the packet **1600** includes designation of the type of identification action. Sound is designated in the packet **1600**.

[0112] A packet **1601** is an example of a packet that is transmitted as the identification action execution response to the packet **1600**. The packet **1601** includes operation information, status information, and attribute information. In the packet **1601**, the operation information is represented by “Operation”. The operation information included in the packet **1601** has a value indicating that the executed operation is the identification action execution response. In the packet **1601**, the status information is represented by “Status Code”. The status information included in the packet **1601** has a value indicating that the identification action has been successfully executed. If the printing device **200** succeeded in executing the identification action, the printing device **200** transmits an identification action execution response having such a value to the information processing device **104** or the print server **102**. In the packet **1601**, the attribute information is represented by “Attribute”. The attribute information included in the packet **1601** includes the type of executed identification action.

[0113] A packet **1602** is another example of a packet that is transmitted as the identification action execution response to the packet **1600**. The packet **1602** includes operation information and status information. The packet **1602** differs from the packet **1601** in the status information. The status information included in the packet **1602** has a value indicating a failure to execute the identification action and the reason for the failure. If the printing device **200** failed to execute the identification action, the printing device **200** transmits an identification action execution response having such a value to the information processing device **104** or the print server **102**.

[0114] As described above, the identification action execution request and the identification action execution response may be transmitted with use of packets that conform to the IPP. Instead of or in addition to the identification action execution request and the identification action execution response, the identification action request and the identification action response may be transmitted

with use of packets that conform to the IPP. A packet that is transmitted as the identification action request may be similar to the packet **1600**. A packet that is transmitted as the identification action response may be similar to the packet **1601** or **1602**.

Variation of Printing Device Registration Operation

[0115] The printing device **200** may execute the same type of identification action (e.g., sound) in the same manner irrespective of whether the printing device **200** has received the identification action execution request from the print server **102** or from the information processing device **104**. Alternatively, the printing device **200** may execute the same type of identification action (e.g., sound) in different manners based on whether the printing device **200** has received the identification action execution request from the print server **102** or from the information processing device **104**. This method will be described with reference to FIG. **17**.

[0116] In step S**1701**, the printing device **200** determines whether or not an identification action execution request has been received. Upon determining that an identification action execution request has been received (YES in step S**1701**), the printing device **200** proceeds to step S**1702**, otherwise (NO in step S**1701**) repeats step S**1701**. That is to say, the printing device **200** waits for the reception of an identification action execution request.

[0117] In step S**1702**, the printing device **200** determines whether or not the identification action execution request has been received from the print server **102**. Upon determining that the identification action execution request has been received from the print server **102** (YES in step S**1702**), the printing device **200** proceeds to step S**1703**, otherwise (NO in step S**1702**) proceeds to step S**1704**. If it is not determined that the identification action execution request has been received from the print server **102**, the identification action execution request has been received from the information processing device **104**.

[0118] In step S**1703**, the printing device **200** executes an identification action in accordance with the identification action execution request from the print server **102**. In step S**1704**, the printing device **200** executes an identification action in accordance with the identification action execution request from the information processing device **104**. Even if the identification action performed in step S**1703** and the identification action performed in step S**1704** are the same type of identification action, the identification actions may be performed in different manners. For example, in the case where sound is designated, the printing device **200** may output a sound with a larger sound volume and/or for a longer duration in step S**1703** when compared with step S**1704**. For example, in the case where flash is designated, the printing device **200** may emit light with a higher light intensity, for a longer period of time, at shorter flashing intervals, or with a combination of any of these in step S**1703** when compared with step S**1704**. If an identification action is executed in different manners as described above, the user can easily recognize whether the printing device **200** executing the identification action is operating as a cloud printer or a local printer.

Other Embodiments

[0119] Embodiment(s) of the present invention 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 embodiment(s) 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 embodiment(s), 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 embodiment(s) and/or controlling the one or more circuits to perform the functions of one or more of the above-described embodiment(s). 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)™), a flash memory device, a memory card, and the like.

[0120] While the present invention has been described with reference to exemplary embodiments, it is to be understood that the invention 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.

[0121] This application claims the benefit of Japanese Patent Application No. 2024-018846, filed Feb. 9, 2024, which is hereby incorporated by reference herein in its entirety.

