



**UNIVERSAL Wi-Fi  
WITH DEVICESCAPE EASY Wi-Fi**

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*Application Note  
February 2009*

## List of Acronyms

ACS	Cisco Access Control Server
API	Application Programming Interface
AP	Access Point
ASD	Application Specific Device
CCX	Cisco Compatible Extensions
EAP	Extensible Authentication Protocol
GUI	Graphical User Interface
IE	Information Element
IP	Internet Protocol
IT	Information Technology
LAN	Local Area Network
OID	Object Identifier
OS	Operating System
QoS	Quality of Service
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
WME	Wireless Multimedia Extensions
WMM	Wi-Fi Multimedia (same as WME)
WZC	Windows Zero Config

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## Introduction

There is no question that users are demanding Wi-Fi functionality on mobile devices today. Unfortunately, Wi-Fi deployments in the 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 Wi-Fi clients for each Wi-Fi environment:

- A Wi-Fi client for the home (typically the supplicant/connection manager provided with the wireless 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 method or wireless extensions).
- A Wi-Fi client for public locations to handle hotspot logins (typically a client provided by the hotspot service provider).

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 Easy Wi-Fi can provide the advantages of an integrated Wi-Fi client solution **and** outperform third party solutions designed for a specific Wi-Fi application.

For a complete overview of Devicescape Easy Wi-Fi, refer to the Devicescape Easy Wi-Fi Product Overview white paper.

## Wi-Fi Environment Types

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

Environment	Requirements	Implementation Examples
Home	<ul style="list-style-type: none"> <li>• Medium security (WEP, WPA/WPA2-PSK)</li> <li>• WPS (Wi-Fi Protected Setup) for easy push-button setup</li> </ul>	<ul style="list-style-type: none"> <li>• Devicescape Easy Wi-Fi</li> <li>• Microsoft WZC (does not support WPS)</li> <li>• Third-party supplicants/connection managers provided with WLAN hardware (may not support WPS)</li> </ul>
Office	<ul style="list-style-type: none"> <li>• High security (WPA/WPA2-enterprise)</li> <li>• Comprehensive 802.1X authentication and EAP support</li> <li>• Cisco CCX for commercial-grade Wi-Fi reliability</li> <li>• Commercial-grade product quality</li> </ul>	<ul style="list-style-type: none"> <li>• Devicescape Easy Wi-Fi</li> <li>• Microsoft WZC (does not support all 802.1X authentication types or CCX)</li> <li>• Third-party supplicants provided with WLAN hardware (may not support all 802.1X authentication types, CCX, or be commercial-grade quality)</li> </ul>
Public Locations	<ul style="list-style-type: none"> <li>• Typically low security (open mode), although 802.1X or WPA-PSK authentication is required on some hotspots</li> <li>• Hotspots can offer free or paid access</li> <li>• Requires a provider-specific login method, typically with a web browser</li> <li>• May allow login via WISPr, although many hotspots only support login via UAM (manual login with a web browser)</li> </ul>	<ul style="list-style-type: none"> <li>• Devicescape Easy Wi-Fi</li> <li>• Manual user login with a web browser</li> <li>• WISPr client (only for hotspots that support WISPr)</li> <li>• 802.1X client (only for hotspots that support 802.1X)</li> </ul>

## 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 Wi-Fi 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.
- 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.
- 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 Wi-Fi to the Rescue

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

- Because Devicescape Easy Wi-Fi 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 Wi-Fi 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 Wi-Fi is provided to developers in source code which can be easily extended to modify or add new features, so that the developer is not “locked in” to a specific set of features or user interface.
- A single Wi-Fi client such as DevicescapE Easy Wi-Fi will have a smaller overall memory footprint than multiple Wi-Fi clients that contain overlapping functionality. A complete DevicescapE Easy Wi-Fi 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 Wi-Fi 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 Wi-Fi requires less interoperability testing and lower support cost than multiple Wi-Fi clients. Moreover, DevicescapE Easy Wi-Fi 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.

In addition, DevicescapE Easy Wi-Fi provides specific advantages over third party solutions for the home, office and public locations as described below.

## **Advantages of Easy Wi-Fi in the Home**

DevicescapE Easy Wi-Fi is the only product available that provides WPS functionality in addition to enterprise and public access in a single Wi-Fi client. DevicescapE Easy Wi-Fi 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 Wi-Fi supports the PIN and push button WPS modes.

## **Advantages of Easy Wi-Fi in the Office**

DevicescapE Easy Wi-Fi 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 Easy Wi-Fi can help implement CCX, refer to the DevicescapE CCX whitepaper.
- 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 Wi-Fi in Public Locations

Devicescape Easy Wi-Fi 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 Wi-Fi 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.
- Automatically detects roaming relationships between service providers.
- If desired, Easy Wi-Fi can automatically provide the user with access to thousands of known "free" hotspots.
- When the Easy Wi-Fi hotspot login feature is coupled with the Easy Wi-Fi supplicant, no user intervention is required to detect and connect the user to a valid hotspot.
- Fully scalable from devices that utilize a full GUI down to devices with little or no UI or internal storage.
- No user login credentials are needed to be stored on the device if desired, improving security.
- 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 and additions can be applied on the Devicescape server side, rather than distributing massive quantities of clients, or requiring a firmware or application update.
- Devicescape Easy Wi-Fi provides multiple methods to retrieve login credentials to provide maximum reliability.
- Devicescape Easy Wi-Fi can be personalized by the end user so they get coverage where they need it, expanding the use of any underlying applications and services.
- Devicescape Easy Wi-Fi 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 Wi-Fi 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 Wi-Fi 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 Wi-Fi, users will find Wi-Fi more relevant and easier to use. 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 of Devicescape Easy Wi-Fi go to [www.devicescape.com](http://www.devicescape.com), or contact Devicescape at [dsbizdev@devicescape.com](mailto:dsbizdev@devicescape.com)

## Devicescape Software, Inc.

USA, Corporate Headquarters

900 Cherry Avenue, 6th Floor  
San Bruno, CA 94066  
USA

Phone: +1.650.829.2600

Fax: +1.650.829.2601

[dsbizdev@devicescape.com](mailto:dsbizdev@devicescape.com)