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Suzuki

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(54) **INFORMATION PROCESSING APPARATUS, NON-TRANSITORY COMPUTER READABLE MEDIUM, AND INFORMATION PROCESSING METHOD FOR CREATING ADAPTED WORKFLOWS FOR EXTERNAL DEVICES**

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(51) **Int. Cl.**
G06F 3/12 (2006.01)

(52) **U.S. Cl.**
CPC ***G06F 3/1275*** (2013.01); ***G06F 3/1205*** (2013.01); ***G06F 3/1253*** (2013.01); ***G06F 3/1286*** (2013.01); *G06F 3/1288* (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

9,019,527 B2 4/2015 Omori
2003/0084016 A1 * 5/2003 Norgaard G06Q 10/10 706/60
2008/0055646 A1 * 3/2008 Kawabata G06Q 10/06 358/1.16
2011/0029977 A1 * 2/2011 Ramanathaiah G06F 9/4881 718/102
2011/0043853 A1 * 2/2011 Omori H04N 1/00949 358/1.15
2012/0287463 A1 * 11/2012 Lida G06F 3/1205 358/1.15
2015/0215491 A1 * 7/2015 Faust H04N 1/00517 715/780

(Continued)

FOREIGN PATENT DOCUMENTS

CN 102129610 A * 7/2011
JP 2011044946 3/2011

(Continued)

OTHER PUBLICATIONS

"Office Action of Japan Counterpart Application", issued on Mar. 11, 2025, with English translation thereof, p. 1-p. 8.

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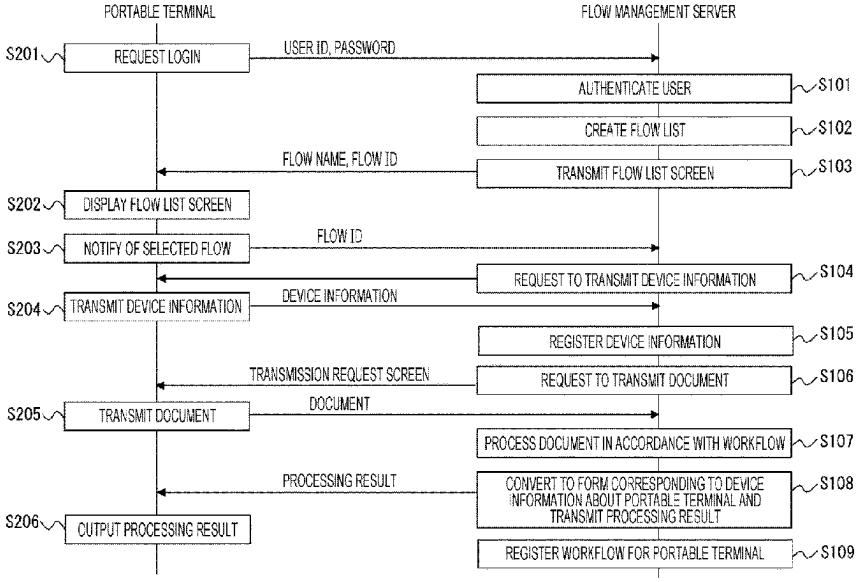
(57) **ABSTRACT**

An information processing apparatus includes a processor configured to: display on a device a flow list of flows that each include a series of processes and that have already been created; and create a flow for the device by replacing a process in a flow selected from the flow list by a user using the device with a process corresponding to device information set for the device.

12 Claims, 6 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

2017/0003923	A1*	1/2017	Hane	H04N 1/00411
2017/0118169	A1*	4/2017	Boucadair	H04L 69/22
2019/0042170	A1*	2/2019	Yamada	G06F 3/1259
2019/0102222	A1*	4/2019	Giampetro	G06F 9/4881
2020/0220989	A1*	7/2020	Kato	H04N 1/00514
2020/0293253	A1*	9/2020	Kobashi	G06F 3/1264
2021/0048964	A1*	2/2021	Deleverio	G06F 3/1208