Claims

1. An information processing device comprising: an obtaining unit configured to obtain information of a printing device that can be registered in the information processing device by searching for one or more printing devices registered in a print server and one or more printing devices connected to a local area network to which the information processing device is connected; a presentation unit configured to, in a case where the information indicates that the printing device is capable of executing an identification action that assists a user in identifying the printing device, present to the user an indication that the printing device corresponding to the information is capable of executing the identification action; a request unit configured to cause the printing device to execute the identification action in response to an instruction from the user to cause the printing device selected from one or more presented printing devices to execute the identification action; and a registration unit configured to register the printing device in the information processing device in response to an instruction from the user to register the printing device in the information processing device.

2. The information processing device according to claim 1, wherein the presentation unit generates a list of one or more printing devices that can be registered in the information processing device based on a result of search performed by the obtaining unit, presents the list to the user, and with respect to each printing device included in the list, in a case where the information of the printing device indicates that the printing device is capable of executing the identification action, presents to the user an indication that the printing device is capable of executing the identification action.

3. The information processing device according to claim 1, wherein, in a case where the information of the printing device includes a type of the identification action that can be executed by the printing device, the presentation unit presents to the user the type of the identification action that can be executed by the printing device.

4. The information processing device according to claim 1, wherein, in response to an instruction from the user to cause the printing device to execute a specific type of the identification action, the request unit causes the printing device to execute the specific type of the identification action.

5. The information processing device according to claim 1, wherein the identification action includes at least one of outputting audio information from the printing device and outputting visual information from the printing device.

6. The information processing device according to claim 1, wherein, in a case where the information processing device has received information indicating that the printing device has executed the identification action, the presentation unit presents to the user an indication that the printing device has executed the identification action.

7. The information processing device according to claim 6, wherein the presentation unit displays a graphic object for obtaining an instruction to cause the printing device to execute the identification action, and changes a manner of display of the graphic object to present to the user the indication that the printing device has executed the identification action.

8. The information processing device according to claim 1, wherein, in a case where the printing device is registered in a print server, the request unit causes the printing device to execute the identification action by requesting the print server to cause the printing device to execute the identification action, and in a case where the printing device is connected to the local area network to which the information processing device is connected, the request unit causes the printing device to execute the identification action by requesting the printing device to execute the identification action.

9. The information processing device according to claim 1, wherein the request unit causes the printing device to execute the identification action with use of an Internet printing protocol.

10. The information processing device according to claim 1, wherein information of a printing device registered in the print server is information registered by the printing device with use of an Internet printing protocol, and the obtaining unit obtains the information of the printing device registered in the print server with use of the Internet printing protocol, and obtains information of a printing device connected to the local area network with use of a protocol different from the Internet printing protocol.

11. The information processing device according to claim 10, wherein the protocol different from the Internet printing protocol is a multicast domain name system.

12. A non-transitory computer readable storage medium storing therein a program for causing a computer to function as the information processing device according to claim 1.

13. A method for controlling an information processing device, the method comprising: obtaining information of a printing device that can be registered in the information processing device by searching for one or more printing devices registered in a print server and one or more printing devices connected to a local area network to which the information processing device is connected; presenting to a user, in a case where the information indicates that the printing device is capable of executing an identification action that assists the user in identifying the printing device, an indication that the printing device corresponding to the information is capable of executing the identification action; causing the printing device to execute the identification action in response to an instruction from the user to cause the printing device selected from one or more presented printing devices to execute the identification action; and registering the printing device in the information processing device in response to an instruction from the user to register the printing device in the information processing device.

14. A printing system comprising: an information processing device; and a printing device, wherein the printing device includes an execution unit configured to execute an identification action that assists a user in identifying the printing device, and the information processing device includes: an obtaining unit configured to obtain information of a printing device that can be registered in the information processing device by searching for one or more printing devices registered in a print server and one or more printing devices connected to a local area network to which the information processing device is connected; a presentation unit configured to, in a case where the information indicates that the printing device is capable of executing the identification action, present to the user an indication that the printing device corresponding to the information is capable of executing the identification action; a request unit configured to cause the printing device to execute the identification action in response to an instruction from the user to cause the printing device selected from one or more presented printing devices to execute the identification action; and a registration unit configured to register the printing device in the information processing device in response to an instruction from the user to register the printing device in the information processing device.

15. The printing system according to claim 14, wherein the execution unit executes the identification action in respective different manners in a case where execution of the identification action is requested by a print server and a case where execution of the identification action is requested by the information processing device.