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Single Entry Point For Wi-Fi Onboarding

Abstract:

This publication describes systems and techniques for a single entry point for Wi-Fi onboarding. Portable electronic devices, including smartphones, include wireless transceivers to allow users to access local wireless networks (*e.g.*, Wi-Fi networks). Different wireless networks require different onboarding procedures and credentials to allow devices to connect for the first time. The varying systems and credentials can be challenging for users to navigate and understand. This publication describes a single entry point (*e.g.*, under the Settings menu) for seamless Wi-Fi onboarding. The entry point can direct the user to a service provider's onboarding process to reduce educational and infrastructure costs for service providers and simplify the process for users.

Keywords:

Wireless network, Wi-Fi, WLAN, WAN, entry point, access point, Hotspot, open network, public network, private network, enterprise network, onboard, connect, provision, configure, user device, user equipment, UE, smartphone, mobile device, portable device

Background:

Portable electronic devices, including smartphones, tablets, laptops, handheld video game consoles, and electronic readers, include one or more wireless transceivers that enable users and electronic devices to access nearby wireless networks. These networks can include wireless local area networks (WLANs) and wireless wide area networks (WANs), which this publication collectively refers to as Wi-Fi networks. Users can be required to complete an onboarding process

to connect to a Wi-Fi network for the first time. Different network providers (*e.g.*, national telecommunication providers, retail stores, commercial offices, municipalities, airports, airplanes) use different onboarding procedures and credentials to protect users and their networks. Many of these onboarding procedures can be difficult for users to locate and understand. From the perspective of a network provider, the costs for the infrastructure of the onboarding procedure and educating users about the process can be substantial.

It is desirable to provide a single entry point for Wi-Fi onboarding on portable electronic devices to improve and simplify user experiences and reduce infrastructural and educational costs for network providers.

Description:

This publication describes systems and techniques to provide a single entry point for Wi-Fi onboarding. When trying to connect to a Wi-Fi network, electronic device users generally navigate to the Wi-Fi menu located under the Settings for the operating system. This publication refers to this menu as the Wi-Fi Picker. Figure 1 illustrates an example of the Wi-Fi Picker on a portable electronic device.



Figure 1

As illustrated in Figure 1, the portable electronic device can be a smartphone, which includes a display screen. As described above, users can generally find the Wi-Fi Picker under Settings. The Wi-Fi Picker indicates whether the device is currently connected to a Wi-Fi network and provides a list of available networks. In the depicted example, several nearby networks (*e.g.*, Hotel Chain Wi-Fi) are available. The Wi-Fi Picker generally indicates a network's signal strength. In this example, the Hotel Chain Wi-Fi network has a stronger signal strength (*e.g.*, four darkened bars) than the River City Public Wi-Fi network (*e.g.*, one darkened bar). The Wi-Fi

Picker can also indicate whether an available network is open (*e.g.*, no lock) or requires credentials to access (*e.g.*, a lock).

As described above, many different onboarding processes exist for gaining access to a Wi-Fi network. The Hotel Chain Wi-Fi network in Figure 1, as an example, may require a hotel guest to connect using an online signup process. The Hotel Chain can implement this process in conformance to the Hotspot 2.0 Release 2 (“R2”) standard. The online signup process can require network providers (*e.g.*, Hotel Chain) to deploy new infrastructure, which can be a high cost for many network providers.

Similarly, the River City Public Wi-Fi network of Figure 1 may require a user to download an onboarding profile from a website. Users download and install the onboarding profile to connect to the network for the first time. Similar to the process for a Hotspot 2.0 R2 network, this onboarding procedure can require the network provider to obtain new Wi-Fi infrastructure. It can also be difficult for users to identify the website from which to download the profile.

The Coffee Shop Hotspot in Figure 1, as another example, may require users to use a captive portal to login. A captive portal is a web page that the user interacts with before gaining access to a Wi-Fi network. The captive portal generally provides a login page that can request user authentication, payment, acceptance of an end-user license agreement, completion of a survey, or a combination thereof. Captive portals can present security issues because users generally access them over an open network that can leave user information susceptible to others. This onboarding procedure can also often result in negative user experiences. For example, some captive portal pages fail to load automatically, take a significant time to load, and are challenging to locate if the webpage was accidentally closed.

The ACME Inc. Network of Figure 1, as an example, utilizes a provisioning application for network onboarding. The provisioning application can direct employees, customers, and guests through the onboarding process. ACME Inc., however, may need to educate users about this application. In particular, users may need to learn the name of the provisioning application, download it, and install a Wi-Fi profile provided therein.

The described systems and techniques provide a single entry point through the Wi-Fi Picker for various onboarding procedures, including those described in connection to Figure 1. The Wi-Fi Picker is often the first place users search for local networks. As a result, the Wi-Fi Picker provides a convenient location to centralize the various onboarding procedures. In this way, the described systems and techniques can provide a more straightforward and intuitive onboarding solution.

Once a user selects a Wi-Fi network to access for the first time, the described systems and techniques prompt the user with the necessary information to begin the onboarding process. Network providers can still have customized onboarding procedures, but the described Wi-Fi Picker can reduce their education costs by aggregating onboarding information into a centralized location. The Wi-Fi Picker can also display additional information regarding available networks (*e.g.*, network provider, network nickname, type of onboarding process).

For networks using a captive portal, the Wi-Fi Picker can identify the login page and, in some implementations, automatically direct users to the page. The login page can be obtained from an online database or learned by the portable electronic device. Similarly, the Wi-Fi Picker can provide a direct link to download a provisional profile for Hotspot 2.0 R1 networks. With a direct link available, network providers can elect not to upgrade their network infrastructure to support Hotspot 2.0 R2. The download link can be obtained from an online database or directly

from network providers upon request by the user's device. In both scenarios, the Wi-Fi Picker can simplify the process for users to navigate to the correct online resources.

Similarly, the Wi-Fi Picker can identify the correct application for networks using a provisioning application. For example, the Wi-Fi Picker can direct a user to the application (*e.g.*, if installed on the user's electronic device) or to an application distribution service on the device (*e.g.*, if not installed on the device). The application can be identified based on an online database or by the application developer upon upload to the application distribution service.

The Wi-Fi Picker can customize the onboarding process for enterprise or Hotspot 2.0 R2 networks based on network-provider requirements. For example, the Wi-Fi Picker can prompt users to authenticate a profile account or direct them to a provisioning service to create a new profile account. For enterprise networks that are not compliant with Hotspot 2.0 R1 or Hotspot 2.0 R2, the Wi-Fi Picker can use a standard configuration format to simplify the process of locating and downloading a provisioning profile.

The described systems and techniques provide users a single entry point for Wi-Fi onboarding to provide a more-convenient onboarding solution for users and reduce education and infrastructure costs for network providers.

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