FOREIGN PATENT DOCUMENTS

JP	2017175232	9/2017
JP	2020077902	5/2020
JP	2020107125	7/2020

* cited by examiner

FIG. 1

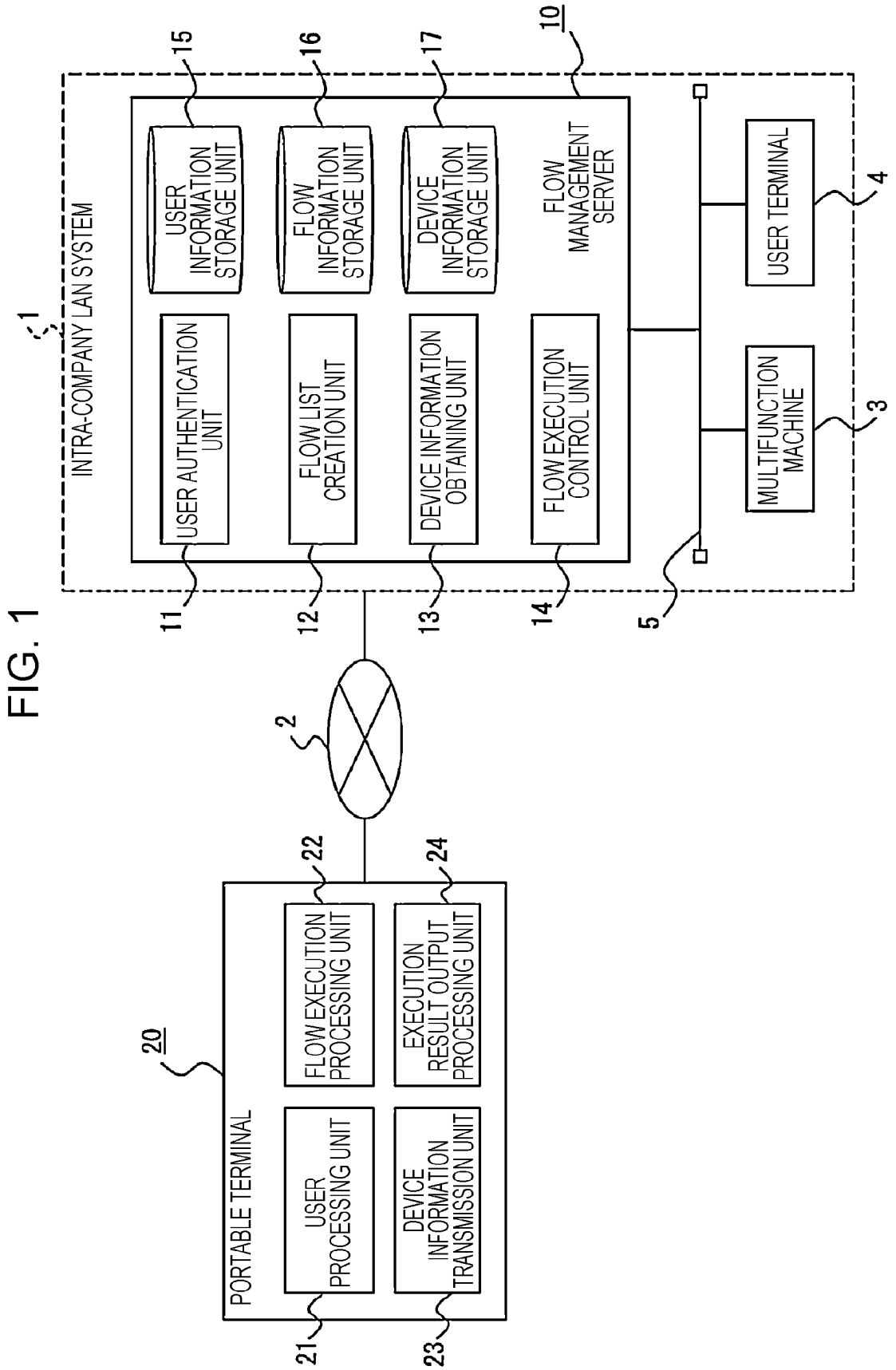

1
INTRA-COMPANY LAN SYSTEM
10
FLOW MANAGEMENT SERVER
15
USER INFORMATION STORAGE UNIT
16
FLOW INFORMATION STORAGE UNIT
17
DEVICE INFORMATION STORAGE UNIT
11
USER AUTHENTICATION UNIT
12
FLOW LIST CREATION UNIT
13
DEVICE INFORMATION OBTAINING UNIT
14
FLOW EXECUTION CONTROL UNIT
5
USER TERMINAL
4
MULTIFUNCTION MACHINE
3
2
20
PORTABLE TERMINAL
22
FLOW EXECUTION PROCESSING UNIT
24
EXECUTION RESULT OUTPUT PROCESSING UNIT
21
USER PROCESSING UNIT
23
DEVICE INFORMATION TRANSMISSION UNIT

FIG. 2

FLOW ID	FLOW NAME	PRIVILEGE INFORMATION	CONFIGURATION INFORMATION		
			INPUT	PROCESSING	OUTPUT
F001	NOISE REMOVAL PROCESS	U01, U04, ···	SCAN	NOISE REMOVAL	PRINT
F002	DIAGRAM DIFFERENCE CHECK PROCESS		READ	COMPARISON	PRINT
F003	OCR PROCESS		SCAN	CHARACTER RECOGNITION	FILE OUTPUT
· · ·					

FIG. 3

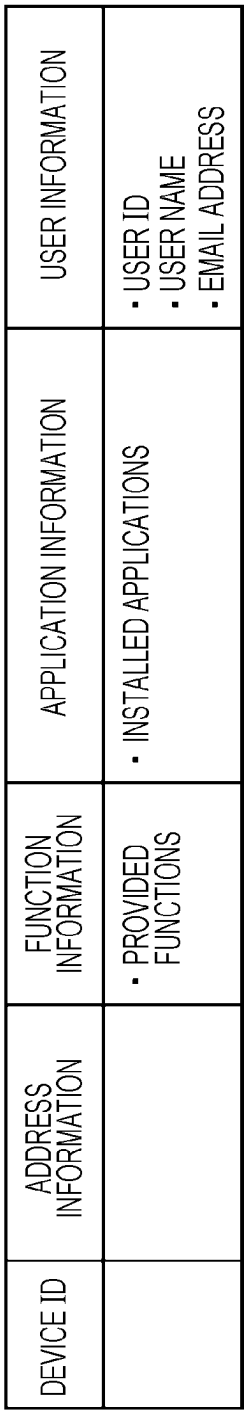

DEVICE ID
ADDRESS INFORMATION
FUNCTION INFORMATION
APPLICATION INFORMATION
USER INFORMATION
• PROVIDED FUNCTIONS
• INSTALLED APPLICATIONS
• USER ID
• USER NAME
• EMAIL ADDRESS

