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AUTOMATIC SETUP / CONFIGURATION FOR NEW DEVICES

Introduction

The present disclosure provides systems and methods to enable automated setup and/or configuration of new devices for a user. Generally, after purchasing a new device (e.g., a smart device, home assistant, media device, etc.), a user will need to go through setup and/or configuration steps to connect the new device to a location's Wi-Fi network (e.g., home Wi-Fi network, etc.) and/or assign a user account, name, etc. to the new device. Such a process may normally require multiple manual steps to be performed by the user (possibly including a vendor application download), can be quite cumbersome, and can be prone to errors. This can significantly affect a user experience, can cause Original Equipment Manufacturer (OEM) expenses (e.g., user support and returns, etc.), and/or lower user satisfaction. The systems and methods of the present disclosure can enable automatic setup and/or configuration (e.g., configuration to user Wi-Fi network and/or other settings) of a new device for a user, for example, based on a user's already provisioned device.

Summary

According to aspects of the present disclosure, systems and methods can provide for automatic setup/configuration of new devices after they have been obtained and enabled (e.g., powered on, etc.) by a user. A user-new device association can be established for a new device and the user and the user-new device association can be provided to a user's already provisioned companion device. The user's companion device can use the user-new device association to identify a new device and begin an automated setup and/or configuration of the new device.

Detailed Description

The systems and methods of the present disclosure can provide for automated setup and/or configuration (e.g., user Wi-Fi network and/or other settings, etc.) of a new device for a

user. For example, a user can purchase a new device, place the new device in a desired location (e.g., home, office, etc.), and power the new device (e.g., plug the new device in/install batteries and turn on the new device). The new device can then automatically be setup/configured (e.g., with user Wi-Fi network and/or other settings, etc.) as described herein.

According to an aspect of the present disclosure, an existing user account (e.g. email account, etc.) can be associated with the newly purchased device identification information (e.g., a MAC address) to create a user-new device association. For example, this association could be established at the time of an online purchase (e.g., based on online store account login, etc.), an offline purchase (e.g., rewards program account, customer service, etc.), and/or self-assigned (e.g., through an application, scanning code on the product box, etc.).

The user is likely to already possess a fully provisioned device (e.g., a companion device), which can have access to the user account and/or Wi-Fi settings or other settings to be configured on one or more new devices. For example, a companion device could be a user's phone, home assistant, media device, smart home device, and/or any other device already configured and assigned to the user. A companion device can receive the user-new device association (e.g., through a notification, a poll, and/or any other mechanism) and the new device can be added to a monitoring service. Alternatively, a companion device can detect the presence of a new device (e.g., that has not been setup/configured for the user), and the companion device can query a monitoring service (e.g., local to the device, at remote server, etc.) to determine if there is a user-new device association for the detected new device.

When the new device has been placed and powered on (if necessary) and the companion device comes into the vicinity (e.g., physical or virtual) of the new device, the companion device may detect the new device presence based on the device identification information associated

with the user's account (e.g., the user-new device association, etc.). In some implementations, device identifications may be explicit (e.g., MAC address, BSSID, serial number, etc.) and/or ephemeral (e.g., hash of ID with or without nonce, etc.). The companion device may be able to identify a new device the user purchased with a high degree of confidence (but not necessarily providing security guarantees of authenticity).

After detection of the new device, the companion device can start an automatic setup and/or configuration process for bringing the new device into a user's network (e.g., Wi-Fi network, etc.) and/or configuring the new device. In some implementations, there may optionally be some user steps to begin automatic setup, for example, verifying that the user wants the new device to be configured (e.g., a home assistant asking: "I found new device, would you like to set it up?"). In some cases, the additional verification to begin setup can be used to provide a better user experience.

According to another aspect of the present disclosure, in some implementations, during the setup/configuration process, the companion device can retrieve a new device certificate (or any other cryptographically signed information) that provides guarantees about device authenticity (e.g., root certificate authority from vendor/developer, certificate chain has device intermediate certificate, etc.) as well as verifies device identification information (e.g. device certificate has ID associated with user account).

The companion device may now have the following information: (1) user/owner account is associated with device identification; (2) verified device authenticity and correct identification information; (3) user consent (e.g., explicit (through voice or UI confirmation) or implicit (allow all configurations in the future, terms of service, etc.)). Based on this information, the

companion device can make a decision to release user associated data (e.g., Wi-Fi password, user account, etc.) to the new device for setup/configuration.

