An image processing apparatus wirelessly communicates with an information processing apparatus without passing through an access point, provides a print service in which predetermined printing is performed in response to a print request from the information processing apparatus via a wireless communication unit, and enables a setting that is used for providing the print service if the setting is disabled when the information processing apparatus establishes communication with the image processing apparatus via the wireless communication unit.
FIG. 3

120 IMAGE PROCESSING APPARATUS

100 INFORMATION PROCESSING APPARATUS

---

F300 ACCESS POINT SEARCHING PROCESSING

F301

F302

F303 WIRELESS CONNECTION ESTABLISHING PROCESSING

F304

F305

F306 AUTOMATIC SETTING PROCESSING OF COMMUNICATION PARAMETERS

F307

F308

F309

REPEAT
FIG. 4

START

S401
BACK UP SSID IF DURING WIRELESS CONNECTION

S402
ACCESS POINT SEARCHING PROCESSING

S403
ANALYZE ACQUIRED SSID

S404
DOES SSID COINCIDE WITH PREDEFINED CHARACTER STRING?

S405
BACK UP CURRENT IPP-PRINT SETTING

S406
IS IPP-PRINT FUNCTION ENABLED?

S407
NO

S408
ENABLE IPP-PRINT FUNCTION

S409
IS mDNS FUNCTION ENABLED?

S410
NO

S408
ENABLE mDNS FUNCTION

END
FIG. 5

START

DISCONNECT WIRELESS COMMUNICATION

READ BACKUP OF THE IPP-PRINT SETTING

IS READ IPP-PRINT SETTING DISABLED SETTING?

YES

DISABLE IPP-PRINT SETTING

READ BACKUP OF THE mDNS SETTING

IS READ mDNS SETTING DISABLED SETTING?

YES

DISABLE mDNS SETTING

IS BACKUP OF SSID PRESENT?

YES

CONNECT TO THE ACCESS POINT WITH BACKED UP SSID

CLEAR SSID

END
### FIG. 6

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Data</th>
</tr>
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<tbody>
<tr>
<td>Message Type</td>
<td>Data indicating message type</td>
</tr>
<tr>
<td>Serial Number</td>
<td>Data indicating serial number</td>
</tr>
<tr>
<td>Model Name</td>
<td>Data indicating model name such as AbcSmartPhone</td>
</tr>
<tr>
<td>OS Version</td>
<td>Data indicating OS version such as AbcOS1.0</td>
</tr>
<tr>
<td></td>
<td>:</td>
</tr>
</tbody>
</table>
FIG. 7

START

BACK UP SSID IF DURING WIRELESS CONNECTION (S701)

AUTOMATIC SETTING PROCESSING OF COMMUNICATION PARAMETERS (S702)

ANALYZE ACQUIRED MODEL NAME/OS VERSION (S703)

DOES MODEL NAME/OS VERSION COINCIDE WITH PREDEFINED CHARACTER STRINGS? (S704)

NO

BACK UP CURRENT IPP-PRINT SETTING (S705)

IS IPP-PRINT FUNCTION ENABLED? (S706)

NO

BACK UP CURRENT mDNS SETTING (S707)

IS mDNS FUNCTION ENABLED? (S708)

NO

END
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>Data indicating message type</td>
</tr>
<tr>
<td>Serial Number</td>
<td>Data indicating serial number</td>
</tr>
<tr>
<td>Model Name</td>
<td>Data indicating model name such as AbcSmartPhone</td>
</tr>
<tr>
<td>OS Version</td>
<td>Data indicating OS version such as AbcOS1.0</td>
</tr>
<tr>
<td>:</td>
<td>:</td>
</tr>
<tr>
<td>[Vendor ID] 3bytes</td>
<td>[Vendor Data] 0-1021bytes TLV format</td>
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</table>
FIG. 9

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Length</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Use mDNS</td>
<td>0x1001</td>
<td>1 bytes</td>
<td>0x00: Do not use</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0x01: Use</td>
</tr>
<tr>
<td>Use IPP-Print</td>
<td>0x1002</td>
<td>1 bytes</td>
<td>0x00: Do not use</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0x01: Use</td>
</tr>
<tr>
<td>Use IPP-Fax</td>
<td>0x1003</td>
<td>1 bytes</td>
<td>0x00: Do not use</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0x01: Use</td>
</tr>
</tbody>
</table>
FIG. 12

START

PRINT

WHAT IS THE LAST USER OPERATION?

S1201

FAX

S1203

S1202

SET THE FOLLOWING IN VENDOR EXTENSION DATA
- SET "USE OF mDNS" ATTRIBUTE TO "USE"
- SET "USE OF IPP-PRINT" ATTRIBUTE TO "USE"

S1204

AUTOMATIC SETTING PROCESSING OF COMMUNICATION PARAMETERS

END

SET THE FOLLOWING IN VENDOR EXTENSION DATA
- SET "USE OF mDNS" ATTRIBUTE TO "USE"
- SET "USE OF IPP-FAX" ATTRIBUTE TO "USE"
FIG. 13

START

BACK UP SSID IF DURING WIRELESS CONNECTION S1301

AUTOMATIC SETTING PROCESSING OF COMMUNICATION PARAMETERS S1302

ANALYZE ACQUIRED VENDOR EXTENSION DATA S1303

IS mDNS ATTRIBUTE “USE”? S1304

NO

YES

BACK UP CURRENT mDNS S1305

IS mDNS FUNCTION DISABLED? S1306

NO

YES S1307

ENABLE mDNS FUNCTION

IS IPP-PRINT ATTRIBUTE “USE”? S1308

NO

YES

BACK UP CURRENT IPP-PRINT SETTING S1309

IS IPP-PRINT FUNCTION DISABLED? S1310

NO

YES S1311

ENABLE IPP-PRINT FUNCTION

IS IPP-FAX ATTRIBUTE “USE”? S1312

NO

YES

BACK UP CURRENT IPP-FAX SETTING S1313

IS IPP-FAX FUNCTION DISABLED? S1314

NO

YES S1315

ENABLE IPP-FAX FUNCTION

END
IMAGE PROCESSING APPARATUS, IMAGE PROCESSING APPARATUS CONTROL METHOD, AND STORAGE MEDIUM

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to an image processing apparatus, an image processing apparatus control method, and a storage medium.

