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(54) **AUTOMATED ADDITION OF DEVICE IDENTIFICATION INFORMATION INTO PRE-PROVISIONING SYSTEM**

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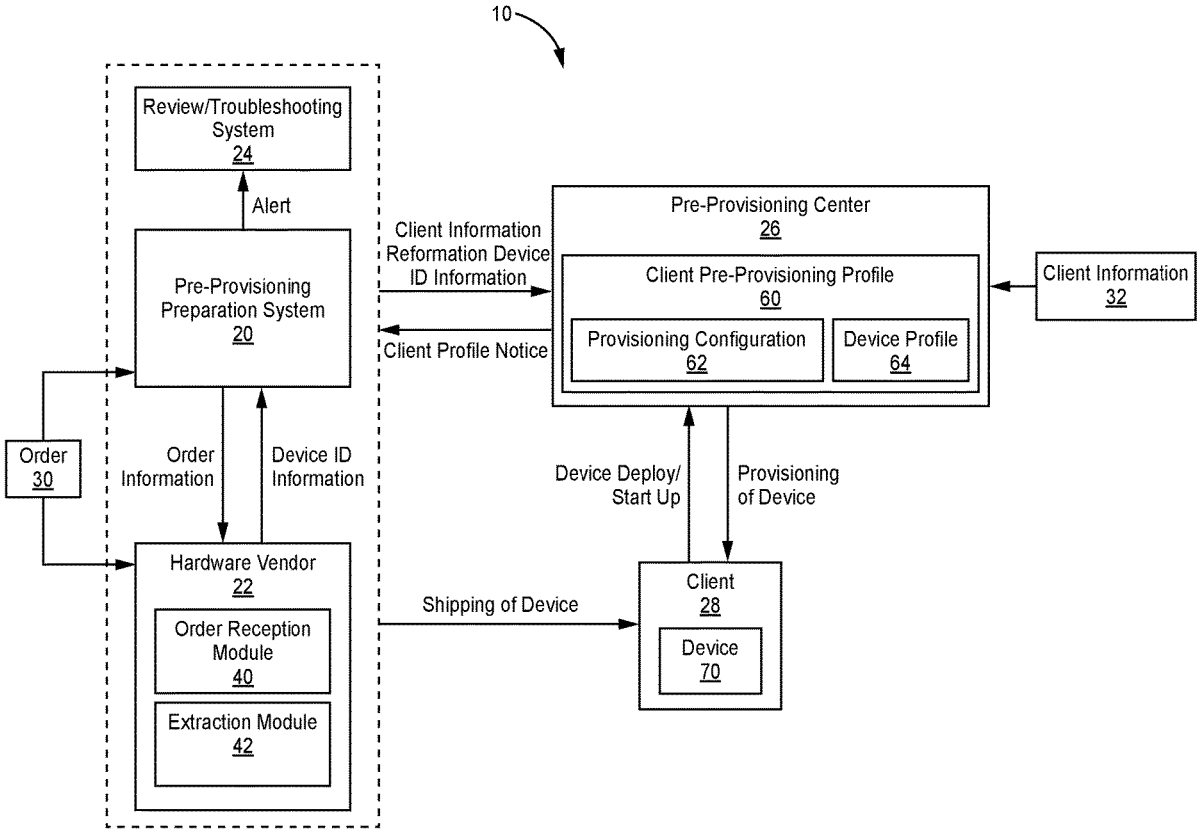
(57) **ABSTRACT**

A method of pre-provisioning a computer hardware device for a client can include receiving an order for the device from the client, identifying whether the client has a pre-provisioning profile, in response to the client having a pre-provisioning profile, extracting device identification information for the device, configuring (by a computer processor) the device identification information into reformatted device identification information suitable for upload to a pre-provisioning center with the pre-provisioning center having the pre-provisioning profile for the client that designates a provisioning configuration for the device and configured to provision the device in response to a start-up prompt by the device, and uploading (by the computer processor), in response to the configurating of the device identification information into reformatted device identification information, the reformatted device identification information to the pre-provisioning center to link the device with the provisioning configuration of the client.



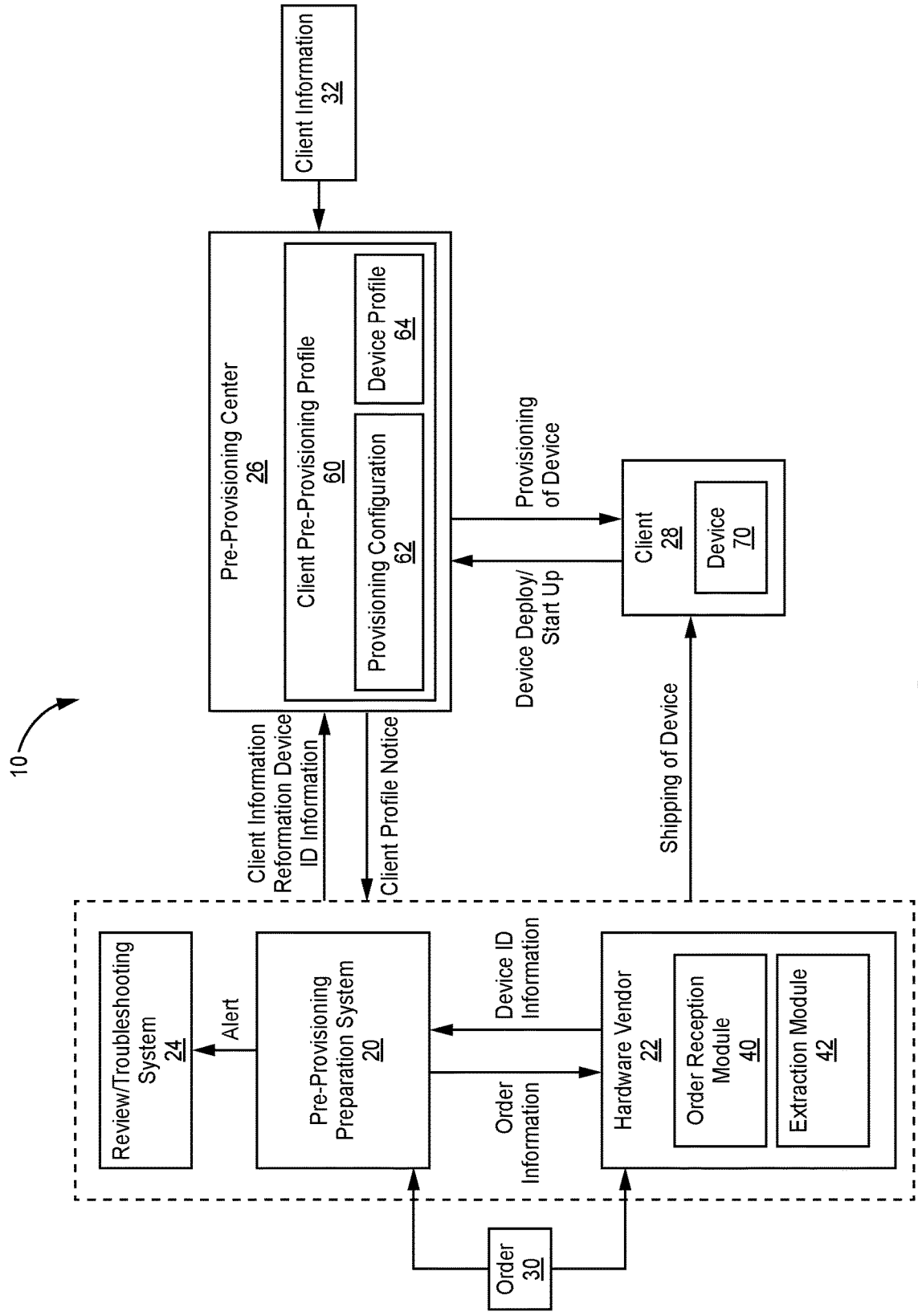

10
Client Information
32
Pre-Provisioning Center
26
Client Pre-Provisioning Profile
60
Device Profile
64
Provisioning Configuration
62
Provisioning of Device
Device Deploy/ Start Up
Client
28
Device
70
Client Information Reformation Device ID Information
Client Profile Notice
Shipping of Device
Review/Troubleshooting System
24
Alert
Pre-Provisioning Preparation System
20
Device ID Information
Order Information
Hardware Vendor
22
Order Reception Module
40
Extraction Module
42
Order
30

