WLAN solutions for HP enterprise notebooks and Tablet PCs

HP Compaq 2510p, 2710p, 6510b, 6515b, 6710s, 6710b, 6715s, 6715b, 6910p, 8510p, 8510w, 8710p, 8710w Notebook PCs

Executive summary

HP has a comprehensive offering of mobile wireless local area network (WLAN) solutions that address enterprise business requirements for security, performance, and manageability. This offering has been recently strengthened with the introduction of the Intel® Wireless Wi-Fi Link 4965AGN[1], Intel Wireless WiFi Link 4965AG, and the Broadcom 4321AGN 802.11a/g/draft-n[1] WiFi Adapter as well as supporting client utilities. This white paper includes:

- An overview of primary enterprise WLAN requirements
- A comparison of HP WLAN adapters
- A comparison of HP WLAN client software features
- Guidelines for choosing a WLAN solution
- A preview of emerging WLAN standards

Introduction

Since early 2003 there has been explosive growth in the sales of mobile computers with integrated WLAN. Adoption of WLAN by enterprise businesses, initially held back by concerns over security and manageability, is growing. These concerns have been—and continue to be—addressed by HP and our WLAN technology partners.

HP offers a selection of standards-based WLAN solutions for enterprise notebooks and Tablet PCs, including WLAN adapters based on technology from Intel and Broadcom, and software that supports a comprehensive set of enterprise features such as Cisco Compatible Extensions (CCX) and profile import/export. All HP WLAN solutions are Wi-Fi Certified to ensure the greatest level of interoperability with other WLAN products.

HP WLAN solutions allow enterprise businesses to unlock the productivity and convenience benefits derived from a high security, high performance, and manageable wireless network.

Enterprise WLAN requirements

Security

Security is a fundamental concern for enterprise IT managers. WLAN is a particular concern, since an intruder does not need physical access to the network to attempt to breach it. Aside from physical access, however, the security challenges for a WLAN are similar to those of a wired LAN:

- Authentication – How to ensure that only authorized users can access the enterprise LAN?
- Data protection and integrity – How to ensure that data on the network are not compromised?
- Manageability – How to make network security more manageable?

HP addresses the need for WLAN authentication through support for 802.1x EAPs. The IEEE 802.1x standard and EAP protocols define a framework for authenticating users on a network, as well as a mechanism for dynamically changing and distributing keys. There are several 802.1x EAP types supporting a variety of authentication methods, including passwords and digital certificates. 802.1x is a proven, scalable authentication method that is widely deployed.

[1] The specifications for the 802.11n WLAN are draft specifications and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11n WLAN devices.

Data on the WLAN is protected by encryption. HP WLAN solutions support all commonly deployed encryption standards, including Wired Equivalent Privacy (WEP), Wi-Fi Protected Access (WPA), Wi-Fi Protected Access version 2 (WPA2), Temporal Key Integrity Protocol (TKIP), and the Advanced Encryption Standard (AES).

Defined as part of the IEEE 802.11 family of WLAN specifications, WEP security was intended to make wireless networks as secure as wired LANs. However, with the symmetrical RC4 stream cipher[2] and static 64- or 128-bit key, WEP security was insufficient for some environments.

WPA was introduced as a software-upgradeable enhancement for WEP. WPA enhanced WEP encryption through the addition of Temporal Key Integrity Protocol (TKIP), providing per-packet key mixing, Message Integrity Check (MIC), extended initialization vector (IV) with sequencing rules, and a re-keying mechanism. WPA is significantly more secure than WEP[3], and has received acceptance from most enterprise IT managers.

AES is a block cipher using the Rijndael encryption algorithm on 128-bit (or 192- or 256-bit) blocks of data; block lengths and key lengths are variable. (Block ciphers are typically more complex than stream ciphers and thus harder to crack. The strength of AES security is validated by its adoption by the U.S. government and military.) AES is a key component of the IEEE 802.11i specification, the most recent WLAN security standard that was ratified in June 2004 by IEEE Task Group i (TGi) working group members. HP's current WLANs include AES and 802.11i as well as the corresponding WiFi interoperability test WPA2.