[0003] 2. Description of the Related Art

[0004] When a wireless LAN that complies with the IEEE802.11 series of standards (hereinafter called the wireless LAN) is used, there are many settings to be set before use. Thus, an automatic setting method for easily setting communication parameters in a wireless device is proposed. For example, the association called Wi-Fi Alliance has developed a standard for a method for automatically setting communication parameters termed a Wi-Fi Protected Setup™ (WPS). Japanese Patent Laid-Open No. 2010-41666 discloses a device that provides communication parameters appropriate for a terminal device by identifying a device type of the terminal device in automatic setting protocol processing for the communication parameters by means of the WPS. According to the WPS, communication between a wireless device and the access point is performed so that the communication parameters are automatically set. In the WPS method, a method is proposed in which devices can be wirelessly connected peer-to-peer by incorporating the access point in one of the devices. This method has been developed as a standard termed Wi-Fi Direct® by Wi-Fi Alliance. Recently, a system is becoming general use in which a user utilizes an image processing apparatus through an information processing apparatus such as a smartphone or a tablet by connecting the information processing apparatus to the image processing apparatus by means of the Wi-Fi Direct®.

[0005] When the Wi-Fi Direct® is used, the information processing apparatus and the image processing apparatus are connected peer-to-peer for utilizing print functions provided in the image processing apparatus through information processing apparatus by a user. However, when functions (such as a search protocol or a printing protocol) that are used by the information processing apparatus for printing are disabled in the image processing apparatus side, a user cannot execute printing even if wireless connection is successful despite the success of the wireless connection.

SUMMARY OF THE INVENTION

[0006] The image processing apparatus of the present invention automatically enables settings that an image processing apparatus uses for provision of an image processing service in which image processing is executed upon wireless communication with the information processing apparatus when the settings are not enabled.

[0007] The image processing apparatus of the present embodiment is capable of communicating with an information processing apparatus by wireless communication. The image processing apparatus includes a wireless communication unit configured to directly communicate with the information processing apparatus by wireless communication without passing through an access point; a providing unit configured to provide a service in which image processing is executed in response to an image processing request transmitted from the information processing apparatus via the wireless communication unit; and an enabling unit configured to enable a setting in the image processing and that is used for providing the service. When the information processing apparatus establishes communication with the image processing apparatus via the wireless communication unit, the enabling unit enables the setting that is used for providing the service if the setting is not enabled.

[0008] According to the image processing apparatus of the present invention, the image processing apparatus of can automatically enable settings that an image processing apparatus uses for provision of an image processing service in which image processing is executed upon wireless communication with the information processing apparatus when the settings are not enabled.

[0009] Further features of the present invention will become apparent from the following description of exemplary embodiments with reference to the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1 illustrates exemplary hardware configurations of an information processing apparatus and an image processing apparatus.

[0011] FIG. 2 illustrates an exemplary software configuration of an information processing apparatus and an image processing apparatus.

[0012] FIG. 3 illustrates processing for searching an information processing apparatus and automatically setting communication parameters.

[0013] FIG. 4 illustrates processing for enabling a print function using an SSID by an image processing apparatus.

[0014] FIG. 5 is processing for disconnecting wireless communication with an information processing apparatus by an image processing apparatus.

[0015] FIG. 6 illustrates an example of a WPS message that an image processing apparatus receives from information processing apparatus.

[0016] FIG. 7 illustrates processing for enabling a print function using a WPS message by an image processing apparatus.

[0017] FIG. 8 illustrates an example of an extended WPS message received by an image processing apparatus.

[0018] FIG. 9 illustrates TLV structured data in a vendor extended region of a WPS message.

[0019] FIG. 10 illustrates a variety of screen examples displayed on a screen of an information processing apparatus upon print request.

[0020] FIG. 11 illustrates a variety of screen examples displayed on a screen of an information processing apparatus upon fax request.

[0021] FIG. 12 illustrates exemplary setting processing of TLV structured data by an information processing apparatus.

[0022] FIG. 13 illustrates processing for enabling a print function using an extended WPS message by an image processing apparatus.

DESCRIPTION OF THE EMBODIMENTS

[0023] FIG. 1 shows exemplary hardware configurations of an information processing apparatus and an image processing apparatus of the present embodiment. The information processing apparatus 100 includes a control unit 101, an operation unit 102, and a display unit 103. The control unit 101 of the information processing apparatus includes a CPU 110, a RAM 111, a ROM 112, an operation unit IF (an operation
unit interface) 113, a display unit I/F (a display unit interface) 114, and a network I/F (a network interface) 115. The respective processing units of the control unit 101 are connected with each other via a system bus 116. The network I/F 115 connects to a network I/F 134 of an image processing apparatus 120 to thereby wirelessly communicate with the image processing apparatus 120. “CPU” is an abbreviation for Central Processing Unit. “RAM” is an abbreviation for Random Access Memory. “ROM” is an abbreviation for Read Only Memory.

[0024] The CPU 110 reads out various programs stored in the ROM 112 into the RAM 111, and analyzes them to thereby execute various processes. The ROM 112 stores a control program for controlling operation by the information processing apparatus 100, and the CPU 110 executes the control program to thereby control overall operation by the information processing apparatus 100. Also, the ROM 112 stores a program for connection to the image processing apparatus 120, and the CPU 110 executes the program so that the information processing apparatus 100 connects to the image processing apparatus 120. Also, the ROM 112 stores a program with which the information processing apparatus 100 automatically sets wireless communication parameters, and the CPU 110 executes the program so that the information processing apparatus 100 automatically sets the wireless communication parameters.

[0025] The image processing apparatus 120 includes a control unit 121, an operation unit 122, and a printer unit 123. The control unit 121 of the image processing apparatus 120 includes a CPU 131, a RAM 132, a ROM 136, an NVRAM 137, an operation unit I/F 133, a network I/F 134, an image bus I/F 138, and a FAX I/F 150. The respective processing units are connected with each other via a system bus 139. The network I/F 134 connects to the network I/F 115 of the information processing apparatus 100 to thereby wirelessly communicate with the image processing apparatus 120. The FAX I/F 150 transmits data received from the information processing apparatus 100 through the network I/F 134 to an external device.

[0026] The control unit 121 of the image processing apparatus 120 includes a RIP 140, a device I/F 141, an image processing unit 142, and an image bus I/F 138. The respective processing units are connected with each other via a bus 138. An interface for connecting the system bus 139 to the image bus 143 that transfers image data at high speed, and operates as a bus bridge that converts a data structure. The image bus 143 is a transmission path for exchanging image data, and is constituted by a PCI bus or an IEEE1394. The RIP (Raster Image Processor) 140, the device I/F 141, and the image processing unit 142 are connected to the image bus 143. The RIP 140 generates a raster image based on a DL (Display List) that the CPU 131 converts, and generates print data received from the network I/F 134. The device I/F 141 is an interface that connects the printer unit 123 to the control unit 121, and converts image data by synchronous/asynchronous methods and temporarily retains input/output data with a buffer memory (not shown). The image processing unit 142 performs processing such as color conversion, filter processing, and resolution conversion with respect to image data that is input to the printer unit 123.