FIG. 1A

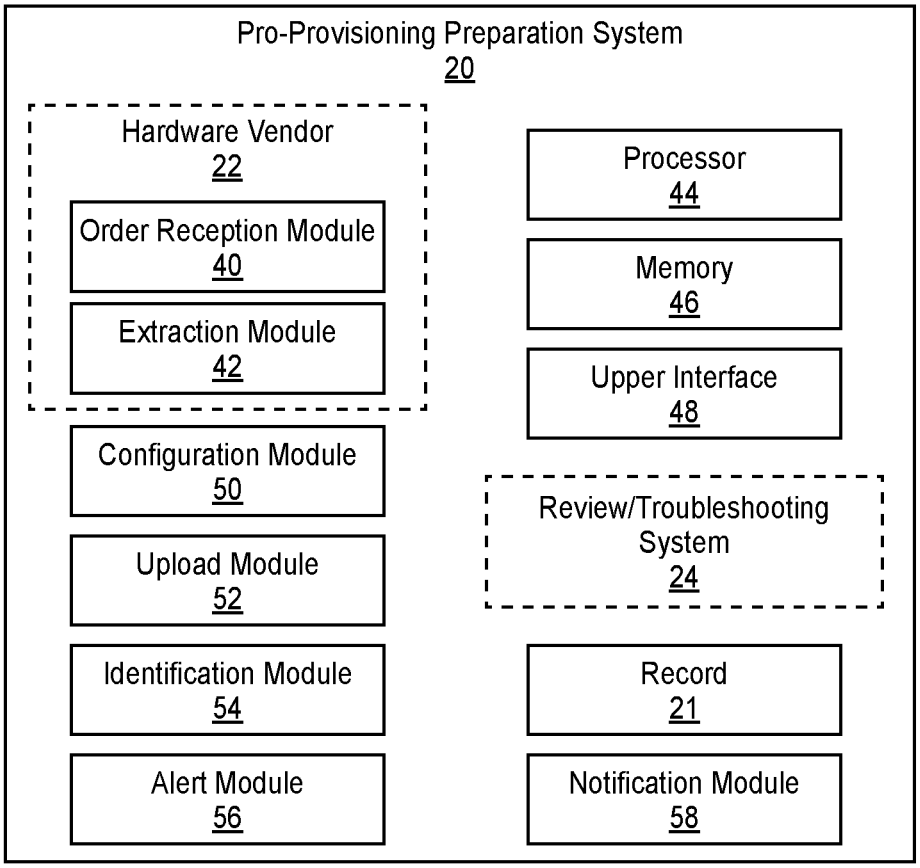

Pro-Provisioning Preparation System
20
Hardware Vendor
22
Order Reception Module
40
Extraction Module
42
Configuration Module
50
Upload Module
52
Identification Module
54
Alert Module
56
Processor
44
Memory
46
Upper Interface
48
Review/Troubleshooting System
24
Record
21
Notification Module
58

FIG. 1B

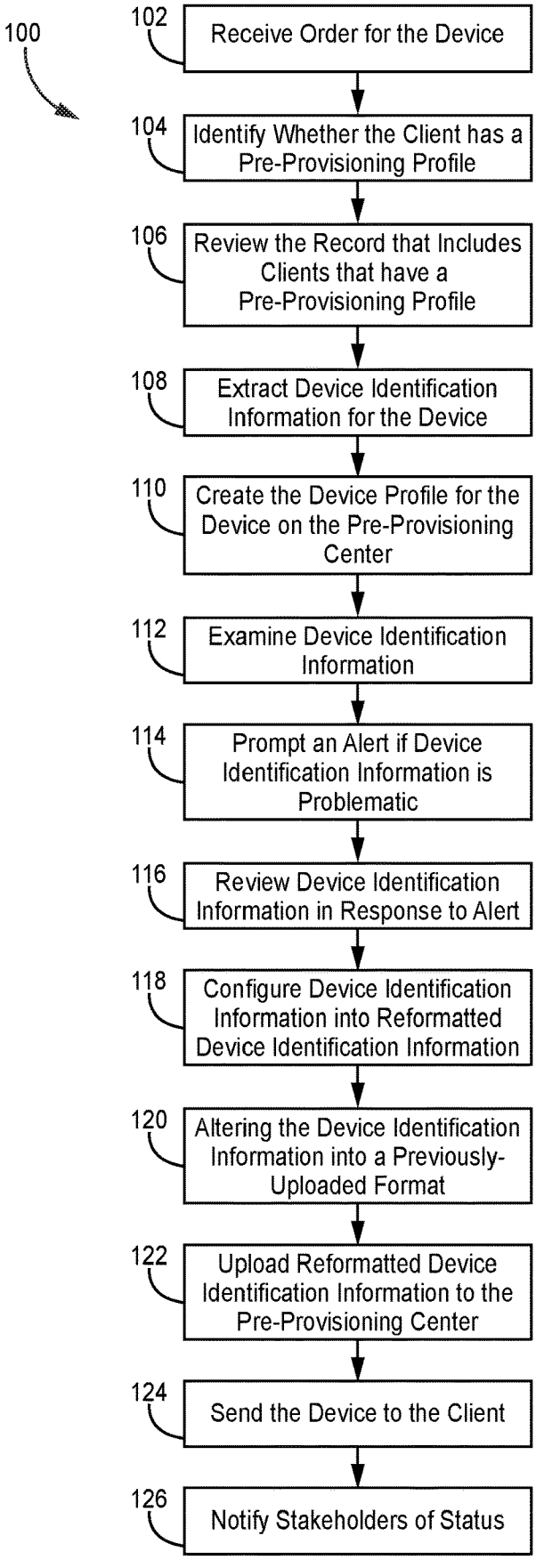

100
102
Receive Order for the Device
104
Identify Whether the Client has a Pre-Provisioning Profile
106
Review the Record that Includes Clients that have a Pre-Provisioning Profile
108
Extract Device Identification Information for the Device
110
Create the Device Profile for the Device on the Pre-Provisioning Center
112
Examine Device Identification Information
114
Prompt an Alert if Device Identification Information is Problematic
116
Review Device Identification Information in Response to Alert
118
Configure Device Identification Information into Reformatted Device Identification Information
120
Altering the Device Identification Information into a Previously-Uploaded Format
122
Upload Reformatted Device Identification Information to the Pre-Provisioning Center
124
Send the Device to the Client
126
Notify Stakeholders of Status

FIG. 2

AUTOMATED ADDITION OF DEVICE IDENTIFICATION INFORMATION INTO PRE-PROVISIONING SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application claims priority to U.S. provisional patent application Ser. No. 63/457,648 by J. Broad, filed Apr. 6, 2023 and entitled "AUTOMATED ADDITION OF DEVICE IDENTIFICATION INFORMATION INTO PRE-PROVISIONING SYSTEM."

