



UNIVERSAL Wi-Fi
WITH DEVICESCAPE EASY WiFi

Application Note
November 2009

List of Acronyms

AP	Access Point
CCX	Cisco Compatible Extensions
EAP	Extensible Authentication Protocol
GUI	Graphical User Interface
LAN	Local Area Network
OS	Operating System
SSID	Service Set Identifier
STA	Station
UAM	Universal Access Method
UI	User Interface
VoIP	Voice over IP
WFA	Wi-Fi Alliance
Wi-Fi	Wireless Fidelity, aka 802.11
WISPr	Wireless Internet Service Provider Roaming
WLAN	Wireless LAN
WPA	Wi-Fi Protected Access
WPS	Wi-Fi Protected Setup
WZC	Windows Zero Config

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Introduction

There is no question that users are expecting Wi-Fi functionality on mobile devices today. Unfortunately, Wi-Fi deployments in home, office and public locations require very different connection methods, and until now there was no single solution to provide universal Wi-Fi access. As a result, a user could require the following separate Wi-Fi clients for each Wi-Fi environment:

- A Wi-Fi client for the home (typically the Wi-Fi connection manager provided with the device, such as Microsoft WZC).
- A third-party Wi-Fi client for the office (typically a third-party supplicant to support the appropriate enterprise wireless authentication methods or wireless extensions).
- A Wi-Fi client for public locations to handle hotspot logins (typically a client provided by the hotspot service provider). In addition, users are expecting this client to access a large footprint of networks and provide advanced features such as geo location services.

Multiple Wi-Fi clients can be confusing and frustrating to the user and adds development complexity and cost for the device manufacturer. Moreover, each Wi-Fi client may have limited functionality which does not suit the end user's needs.

This application note describes how Devicescape Easy WiFi can provide the advantages of an integrated Wi-Fi client solution **and** outperform third party solutions designed for a specific Wi-Fi environment.

For a complete overview of Devicescape Easy WiFi, refer to the Devicescape Easy WiFi Product Overview white paper available from the Devicescape website at www.devicescape.com.

Wi-Fi Environment Types

The three typical Wi-Fi environments a user will encounter are in home, office and public locations. Each Wi-Fi environment has unique characteristics as summarized below:

Environment	Requirements	Implementation Examples
Home	<ul style="list-style-type: none"> • Medium security (WEP, WPA/WPA2-PSK) • WPS (Wi-Fi Protected Setup) for easy push-button setup 	<ul style="list-style-type: none"> • Devicescape Easy WiFi • Microsoft WZC (does not support WPS) • Third-party supplicants/connection managers provided with WLAN hardware (may not support WPS)
Office	<ul style="list-style-type: none"> • High security (WPA/WPA2-enterprise) • Comprehensive 802.1X authentication and EAP support • Cisco CCX for commercial-grade Wi-Fi reliability • Commercial-grade product quality 	<ul style="list-style-type: none"> • Devicescape Easy WiFi • Microsoft WZC (does not support all 802.1X authentication types or CCX) • Third-party supplicants provided with WLAN hardware (may not support all 802.1X authentication types, CCX, or be commercial-grade quality)
Public Locations	<ul style="list-style-type: none"> • Typically low security (open mode), although 802.1X authentication or WEP/WPA-PSK encryption may be required at some hotspots • Captive portal login page with free or paid access • UAM (manual browser login) or WISPr compatible • A large number of hotspot locations required to make the service useful • Geo location capability to identify hotspot locations 	<ul style="list-style-type: none"> • Devicescape Easy WiFi • Manual user login with a web browser (requires the user to manually set up a hotspot access plan, and geo location services typically not available) • WISPr client (only for hotspots that support WISPr, and no free hotspots or geo location services available) • 802.1X client (only for hotspots that support 802.1X, and no free hotspots or geo location services available)

Problems with using multiple Wi-Fi clients

Chipset makers, service providers and device makers have all implemented Wi-Fi clients to address their specific functionality, but only Devicescape Easy WiFi provides universal Wi-Fi access for home, office and public Wi-Fi environments.

Using multiple Wi-Fi clients on a single mobile device to provide coverage for home, office and public Wi-Fi locations is problematic for both the user and the device manufacturer.

Common issues are:

- Multiple Wi-Fi clients will inevitably have overlapping functionality and features which results in a confusing experience for the user. For example, a user may not know the best place to add their home WPA-PSK network if several of the Wi-Fi clients support WPA-PSK networks. Additionally, a user may not even understand that they have to enter a WPA passphrase in the first place.
- User network credentials are spread across multiple Wi-Fi clients. The user has to manually switch from one client to another in order to login to the appropriate Wi-Fi service. For example, the user may use WZC at home, then a CCX-enabled client at work, then a hotspot provider login client for public access. In many cases, the user has to manually know which Access Point (AP) SSID to select in order to gain network access.
- Third party Wi-Fi clients may be too specific to be useful for all users. For example, a hotspot login client may only work on a specific service provider's network and only support specific network types. If the user wants to subscribe to a second service provider network to gain additional coverage, then an additional hotspot login client is typically required.
- Many smart phones do not have enough built-in memory to support multiple Wi-Fi clients, requiring the user to purchase an additional memory card when adding new Wi-Fi clients for the office and hotspot login clients. For device manufacturers that provide the software directly, multiple Wi-Fi clients would require a larger overall memory footprint on the device.
- Many third-party Wi-Fi clients are installed as a service and are started automatically when the device is powered on. When multiple Wi-Fi clients try to gain access to WLAN driver resources for SSID scans and connecting to a specific SSID, the result is increased battery consumption, connection delays and unpredictable behavior.
- For IT organizations and device makers, more end-user support is required to address interoperability issues between the Wi-Fi client supported by the company and additional Wi-Fi clients installed by the user to satisfy Wi-Fi connectivity requirements outside of the office.