[0027] Next, a description will be given of software function block diagrams of the information processing apparatus and the image processing apparatus of the present embodiment with reference to FIG. 2. The CPU 110 and CPU 131 provided in the information processing apparatus 100 and the image processing apparatus 120 realize the respective functions by executing the respective control programs.

[0028] The information processing apparatus 100 includes a communication parameter autoconfiguration unit 201, an access point controlling unit 206, a packet transmitting unit 207, a packet receiving unit 208, a network controlling unit 209, a search protocol controlling unit 210, and a printing protocol controlling unit 211. The communication parameter autoconfiguration unit 201 includes an automatic setting control unit 202, a communication parameter setting unit 203, and a communication parameter providing unit 204.

[0029] The communication parameter setting unit 203 performs processing for deciding communication parameters by executing the WPS. The communication parameter setting unit 203 automatically sets communication parameters such as an SSID (Service Set Identifier) that is an identifier of an access point, an encryption method, an encryption key, and an authentication method that are required for wireless LAN communication. Also, the communication parameter setting unit 203 sets extension data about validation for attributes or a print function of the information processing apparatus 100 in the WPS message. In other words, the communication parameter setting unit 203 functions as a setting unit that sets communication parameters for realizing provision of a print service that performs a predetermined print service by the image processing apparatus.

[0030] The access point controlling unit 206 controls connections to wireless devices such as the image processing apparatus 120 as an access point. The packet transmitting unit 207 transmits packets concerning various communications. The packet receiving unit 208 receives packets concerning various communications. The network controlling unit 209 controls the connection to the network by wireless communication and the like and disconnection from the network and the like. The printing protocol controlling unit 211 performs a protocol control of an Internet Printing Protocol (IPP), which is a printing protocol. The IPP is used by the information processing apparatus 100 for transmitting an image to the image processing apparatus 120 when a user selects an image with the information processing apparatus 100 and requests printing. In other words, the printing protocol controlling unit 211 functions as a transmission unit that transmits a printing request. The search protocol controlling unit 210 functions as a search unit, and performs protocol control of a multicast DNS (mDNS), which is a device search protocol. The mDNS is used when the information processing apparatus 100 requests searching for image processing apparatuses that have an IPP function.

[0031] The communication parameter autoconfiguration unit 201 controls various protocols in automatic setting processing of the communication parameter. The automatic setting control unit 202 controls the communication parameter setting unit 203 and the communication parameter providing unit 204 to thereby realize the automatic setting processing of communication parameters as described heretofore. The communication parameter setting unit 203 sets communication parameters that are provided to other devices. The communication parameter providing unit 204 provides the communication parameters set by the communication parameter setting unit 203 to other devices.

[0032] The image processing apparatus 120 includes a communication parameter autoconfiguration unit 221, a com-
communication parameter analyzing unit 226, an SSID analyzing unit 227, a packet transmitting unit 228, a packet receiving unit 229, and a network controlling unit 230. Also, the image processing apparatus 120 includes a search control parameter analyzing unit 231 and a printing protocol controlling unit 232. The communication parameter autoconfiguration unit 221 includes an automatic setting control unit 222, a communication parameter setting unit 223, and a communication parameter providing unit 224.

[0033] The automatic setting control unit 222 of the communication parameter autoconfiguration unit 221 controls overall the communication parameter autoconfiguration unit. The automatic setting control unit 222 communicates with the information processing apparatus 100 to thereby automatically set communication parameters. Also, the communication parameter setting unit 223 automatically sets communication parameters such as an SSID that is a network identifier, an encryption method, an encryption key, or an authentication method which are required for wireless LAN communication.

[0034] The communication parameter analyzing unit 226 performs processing for analyzing the communication parameters set in the WPS message to thereby decide functions that are enabled in the image processing apparatus. The SSID analyzing unit 227 performs processing for analyzing the SSID to thereby decide functions that are enabled in the image processing apparatus. The packet transmitting unit 228 transmits packets related to various communications. The packet receiving unit 229 receives packets related to various communications. The network controlling unit 230 controls the network connection to the network, disconnection from the network, and the like. The search protocol controlling unit 231 performs a search protocol control of a multicastDNS (mDNS), which is a device search protocol. The search protocol controlling unit 231 responds to the information processing apparatus 100 upon receipt of a search request for image processing apparatuses that can communicate by wireless communication. The printing protocol controlling unit 232 performs a printing control protocol of an Internet Printing Protocol (IPP), which is a printing protocol. The FAX protocol controlling unit 233 performs a facsimile control protocol. The printing protocol controlling unit 232 and the FAX protocol controlling unit 233 control the respective protocols to thereby provide an image processing service for performing image processing selected by a user.

[0035] Next, a description will be given of automatic setting processing of communication parameters by wireless communication in the present embodiment with reference to FIG. 3. FIG. 3 illustrates a sequence diagram between the information processing apparatus 100 and the image processing apparatus 120. This sequence between the information processing apparatus 100 and the image processing apparatus 120 generally consists of access point searching processing (F300), wireless connection establishing processing (F303), and automatic setting processing of communication parameters (F306). The following are descriptions of each process. When instructed to initiate automatic setting processing of communication parameters, the image processing apparatus 120 searches an access point that can execute the automatic setting processing of communication parameters. Specifically, when a user presses a button and the like and a setting of wireless communication is enabled via the operation unit 122 of the image processing apparatus 120, the automatic setting control unit 222 initiates searching for the access point by broadcast. The image processing apparatus 120 transmits a probe request (F301) for searching for an access point that can execute the automatic setting processing of communication parameters.

[0036] When instructed to initiate the automatic setting processing of communication parameters by a user operation, the information processing apparatus 100 similarly places itself in a state in which it awaits accessing the embedded access point. Upon receipt of the probe request (F301), the automatic setting control unit 201 of the information processing apparatus 100 analyzes the probe request. The communication parameter setting unit 203 sets a probe response (F302), in which additional information indicating that the automatic setting processing of communication parameters is executable, is added based on an analysis result by the automatic setting control unit 202. The communication parameter providing unit 204 passes the probe response (F302) via the packet transmitting unit 207 to the image processing apparatus 120. Here, an SSID is included in the probe response passed from the communication parameter providing unit 204. The automatic setting control unit 222 of the image processing apparatus 120 receives and analyzes the probe response (F302) to thereby recognize that the information processing apparatus 100 can execute the automatic setting processing of communication parameters. When the information processing apparatus 100 has not instructed initiating the automatic setting processing of communication parameters, the automatic setting control unit 202 passes the probe response without adding the additional information indicating that the automatic setting processing of communication parameters is executable.