FIG. 4

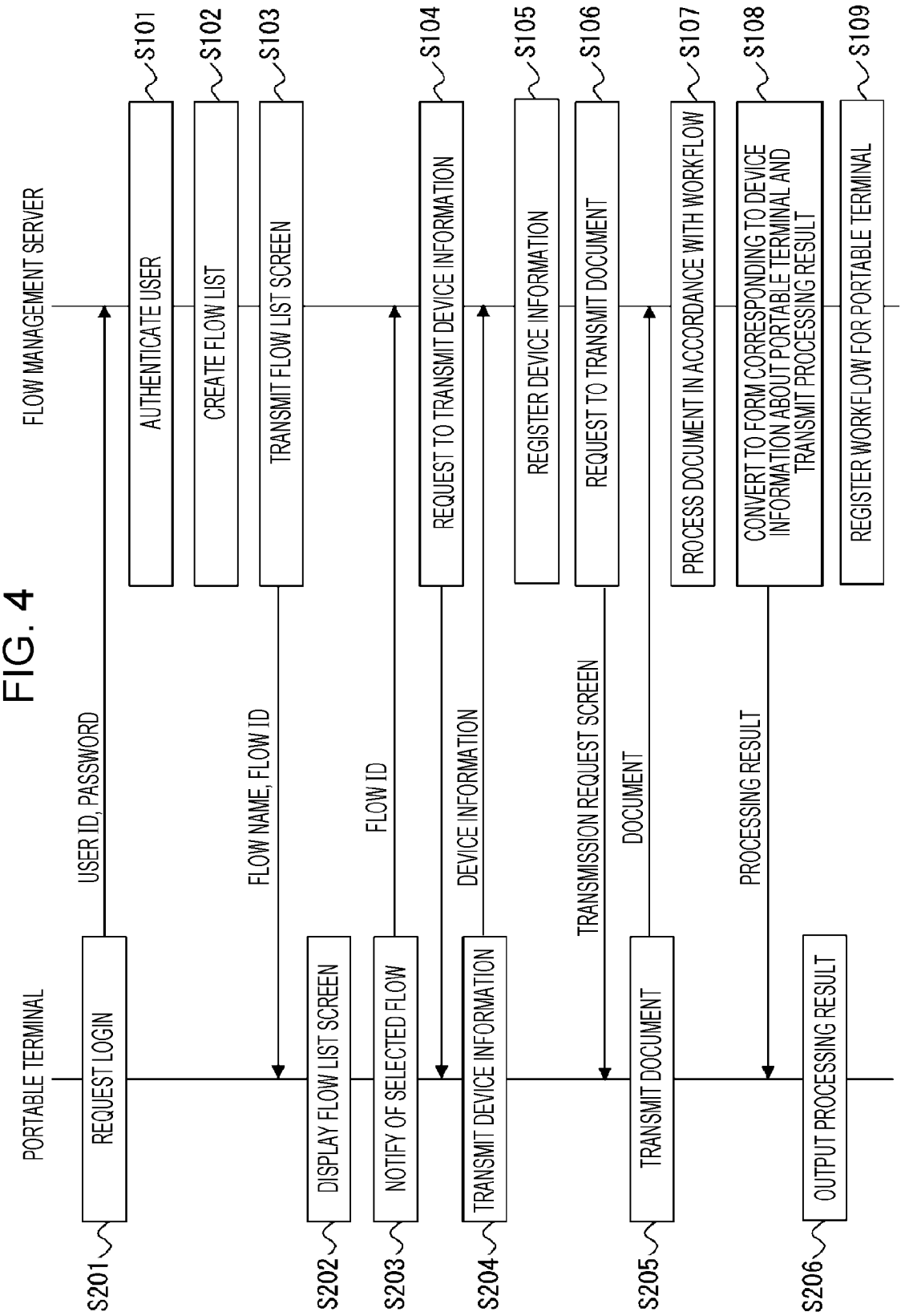

PORTABLE TERMINAL
FLOW MANAGEMENT SERVER
REQUEST LOGIN
USER ID, PASSWORD
AUTHENTICATE USER
S101
CREATE FLOW LIST
S102
TRANSMIT FLOW LIST SCREEN
S103
FLOW NAME, FLOW ID
DISPLAY FLOW LIST SCREEN
S202
FLOW ID
NOTIFY OF SELECTED FLOW
S203
REQUEST TO TRANSMIT DEVICE INFORMATION
S104
DEVICE INFORMATION
TRANSMIT DEVICE INFORMATION
S204
REGISTER DEVICE INFORMATION
S105
TRANSMISSION REQUEST SCREEN
REQUEST TO TRANSMIT DOCUMENT
S106
DOCUMENT
TRANSMIT DOCUMENT
S205
PROCESS DOCUMENT IN ACCORDANCE WITH WORKFLOW
S107
PROCESSING RESULT
CONVERT TO FORM CORRESPONDING TO DEVICE INFORMATION ABOUT PORTABLE TERMINAL AND TRANSMIT PROCESSING RESULT
S108
OUTPUT PROCESSING RESULT
S206
REGISTER WORKFLOW FOR PORTABLE TERMINAL
S109
S201

FIG. 5

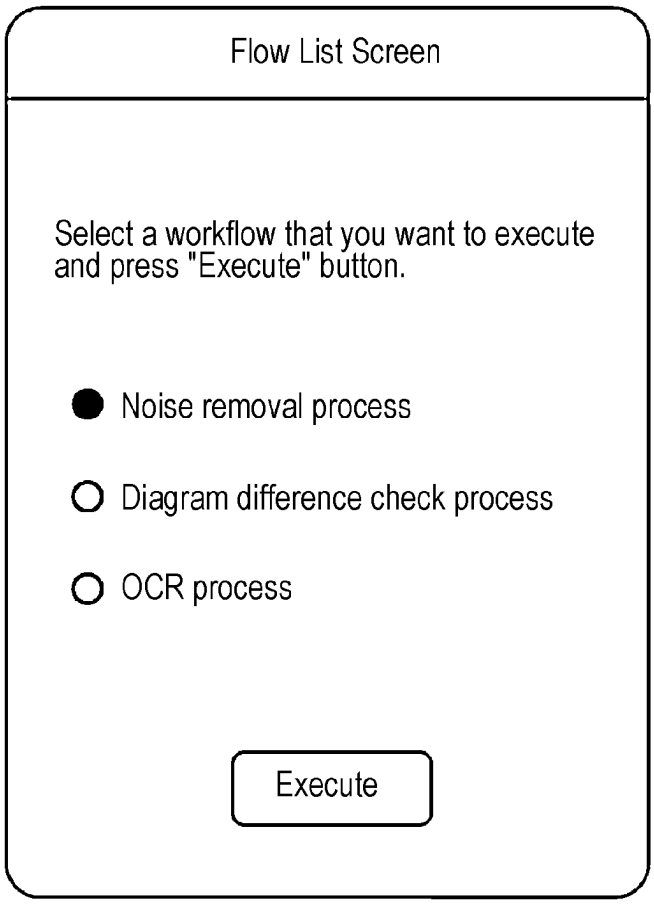
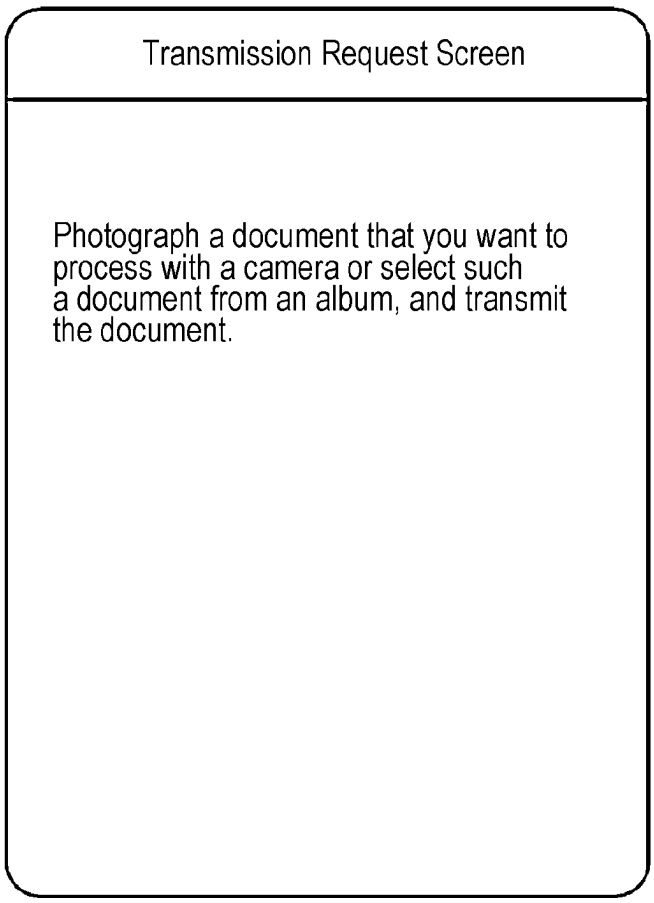