Thus, the systems and methods of the present disclosure can allow for an automatic setup process (e.g., having no or minimal user involvement), thereby making the experience much easier for users. Easier setup and configuration improves the user experience, and can reduce support costs and return costs for device manufacturers. In some implementations, the present disclosure can also provide a "technical assistant" capable of setting up new devices in a user's home.

Figure 1 depicts an example system 100 according to an implementation of the present disclosure. Figure 1 illustrates one example computing system that can be used to implement the present disclosure. Other computing systems can be used as well. The system 100 may comprise one or more companion computing devices, such as companion computing device 102, one or more new computing devices, such as new computing device 130, coupled over one or more networks, such as network 180.

The companion computing device 102 can include one or more processors 104 and a memory 106. The one or more processors 104 can be any suitable processing device and can be one processor or a plurality of processors that are operatively connected. The memory 106 can include one or more non-transitory computer-readable storage mediums, such as RAM, ROM, EEPROM, EPROM, flash memory devices, magnetic disks, etc., and combinations thereof. The memory 106 can store data 108 and instructions 110 which are executed by the processor 104 to cause the companion computing device 102 to perform operations, such as described herein.

According to an aspect of the present disclosure, the companion computing device 102 can include a display automated device setup system 112 that can implement one or more

features of the present disclosure. For example, the automated device setup system 112 can receive a user-new device association which associates a new device (e.g., unconfirmed, newly purchases, etc.) and a user (e.g., the user who is also associated with the companion computing device 102). In some implementations, the automated device setup system 112 can include or be associated with a device monitoring service 114, which can assist in identifying one or more new devices that can be setup/configured by the automated device setup system 112. The automated device setup system 112 can detect the presence of a new device (e.g., new computing device 130, etc.) needing to be setup/configured. For example, after a new device (e.g., new computing device 130) has been enabled (e.g., placed in location, powered on, etc.) and the companion computing device 102 comes into the vicinity of the new device, the companion computing device 102 (e.g., the automated device setup system 112) may detect the new device presence based on the device identification information associated with the user's account. After detecting/identifying the new device (e.g., new computing device 130), the automated device setup system 112 can start an automatic setup/configuration process to provision the new device for the user.

The user companion device 102 can also include one or more input/output interface(s) 116. One or more input/output interface(s) 116 can include, for example, devices for receiving information from or providing information to a user, such as a display device, touch screen, touch pad, mouse, data entry keys, an audio output device such as one or more speakers, a microphone, haptic feedback device, etc. The companion computing device 102 can also include one or more communication/network interface(s) 118 used to communicate with one or more systems or devices, including systems or devices that are remotely located from the companion computing device 102.

The new computing device 130 can include one or more processors 132 and a memory 134. The one or more processors 132 can be any suitable processing device and can be one processor or a plurality of processors that are operatively connected. The memory 134 can include one or more non-transitory computer-readable storage mediums, such as RAM, ROM, EEPROM, EPROM, flash memory devices, magnetic disks, etc., and combinations thereof. The memory 134 can store data 136 and instructions 138 which are executed by the processor 132 to cause the new computing device 130 to perform operations, for example, to implement operations as discussed herein. For example, the new computing device 130 may communicate with and receive one or more instructions and/or other data from companion computing device 102 to allow the new computing device 130 to be setup/configured to one or more of the user's networks (e.g., Wi-Fi network, etc.) and/or other user settings.

The new companion device 130 can also include one or more input/output interface(s) 140. One or more input/output interface(s) 140 can include, for example, devices for receiving information from or providing information to a user, such as a display device, touch screen, touch pad, mouse, data entry keys, an audio output device such as one or more speakers, a microphone, haptic feedback device, etc. The new computing device 130 can also include one or more communication/network interface(s) 142 used to communicate with one or more systems or devices, including systems or devices that are remotely located from the new computing device 130.

Figure 2 depicts a flowchart illustrating example operations 200 for automatic setup/configuration of a new device in accordance with aspects of the present disclosure. Although operations 200 are shown and described in a particular order for purposes of

illustration and discussion, the operations are not limited to the particularly illustrated order or arrangement and certain operations can be performed in different orders or simultaneously.

The operations begin at block 202 where a user-new device association is obtained. For example, an existing user account (e.g. email account, etc.) can be associated with identification information (e.g., a MAC address) of a newly purchased device to create a user-new device association. As an example, this association could be established at the time of an online purchase, an offline purchase, and/or self-assigned (e.g., by a user). A user's already established companion device can receive the user-new device association.