[0037] Next, the SSID analyzing unit 227 of the image processing apparatus 120 receives and analyzes the SSID included in the probe response (F302) from the automatic setting control unit 222. When the SSID coincides with a character string stored in a storage device (not shown), the SSID analyzing unit 227 transmits an association request (F304) for performing association so that the automatic setting control unit 222 temporally wirelessly connects to the information processing apparatus 100. The character string is described hereinafter with reference to FIG. 4. Upon receipt of the association request (F304), the automatic setting control unit 202 of the information processing apparatus 100 returns an association response (F305) to thereby complete association. Even if the SSID coincides with the stored character string, normal data communication cannot be achieved at the stage of completion of the association since an encryption key and the like does not coincide.

[0038] The automatic setting control unit 222 of the image processing apparatus 120 initiates the automatic setting protocol processing of the communication parameters with the information processing apparatus 100 by using an EAP (Extensible Authentication Protocol) packet. The EAP packet is a packet by which communication between a providing apparatus and a receiving apparatus can be established without cryptographic processing, authentication processing and the like. The automatic setting protocol processing of the communication parameters is initiated when the communication parameter setting unit 223 sets the EAP packet and transmits an initiation message (F307) via the packet transmitting unit 228.

[0039] Upon receipt of the initiation message for the automatic setting protocol processing of the communication parameter, the automatic setting control unit 202 transmits an
EAP Request packet (F308) to the image processing apparatus 120 to thereby initiate the negotiation of communication parameters. Upon receipt of the EAP Request packet (F308), the automatic setting control unit 202 transmits an EAP Response packet (F309) to the information processing apparatus 100. Transmitting and receiving of the EAP Request packet and the EAP Response packet are repeated so that the automatic setting of the communication parameter can be realized without the access point. In other words, the automatic setting control unit 202 functions as a wireless communication unit that directly and wirelessly communicates with the information processing apparatus without the access point. The automatic setting control unit 202 also functions as a wireless communication unit that directly and wirelessly communicates with the image processing apparatus without the access point. Although a description is given of an embodiment in which the information processing apparatus 100 includes the access point, the image processing apparatus 120 may include the access point. In that case, a search for the access point is initiated from the information processing apparatus 100 side. The automatic setting processing of communication parameters is available from both the information processing apparatus 100 and the image processing apparatus 120.

[0040] In the automatic setting processing of communication parameters (F306), encryption processing of a communication path for providing the communication parameter, authentication processing for determining whether or not the communication parameters can be provided, and the like are performed. Hence, various messages for performing the aforementioned processing are transmitted and received between the image processing apparatus 120 and the information processing apparatus 100. Equipment information of the information processing apparatus 100 is included in all or a portion of each message transmitted from the information processing apparatus 100. Such equipment information includes a model name, an OS version, vendor extension data, and the like. A model name of the access point (such as A8cSmartPhone) is set in the model name. For example, A8cOS1.0 is set in the OS version. Data defined by a vendor (such as IPP-PRINT-ON, mDNS-ON) is set in the vendor extension data. The details of the vendor extension data are described hereinafter in the third embodiment. That is, the image processing apparatus 120 can acquire the equipment information of the information processing apparatus 100 by performing the automatic setting processing of communication parameters (F306).

First Embodiment

[0041] A configuration for enabling predetermined functions by use of the SSID information will be described with reference to FIG. 4. The image processing apparatus 120 and the information processing apparatus 100 in the present embodiment can communicate with each other by wireless communication. With reference to FIG. 4, a description will be given of the processing flow when the image processing apparatus 120 in the present embodiment wirelessly connects to the information processing apparatus 100 by using a Wi-Fi Direct®. The processing flow is executed by the control unit 121 of the image processing apparatus 120.

[0042] In S401, when the image processing apparatus 120 is currently wirelessly connected, the automatic setting control unit 202 backs up an SSID currently used for connecting to the NVRAM 137 of the image processing apparatus 120. That is, when the image processing apparatus 120 wirelessly connects to a plurality of user devices via the wireless LAN, it is required for the image processing apparatus 120 to disconnect the wireless connection by the wireless LAN in order to communicate with the information processing apparatus 100 peer-to-peer. Hence, the automatic setting control unit 222 of the image processing apparatus 120 backs up the SSID that is an identifier of the currently wirelessly connected access point to the NVRAM 137. In S402, the automatic setting control unit 222 performs the access point searching processing (F300) described with reference to FIG. 3. The automatic setting control unit 222 acquires, from the information processing apparatus 100, an SSID as identification information for identifying the information processing apparatus by transmitting a probe request. In S403, the SSDS analyzing unit 227 compares whether or not the SSID acquired from the automatic setting control unit 222 coincides with a predefined character string (such as A8cSmartPhone_AP) stored in the storage unit. “Predefined character string” denotes a character string indicating an SSID of a specific information processing apparatus. “Specific information processing apparatus” denotes an information processing apparatus that has functions for connecting to the image processing apparatus by means of the Wi-Fi Direct® function, and using the image processing apparatus by means of an IPP-Print function and an mDNS function.

[0043] In S404, when the SSDS analyzing unit 227 determines that the character string does not coincide with the acquired SSID, the automatic setting control unit 222 terminates processing. In S404, when the SSDS analyzing unit 227 determines that the character string coincides with the acquired SSID, the automatic setting control unit 222 backs up the current IPP-Print setting to the NVRAM 137 in S405. In S406, the automatic setting control unit 222 determines whether or not the IPP-Print function is enabled. The enabled state of the IPP-Print function indicates a state in which printing can be executed with the IPP, whereas the disabled state of the IPP-Print function indicates a state in which printing cannot be executed with the IPP. In S407, when the IPP-Print function is disabled, the automatic setting control unit 222 enables the IPP-Print function.

[0044] Next, the automatic setting control unit 222 backs up the current mDNS setting to the NVRAM 137 in S408. In S409, the automatic setting control unit 222 determines whether or not an mDNS function is valid. The enabled state of the mDNS function indicates a state in which searching with the mDNS is available, whereas the disabled state of the mDNS function indicates a state in which searching with the mDNS is not available. In S410, the automatic setting control unit 222 enables the mDNS when the mDNS is disabled. In other words, the automatic setting control unit 222 functions as an enabling unit and enables the IPP-Print function and the mDNS function when the IPP-Print function and/or the mDNS function are disabled. Also, the printing protocol controlling unit 232 and the search protocol controlling unit 231 function as a providing unit and provide a predetermined print service in response to the information processing apparatus when the IPP-Print function and the mDNS function are enabled.

[0045] It is assumed that the period of validity is preset in enabling processing of the IPP-Print function and the mDNS function. In general, the image processing apparatus having the LAN function is used by a plurality of users through the LAN. Thus, it is desirable to set the period of validity with
respect to the period during connection with the specific information processing apparatus peer-to-peer. Any period of validity may be set as the period of validity as long as the image processing apparatus can execute printing after receiving a print request from the specific information processing apparatus.