Flow List Screen
Select a workflow that you want to execute and press "Execute" button.
Noise removal process
Diagram difference check process
OCR process
Execute

FIG. 6


Transmission Request Screen
Photograph a document that you want to process with a camera or select such a document from an album, and transmit the document.

INFORMATION PROCESSING APPARATUS, NON-TRANSITORY COMPUTER READABLE MEDIUM, AND INFORMATION PROCESSING METHOD FOR CREATING ADAPTED WORKFLOWS FOR EXTERNAL DEVICES

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is based on and claims priority under 35 USC 119 from Japanese Patent Application No. 2021-128165 filed Aug. 4, 2021.

Background

(i) Technical Field

The present disclosure relates to an information processing apparatus, a non-transitory computer readable medium, and an information processing method.

(ii) Related Art

In enterprises, people may create workflows to carry out operations. For example, a person may carry out a predetermined operation in accordance with a workflow that is a series of processes including input of a process target document, processing that is performed for the input document, and output of a processing result.

Workflows are basically registered in an intra-company multifunction machine or management server and used at the intra-company multifunction machine or from user terminals. Recently, remote work has been on the rise and there has been a demand for making workflows managed within a company executable from outside the company by using portable terminals.

Examples of the related art include Japanese Unexamined Patent Application Publication Nos. 2020-077902, 2017-175232, and 2011-044946.

SUMMARY

When a person tries to use an existing internal flow from an external device as is, a function used in the flow might not be installed in the externally used device. Therefore, a flow that is externally executable is to be created.

However, creation of the flow for the externally used device from scratch may involve substantial effort.

Aspects of non-limiting embodiments of the present disclosure relate to creating a flow that is adapted to an externally used device by using an already created flow more efficiently than in a case of creating the flow for the device from scratch.

Aspects of certain non-limiting embodiments of the present disclosure address the above advantages and/or other advantages not described above. However, aspects of the non-limiting embodiments are not required to address the advantages described above, and aspects of the non-limiting embodiments of the present disclosure may not address advantages described above.

According to an aspect of the present disclosure, there is provided an information processing apparatus including a processor configured to: display on a device a flow list of flows that each include a series of processes and that have already been created; and create a flow for the device by replacing a process in a flow selected from the flow list by a user using the device with a process corresponding to device information set for the device.

BRIEF DESCRIPTION OF THE DRAWINGS

An exemplary embodiment of the present disclosure will be described in detail based on the following figures, wherein:

FIG. **1** is an overall configuration diagram illustrating a workflow system in the present exemplary embodiment;

FIG. **2** is a diagram illustrating an example data structure of flow information stored in a flow information storage unit in the present exemplary embodiment;

FIG. **3** is a diagram illustrating an example data structure of device information stored in a device information storage unit in the present exemplary embodiment;

FIG. **4** is a sequence chart illustrating processes that are performed in a case where a user executes a workflow from outside a company by using a portable terminal in the present exemplary embodiment;

FIG. **5** is a diagram illustrating an example of a flow list screen in the present exemplary embodiment; and

FIG. **6** is a diagram illustrating an example of a transmission request screen for a document in the present exemplary embodiment.

DETAILED DESCRIPTION

Hereinafter, an exemplary embodiment of the present disclosure will be described with reference to the drawings.

FIG. **1** is an overall configuration diagram illustrating a workflow system in the present exemplary embodiment. The workflow system is a system constituted by an intra-company local area network (LAN) system **1** that is built within a company, such as an office of an enterprise, and a portable terminal **20** that is used outside the company connected to each other by a network **2**, which is, for example, the Internet, to manage and execute workflows.

"Workflow" is also defined as an operation flow. Specifically, with a workflow, a series of processes is performed sequentially to thereby provide a predetermined operational process. When a process flow is called "flow", a workflow is an example of the flow. In the present exemplary embodiment, a workflow is assumed to be an example of the flow, and a description will be given. Therefore, "workflow" and "flow" are assumed to be synonymous with each other. Accordingly, "workflow" may be simply referred to as "flow".

"Outside the company" refers to a place that is outside the enterprise in which the intra-company LAN system **1** is built and that is a co-working space, a home of, for example, an employee of the enterprise, or the like. The intra-company LAN system **1** and the portable terminal **20** are connected to each other via, for example, a virtual private network (VPN) to thereby exchange data while safety in terms of security is ensured. The network environment for which safety is ensured is built by using an existing technique, and therefore, a description of the network connection will be omitted in the present exemplary embodiment.

The intra-company LAN system **1** is constituted by a flow management server **10**, a multifunction machine **3**, and a user terminal **4** connected to each other by a LAN **5**. Although FIG. **1** illustrates only one multifunction machine **3** and one user terminal **4**, plural multifunction machines **3** and plural user terminals **4** may be connected.

The multifunction machine **3** is an example of an image forming apparatus having various functions including a print

function, a copy function, and a scanner function and is an apparatus that includes a computer. The multifunction machine **3** is a device that performs all or some of the process functions of workflows. The multifunction machine **3** in the present exemplary embodiment may be implemented as an existing general-purpose image forming apparatus. That is, the multifunction machine **3** includes hardware, such as a central processing unit (CPU), a read-only memory (ROM), a random access memory (RAM), an operation panel that serves as a user interface, a hard disk drive (HDD) that serves as a memory, a network interface that serves as a communication unit, a scanner, and a printer.