FIELD OF THE INVENTION

[0002] The disclosure relates generally to pre-provisioning computer hardware devices and, more specifically, to the automated collection of device identification information for use in associating the device with a pre-provisioning configuration designated by the device owner in an online pre-provisioning center.

BACKGROUND

[0003] When an individual and/or company (hereinafter, collectively, a "client") orders/purchases a computer hardware device, such as a computer processor, the device often arrives to the client with no client-specific software installed and/or user configurations set up on the device. To configure the device for the client's needs and/or preferences (called provisioning the device), the client must either select, download, and install the software and/or take multiple, complex steps to configure the client's preferences on the device, or the device must first be sent to a provisioning vendor who provisions the device before sending the device to the client. These options are time consuming and may require numerous actions taken on the physical device during provisioning before the client can use the device as intended.

SUMMARY

[0004] A method of pre-provisioning a computer hardware device for a client can include receiving an order for the device from the client, identifying whether the client has a pre-provisioning profile, in response to the client having a pre-provisioning profile, extracting device identification information for the device, configuring (by a computer processor) the device identification information into reformatted device identification information suitable for upload to a pre-provisioning center with the pre-provisioning center having the pre-provisioning profile for the client that designates a provisioning configuration for the device and configured to provision the device in response to a start-up prompt by the device, and uploading (by the computer processor), in response to the configurating of the device identification information into reformatted device identification information, the reformatted device identification information to the pre-provisioning center to link the device with the provisioning configuration of the client.

[0005] A system for pre-provisioning preparation for a computer hardware device for a client can include an order reception module configured to receive an order for the device from the client, an identification module that reviews the order by the client and determines whether the client has a pre-provisioning profile, an extraction module in communication with the order reception module and configured to, in response to the identification module determining that the client has a pre-provisioning profile, extract device identification information for the device, a configuration module in communication with the extraction module and configured to reformat the device identification information into reformatted device identification information suitable for upload to a pre-provisioning center having the pre-provisioning profile for the client that designates a provisioning configuration for the device and being configured to provision the device in response to a start-up prompt by the device, and an upload module in communication with the configuration module and configured to upload, in response to the configurating of the device identification information into reformatted device identification information, the reformatted device identification information to the pre-provisioning center to link the device with the provisioning configuration of the client.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. **1**A is an example of a schematic of a system for pre-provisioning and provisioning a computer hardware device.

[0007] FIG. **1**B an example of a schematic of a pre-provisioning preparation system for use within the system of FIG. **1**A.

[0008] FIG. **2** is an example flow chart of a pre-provisioning preparation process performed by the system in FIGS. **1**A and **1**B.

[0009] While the above-identified figures set forth one or more examples of the present disclosure, other examples/embodiments are also contemplated, as noted in the discussion. In all cases, this disclosure presents the invention by way of representation and not limitation. It should be understood that numerous other modifications and embodiments can be devised by those skilled in the art, which fall within the scope and spirit of the principles of the invention. The figures may not be drawn to scale, and applications and examples of the present invention may include features and components not specifically shown in the drawings.

DETAILED DESCRIPTION

[0010] Systems and related methods are disclosed herein for use in collecting preparatory information and pre-provisioning a computer hardware device purchased (e.g., ordered) by an individual, company, or another entity (hereinafter, a "client") with software and/or configurations as specified by that client dependent upon client needs and/or preferences. As a part of these processes, the systems can receive an order for the device as placed by the client, identify that the client is one that has a pre-provisioning profile detailing the provisioning configuration for the device (e.g., by reviewing a record that includes a list of all clients that have a pre-provisioning profile), associate (e.g., link) the device with the client, and extract device identification information from the device. The device identification information can then be configured into reformatted device identification information that is suitable to be uploaded to (e.g., places the information in a format that is able to be accepted by) a pre-provisioning center that can include the pre-provisioning profile and the provisioning configuration as specified by the client. The systems can automatically extract the device identification information, configure the information into reformatted device identification information, and upload the reformatted device iden-

tification information to the pre-provisioning center. For example, the system can upload the reformatted device identification information in response to the configuring of the device identification information into reformatted device identification information. The systems can link the reformatted device identification information with a device profile so that, when the device is deployed (i.e., powered on and connected to the internet) by the client, the pre-provisioning center connects to the device and provisions the device with the provisioning configuration specified in the pre-provisioning center. Without the systems uploading the reformatted device identification information for the device to the pre-provisioning center, the client may have to take multiple, complex steps to connect to the pre-provisioning center, notify the pre-provisioning center of the particular device that needs to be provisioned, and begin the provisioning process.

[0011] In this disclosure, "provisioning" includes having a third party, such as a vendor or outside company (e.g., not the client), set up the device with client-specific software, layouts, applications, configurations, etc. (hereinafter referred to as "software and/or configurations") so that the client does not need to set up the device itself when the device is deployed. Additionally, in this disclosure, "pre-provisioning" includes selecting the client-specific software, layouts, applications, configurations, etc. before the device is deployed so that, upon deployment, the device can be provisioned soon thereafter without the need for too many additional actions.

[0012] The systems and related processes can include various additional features, such as the ability to identify, after the order from the client has been received, whether the client has a pre-provisioning profile (e.g., by reviewing a record that includes a list of clients that have a pre-provisioning profile) and, if so, continue with the pre-provisioning preparation process. Also, the systems and related processes can have the ability to examine the extracted device identification information and/or the reformatted device identification information and, in response to the information being in a configuration that cannot be accepted by the pre-provisioning center upon upload, prompt an alert to a troubleshooting system and/or automatically reconfigure the information into an acceptable format. The systems and related processes can also create a device profile (for the device ordered by the client) having the reformatted device identification information. The device profile can be in the pre-provisioning center, and the processes can further associate that device profile with the client pre-provisioning profile. The systems can work in conjunction with a hardware vendor (or can include all the responsibilities and/or functionality of a hardware vendor) to receive the order for the device from the client, associate the device with the client (e.g., find the device within its inventory), and extract the device identification information before the device is delivered to the client. The various capabilities, functions, configurations, and advantages of the disclosed systems and processes will be realized by reviewing this disclosure.

[0013] FIG. **1**A is an example of a schematic of the system for pre-provisioning and provisioning a computer hardware device, while FIG. **1**B is an example of a schematic of a pre-provisioning preparation system. FIGS. **1**A and **1**B are described together. Pre-provisioning and provisioning system **10** (also referred to herein as "provisioning system **10**") includes pre-provisioning preparation system **20** (also referred to herein as "preparation system **20**"), hardware vendor **22**, troubleshooting system **24**, pre-provisioning center **26**, and client **28**. Order **30** and client information **32** are received by provisioning system **10**. Hardware vendor **22** can include order reception module **40** and extraction module **42**, and, as shown in FIG. **1**B, preparation system **20** can be an extended system that includes hardware vendor **22** and/or review or troubleshooting system **24** (also referred to herein as (troubleshooting system **24**"). Pre-provisioning preparation system **20** can also include record **21**, processor **44**, memory **46**, user interface **48**, configuration module **50**, upload module **52**, identification module **54**, alert module **56**, notification module **58** as well as other components not expressly disclosed herein. Pre-provisioning center **26** can include client pre-provisioning profile **60** having provisioning configuration **62** and/or device profile **64**, and client **28** can be delivered/provided with computer hardware device **70** so as to have physical possession and/or control over device **70**.