Devicescape Easy WiFi to the Rescue

Devicescape Easy WiFi provides the following benefits over separate Wi-Fi client solutions:

- Because Devicescape Easy WiFi has knowledge of **all** of the networks available to the user for home, office and public locations, it can automatically select the best possible network for a specific environment, or select a network based on priority or signal quality when multiple networks exist. This is especially true for public hotspots, where Devicescape Easy WiFi can automatically detect a valid hotspot network and log the user into the network which saves the user from the tedious process of typing in credentials on a web browser.
- User network credentials are stored in a single location, easily accessible by the user via a single interface.
- Devicescape Easy WiFi is provided to developers in source code which can be easily extended to modify or add new features, so that the OEM or service provider is not "locked in" to a specific set of features or user interface.
- A single Wi-Fi client such as Devicescape Easy WiFi will have a smaller overall memory footprint than multiple Wi-Fi clients that contain overlapping functionality. A complete Devicescape Easy WiFi implementation for home, office and public hotspots typically requires around 300 Kbytes of ROM memory and 150 Kbytes of RAM memory (excluding TLS library and user interface). Devicescape Easy WiFi was developed from the ground-up for small footprint embedded applications.
- For IT organizations and device makers, a single Wi-Fi client such as Devicescape Easy WiFi requires less interoperability testing and lower support cost than multiple Wi-Fi clients. Moreover, Devicescape Easy WiFi is supported on a variety of OS platforms which provides a consistent user experience and lower support cost for device makers deploying the product across multiple platforms.

Devicescape Easy WiFi provides additional advantages over third party solutions for home, office and public locations as described below.

Advantages of Easy WiFi in the Home

Devicescape Easy WiFi is the only product available that provides WPS functionality in addition to full enterprise and public access in a single Wi-Fi client. Devicescape Easy WiFi makes it simple for a consumer to connect to an existing home network, or configure a new one.

WPS (Wi-Fi Protected Setup) is a Wi-Fi Alliance standard that enables simplified user setup of Wi-Fi networking in the home, resulting in greater customer satisfaction and fewer product returns. Devicescape Easy WiFi supports the PIN and push button WPS modes.

Advantages of Easy WiFi in the Office

Devicescape Easy WiFi is the only product available that provides the following advanced enterprise Wi-Fi features plus home and public access in a single Wi-Fi client:

- Cisco Compatibility Extensions (CCX) to provide enterprise-grade Wi-Fi performance and reliability. For more information on the advantages of CCX on how Devicescape Easy WiFi can help implement CCX, refer to the Devicescape CCX whitepaper available from the Devicescape website at www.devicescape.com.
- Full support for all industry-standard EAP types to give the broadest coverage of secure Wi-Fi authentication methods in a commercial Wi-Fi client. Other Wi-Fi clients such as WZC only support a small number of Wi-Fi authentication methods and do not support popular authentication methods such as EAP-TTLS, EAP-SIM or EAP-AKA.

Advantages of Easy WiFi at Public Locations

Devicescape Easy WiFi provides numerous advantages over basic WISPr clients and service provider Wi-Fi clients, and is the only product available that combines public hotspot access with enterprise and home access in a single Wi-Fi client. Specific advantages include:

- Full compatibility with all service providers (both WISPr and non-WISPr/UAM networks) to provide the largest hotspot network support in the industry.
- Fully scalable hotspot access. Devicescape Easy WiFi can be configured from being locked to a single provider footprint (provider's network plus their roaming partners) all the way to a practically unlimited number of providers and the user's personal networks.
- Automatically detects roaming relationships between service providers.
- If desired, Devicescape Easy WiFi can automatically provide the user with access to a huge worldwide network of known "free" hotspots, called the Easy WiFi Network. This network can provide hotspot access for a device without user registration or signup, and locations are constantly verified for quality.
- Fully scalable from devices that utilize a full GUI down to devices with little or no UI or internal storage. No browser is required.
- User login credentials are retrieved dynamically "on demand" when connecting to the hotspot, or can be stored locally on the device.
- User login credentials can be automatically provided for classes of devices (for example "all laptops" or "all Wi-Fi cameras"), allowing specific rate plans to be constructed.
- Network updates, additions and roaming relationships are applied at the Devicescape server, rather than requiring a bulk update of all clients.
- If desired, hotspot geo location information can be provided to enable a multitude of location-based services.

- Full source code is provided for maximum integration flexibility. The Devicescape Easy WiFi application and library architecture makes it easy to embed Devicescape Easy WiFi functionality into a network application such as a VPN client or streaming media client.
- Devicescape Easy WiFi provides the broadest range of platform support in the industry, supporting platforms such as Symbian S60, iPhone/iPod Touch, Mac OS X, Linux and Windows/Windows Mobile. Devicescape Easy WiFi can also be easily ported to other platforms. This enables a device manufacturer to implement a consistent Wi-Fi product experience across a complete range of product models.

Summary

Devicescape Easy WiFi provides many advantages and features over other third-party Wi-Fi clients to provide truly universal Wi-Fi access with an integrated Wi-Fi client.

With Devicescape Easy WiFi, users will find Wi-Fi more relevant and easier to use with more features. For device makers, universal Wi-Fi access can be a powerful selling feature that differentiates their product from other Wi-Fi enabled devices.

For more information about Devicescape Easy WiFi, go to www.devicescape.com, or contact Devicescape at dsbizdev@devicescape.com

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