The user terminal **4** is an information processing apparatus that is used within the company by, for example, an employee of the enterprise (hereinafter referred to as "user"), and is implemented as an existing general-purpose hardware configuration of, for example, a personal computer (PC). That is, the user terminal **4** includes hardware, such as a CPU, a ROM, a RAM, a mouse, a keyboard, and a display that serve as a user interface, an HDD that serves as a memory, and a network interface that serves as a communication unit. The user terminal **4** is an example of a device that is used by a user who wants to use, within the company, workflows managed by the flow management server **10**. The user terminal **4** taken out of the company and used may serve as the portable terminal **20**.

The flow management server **10** is provided as an example of the information processing apparatus according to the exemplary embodiment of the present disclosure. The flow management server **10** may be implemented as a hardware configuration of an existing general-purpose server computer. That is, the flow management server **10** includes a CPU, a ROM, a RAM, an HDD that serves as a memory, and a network interface that serves as a communication unit.

The flow management server **10** manages workflows that are executed in the intra-company LAN system **1** and also executes workflows, for example, in cooperation with other devices including the multifunction machine **3**. As illustrated in FIG. **1**, the flow management server **10** includes a user authentication unit **11**, a flow list creation unit **12**, a device information obtaining unit **13**, a flow execution control unit **14**, a user information storage unit **15**, a flow information storage unit **16**, and a device information storage unit **17**. Note that a constituent element not described in the present exemplary embodiment is omitted in FIG. **1**.

The user authentication unit **11** performs user authentication in response to a login request from a user. As "user" in the present exemplary embodiment, an employee of the enterprise is assumed as described above. A user has an account for logging in to the flow management server **10**. The flow list creation unit **12** creates, for a logged-in user, a list of workflows (also referred to as "flow list") available to the user. The device information obtaining unit **13** obtains information regarding the portable terminal **20** used by the logged-in user as device information. The flow execution control unit **14** controls execution of a workflow selected by the user from the flow list.

In the user information storage unit **15**, personal information about a user having an account on the flow management server **10** is stored as user information. The user information includes a user ID that is typically used as a login ID, a password that is input at the time of login, a user name, and privileges granted to the user.

FIG. **2** is a diagram illustrating an example data structure of flow information stored in the flow information storage unit **16** in the present exemplary embodiment. The flow information is information regarding workflows managed by the flow management server **10**. In the flow information, processes that constitute each workflow, the order in which the processes are performed, and so on are set. That is, in the flow information, a flow ID, a flow name, privilege information, and configuration information are set in association with one another for each workflow. The flow ID is identification information about the workflow. The flow name is the name of the workflow. As the privilege information, information regarding privileges to execute the workflow is set. With reference to the privilege information, it is possible to identify a user who is allowed to execute the workflow or processes that constitute the workflow. As the configuration information, a series of process functions that constitute the workflow is set. A workflow described in the present exemplary embodiment is assumed to include processes that are performed for a document, and a series of processes for a document is defined such that each process is classified as "input", "processing", or "output". As "input", a process function of inputting document data (hereinafter simply referred to as "document") that is a process target is set. As "processing", a process function that is executed for the input document is set. As "output", a process function of outputting a processing result is set.

FIG. **3** is a diagram illustrating an example data structure of device information stored in the device information storage unit **17** in the present exemplary embodiment. The device information is information regarding devices that request the flow management server **10** to execute workflows and that perform some of the processes included in a workflow as the case may be. In the present exemplary embodiment, devices managed with the device information include the multifunction machine **3**, the user terminal **4**, and the portable terminal **20**. In the device information, a device ID, address information, function information, application information, and user information are set in association with one another for each device. The device ID is identification information about the device. In a case where the device is a portable phone, for example, the International Mobile Equipment Identifier (IMEI) of the device may be used as the device ID. The address information is address information that is used in data communication with the device and is, for example, the Internet Protocol (IP) address of the device. When address information is added to data that is exchanged, the transmission source and the destination of the data are identified. As the function information, information about functions of the device is set. When the device uses its function, a predetermined process is performed. As the application information, information about applications installed in the device is set. Although depending on the model of the device, at least one of the function information or the application information may be included in the device information. As the user information, information regarding a user who uses the device is set. As the user information, for example, a user ID and a user name that serve as identification information about the user and an email address or the like that serves as contact information about the user are set. In a case where the device is shared, the user information may include no information or may include personal information about the administrator.

The user authentication unit **11**, the flow list creation unit **12**, the device information obtaining unit **13**, and the flow execution control unit **14** in the flow management server **10** are implemented by a cooperative operation between the computer that constitutes the flow management server **10** and a program running on the CPU mounted in the computer. The user information storage unit **15**, the flow infor-

mation storage unit **16**, and the device information storage unit **17** are implemented as the HDD mounted in the flow management server **10**. Alternatively, the RAM may be used or a memory in the intra-company LAN system **1** may be used via the network.

The portable terminal **20** is an example of a device that is used in a case where a user uses a workflow managed by the flow management server **10** from outside the company. In the present exemplary embodiment, although a smartphone is assumed to be the portable terminal **20** and a description is given, for example, a tablet terminal or a portable PC may be used instead of a smartphone. The portable terminal **20** is implemented as an existing general-purpose hardware configuration. That is, the portable terminal **20** includes hardware, such as a CPU, a ROM, a RAM, a liquid crystal touch panel that serves as a user interface, a storage that serves as a memory, and a network interface that serves as a communication unit.

The portable terminal **20** includes a user processing unit **21**, a flow execution processing unit **22**, a device information transmission unit **23**, and an execution result output processing unit **24**. Note that a constituent element not described in the present exemplary embodiment is omitted in FIG. **1**.

The user processing unit **21** performs a login process and a logout process for the flow management server **10**. The flow execution processing unit **22** performs a process for using a workflow managed by the flow management server **10**. The device information transmission unit **23** transmits device information regarding the portable terminal **20** in response to a request from the flow management server **10**. The execution result output processing unit **24** performs a process for outputting an execution result of a workflow executed under the control of the flow management server **10**.

The user processing unit **21**, the flow execution processing unit **22**, the device information transmission unit **23**, and the execution result output processing unit **24** in the portable terminal **20** are implemented by a cooperative operation between the computer that constitutes the portable terminal **20** and a program running on the CPU mounted in the computer.