[0014] Pre-provisioning and provision system **10**, as well as pre-provisioning preparation system **20**, can include other components not expressly disclosed herein and/or can have other capabilities, functions, and/or configurations than those disclosed herein and shown in FIGS. **1**A and **1**B. Additionally, provisioning system **10** and/or preparation system **20** can each or collectively be a discrete assembly or be formed by one or more elements capable of individually or collectively implementing the functionalities described herein. In some examples, provisioning system **10** and/or preparation system **20** can be implemented as a plurality of discrete circuitry subassemblies. In some examples, one or all components of pre-provisioning and provisioning system **10** and/or pre-provisioning preparation system **20** can include or be implemented at least in part as a smartphone or tablet, among other options. In some examples, one or all components of pre-provisioning and provisioning system **10** and/or pre-provisioning preparation system **20** can include and/or be implemented as downloadable software in the form of a mobile application. The mobile application can be implemented on a computing device, such as a personal computer, tablet, or smartphone, among other suitable devices. One or all components of provisioning system **10** and/or preparation system **20** can be considered to form a single computing device even when distributed across multiple component computing devices.

[0015] Any components of pre-provisioning and provisioning system **10** and/or pre-provisioning preparation system **20** can use a rules-based engine/program to establish and refine functions/techniques for performing the processes described herein. For example, one or multiple rules based engines/programs can be used to perform the functions of pre-provisioning preparation system **20** by receiving, as input(s), order **30**, order information, and/or device identification information, and using those inputs to generate outputs, which can be reformatted device identification information.

[0016] Pre-provisioning preparation system **20** can include multiple components for receiving order **30** from client **28**, identify whether client **28** has a pre-provisioning profile **60**, extracting device identification information from device **70**, configuring the device identification information into reformatted device identification information suitable for upload to pre-provisioning center **26**, and/or automatically uploading the reformatted device identification infor-

mation to pre-provisioning center **28**. Provisioning system **10** can include a configuration in which one, some, or all of these functions are performed by different components (such as hardware vendor **22**, troubleshooting system **24**, etc.). Preparation system **20** can include various components for performing the above functions (as well as other functions described in this disclosure), such as processor **44**, memory **46**, and/or user interface **48**.

[0017] Pre-provisioning preparation system **20**, (and/or other components of provisioning system **10** and/or preparation system **20**, such as hardware vendor **22** and/or troubleshooting system **24**) can include one or multiple computer processors **44** (also referred to as "processor **44**"). In general, processor **44** can include any or more than one of a processor, a microprocessor, a controller, a digital signal processor (DSP), an application specific integrated circuit (ASIC), a field-programmable gate array (FPGA), or other equivalent discrete or integrated logic circuitry. Processor **44** can perform instructions stored within storage media, such as memory **46** (or located elsewhere), and/or processor **44** can include storage media such that processor **44** is able to store instructions and perform the functions described herein. Additionally, processor **44** can perform other computing processes described herein, such as the functions performed by any of the components of provisioning system **10** and/or preparation system **20**.

[0018] Pre-provisioning preparation system **20** (and/or other components of provisioning system **10** and/or preparation system **20**) can also include memory **46**. Memory **46** is configured to store information and, in some examples, can be described as a computer-readable storage medium. Memory **46**, in some examples, is described as computer-readable storage media. In some examples, a computer-readable storage medium can include a non-transitory medium. The term "non-transitory" can indicate that the storage medium is not embodied in a carrier wave or a propagated signal. In certain examples, a non-transitory storage medium can store data that can, over time, change (e.g., in RAM or cache). In some examples, memory **46** is a temporary memory. As used herein, a temporary memory refers to a memory having a primary purpose that is not long-term storage. Memory **46**, in some examples, is described as volatile memory. As used herein, a volatile memory refers to a memory that that the memory does not maintain stored contents when power to memory **46** is turned off. Examples of volatile memories can include random access memories (RAM), dynamic random-access memories (DRAM), static random access memories (SRAM), and other forms of volatile memories. In some examples, the memory is used to store program instructions for execution by the processor. The memory, in one example, is used by software or applications running on pre-provisioning preparation system **20** to temporarily store information during program execution.

[0019] Memory **46**, in some examples, also includes one or more computer-readable storage media. Memory **46** can be configured to store larger amounts of information than volatile memory. Memory **46** can further be configured for long-term storage of information. In some examples, memory **46** includes non-volatile storage elements. Examples of such non-volatile storage elements can include, for example, magnetic hard discs, optical discs, floppy discs, flash memories, cloud storage (e.g., electronic storage media on a server or other media remote from the operator's computer hardware), or forms of electrically programmable memories (EPROM) or electrically erasable and programmable (EEPROM) memories. As shown in the example of pre-provisioning preparation system **20**, memory **46** can store order information, shipping information, payment information, device identification information, reformatted device identification information, client information, information regarding whether client **28** has client pre-provisioning profile **60** at pre-provisioning center **26**, and other information, data, and/or instructions.

[0020] Pre-provisioning preparation system **20** (and/or other components of system **10** and/or system **20**) can also include user interface **48**. User interface **48** can be an input and/or output device and enables an operator to control operation of pre-provisioning preparation system **20**. For example, user interface **48** can be configured to receive inputs from an operator and/or provide outputs. User interface **48** can include one or more of a sound card, a video graphics card, a speaker, a display device (such as a liquid crystal display (LCD), a light emitting diode (LED) display, an organic light emitting diode (OLED) display, etc.), a touchscreen, a keyboard, a mouse, a joystick, or other type of device for facilitating input and/or output of information in a form understandable to users and/or machines.

[0021] Hardware vendor **22** can be incorporated into preparation system **20** (as shown in example FIG. **1**B) so that both are in the same location and use processor **44**, memory **46**, and/or user interface **48** in conjunction as an all-encompassing component to perform the functions disclosed herein. Alternatively, hardware vendor **22** can be separate from preparation system **20** as shown in example FIG. **1**A. For example, hardware vendor **22** can be a separate entity/company than that which includes pre-provisioning preparation system **20** and can have its own processor, memory, and/or user interface (among other components). In one example, hardware vendor **22** is a computer hardware device fulfillment center that include inventory having device **70** (and other computer hardware) with the fulfillment center being owned and/or operated by or in association with the same company/entity that owns and/or operates preparation system **20**. In another example, hardware vendor **22** is a different company or separate entity potentially situated at a different location than pre-provisioning preparation system **20**, and hardware vendor **22** is in wired or wireless communication with pre-provisioning preparation system **20** to exchange information regarding client **28** and/or device **70**.

[0022] Hardware vendor **22** can include order reception module **40** configured to receive order **30** for deice **70** from client **28**. In other examples, order reception module **40** can be part of pre-provisioning preparation system **20**, and information regarding order **30** can be provided by pre-provisioning preparation system **20** to hardware vendor **22**. Order reception module **40** can include or be in communication with a user interface that allows for client **28** to place order **30**, such as a website on the internet. Order reception module **40** can be in communication with any of the components of system **10** and can include other capabilities and/or functions.