Manageability

For large WLAN deployments, the effort required to implement and maintain WLAN security measures can be significant. Manageability features of HP WLAN solutions include:

Restricted user rights

User rights to certain settings may be restricted to prevent modifying WLAN profiles (for example, security keys), and in some cases from creating new profiles.

Easy distribution of encryption keys and user profiles

The management and distribution of encryption keys and user profiles can be cumbersome and potentially insecure. Appropriate WLAN management solutions—such as 802.1x and the ability to import and export WLAN profiles—can be used to distribute keys and profiles, minimizing the burden on IT staff.

User credential management

HP addresses the need for the security and simplified management of user credentials by allowing Windows® Domain credentials to be re-used for authentication. Security can also be further enhanced by the HP ProtectTools Security Manager—a single client console application that unifies security capabilities of HP client PCs under a common architecture and single user interface. Today a range of features is being delivered that builds on underlying hardware security building blocks such as embedded security chips designed to the Trusted Computing Group (TCG) standard and Smart Card technology. Collectively, these features are addressing business customer needs for better protection against unauthorized PC access, as well as stronger protection for sensitive data stored locally or accessed over a network.

Managed product lifecycles and software upgrades

Stable product configurations over a long purchase period ease IT management by minimizing technology transitions. WLAN driver and client software that are compatible across multiple notebooks and WLAN adapters, and are backwards compatible with previous revisions, simplify maintenance of the WLAN installed base.

[2] For more information, visit www.rsasecurity.oom
[3] Wi-Fi Protected Access Whitepaper, available at www.wi-fi.org

Performance

HP works to optimize WLAN performance at each step of the product development process, starting with the selection of the WLAN technology provider. Through strategic relationships with companies like Intel and Broadcom, jointly designing and testing standards-based solutions during the development process, HP is able to provide leading performance wireless LAN adapters at a competitive cost.

The latest generation of WLAN adapters is based on the draft IEEE standard for 802.11n networks. These new WLAN adapters use multiple data streams to achieve data throughput up to 300Mbps (compared to 54Mbps for 802.11g WLAN adapters).

Starting with a high performance WLAN adapter, however, is not enough. The adapter must be integrated into the notebook with a complementary antenna for maximum range and throughput. HP places the WLAN antennas in the display enclosure, where they are less susceptible to interference by electrical signals in the base of the notebook, less susceptible to signal absorption and antenna de-tuning by the proximity of the user; and, by being elevated, have better 'visibility' of the WLAN signal. This placement of high-efficiency antennas minimizes signal loss, which helps users stay connected over longer distances and helps maximize throughput at all points in the network coverage area. The HP antennas are "dual-band"—capable of supporting wireless LAN technologies that use either the 5 GHz or 2.4 GHz frequency bands. This allows customers to benefit from the higher network capacities of 802.11a and 802.11draft-n while remaining compatible with 802.11b and 802.11g networks. Finally, HP employs an omni-directional, diversity antennae approach—a minimum of two antennas in every notebook that work independently—to help ensure the best possible performance, regardless of how the notebook is oriented. Diversity design improves indoor performance by minimizing the radio frequency (RF) reflection effects ("multipath"), which can cause localized signal weaknesses at either of the antennae. HP notebooks using 802.11draft-n WLAN adapters with MIMO (Multiple-In, Multiple-Out) technology take advantage of multipath effects to increase range when connecting to a wireless access point or wireless router that also uses 802.11draft-n technology.

The final guarantee of WLAN performance is provided by HP's test and qualification process. First the design is validated and tuned in the laboratory, and then it is tested in real world conditions. An in-factory verification of WLAN performance confirms that each WLAN notebook meets HP's exacting standards.