Any program used in the present exemplary embodiment may be provided via a communication unit as a matter of course or may be stored in a computer-readable recording medium, such as a compact disc read-only memory (CD-ROM) or a Universal Serial Bus (USB) memory, and provided. The program provided via the communication unit or the recording medium is installed in a computer, and a CPU of the computer executes the program step by step to thereby implement various processes.

Now, an operation in the present exemplary embodiment will be described. One of the characteristics of the present exemplary embodiment is a process that is performed in a case where a user uses the portable terminal **20** to use, from outside the company, a workflow managed by the flow management server **10**. In a case where a workflow is executed from the multifunction machine **3** or from the user terminal **4** in the company, existing processes are to be performed, and therefore, a description of such a case will be omitted. The case where a user uses the portable terminal **20** to execute, from outside the company, a workflow will be described below with reference to the sequence chart illustrated in FIG. **4**.

A user causes the portable terminal **20** to display a predetermined login screen and makes a login request to the flow management server **10**. The user processing unit **21** in the portable terminal **20** transmits a login request that includes a user ID and a password specified on the login screen to the flow management server **10** (step S**201**).

The user authentication unit **11** in the flow management server **10** performs user authentication with reference to the user information in response to the login request transmitted from the portable terminal **20** (step S**101**). Here, it is assumed that the user authentication is successfully completed, and the description will be continuously given below.

Subsequently, the flow list creation unit **12** checks privileges granted to the logged-in user for workflows against privilege information set in flow information and identifies workflows for which the user is granted the privilege to execute. The flow list creation unit **12** creates a flow list that includes the flow names of the identified workflows (step S**102**). The flow list creation unit **12** transmits a flow list screen created accordingly to the portable terminal **20** to display the flow list screen on the portable terminal **20** (step S**103**). The flow list screen that is transmitted includes the flow names, which are display targets, and flow IDs corresponding to the flow names.

In response to receiving the flow list screen, the flow execution processing unit **22** displays the flow list screen on the liquid crystal panel of the portable terminal **20** (step S**202**). FIG. **5** illustrates an example of the flow list screen in the present exemplary embodiment. In response to the user selecting from the flow list, a workflow that the user wants to execute, the flow execution processing unit **22** notifies the flow management server **10** of the flow ID of the selected workflow (step S**203**). FIG. **5** illustrates example display in a case where a workflow "noise removal process" is selected.

Subsequently, in response to receiving the flow ID of the user-selected workflow transmitted from the portable terminal **20**, the device information obtaining unit **13** requests the portable terminal **20** to transmit device information (step S**104**). Note that the device information obtaining unit **13** may request the portable terminal **20** to transmit device information related to at least the workflow selected by the user. In a case where information regarding all functions and applications of the portable terminal **20** is to be obtained as device information regardless of the selected workflow, the process for obtaining device information may be performed before selection of a workflow by the user, that is, for example, before the process in step S**102**.

In response to the transmission request from the flow management server **10**, the device information transmission unit **23** in the portable terminal **20** collects and returns device information about the portable terminal **20** (step S**204**).

In response to receiving the device information transmitted from the portable terminal **20** in response to the transmission request, the device information obtaining unit **13** registers the obtained device information about the portable terminal **20** in the device information storage unit **17** (step S**105**). Although the device information that is registered in the device information storage unit **17** is transmitted in response to the transmission request from the flow management server **10**, the device information may be actively transmitted from the portable terminal **20** without waiting for the transmission request. In a case of actively transmitting the device information, the portable terminal **20** may, for example, transmit the device information together with the flow ID of the flow selected from the flow list in step S**203**.

In the example screen display illustrated in FIG. **5**, the user selects "noise removal process". In the example setting

of flow information illustrated in FIG. **2**, "input" of "noise removal process" is "scan", and therefore, it is found that the selected workflow is a workflow in which scan data of a document obtained by using a scan function of, for example, the multifunction machine **3** is used as input data.

A scanner is not connected to the portable terminal **20**, which is known with reference to the device information, and therefore, it is not possible to use "input" included in the existing "noise removal process" as is. In the present exemplary embodiment, a part (that is, "input") of the existing "noise removal process" selected by the user is replaced with a process corresponding to the device information about the portable terminal **20** to make "noise removal process" executable.

The flow execution control unit **14** recognizes that the portable terminal **20** has a camera function and a file transmission function with reference to the device information about the portable terminal **20** and requests the portable terminal **20** to transmit a document (step S**106**), which is a process that replaces "scan" set as "input" of the workflow. In the present exemplary embodiment, the flow execution control unit **14** transmits a transmission request screen for a document to the portable terminal **20** to display the transmission request screen on the portable terminal **20**. FIG. **6** illustrates an example of the transmission request screen displayed on the liquid crystal panel of the portable terminal **20** in this case.

The flow execution processing unit **22** returns a process target document in response to the transmission request from the flow management server **10** (step S**205**).

As described above, in the present exemplary embodiment, a process that replaces the process already set in the workflow is identified with reference to the device information about the portable terminal **20**, and the "input" process that is implemented with the identified process is performed.

In response to obtaining the process target document, the flow execution control unit **14** performs for the document, a process set as "processing" in the workflow by itself or in cooperation with other devices (step S**107**). The process set as "processing" is basically performed by using functions of the intra-company LAN system **1**, and therefore, it is possible to perform the process set as "processing" as is. However, in a case where, for example, a device that performs the "output" process included in the workflow is placed outside the company, the device may be unable to perform output as requested by the workflow.

For example, it is assumed that "output" in the workflow is "print" and that a device to which a processing result is delivered has a print function. In a case where creation of print data having a resolution of 4800 dpi is set as "processing" in the workflow and the upper limit of the resolution of a printer outside the company is 600 dpi, the printer to which the processing result is delivered is unable to perform the process if the existing workflow remains unchanged. Therefore, the process of creating print data set as "processing" may be replaced with a process of creating print data having a resolution of 600 dpi. As described above, even when it is possible to perform the process set as "processing" in the workflow as is, in the present exemplary embodiment, a part (that is, "processing") of the workflow may be replaced in accordance with the capability of the device to which the processing result is delivered.