[0023] Hardware vendor **22** can also include extraction module **42**. Extraction module **42** can be configured to associate device **70** with client **28** (among other capabilities). For example, device **70** can be within inventory and then removed from inventory to prepare device **70** for

shipment to client **28**. During this process, device **70** can be designated as being for client **28** to fulfill order **30**. Extraction module **42** can also be configured to extract device identification information from device **70**. The device identification information can be physically on device **70**, physically on a package containing device **70**, and/or digitally on or within device **70** (e.g., in the "properties" dialogue box on software on device **70**). The device identification information can include a model number, a serial number, a maker/brand of device **70**, a date that device **70** was constructed and/or assembled, a hardware identifier, and other information regarding device **70**. Extraction module **42** can be configured to scan a barcode or other code that contains the device identification information, examine device **70** (and/or a package for device **70**) and collect device identification information visually, such as through the use of computer vision and/or optical character recognition, and/or extract device identification information through other means. In one example, device identification information for device **70** is collected upon reception and/or construction of device **70** by hardware vendor **22** and is stored in memory **46** or at another location. Once order **30** is placed, extraction module **42** can associate device **70** with client **28** within an inventory software system and extract/access the device identification information as stored in memory **46** or at another location.

[0024] After extracting the device identification information, hardware vendor **22** can prepare device **70** (e.g., labeling and packing device **70**) and send device **70** to client **28** via various means, including via shipping device **70**.

[0025] Hardware vendor **22** can communicate the device identification information to pre-provisioning preparation system **20** (e.g., to memory **46** and/or configuration module **50**). Configuration module **50** can access the device identification information in memory **46** and/or receive the device identification information from hardware vendor **22** and configure/transform the device identification information into reformatted device identification information that is in a format that is suitable for upload to and acceptance by pre-provisioning center **26**. Configuring device identification information can include adding, modifying, and/or deleting digits, characters, and/or spaces within any numbers, words, phrases, etc. in device identification information. Configuring device identification information can also include adding information based on the device identification information, such as a maker/brand based on the device model number. Configuration module **50** can also change the type of file within which reformatted device identification information is contained and/or saved to a file format that is suitable for uploading to pre-provisioning center **26**. Configuration module **50** can perform other manipulations of device identification information to allow for uploading and use by pre-provisioning center **26**.

[0026] Pre-provisioning preparation system **20** can also include upload module **52**, which is in wired or wireless communication with pre-provisioning center **26** to upload/send reformatted device identification information to pre-provisioning center **26**. Upload module **52**, and pre-provisioning preparation system **20** generally, can be configured to automatically upload the reformatted device identification information after configuration module **50** generates the reformatted device identification information. For example, preparation system **20** can automatically upload the reformatted device identification information when the reformatted device identification information is added or saved to memory **46**. Upload module **52** can include other capabilities, functions, and/or configurations not disclosed herein for providing reformatted device identification information to pre-provisioning center **26**. For example, upload module **52** can be configured to create device profile **64** to which the reformatted device identification information is sent/uploaded for use in provisioning device **70**.

[0027] Pre-provisioning preparation system **20** can include other components and/or capabilities, such as identification module **54** configured to identify that client **28** has client pre-provisioning profile **60** such that preparation system **20** is aware that pre-provisioning needs to be performed on device **70** (so device identification information needs to be extracted, configured, and uploaded). Pre-provisioning preparation system **20** can include a record that includes clients **28** that each have a client pre-provisioning profile **60**. Identification module **54** can be in communication with pre-provisioning center **26** to receive a notice/information regarding whether client **28** has a client pre-provisioning profile **60**, or the notice/information regarding whether client **28** has a client pre-provisioning profile **60** can be received by pre-provisioning preparation system **20** and saved in record **21** or other matter in memory **46** for access by identification module **54**. In one example, identification module **54** can compare client **28** that placed order **30** to record **21** of clients having a client pre-provisioning profile **60** to determine if client **28** has a pre-provisioning profile **60**. Identification module **54** can perform the comparison and/or identification automatically after order **30** and/or device identification information are received (e.g., in response to receiving order **30** and/or device identification information), or identification module **54** can be prompted by a user/operator or other component and/or instruction. Record **21** can be stored in memory **46** or at another location and can include a list of clients **28** that have a pre-provisioning profile **60** in pre-provisioning center **26**.

[0028] Pre-provisioning preparation system **20** (i.e., any of the components of pre-provisioning preparation system **20**) can examine the device identification information, and can include alert module **56** that can prompt an alert in response to the device identification information have particular characteristics that may prevent configuration into reformatted device identification information that is suitable for upload. Alert module **56** can prompt the alert to troubleshooting system **24** to notify troubleshooting system **24** of the characteristics so that troubleshooting system **24** can review the device identification information. Additionally, troubleshooting system **24** can alter the characteristics (and/or instruct configuration module **50**) to ensure the configuration of device identification information produces reformatted device identification information that is able to be uploaded and used by pre-provisioning center **26**. Troubleshooting system **24** can be a part of preparation system **20** or can be a separate component, and troubleshooting system **24** can have a variety of configurations and/or capabilities. For example, troubleshooting system **24** can use processor **44**, memory **46**, and/or user interface **48** either as part of pre-provisioning preparation system **20** or as a separate component (or include its own processor(s), memory, etc.). Additionally, troubleshooting system **24** can have a user interface that allows a user/operator to manually correct/alter the device identification information. In another example, troubleshooting system **24** can automatically alter (or instruct configuration module **50** to correct/alter) the

device identification information and/or use a rules-based engine/program to perform corrective tasks.

[0029] The issue or information that prompts an alert and/or notice by alert module **56** can be anything that may interfere with the extraction, configuration, and/or uploading of device identification information. In one example, alert module **56** prompts an alert in response to a model number of the device identification information showing that device **70** is a new model that has not previously been seen by pre-provisioning preparation system **20** and has not previously experienced the pre-provisioning preparation and/or provisioning process. In this situation, troubleshooting system **24** or another component of pre-provisioning preparation system **20** can reconfigure the model number of the device identification information into reformatted model number/device identification information that can be uploaded to pre-provisioning center **26**. In another example, alert module **56** prompts an alert in response to a serial number of device identification information showing that the serial number is in a format that cannot be uploaded to pre-provisioning center **26**. In this situation, troubleshooting system **24** or another component of pre-provisioning preparation system **20** can reconfigure the serial number of the device identification information into reformatted serial number (e.g., device identification information) that can be uploaded to pre-provisioning center **26**.

[0030] Pre-provisioning preparation system **20** can also include notification module **58**, which can be configured to notify various stakeholders regarding the status of device **70** and/or the pre-provisioning process. The stakeholders can include client **28**; any individual and/or programs/components internal to pre-provisioning preparation system **20**, such as hardware vendor **22**; the individual to which device **70** is being sent, the individual that placed order **30**, and/or any other individuals, entities, programs, etc. that is interested in receiving updates/notifications as to the status of the pre-provisioning and/or provisioning of device **70**. Notification module **58** can update/notify the stakeholders regarding any statuses, changes in status, development/progression along the pre-provisioning and/or provisioning processes, and/or other information/data regarding device **70**. For example, notification module **58** can provide a notice to the stakeholders upon pre-provisioning preparation system **20** receiving order **30**. In another example, notification module **58** can provide a notice to the stakeholders upon extraction of device identification information from device **70**. Another example can include notification module **57** providing the stakeholders with an update regarding the reformatting of the device identification information and/or the uploading of reformatted device identification information to pre-provisioning center **26**. Other examples can include notification module **58** providing a notice to stakeholders when device **70** is sent to client **28**, when device **70** is received by client **28**, when device **70** is deployed, and/or when the provisioning of device **70** has begun and/or has been completed.