At block 204, in some implementations, the new device identification information and/or the user-new device association can be added to a monitoring service (e.g., on a companion device) that monitors for new devices that may need to be configured for the user.

At block 206, the companion device can detect the presence of the new device needing to be setup/configured. For example, after the new device has been enabled (e.g., placed in location, powered on, etc.) and the companion device comes into the vicinity of the new device, the companion device may detect the new device presence based on the device identification information associated with the user's account (e.g., the user-new device association, etc.).

At block 208, in some implementations, the companion device can retrieve a new device certificate (or any other cryptographically signed information) that provides guarantees about device authenticity as well as verifies device identification information. For example, based on this information, the companion device can make a decision to release user associated data (e.g., Wi-Fi password, user account, etc.) to the new device for setup/configuration.

At block 210, the companion device can start an automatic setup/configuration process to provision the new device for the user. Optionally, in some implementations, the companion

device may request verification from the user that the user wants the new device to be configured.

Figure 3 depicts a flowchart illustrating example operations 300 for automatic setup/configuration of a new device in accordance with aspects of the present disclosure. Although operations 300 are shown and described in a particular order for purposes of illustration and discussion, the operations are not limited to the particularly illustrated order or arrangement and certain operations can be performed in different orders or simultaneously.

The operations begin at block 302 where a companion device detects the presence of a new device (e.g., a device assigned to the user that is not setup/configured for user) nearby.

At block 304, the companion device determines whether the new device is associated with the user. For example, the companion device can query a monitoring service (e.g., local to the companion device, at a remote device such as a cloud server, etc.) to determine if there is a user-new device association for the detected new device.

At block 306, if there is an established user-new device association for the detected new device, operations continue to block 308. If there is not a user-new device association established for the detected new device, operations end.

At block 308, in some implementations, the companion device can retrieve a new device certificate (or any other cryptographically signed information) that provides guarantees about device authenticity as well as verifies device identification information. For example, based on this information, the companion device can make a decision to release user associated data (e.g., Wi-Fi password, user account, etc.) to the new device for setup/configuration.

At block 310, the companion device can start an automatic setup/configuration process to provision the new device for the user. Optionally, in some implementations, the companion

device may request verification from the user that the user wants the new device to be configured.

Further to the descriptions above, a user may be provided with controls allowing the user to make an election as to both if and when systems, programs or features described herein may enable collection of user information (e.g., sharing of information associated with a user's account, a user's devices (e.g., new device(s) and/or companion device(s)), a user's passwords and/or networks, a user's preferences, or a user's current location), and if the user is sent content or communications from a server. In addition, certain data may be treated in one or more ways before it is stored or used, so that personal data is removed or otherwise treated appropriately. For example, a user's identity may be treated so that no personally identifiable information can be determined for the user, or a user's geographic location may be generalized where location information is obtained (such as to a city, ZIP code, or state level), so that a particular location of a user cannot be determined. Thus, the user may have control over what information is collected about the user and/or associated devices and/or accounts and/or passwords, how that information is used, and what information is shared between devices and/or otherwise provided to the user.
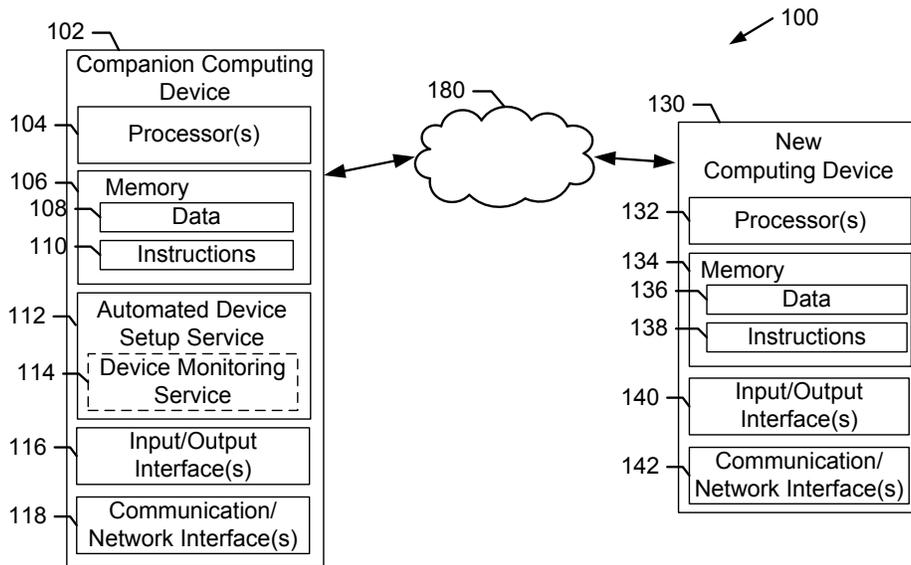
Figures