[0046] In the aforementioned processing, the image processing apparatus 120 is in a state to access the information processing apparatus 100 in the access point searching processing (F300). Then, when the settings such as the IPP-Print function, the mDNS function used for provision of print service or the like is disabled upon wireless connection, the image processing apparatus 120 can automatically enable those settings by using the received SSID.

[0047] Next, with reference to FIG. 5, processing when the image processing apparatus 120 disconnects a wireless connection to the information processing apparatus 100 in the present embodiment by use of the Wi-Fi Direct®, and resumes wireless connection to the access point that the image processing apparatus 120 originally has connected will be explained. The processing flow is executed by the control unit 121 of the image processing apparatus 120.

[0048] In S501, the automatic setting control unit 222 of the image processing apparatus 120 deactivates wireless communication to the information processing apparatus 100. In S502, the automatic setting control unit 222 reads a backup of the IPP-Print setting from the NVRAM 137. In S503, the automatic setting control unit 222 determines whether or not the read IPP-Print setting is a disable setting. When the read IPP-Print setting is the disable setting, the automatic setting control unit 222 of the IPP-Print setting in S504. Next, the automatic setting control unit 222 reads a backup of the mDNS setting from the NVRAM 137 in S505. In S506, the automatic setting control unit 222 determines whether or not the read mDNS setting is a disable setting. When the read mDNS setting is the disable setting, the automatic setting control unit 222 of the mDNS setting in S507. Next, the automatic setting control unit 222 disconnects a wireless connection to the access point that the image processing apparatus 120 is in contact with in the NVRAM 137 in S508. When the backup of the SSID is present, the automatic setting control unit 222 connects to the access point with the backed up SSID in S509. In S510, the automatic setting control unit 222 deletes the backup of the SSID.

[0049] In the aforementioned processing, although the IPP-Print setting and the mDNS setting are described as an example, settings to be enabled are not limited thereto. Those skilled in the art can conceive that any settings are enabled as long as the image processing apparatus can provide by wireless communication. Naturally, processing is not limited to processing in which the mDNS setting is enabled after the IPP-Print setting is enabled, and each setting may be enabled in any processing order.

[0050] Also, as described above, it is postulated that the image processing apparatus having the LAN function is used by a plurality of users through the LAN. In such environment, the image processing apparatus is managed by connecting to a specific access point that intermediates access to the LAN for connecting to the LAN. In this environment, when the image processing apparatus wirelessly connects to the information processing apparatus 100 by the Wi-Fi Direct®, the plurality of users cannot connect to the LAN since the access point for connection is changed as described with FIG. 4. Hence, when the image processing apparatus 120 deactivates the wireless connection to the information processing apparatus 100 by the Wi-Fi Direct®, it promptly reconnects to the access point to which the image processing apparatus 120 has originally connected in order to connect to the LAN as described with FIG. 5. In this arrangement, a user who has originally used the image processing apparatus through the LAN can continuously use the image processing apparatus through the LAN.

[0051] With reference to FIG. 4 and FIG. 5, the description of processing was given in which the IPP-Print function and the mDNS function were temporarily enabled for enhancing the convenience. Here, peer-to-peer connection is performed in the Wi-Fi Direct®. Thus, an embodiment can be conceived in which security functions held by the image processing apparatus are disabled during Wi-Fi Direct® connection so that unnecessary security processing is omitted and processing capabilities of the image processing apparatus are improved. For example, an IPsec function, an IP filter function, and an SSL function are conceived as the security functions.

[0052] In the first embodiment, when the SSID of the access point which the image processing apparatus 120 accessed coincides with the predetermined value, the image processing apparatus 120 enables the prescribed functions, resulting in enhanced convenience.

Second Embodiment

[0053] In the first embodiment, the image processing apparatus uses the SSID in the access point searching processing (F300), and the predetermined functions used in the print service are enabled. In the second embodiment, with reference to FIG. 6 and FIG. 7, a configuration is described in which the predetermined functions are enabled by use of existing data included in a WPS message. In the automatic setting processing of communication parameters (F306) shown in FIG. 3, a plurality of attributes (reference numeral 601 in FIG. 6) in the WAP message transmitted from the communication parameter autoconfiguration unit 201 of the information processing apparatus 100. The following is a description of specific data stored in the respective attributes. Data indicating a message type is stored in “Message Type”. A serial number of a wireless apparatus is stored in “Serial Number”. A model name of the wireless apparatus is stored in “Model Name”. An OS version of the wireless apparatus is stored in “OS Version”. In addition to these, various attribute data required for the negotiation of communication parameters are stored.

[0054] With reference to FIG. 7, a description will be given of the processing flow when the image processing apparatus 120 in the second embodiment performs wireless connection to the information processing apparatus 100 by using the Wi-Fi Direct®. The processing flow is executed by the control unit 121 of the image processing apparatus 120.

[0055] In S701, when the image processing apparatus 120 is already wirelessly connected, the automatic setting control unit 222 of the image processing apparatus 120 backs up the current SSID used for the connection to the NVRAM 137. In S702, the automatic setting control unit 222 performs the automatic setting processing of communication parameters as described with reference to FIG. 3. Specifically, the automatic setting control unit 222 acquires the WPS message set by the communication parameter setting unit 203 of the information processing apparatus 100 in the automatic setting processing of communication parameter (F306) shown in
FIG. 3. The “Model Name” and the “OS Version” of the information processing apparatus 100 are included in the WPS message.

[0056] In S703, the communication parameter analyzing unit 226 compares whether the Model Name and the OS Version acquired from the automatic setting control unit 222 coincide with predefined character strings stored in the storage unit. “Predefined character strings” denotes character strings indicating the specific information processing apparatus, and examples of such character strings are “AbeSmartPhone”, “AbeOS1.0” and the like. “Specific information processing apparatus” denotes an information processing apparatus having functions for connecting to the image processing apparatus by means of the Wi-Fi Direct® function, and using the image processing apparatus by means of the IPP-Print function and the mDNS function.

[0057] In S704, when the communication parameter analyzing unit 226 determines that the Model Name and the OS Version do not coincide with the character strings, the automatic setting control unit 222 terminates processing. In S704, when the communication parameter analyzing unit 226 determines that the Model Name and the OS Version coincide with the character strings, the automatic setting control unit 222 backs up the current IPP-Print setting to the NVRAM 137 of the image processing apparatus 120 in S705. In S706, the automatic setting control unit 222 determines whether or not the IPP-Print function is enabled. When the IPP-Print function is disabled, the automatic setting control unit 222 enables the IPP-Print function in S707. Next, in S708, the automatic setting control unit 222 backs up the current mDNS setting to the NVRAM 137 of the image processing apparatus 120. In S709, the automatic setting control unit 222 determines whether or not the mDNS function is enabled. When the mDNS function is disabled, the automatic setting control unit 222 enables the mDNS function in S710. Note that processing flow that is executed when the image processing apparatus 120 in the second embodiment disconnects the wireless connection to the information processing apparatus 100 by using the Wi-Fi Direct® is the same as that described with reference to FIG. 5.