[0031] The above components of pre-provisioning preparation system **20**, hardware vendor **22**, and/or troubleshooting system **24** can each include or collectively use a computer processor having necessary software (e.g., processor **44**), digital storage media (e.g., memory **46**), a user interface (e.g., user interface **48**), and/or other elements, hardware, software, etc. for performing the functions described herein.

[0032] Pre-provisioning preparation system **20** provides/uploads reformatted device identification information (and information that associates the reformatted device identification information to client **28**) to pre-provisioning center **26**, while pre-provisioning center **26** can provide information detailing that client **28** has a client pre-provisioning profile **60** to pre-provisioning preparation system **20**.

[0033] Pre-provisioning center **26** can be a cloud-based management system, such as Microsoft Intune, and/or a system used to set up and pre-configure new devices, such as Windows Autopilot. In one example, pre-provisioning center **26** is one all-encompassing system that can include and/or perform the functions of both schemes. In another example, pre-provisioning center **26** is multiple components that collectively allow for client **28** to provide client information **32** to create client pre-provisioning profile **60** having previsioning configuration **62** and/or device profile **64** for specifying the client's preferences for provisioning device **70**. Pre-provisioning center **26** can have any configurations, capabilities, and elements for performing the functions described herein. For example, pre-provisioning center **26** can have one or multiple computer processors, storage media/memory, user interfaces, and/or other components at one or multiple locations (e.g., in the cloud, at multiple data and/or processing centers, etc.).

[0034] Client **28**, or preparation system **20**, can set up client pre-provisioning profile **60** on/at pre-provisioning center **26**. Client pre-provisioning profile **60** can include designated information dependent upon client information **32**, and pre-provisioning system **20** and/or pre-provisioning center **26** can locate the provisioning preferences as designated in provisioning configuration **62** and/or device profile **64**. Client **28** can create client pre-provisioning profile **60** (and provisioning configuration **62** and/or device profile **64**) through various means, such as providing client information **32** via a website, a user portal, an email message, and/or other methods. In one example, client **28** can have the entity/company operating preparation system **20** create client pre-provisioning profile **60**, provisioning configuration **62**, and/or device profile **64** for client **28** by providing client information **32** to pre-provisioning center **26**.

[0035] The preferences for the software, layouts, applications, configurations, etc. client **28** desires on device **70** (e.g., the provisioning of device **70**) can be specified in provisioning configuration **62**. The preferences set out in provisioning configuration **62** can be specified for device **70** specifically or can be generally specified depending on the type of hardware to be provisioned for client **28** (e.g., any PC ordered by client **28** will be provisioned according to a first configuration while any Chrome device ordered by client **28** will be provisioned according to a second configuration as set out in provisioning configuration **62**). These preferences in provisioning configuration **62** can be set up, modified, and/or deleted at any time by client **28** and/or anyone with permission/access to client pre-provisioning profile **60**.

[0036] The reformatted device identification information can be provided to and/or stored in device profile **64** of client pre-provisioning profile **60**. With the reformatted device identification information being in device profile **64** to associate device **70** with client **28**, pre-provisioning center **26** can determine how device **70** is to be provisioned. For example, reformatted device identification information can include that device **70** is a PC computer. Pre-provisioning center **26** can see this in device profile **64** and determine that, based on provisioning configuration **62**, that device **70** is to be provisioned according to a first configuration. Thus, after

device **70** is sent to client **28** from hardware vendor **22** and deployed (e.g., powered on and/or connected to the internet), pre-provisioning center **26** can automatically start provisioning device **70** based on the preferences set out by client **28** in provisioning configuration **62**.

[0037] When device **70** is deployed, pre-provisioning center **26** can recognize device **70** via reformatted device identification information in device profile **64** and automatically begin provisioning device **70**. To provision device **70**, client **28** will have to take only minimal action, such as powering on device **70** and/or connecting device **70** to the internet (or otherwise place device **70** in communication with pre-provisioning center **26**). Because pre-provisioning center **26** is provided information about device **70** (e.g., reformatted device identification information) by pre-provisioning preparation system **20**, pre-provisioning center **26** can locate and/or recognize device **70** to automatically begin provisioning device **70**.

[0038] FIG. **2** is an example flow chart of pre-provisioning preparation process **100** as performed by, for example, preparation system **20** in FIGS. **1**A and **1**B. While process **100** is described herein as being used with regards to provisioning system **10** and/or preparation system **20**, process **100** can be performed by any system having any components, capabilities, configurations, and/or functionalities suitable for performing process **100**. Additionally, process **100** can include other steps not expressly disclosed herein and/or can include performing the disclosed steps in any order and/or multiple times as is desired and/or necessary to pre-provision device **70** for client **28**.

[0039] First, process **100** includes step **102**, which is to receive order **30** for device **70**. Order **30** can be received from client **28** or another entity and can be received by pre-provisioning preparation system **20**, hardware vendor **22**, and/or by another component of provisioning system **10**. Order **30** can be placed via any method, including via a phone call, in person, and/or through a website on the internet. Step **102** can include finding device **70** within inventory, such as within a warehouse full of computer hardware products, and/or can include associating the device **70** with client **28**, such as by noting or otherwise marking on device **70** and/or within an inventory system that device **70** is earmarked for client **28** to fulfill order **30**.

[0040] Then, process **100** can include step **104**, which is to identify whether client **28** has a client pre-provisioning profile **60**. Step **104** can include providing client information to pre-provisioning center **26** and pre-provisioning center **26** determining whether client **28** has a pre-provisioning profile **60**. Alternatively, step **104** can include pre-provisioning preparation system **20** identifying whether client **28** has a pre-provisioning profile **60**, such as by client **28** notifying preparation system **20** that client **28** has created a pre-provisioning profile **60**. Step **104** can be performed and/or include other ways of identifying if client **28** has a client pre-provisioning profile **60**, such as via step **106**. Step **104** can be performed by any component of preparation system **20**, including identification module **54**.

[0041] Step **106** can include pre-provisioning preparation system **20** reviewing record **21**, which can include a list of all clients **28** that have client pre-provisioning profile **60** in pre-provisioning center **26**. Pre-provisioning center **26** can provide a client profile notice to pre-provisioning preparation system **20** (when a client pre-provisioning profile **60** is created for client **28**) to create and/or add clients **28** to record **21**, or pre-provisioning preparation system **20** can otherwise have information regarding if client **28** has a client pre-provisioning profile **60** (such as by client **28** notifying preparation system **20** that client **28** has created a pre-provisioning profile **60**).

[0042] In response to step **104** and/or **106** revealing that client **28** has a pre-provisioning profile **60**, process **100** may continue with step **108**, which is to extract device identification information for device **70**. The extraction of device identification information, as described above, can be performed by any of the components of preparation system **20**, including hardware vendor **22** and/or extraction module **42**. The device identification information can be extracted by physically examining device **70** and/or a package containing device **70** or by extracting the information digitally from device **70** (or by other methods). Step **108** can also include providing pre-provisioning preparation system **20** with the device identification information that is extracted from device **70**.