In response to completion of "processing" in the workflow, the flow execution control unit **14** performs the "output" process, in the workflow, of outputting the processing result. The flow execution control unit **14** in the present exemplary embodiment refers to the device information about the portable terminal **20** and performs a process as described below to determine a destination to which the processing result is to be delivered and the form of the processing result.

In the existing "noise removal process", "output" is "print". Therefore, when "output" in "noise removal process" is performed as usual, a destination to which the processing result, that is, print data, is delivered is the multifunction machine **3** in the intra-company LAN system **1**, and the multifunction machine **3** is caused to perform the print process. However, in a case where the portable terminal **20** is not connected to the intra-company LAN system **1** to which the multifunction machine **3** is connected as in this example, "print" set as "output" in "noise removal process" is not to be processed as usual but is to be replaced. That is, the flow execution control unit **14** replaces a process of transmitting the processing result to the multifunction machine **3** with a process of transmitting the processing result to the portable terminal **20**.

Subsequently, in a case where a printer is placed at a location, such as a home, where the portable terminal **20** is used and an application having a print function of printing at the printer is installed in the portable terminal **20**, that is, in a case where it is possible to use a printer outside the intra-company LAN system **1**, the flow execution control unit **14** converts, as appropriate, the print data to a format (for example, a Portable Document Format (PDF) document) that can be processed by the portable terminal **20** and the printer, and transmits the converted print data to the portable terminal **20** as the processing result by, for example, attaching the print data to an email as an attached document (step S**108**). That is, the flow execution control unit **14** replaces the process of causing the multifunction machine **3** to print the print data with a process of transmitting to the portable terminal **20** the print data converted to the format that can be provided to the user as described above. "Format that can be provided to the user" refers to a format that can be processed, saved, and viewed by the portable terminal **20**.

In a case where an application having the print function is not installed in the portable terminal **20** but an application having a network print function, such as netprint (registered trademark), is installed therein, the flow execution control unit **14** makes a request to a confirmation number issuing source to obtain a confirmation number to be used in printing of the print data that is an output target. The flow execution control unit **14** identifies a document format that can be viewed on the portable terminal **20** on the basis of applications installed in the portable terminal **20**. In a case where the portable terminal **20** is able to process plural document formats, the flow execution control unit **14** may identify a document format to which the print data is converted, in accordance with priority levels set in advance. The flow execution control unit **14** converts the print data to the document format as appropriate and transmits the converted print data to the portable terminal **20** as the processing result together with the confirmation number (step S**108**). That is, the flow execution control unit **14** replaces the process of causing the multifunction machine **3** to print the print data to a process of transmitting to the portable terminal **20** the print data in the document format that can be provided to the user as described above and the confirmation number as the processing result. Also in this case, an email may be used to transmit the processing result.

As described above, in a case where the portable terminal **20** is able to use a printer outside the intra-company LAN system **1**, when the portable terminal **20** has the print function, the flow execution control unit **14** replaces the

existing process with the process of transmitting the print data to the portable terminal **20** as information to be used in printing at the printer, and when the portable terminal **20** does not have the print function, the flow execution control unit **14** replaces the existing process to the process of obtaining a confirmation number and transmitting the confirmation number to the portable terminal **20** together with the print data.

Note that for the user terminal **4**, replacement with the above-described process is not performed. In a case where the portable terminal **20** is taken into the company and is connected to the intra-company LAN system **1**, the portable terminal **20** can be treated similarly to the user terminal **4**. Therefore, in a case where the portable terminal **20** executes the workflow within the company, the flow execution control unit **14** does not perform the above-described process replacement.

In response to obtaining the processing result of the workflow transmitted from the flow management server **10**, the execution result output processing unit **24** in the portable terminal **20** performs a process corresponding to the form of the transmitted processing result to thereby output the print data that is the processing result (step S**206**). That is, in response to receiving an email, the execution result output processing unit **24** uses its print function to cause the printer to print the print data attached to the email. In a case where a confirmation number is added to the print data, the execution result output processing unit **24** uses its network print function to print the print data by using a multifunction copy machine placed in a nearby shop, such as a convenience store. Even in a case where there is no nearby shop or there is no time to go to a shop, the user can view a document corresponding to the print data because the print data in a document format that can be viewed on the portable terminal **20** has been created.

Note that the above description is given under the assumption that a file, such as print data, that is a processing result can be successfully transmitted from the flow management server **10** to the portable terminal **20**. However, the flow management server **10** and the portable terminal **20** might not be kept connected to the network during execution of the workflow. That is, the flow management server **10** and the portable terminal **20** might not be connected to the network at the time when the process in step S**108** is performed. Therefore, in accordance with the network connection relationship between the flow management server **10** and the portable terminal **20**, the flow execution control unit **14** may determine whether to replace the "output" process that is a part of the workflow and perform transmission as described above, or not to replace the "output" process.

An example case where the existing process is replaced with the process of transmitting a file, such as print data, that is the processing result from the flow management server **10** to the portable terminal **20** has been described above. However, the replacement process is not to be limited to the process of file transmission. For example, in a case where the volume of a file created as a result of processing is excessively large and where the network load or the storage capacity of the portable terminal **20** is taken into consideration, it may be better not to transmit the file. In this case, the flow execution control unit **14** may store the created file in a predetermined storage location in the intra-company LAN system **1** and notify the portable terminal **20** of the storage location in step S**108** as the processing result. In this case, the user of the portable terminal **20** may obtain the file when the user comes to the office.

Although "output" is assumed to be a part of the workflow here, it may be determined whether or not to replace a process set as "input" or "processing", in accordance with the network connection relationship between the flow management server **10** and the portable terminal **20**.

As described above, according to the present exemplary embodiment, even in a case where it is not possible to externally use an existing workflow as is, the entire workflow or a part of the workflow is replaced by a process that can be externally used to make the workflow executable. Therefore, the existing workflow is changed and used so as to be adapted to the environment in which the portable terminal **20** uses the workflow.

As described above, the flow execution control unit **14** replaces some of the processes in the existing workflow "noise removal process" so as to be executable by the portable terminal **20**. The flow execution control unit **14** creates flow information regarding the workflow created by process replacement and registers the flow information in the flow information storage unit **16** (step S**109**). In other words, according to the present exemplary embodiment, a workflow for the portable terminal **20** is created from an existing workflow, that is, an already created workflow. Once the workflow for the portable terminal **20** has been thus created, in a case where the user wants to execute the workflow, the user uses the workflow for the portable terminal **20** retained on the flow management server **10** by selecting the workflow for the portable terminal **20** from the flow list (steps S**202** and S**203**).