[0058] When the existing attributes (the Model Name and the OS Version) included in the WPS message received by the image processing apparatus 120 coincide with the predefined values, the image processing apparatus 120 enables the predetermined functions. Thus, unlike the first embodiment, enabling processing is executed with further accuracy because the image processing apparatus acquires detailed attribute information with respect to the information processing apparatus. In addition, the image processing apparatus can provide functions conforming to individual information processing apparatuses, resulting in enhanced convenience. Although the information processing apparatus can execute print processing by wireless communication based on a combination of the Model Name and the OS Version, the embodiment is not limited thereto. For example, the print processing may be determined based on only the OS Version, or determined based on information other than the aforementioned two attributes.

Third Embodiment

[0059] Next, a configuration in which predetermined functions are enabled by use of the WPS message will be described with reference to FIG. 8, FIG. 9, FIG. 10, FIG. 11 and FIG. 12. Note that FIG. 10 and FIG. 11 are for describing operation flows performed on the operation unit 102 of the information processing apparatus 100, and these operation flows are a common configuration in the first, second and third embodiments.

[0060] With reference to FIG. 8, a description will be given of vendor extension data included in a WPS message transmitted by the information processing apparatus 100 in the third embodiment. The vendor extension data indicates custom attributes that can be included in the WPS message by a device manufacturer. A user who operates the information processing apparatus 100 can customize attributes by adding information (such as IPP-PRINT=ON and mDNS=ON) to the vendor extension data. FIG. 8 indicates vendor extension data added to the WPS message transmitted by the information processing apparatus 100 in the automatic setting processing of communication parameters (F106) described with reference to FIG. 6. A “vender ID” (3 bytes) that is provided by the Internet Assigned Numbers Authority (IRNA) is stored in an attribute (801) region of vendor extension data. Data (0-1021 bytes) that consists of a Type-Length-Value (TLV) structure stored in a data (802) region. With reference to FIG. 9, a description will be given of the TLV-structured data that is set in a vendor extended region and that is described with reference to FIG. 8. Three types of attributes are exemplified in FIG. 9, in which the respective attributes indicate “use of an mDNS”, “use of an IPP-Print”, and “use of an IPP-Fax”. The respective Type codes (902) are defined by “1001”, “1002”, and “1003”. The respective Length codes (903) of attributes are all 1 byte. With respect to the respective Value codes (904) of all attributes, “0x00” indicates “do not use”, and “0x01” indicates “use”.

[0062] With reference to FIG. 10, a description will be given of operation flow in which a user performs a printing request to the image processing apparatus 120 with the information processing apparatus 100 of the present embodiment. Hereinafter, the operation unit 102 and the display unit 103 function as a display unit that displays a screen on which a user performs a printing request to the image processing apparatus, and displays the various screens shown in FIG. 10. By a user operation, the display unit 103 of the information processing apparatus 100 displays an image display screen 1001 on which an image intended by the user is displayed. A menu key 1011 for operation on the image display screen 1001 is arranged on the image display screen 1001. When the user presses the menu key, the operation unit 102 detects the pressing, and the screen transits to a menu selection screen 1002. The user can select an intended operation on the image from among those on the menu 1012. When the user wishes to print the image, a print key is pressed. The screen transits to a printer option screen 1003 upon the pressing of the print key by the user.

[0063] The user can set print options including a printer selection, a copy setting and the like on the printer option screen 1003. When the user presses the printer selection key 1013 on the printer option screen 1003, the screen transits to a printer selection screen 1004 in case where the information processing apparatus 100 is already connecting to the image processing apparatus 120 by the Wi-Fi Direct®. In case where the information processing apparatus 100 is not connecting to the image processing apparatus 120, the screen transits to a printer selection screen 1006 on which a Wi-Fi Direct® key 1015 is displayed.

[0064] On the printer selection screen 1004, when the information processing apparatus 100 is currently connecting to
the image processing apparatus 120 by the Wi-Fi Direct®, the display unit 103 displays the screen 1004 with an icon 1014 for clearly explaining that the information processing apparatus 100 is currently connecting to the image processing apparatus 120 by the Wi-Fi Direct®. In the present embodiment, the image processing apparatus 120 during connection is displayed with its name “MF5100”. When the user selects the MF5100, the screen transfers to a print screen 1005. A print key 1016 is displayed on the print screen 1005. Upon the pressing of the print key 1016, the information processing apparatus 100 transmits image data to the image processing apparatus 120 for printing.

[0065] When the screen transits to the printer selection screen 1006, the display unit 103 also displays a Wi-Fi Direct® key 1015 in addition to the printer selection apparatus 120. When Wi-Fi Direct® connection is initiated by pressing the Wi-Fi Direct® key 1015 by the user, the screen transits to a screen 1007 that indicates Wi-Fi Direct® connection is ongoing. After completion of Wi-Fi Direct® connection, when a connection destination is the image processing apparatus 120, the screen transits to the print screen 1005 on which the image processing apparatus 120 remains selected.

[0066] That is, while the icon for clearly explaining that wireless connection is ongoing by the Wi-Fi Direct® is displayed on the printer selection screen, a user can select the printer during Wi-Fi Direct® connection. When the image processing apparatus is not currently connecting to the image processing apparatus by the Wi-Fi Direct®, the user provides the user with the Wi-Fi Direct® connection through the printer selection screen so that the user can select the connected printer. In the aforementioned processing, the automatic setting processing of communication parameters described with reference to FIG. 3 is performed in response to pressing the printer selection key 1013, and the name of the image processing apparatus during connection is displayed on the printer option screen 1003. Alternatively, an icon of the image processing apparatus during connection may be displayed on the printer option screen 1003. Alternatively, the automatic setting processing of communication parameters described with reference to FIG. 3 is performed in response to pressing the Wi-Fi Direct® key 1015 by the user. Alternatively, a configuration may be applied with which the image processing apparatus 120 executes printing in response to selecting an intended image processing apparatus by the user on the printer selection screen 1004 without a display of the print screen 1005.