Figure 1

102 ⌐

Companion Computing Device

104 ⌐ | Processor(s)

106 ⌐ | Memory
108 ⌐ | Data
110 ⌐ | Instructions

112 ⌐ | Automated Device Setup Service
114 ⌐ | Device Monitoring Service

116 ⌐ | Input/Output Interface(s)

118 ⌐ | Communication/ Network Interface(s)

180 ⌐ (cloud)

100

130 ⌐

New Computing Device

132 ⌐ | Processor(s)

134 ⌐ | Memory
136 ⌐ | Data
138 ⌐ | Instructions

140 ⌐ | Input/Output Interface(s)

142 ⌐ | Communication/ Network Interface(s)

Figure 2

200

202
Obtain user-new device association

204
Add new device to monitoring service at companion device

206
Detect presence of new device

208
Verify new device authenticity and identification information

210
Start automatic setup/configuration process to provision the new device

Figure 3

300

302
Companion device detects presence of new device nearby

304
Determine if new device has a user-new device association (e.g., with same user as companion device)

306
User-new device association established? — No → Stop

Yes

308
Verify new device authenticity and identification information

310
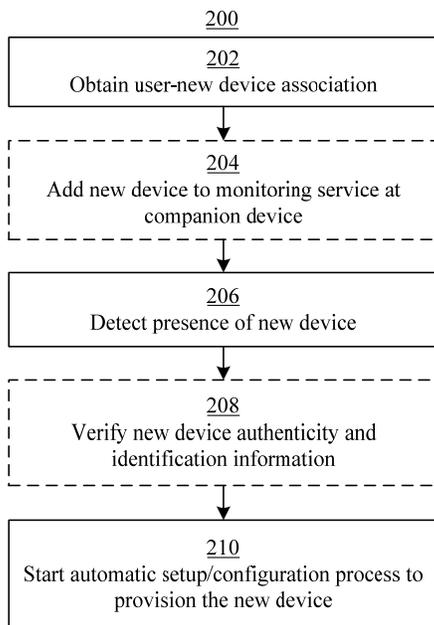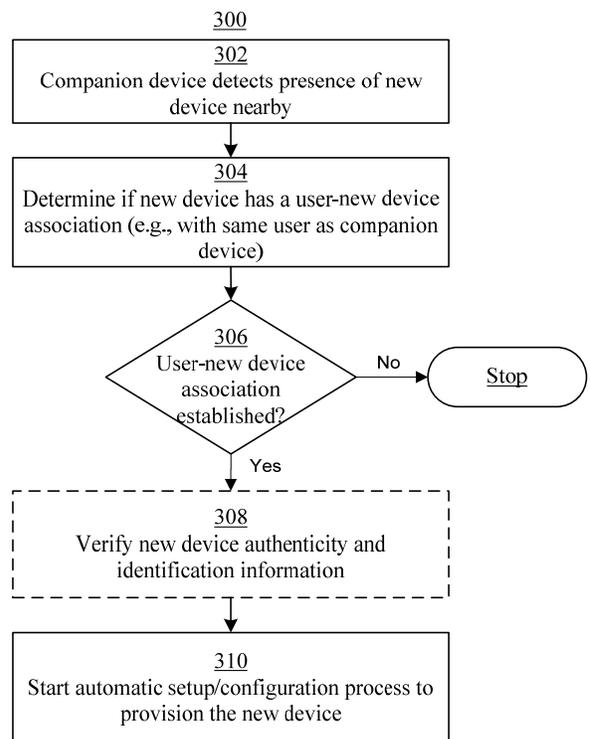Start automatic setup/configuration process to provision the new device

Abstract

The present disclosure describes systems and methods that provide for automated setup and/or configuration of new devices for a user. More particularly, the present disclosure can enable automatic setup and/or configuration of a new device for a user based on a user's already provisioned device. In an example implementation, a user-new device association can be established for a new device and the user and the user-new device association can be provided to a user's already provisioned companion device. The user's companion device can use the user-new device association to identify a new device and begin an automated setup and/or configuration of the new device.