Note that to the flow information corresponding to the workflow for the portable terminal **20**, information indicating that the workflow is for external use, the user ID of the user for which the workflow is created or the device ID of the portable terminal **20**, device information about the portable terminal **20**, and so on may be linked and managed. Accordingly, the workflow for the portable terminal **20** may be used not only by the user for which the workflow is created but also from a device having an internal environment equivalent to that of the portable terminal **20**, that is, a device having functions and applications the same as or similar to those of the portable terminal **20**.

The flow execution processing unit **22** may display a workflow created for the portable terminal **20** so as to be distinguishable from other workflows on the flow list displayed on the screen to thereby allow the user to find the flow for the portable terminal **20**.

In the present exemplary embodiment, in response to the user selecting the workflow "noise removal process", a workflow "noise removal process" adapted to the portable terminal **20** is created. Meanwhile, the user may subsequently select a workflow other than "noise removal process". Therefore, the case where the user selects a workflow other than "noise removal process" is assumed, and a workflow corresponding to the other workflow, such as "diagram difference check process" or "OCR process", and adapted to the portable terminal **20** may be created in advance and prepared before selection by the user. It is possible to create the workflow corresponding to the other workflow and adapted to the portable terminal **20** with reference to device information about the portable terminal **20**. Although device information about the external device is retained and managed in the intra-company LAN system **1** in step S**105** illustrated in FIG. **4**, the internal environment of the external device, that is, functions or applications installed in the external device, may be updated, and therefore, a process may be performed to update the device information as appropriate.

In the embodiments above, the term "processor" refers to hardware in a broad sense. Examples of the processor include general processors (e.g., CPU: Central Processing Unit) and dedicated processors (e.g., GPU: Graphics Processing Unit, ASIC: Application Specific Integrated Circuit, FPGA: Field Programmable Gate Array, and programmable logic device).

In the embodiments above, the term "processor" is broad enough to encompass one processor or plural processors in collaboration which are located physically apart from each other but may work cooperatively. The order of operations of the processor is not limited to one described in the embodiments above, and may be changed.

The foregoing description of the exemplary embodiments of the present disclosure has been provided for the purposes of illustration and description. It is not intended to be exhaustive or to limit the disclosure to the precise forms disclosed. Obviously, many modifications and variations will be apparent to practitioners skilled in the art. The embodiments were chosen and described in order to best explain the principles of the disclosure and its practical applications, thereby enabling others skilled in the art to understand the disclosure for various embodiments and with the various modifications as are suited to the particular use contemplated. It is intended that the scope of the disclosure be defined by the following claims and their equivalents.

What is claimed is:

1. An information processing apparatus comprising:

a processor configured to:

display on a first device a flow list of flows that each include a series of processes and that have already been created for a second device;

receive a selection of a flow by a user using the first device;

create a new flow for the first device by replacing a process in the selected flow by determining that the first device does not have a function to perform the replaced process while the second device has the function **1** with a process corresponding to device information set for the first device;

determine whether or not to replace the process in the flow, in accordance with a network connection relationship between the first device and the information processing apparatus; and

in a case where the process in the flow is a print process of causing a printer to print an execution result of the flow, the printer being connected to a local network to which the information processing apparatus is connected, and the first device is not connected to the local network, replace the process in the flow with a process of transmitting the execution result of the flow to the first device.

2. The information processing apparatus according to claim **1**, wherein the device information includes information about at least one of a function or an application set in the first device.

3. The information processing apparatus according to claim **2**, wherein the processor is configured to obtain the device information from the first device in response to the user selecting the flow.

4. The information processing apparatus according to claim **1**, wherein the processor is configured to obtain the device information from the first device in response to the user selecting the flow.

5. The information processing apparatus according to claim **1**, wherein in a case where the device is able to use a printer outside the local network, the processor is configured to replace the process in the flow with a process of transmitting to the first device, information to be used to cause the printer outside the local network to print the execution result of the flow.

6. The information processing apparatus according to claim **1**, wherein the processor is configured to replace the process in the flow with a process of transmitting to the first device, the execution result of the flow in a format with which an application set in the first device is able to provide the execution result to the user.

7. The information processing apparatus according to claim **1**, wherein in a case where the first device is connected to the local network, the processor is configured not to replace the process in the flow.

8. The information processing apparatus according to claim **1**, wherein the processor is configured to retain in a memory the created flow for the first device.

9. The information processing apparatus according to claim **8**, wherein the processor is configured to display the flow for the first device included in the flow list on the device in a distinguishable manner.

10. The information processing apparatus according to claim **8**, wherein the processor is configured to create a flow for the first device by replacing a process in a flow other than the flow selected by the user from the flow list, the process being identical to the process in the flow selected by the user, with a process corresponding to the device information.

11. A non-transitory computer readable medium storing a program causing a computer to execute a process, the process comprising: displaying on a first device a flow list of flows that each include a series of processes and that have already been created for a second device; receiving a selection of a flow by a user using the first device; creating a new flow for the first device by replacing a process in the selected flow by determining that the first device does not have a function to perform the replaced process while the second device has the function with a process corresponding to device information set for the first device; determining whether or not to replace the process in the flow, in accordance with a network connection relationship between the first device and the computer and in a case where the process in the flow is a print process of causing a printer to print an execution result of the flow, the printer being connected to a local network to which the computer is connected, and where the first device is not connected to the local network, replacing the process in the flow with a process of transmitting the execution result of the flow to the first device.

12. An information processing method comprising:

displaying on a first device a flow list of flows that each include a series of processes and that have already been created for a second device;

receiving a selection of a flow by a user using the first device;

creating a new flow for the first device by replacing a process in the selected flow by determining that the first device does not have a function to perform the replaced process while the second device has the function with a process corresponding to device information set for the first device;

determining whether or not to replace the process in the flow, in accordance with a network connection relationship between the first device and an information processing apparatus; and

in a case where the process in the flow is a print process of causing a printer to print an execution result of the flow, the printer being connected to a local network to which the information processing apparatus is

connected, and the first device is not connected to the local network, replacing the process in the flow with a process of transmitting the execution result of the flow to the first device.

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