[0067] With reference to FIG. 11, a description will be given of operation flow in which a user performs a fax request with the information processing apparatus 100 in the present embodiment. Upon initiating the image processing apparatus 120 to fax. By a user operation, the display unit 103 of the information processing apparatus 100 displays an image display screen 1101 on which an image intended by the user is displayed. A menu key 1111 for operation to the image by the user is arranged on the image display screen 1101. When the user presses the menu key 1111, the screen transits to a menu selection screen 1102. The user can select intended operation from among the menu 1112. When the user wishes to fax, a fax key is pressed. When the fax key is pressed, the screen transits to a fax option screen 1103. The user can set fax options such as a printer selection or an image quality setting on the fax option screen 1103. When the user presses a printer selection key 1113 on the fax option screen 1103, the screen transits to a printer selection screen 1104 if the information processing apparatus 100 is being connected by Wi-Fi Direct®, and otherwise the screen transits to a printer selection screen 1106. On the printer selection screen 1104, when the information processing apparatus 100 is currently connecting to the image processing apparatus 120 by the Wi-Fi Direct®, the display unit 103 displays the printer selection screen 1104 on which an icon 1114 for clearly explaining that the information processing apparatus is currently connecting to the image processing apparatus 120 is added. In the present embodiment, the image processing apparatus 120 is displayed with its name “MF5100”. When the user selects the “MF5100”, the screen transits to a fax option screen 1105. A fax key 1116 is displayed on the fax option screen 1105. When the fax key 1116 is pressed, the information processing apparatus 100 transmits image data to the image processing apparatus 120 for a fax.

[0068] When the screen transits to the printer selection screen 1106, the display unit 103 also displays a Wi-Fi Direct® key 1115 in addition to one or more printers during connection or connectable printers. When Wi-Fi Direct® connection is initiated by pressing the Wi-Fi Direct® key 1115 by the user, the screen transits to a screen 1107 that indicates Wi-Fi Direct® connection is ongoing. After completion of Wi-Fi Direct® connection, when the connection destination is the image processing apparatus 120 the screen transits to the fax option screen 1105 on which the image processing apparatus 120 remains selected.

[0069] That is, the user can select the printer already during Wi-Fi Direct connection if available on the printer selection screen. When the information processing is not connecting to the image processing apparatus by the Wi-Fi Direct®, the user instructs Wi-Fi Direct® connection on the fax selection screen so that the user can select the connected printer.

[0070] With reference to FIG. 12, a description will be given of operation flow when the information processing apparatus 100 of the present embodiment performs wireless connection to the image processing apparatus 120 by using Wi-Fi Direct®. The processing flow is executed by the information processing apparatus 100 when the Wi-Fi Direct® key 1015 or 1115 shown in FIG. 10 and FIG. 11 is pressed. In S1201, the automatic setting control unit 202 of the information processing apparatus 100 determines the last user operation. Specifically, the last user operation means an operation selected by the user on the menu selection screen 1012 or 1112 shown in FIG. 10 and FIG. 11. When the user selects a print key, the processing advances to S1202. In S1202, the communication parameter setting unit 203 sets the “use of mDNS” attribute and the “IPP-Print” attribute to “use” in the WPS message described with reference FIG. 8 and FIG. 9. Also, when the user selects a fax key, the processing advances to S1203. In S1203 the communication parameter setting unit 203 sets the “use of mDNS” attribute and the “IPP-Fax” attribute to “use” in the WPS message described with reference FIG. 8 and FIG. 9. Next, in S1204, the WPS message is transmitted to the image processing apparatus and the automatic setting processing of communication parameters by using the WPS message in which vendor extension data is set is performed.

[0071] With reference to FIG. 13, a description of processing flow when the image processing apparatus 120 in the present embodiment performs wireless connection to the information processing apparatus 100 by the Wi-Fi Direct®.
The processing flow is executed by the control unit 121 of the image processing apparatus 120.

When the image processing apparatus 120 is already performing wireless connection in S1301, the automatic setting control unit 222 backs up currently used SSID for connection to the NVRAM 137 of the image processing apparatus 120. In S1302, the communication parameter autoconfiguration unit 221 performs the automatic setting processing of communication parameters described with reference to FIG. 3. In the automatic setting processing of communication parameter (F306) shown in FIG. 3, the automatic setting control unit 222 acquires vendor extension data included in the WPS message from the automatic setting control unit 202 of the information processing apparatus 100. In S1303, the communication parameter analyzing unit 226 of the image processing apparatus 120 acquires vendor extension data from the automatic setting control unit 222 and analyzes it. The automatic setting control unit 222 acquires each value set in "use of mDNS", "use of IPP-Print" and "use of IPP-Fax" described with reference to FIG. 9 from the communication parameter analyzing unit 226.

In S1304, the processing advances to S1305. Otherwise, the processing advances to S1308. In S1305, the automatic setting control unit 222 backs up the current mDNS setting to the NVRAM 137 of the image processing apparatus 120. In S1306, the automatic setting control unit 222 determines whether or not the mDNS function is enabled, and enables the mDNS function when it is disabled.

In S1307, the communication parameter analyzing unit 226 determines that "use" is set in the "mDNS" attribute in S1304, the processing advances to S1308. Otherwise, the processing advances to S1309. In S1308, the automatic setting control unit 222 backs up the current IPP-Print setting to the NVRAM 137 of the image processing apparatus 120. In S1309, the automatic setting control unit 222 determines whether or not the IPP-Print function is enabled, and enables the IPP-Print function when it is disabled.

In S1310, the communication parameter analyzing unit 226 determines that "use" is set in an "IPP-Fax" attribute in S1312, and the processing advances to S1313. Otherwise, the processing is terminated. In S1313, the automatic setting control unit 222 backs up the current IPP-Fax setting to the NVRAM 137 of the image processing apparatus 120. In S1314, the automatic setting control unit 222 determines whether or not the IPP-Fax function is enabled, and enables the IPP-Fax function when it is disabled.

In S1315, the communication parameter analyzing unit 226 determines that "use" is set in an "IPP-Print" attribute in S1318, and the processing advances to S1317. Otherwise, the processing is terminated. In S1317, the automatic setting control unit 222 backs up the current IPP-Print setting to the NVRAM 137 of the image processing apparatus 120. In S1318, the automatic setting control unit 222 determines whether or not the IPP-Print function is enabled, and enables the IPP-Print function when it is disabled.

In S1319, the communication parameter analyzing unit 226 determines that "use" is set in an "IPP-Fax" attribute in S1321, and the processing advances to S1320. Otherwise, the processing is terminated. In S1320, the automatic setting control unit 222 backs up the current IPP-Fax setting to the NVRAM 137 of the image processing apparatus 120. In S1321, the automatic setting control unit 222 determines whether or not the IPP-Fax function is enabled, and enables the IPP-Fax function when it is disabled.

In S1322, the communication parameter analyzing unit 226 determines that "use" is set in an "IPP-Print" attribute in S1324, and the processing advances to S1323. Otherwise, the processing is terminated. In S1323, the automatic setting control unit 222 backs up the current IPP-Print setting to the NVRAM 137 of the image processing apparatus 120. In S1324, the automatic setting control unit 222 determines whether or not the IPP-Print function is enabled, and enables the IPP-Print function when it is disabled.