[0043] Process **100** can also include step **110**, which includes creating a device profile **64** for device **70** on pre-provisioning center **26** and associating device profile **64** with client pre-provisioning profile **60**. Device profile **64** can be on client pre-provisioning profile **60** and can include provisioning configuration **62**. Device profile **64** can include instructions for how device **70** is to be provisioned by pre-provisioning center **26** once device **70** is deployed by client **28**. Step **110** can be performed by pre-provisioning preparation system **20**, an operator in control of operation of preparation system **20**, client **28**, and/or by any other party authorized by client **28** to aid in the provisioning of device **70**. Process **100** does not need to include step **110** if client pre-provisioning profile **60** already includes instructions and/or information for provisioning device **70**.

[0044] Next, process **100** can include step **112**, which is to examine device identification information. Step **112** can be performed by preparation system **20** and/or other components, such as troubleshooting system **24**. Device identification information is examined to determine if the information correctly identifies device **70** and/or is in a format that may be suitable for configuration module **50** to configure the information.

[0045] If step **112** reveals that device identification information is problematic (e.g., does not correctly identify device **70** and/or is in an incorrect format), step **114** can be performed, which includes prompting an alert in response to device identification information being problematic. The alert can consist of any notice provided to an operator of preparation system **20** and/or to troubleshooting system **24**. The alert can be prompted by preparation system **20** in response to the examination of the device identification information, or the alert can be prompted by another component/system, such as by alert module **56** or troubleshooting system **24** (in this example, troubleshooting system **24** would be provided with device identification information and perform steps **112** and **114**).

[0046] In response to the performance of step **114** prompting the alert, process **100** can include step **116**, which includes reviewing device identification information in response to the alert. The review can examine device identification information for errors that would prevent the uploading of the device identification information and/or prevent the performance of step **118** (configuring the information). Troubleshooting system **24** can review device

identification information and alter device identification information as needed, or other components of system **20** can review and/or alter device identification information in response to an alert.

[0047] Next, process **100** can include step **118**, which is configuring device identification information into reformatted device identification information. Step **118** can be performed by preparation system **20** and, more specifically, by configuration module **50**. Step **118** can include adding, modifying, and/or deleting digits, characters, and/or spaces within any numbers, words, phrases, etc. in device identification information to reformat the information into reformatted device identification information that is suitable for upload to and acceptance by pre-provisioning center **26**.

[0048] Step **120** can be performed anytime during process **100**, which is altering the device identification information into a previously-uploaded format. Step **120** can be a subset of step **118** or can be performed at another time during process **100**. Device identification information can be altered/configured into a format that has previously been uploaded to pre-provisioning center **26**. For example, device **70** can be a specific type of computer hardware item that has previously been pre-provisioned by provisioning system **10**, so preparation system **20** can recognize that device **70** is this specific type of computer hardware item and alter the device identification information into that format that was used/uploaded for the previous, similar computer hardware item and accepted by pre-provisioning center **26**. Step **120** can be performed by any component of preparation system **20**, including configuration module **50**, and performed for any portion of device identification information, such as to the serial number, the model number, and/or the maker/brand identifier.

[0049] Process **100** can include step **122**, which is uploading reformatted device identification information to pre-provisioning center **26**. Preparation system **20** can upload the reformatted device identification information to pre-provisioning center **26** (e.g., to client pre-provisioning profile **60**) by any method of communication, including wired or wireless communication, such as via the internet. Step **122** can include taking necessary security measures to ensure preparation **20** has access to pre-provisioning center **26** (and/or to client pre-provisioning profile **60**), such as by entering a username and/or password or otherwise verifying/authenticating its permission to upload reformatted device identification information. Additionally, step **112** can include verification that the uploaded reformatted device identification information was successfully received and accepted by pre-provisioning center **26**.

[0050] Process **100** can include step **124**, which is sending/delivering device **70** to client **28**. This can be performed by hardware vendor **22** or another component of provisioning system **10**, and can include preparing device **70** for shipment and shipping device **70** to client **28**. Once received by client **28**, device **70** can be deployed and the provisioning of device **70** can be performed by pre-provisioning center **26**.

[0051] Throughout pre-provisioning preparation process **100**, process **100** can include step **126**, which is notifying stakeholders of the status of device **70** and/or the status of the pre-provisioning of device **70**. Step **126** can be performed by notification module **58** and/or by other components of pre-provisioning preparation system **20**. Step **126** can be performed multiple times throughout process **100** and/or after any steps of process **100**. The notification of stakeholders (step **126**) can be performed after order **30** is received for device **70** (step **102**), the device identification information is extracted for device **70** (step **108**), device profile **64** is created for device **70** on pre-provisioning center **26** (step **110**), the device identification information is configured into reformatted device identification information (step **118**), the reformatted device identification information is uploaded to pre-provisioning center **26** (step **120**), device **70** is sent to client **28** (step **124**), and/or before, during, or after any of the other steps of process **100**.

[0052] Provisioning system **10**, preparation system **20**, and related methods (e.g., process **100**) are disclosed herein for use in pre-provisioning device **70** ordered by client **28** with software and/or configurations as specified by that client **28** dependent upon client **28** needs and/or preferences. Preparation system **20** can receive order **30** for device **70** as placed by client **28**, identify that client **28** is one that has a client pre-provisioning profile **60** detailing provisioning configuration **62** for device **70**, associate device **70** with client **28**, and extract device identification information from device **70**. The device identification information can then be configured into reformatted device identification information that is a format suitable for upload to (e.g., places the information in a format that is able to be accepted by) pre-provisioning center **26**.

[0053] Pre-provisioning center **26** can include client pre-provisioning profile **60** and provisioning configuration **62** as specified by client **28**. Preparation system **20** can automatically upload the reformatted device identification information to pre-provisioning center **26** and associate the reformatted device identification information with device profile **64** so that, when device **70** is deployed by client **28**, pre-provisioning center **26** can connect to device **70** and provision device **70** with the client preferences specified in provisioning configuration **62**. Without preparation system **20** uploading the reformatted device identification information for device **70** to associate device **70** with client **28**, client **28** may be required to take multiple, complex steps to connect to pre-provisioning center **26**, notify pre-provisioning center **26** of the particular device that needs to be provisioned, select the software and/or configuration to install onto device **70**, and begin the provisioning process of device **70**.

[0054] The following are nonlimiting examples of the systems and related processes of pre-provisioning a computer hardware device:

[0055] A method of pre-provisioning a computer hardware device for a client can include receiving an order for the device from the client, identifying whether the client has a pre-provisioning profile, in response to the client having a pre-provisioning profile, extracting device identification information for the device, configuring (by a computer processor) the device identification information into reformatted device identification information suitable for upload to a pre-provisioning center with the pre-provisioning center having the pre-provisioning profile for the client that designates a provisioning configuration for the device and configured to provision the device in response to a start-up prompt by the device, and uploading (by the computer processor), in response to the configurating of the device identification information into reformatted device identification information, the reformatted device identification

information to the pre-provisioning center to link the device with the provisioning configuration of the client.

[0056] The method can further include that the step of identifying that the client has a pre-provisioning profile further includes reviewing a record that includes clients that have a pre-provisioning profile.

[0057] The method can further include examining the device identification information and prompting an alert in response to a model number of the device identification information showing that the device is a new model and has not previously experienced the pre-provisioning process.

[0058] The method can further include reviewing the device identification information in response to the alert.