In S1325, the communication parameter analyzing unit 226 determines that "use" is set in an "IPP-Fax" attribute in S1328, and the processing advances to S1327. Otherwise, the processing is terminated. In S1327, the automatic setting control unit 222 backs up the current IPP-Fax setting to the NVRAM 137 of the image processing apparatus 120. In S1328, the automatic setting control unit 222 determines whether or not the IPP-Fax function is enabled, and enables the IPP-Fax function when it is disabled.

In S1329, the communication parameter analyzing unit 226 determines that "use" is set in an "IPP-Print" attribute in S1331, and the processing advances to S1330. Otherwise, the processing is terminated. In S1330, the automatic setting control unit 222 backs up the current IPP-Print setting to the NVRAM 137 of the image processing apparatus 120. In S1331, the automatic setting control unit 222 determines whether or not the IPP-Print function is enabled, and enables the IPP-Print function when it is disabled.

In S1332, the communication parameter analyzing unit 226 determines that "use" is set in an "IPP-Fax" attribute in S1335, and the processing advances to S1334. Otherwise, the processing is terminated. In S1334, the automatic setting control unit 222 backs up the current IPP-Fax setting to the NVRAM 137 of the image processing apparatus 120. In S1335, the automatic setting control unit 222 determines whether or not the IPP-Fax function is enabled, and enables the IPP-Fax function when it is disabled.

In S1336, the communication parameter analyzing unit 226 determines that "use" is set in an "IPP-Print" attribute in S1339, and the processing advances to S1338. Otherwise, the processing is terminated. In S1338, the automatic setting control unit 222 backs up the current IPP-Print setting to the NVRAM 137 of the image processing apparatus 120. In S1339, the automatic setting control unit 222 determines whether or not the IPP-Print function is enabled, and enables the IPP-Print function when it is disabled.

In S1340, the communication parameter analyzing unit 226 determines that "use" is set in an "IPP-Fax" attribute in S1343, and the processing advances to S1342. Otherwise, the processing is terminated. In S1342, the automatic setting control unit 222 backs up the current IPP-Fax setting to the NVRAM 137 of the image processing apparatus 120. In S1343, the automatic setting control unit 222 determines whether or not the IPP-Fax function is enabled, and enables the IPP-Fax function when it is disabled.

In S1344, the communication parameter analyzing unit 226 determines that "use" is set in an "IPP-Print" attribute in S1347, and the processing advances to S1346. Otherwise, the processing is terminated. In S1346, the automatic setting control unit 222 backs up the current IPP-Print setting to the NVRAM 137 of the image processing apparatus 120. In S1347, the automatic setting control unit 222 determines whether or not the IPP-Print function is enabled, and enables the IPP-Print function when it is disabled.

In S1348, the communication parameter analyzing unit 226 determines that "use" is set in an "IPP-Fax" attribute in S1351, and the processing advances to S1350. Otherwise, the processing is terminated. In S1350, the automatic setting control unit 222 backs up the current IPP-Fax setting to the NVRAM 137 of the image processing apparatus 120. In S1351, the automatic setting control unit 222 determines whether or not the IPP-Fax function is enabled, and enables the IPP-Fax function when it is disabled.

In S1352, the communication parameter analyzing unit 226 determines that "use" is set in an "IPP-Print" attribute in S1355, and the processing advances to S1354. Otherwise, the processing is terminated. In S1354, the automatic setting control unit 222 backs up the current IPP-Print setting to the NVRAM 137 of the image processing apparatus 120. In S1355, the automatic setting control unit 222 determines whether or not the IPP-Print function is enabled, and enables the IPP-Print function when it is disabled.
wherein the providing unit provides the image processing service when the setting is enabled and wireless communication is established.

3. The image processing apparatus according to claim 1, wherein the wireless communication unit searches for the information processing apparatus of which a wireless communication setting is enabled, and receives identification information, from the searched information processing apparatus, for identifying the information processing apparatus, and when wireless communication is established based on the identification information, the wireless communication unit further receives attribute information of the information processing apparatus from the information processing apparatus,

wherein when the attribute information coincides with attribute information stored in a storage unit of the image processing apparatus by analyzing the received attribute information, and

wherein the providing unit provides the image processing service when the setting is enabled and wireless communication is established.

4. The image processing apparatus according to claim 3, wherein the attribute information further includes one or more attributes relating to the setting that is used for providing the service, and

wherein the enabling unit analyzes the each attribute so as to enable the setting that is used for providing the service, and not to enable the setting that is not used for providing the service.

5. The image processing apparatus according to claim 4, wherein the attribute relating to the setting that is used for providing the service is a setting in which the wireless communication unit responds to the image processing apparatus upon receipt of a search request for the image processing apparatus that is capable of communicating by wireless communication, or a setting in which the enabling unit sets a type of image processing executed by the image processing apparatus.

6. The image processing apparatus according to claim 1, wherein when the information processing apparatus establishes wireless communication, the wireless communication unit interrupts communication with the access point after storing identification information for connecting to the access point in the storage, and communicates with only the information processing apparatus by interrupting the communication with the access point, and

wherein when the information processing apparatus removes the wireless communication setting, the wireless communication unit acquires the identification information for connecting to the access point from the storage unit, and resumes the communication with the access point based on the acquired identification information.

7. The image processing apparatus according to claim 1, wherein a security function that is used for communicating with a plurality of the information processing apparatuses is set in the setting that is used for providing the service, and wherein the providing unit provides the service with the information processing apparatus without using the security function as long as wireless communication with the information processing apparatus is established.

8. The image processing apparatus according to claim 1, wherein the service in which image processing is executed includes at least print processing or fax processing.

9. A method for controlling an image processing apparatus that is capable of communicating with an information processing apparatus by wireless communication, the method comprising:

directly communicating with the information processing apparatus by wireless communication without passing through the access point;

providing a service in which image processing is executed in response to an image processing request transmitted from the information processing apparatus in the wireless communication step; and

enabling a setting in the image processing the setting that is used for providing the service, wherein when the information processing apparatus establishes communication with the image processing apparatus via the wireless communication unit, the setting that is used for providing the service in the enabling step is used if the setting is not enabled.

10. A non-transitory storage medium on which is stored a computer program for making a computer execute a method for controlling an image processing apparatus that is capable of communicating with an information processing apparatus by wireless communication, the method comprising:

directly communicating with the information processing apparatus by wireless communication without passing through the access point;

providing a service in which image processing is executed in response to an image processing request transmitted from the information processing apparatus in the wireless communication step; and

enabling a setting in the image processing step that is used for providing the service, wherein when the information processing apparatus establishes communication with the image processing apparatus via the wireless communication unit, the setting that is used for providing the service in the enabling step is used if the setting is not enabled.

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