[0059] The method can further include reconfiguring the model number of the device identification information into reformatted device identification information that can be uploaded to the pre-provisioning center.

[0060] The method can further include examining the device identification information and prompting an alert in response to a serial number of the device identification information showing that the serial number is in a format that cannot be uploaded to the pre-provisioning center.

[0061] The method can further include reconfiguring the serial number of the device identification information into reformatted device identification information that can be uploaded to the pre-provisioning center.

[0062] The method can further include that the device identification information includes at least one of the following: a model number of the device, a serial number of the device, and a hardware identifier.

[0063] The method can further include notifying stakeholders of a status of the device.

[0064] The method can further include that the steps of associating the device with the client and extracting the device identification information for the device are performed during preparation of the device for shipment to the client.

[0065] The method can further include uploading the reformatted device identification information to a device profile for the device on the pre-provisioning center.

[0066] The method can further include creating the device profile for the device on the pre-provisioning center to which the reformatted device identification information is uploaded.

[0067] The method can further include that the steps of extracting the device identification information and configuring the device identification information into reformatted device identification information are performed automatically by the computer processor in response to receiving the order for the device from the client and identifying that the client has a pre-provisioning profile.

[0068] The method can further include that the step of configuring the device identification information into reformatted device identification information further includes altering the device identification information into a format that has previously been uploaded to the pre-provisioning center for another, previous device.

[0069] A system for pre-provisioning preparation for a computer hardware device for a client can include an order reception module configured to receive an order for the device from the client, an identification module that reviews the order by the client and determines whether the client has a pre-provisioning profile, an extraction module in communication with the order reception module and configured to, in response to the identification module determining that the client has a pre-provisioning profile, extract device identification information for the device, a configuration module in communication with the extraction module and configured to reformat the device identification information into reformatted device identification information suitable for upload to a pre-provisioning center having the pre-provisioning profile for the client that designates a provisioning configuration for the device and being configured to provision the device in response to a start-up prompt by the device, and an upload module in communication with the configuration module and configured to upload, in response to the configurating of the device identification information into reformatted device identification information, the reformatted device identification information to the pre-provisioning center to link the device with the provisioning configuration of the client.

[0070] The system can further include that the configuration module and the upload module are at least partially incorporated into a first computer processor.

[0071] The system can further include that the order reception module and the extraction module are at least partially incorporated into a second computer processor in communication with the first computer processor.

[0072] The system can further include an alert module that is configured to prompt an alert in response to a model number of the device identification information showing that the device is a new model and has not previously experienced a pre-provisioning process.

[0073] The system can further include a record that includes clients that have a pre-provisioning profile, wherein the identification module reviews the order by the client and the record to determine whether the client is in the record and thus has a pre-provisioning profile.

[0074] The system can further include that, in response to the identification module determining that the client has a pre-provisioning profile, the extraction module extracts the device identification information, the configuration module reformats the device identification information into the reformatted device identification information, and the upload module automatically uploads the reformatted device identification information to the pre-provisioning center.

[0075] While the invention has been described with reference to an exemplary embodiment(s), it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular embodiment(s) disclosed, but that the invention will include all embodiments falling within the scope of the appended claims.

1. A method of pre-provisioning a computer hardware device for a client, the method comprising:

receiving an order for the device from the client;

identifying whether the client has a pre-provisioning profile;

in response to the client having a pre-provisioning profile, extracting device identification information for the device;

configuring, by a computer processor, the device identification information into reformatted device identifica-

tion information suitable for upload to a pre-provisioning center, the pre-provisioning center having the pre-provisioning profile for the client that designates a provisioning configuration for the device and configured to provision the device in response to a start-up prompt by the device; and

uploading, by the computer processor and in response to the configurating of the device identification information into reformatted device identification information, the reformatted device identification information to the pre-provisioning center to link the device with the provisioning configuration of the client.

2. The method of claim **1**, wherein the step of identifying that the client has a pre-provisioning profile further comprises:

reviewing a record that includes clients that have a pre-provisioning profile.

3. The method of claim **1**, further comprising:

examining the device identification information; and

prompting an alert in response to a model number of the device identification information showing that the device is a new model and has not previously experienced the pre-provisioning process.

4. The method of claim **3**, further comprising:

reviewing the device identification information in response to the alert.

5. The method of claim **4**, further comprising:

reconfiguring the model number of the device identification information into reformatted device identification information that can be uploaded to the pre-provisioning center.

6. The method of claim **1**, further comprising:

examining the device identification information; and

prompting an alert in response to a serial number of the device identification information showing that the serial number is in a format that cannot be uploaded to the pre-provisioning center.

7. The method of claim **6**, further comprising:

reconfiguring the serial number of the device identification information into reformatted device identification information that can be uploaded to the pre-provisioning center.

8. The method of claim **1**, wherein the device identification information includes at least one of the following: a model number of the device, a serial number of the device, and a hardware identifier.

9. The method of claim **1**, further comprising:

notifying stakeholders of a status of the device.

10. The method of claim **1**, wherein the steps of associating the device with the client and extracting the device identification information for the device are performed during preparation of the device for shipment to the client.

11. The method of claim **1**, further comprising:

uploading the reformatted device identification information to a device profile for the device on the pre-provisioning center.

12. The method of claim **11**, further comprising:

creating the device profile for the device on the pre-provisioning center to which the reformatted device identification information is uploaded.

13. The method of claim **1**, wherein the steps of extracting the device identification information and configuring the device identification information into reformatted device identification information are performed automatically by the computer processor in response to receiving the order for the device from the client and identifying that the client has a pre-provisioning profile.

14. The method of claim **1**, wherein the step of configuring the device identification information into reformatted device identification information further comprises:

altering the device identification information into a format that has previously been uploaded to the pre-provisioning center for another, previous device.

15. A system for pre-provisioning preparation for a computer hardware device for a client, the system comprising:

an order reception module configured to receive an order for the device from the client;

an identification module that reviews the order by the client and determines whether the client has a pre-provisioning profile;

an extraction module in communication with the order reception module and configured to, in response to the identification module determining that the client has a pre-provisioning profile, extract device identification information for the device;

a configuration module in communication with the extraction module and configured to reformat the device identification information into reformatted device identification information suitable for upload to a pre-provisioning center having the pre-provisioning profile for the client that designates a provisioning configuration for the device and being configured to provision the device in response to a start-up prompt by the device; and

an upload module in communication with the configuration module and configured to upload, in response to the configurating of the device identification information into reformatted device identification information, the reformatted device identification information to the pre-provisioning center to link the device with the provisioning configuration of the client.

16. The system of claim **15**, wherein the configuration module and the upload module are at least partially incorporated into a first computer processor.

17. The system of claim **16**, wherein the order reception module and the extraction module are at least partially incorporated into a second computer processor in communication with the first computer processor.

18. The system of claim **15**, further comprising:

an alert module that is configured to prompt an alert in response to a model number of the device identification information showing that the device is a new model and has not previously experienced a pre-provisioning process.

19. The system of claim **15**, further comprising:

a record that includes clients that have a pre-provisioning profile, wherein the identification module reviews the order by the client and the record to determine whether the client is in the record and thus has a pre-provisioning profile.

20. The system of claim **20**, wherein, in response to the identification module determining that the client has a pre-provisioning profile, the extraction module extracts the device identification information, the configuration module reformats the device identification information into the reformatted device identification information, and the upload module automatically uploads the reformatted device identification information to the pre-provisioning center.

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