Cisco

Any discussion of network security and manageability would be incomplete without addressing the solutions offered by Cisco Systems, Inc. Cisco has met enterprise network requirements by offering innovative products that address needs for security and manageability, typically by combining standards-based and Cisco-proprietary technologies.

HP is committed to offering business notebooks that customers can deploy in a Cisco wireless LAN environment. Therefore, all HP business notebook WLANs are Cisco compatible, as verified through the Cisco Compatible Extensions Program (CCX). The Cisco Compatible Extensions Program (CCX) for WLAN devices assures compatibility between Cisco Aironet WLAN products and HP notebooks through extensive independent testing. Cisco Compatible HP notebooks interoperate with Cisco Aironet Wireless LAN products and support proprietary Cisco features that enhance security and manageability.

The Cisco Compatible Extensions Program (CCX) is not compatible with Microsoft Windows Vista at this time. Cisco Systems has committed to supporting CCX under Microsoft Windows Vista in the future. HP is committed to certifying HP notebooks with CCX under Microsoft Windows Vista once Cisco Systems provides that support.

HP WLAN adapters

HP notebooks and tablet PCs for enterprise business feature a choice of WLAN adapters. Table 1 compares selected characteristics of the adapters, and Table 2 shows availability by product.

Table 1: Feature comparison, WLAN adapters

Feature	Intel Wireless Wi-Fi Link 4965AGN	Intel Wireless Wi-Fi Link 4965AG	Intel Pro/Wireless 3945ABG Network Connection	Broadcom 4321AGN 802.11a/g/draft-n WiFi Adapter	Broadcom 4311AG 802.11a/b/g WiFi Adapter	Broadcom 4311BG 802.11b/g WiFi Adapter
Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11draft-n	IEEE 802.11a IEEE 802.11b IEEE 802.11g	IEEE 802.11a IEEE 802.11b IEEE 802.11g	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11draft-n	IEEE 802.11a IEEE 802.11b IEEE 802.11g	IEEE 802.11b IEEE 802.11g
Frequency Band	2.4 GHz, 5 GHz	2.4 GHz, 5 GHz	2.4 GHz, 5 GHz	2.4 GHz, 5 GHz	2.4 GHz, 5 GHz	2.4 GHz
Data Rates (Mbps)	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n (draft): 66 possible data rates, ranging from 6 Mbps to 300 Mbps	802.11b: 1, 2, 5.5, 11 802.11a/g: 6, 9, 12,18, 24, 36, 48, 54	802.11b: 1, 2, 5.5, 11 802.11a/g: 6, 9, 12,18, 24, 36, 48, 54	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n (draft): 66 possible data rates, ranging from 6 Mbps to 300 Mbps	802.11b: 1, 2, 5.5, 11 802.11a/g: 6, 9, 12,18, 24, 36, 48, 54	802.11b: 1, 2, 5.5, 11 802.11g: 6, 9, 12,18, 24, 36, 48, 54
Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM
HW Accelerated AES	Yes	Yes	Yes	Yes	Yes	Yes
Output Power (for CKK)	15 dBm	15 dBm	15 dBm	17 dBM	17 dBM	17 dBM
Output Power (for OFDM; power varies by data rate and frequency band)	15 dBm	15 dBm	15 dBm	15 dBm	15 dBM	15 dBM
Power Consumption(max), Transmit	2.3 W	1.6 W	1.8 W	2.0 W	2.0 W	2.0 W

Feature	Intel Wireless Wi-Fi Link 4965AGN	Intel Wireless Wi-Fi Link 4965AG	Intel Pro/Wireless 3945ABG Network Connection	Broadcom 4321AGN 802.11a/g/draft-n WiFi Adapter	Broadcom 4311AG 802.11a/b/g WiFi Adapter	Broadcom 4311BG 802.11b/g WiFi Adapter
Power Consumption (max), Receive	1.9 W	1.1 W	1.4 W	3.3 W	1.5 W	1.5 W
Power Consumption (nominal), Idle mode	30 mW	30 mW	100 mW	300 mW	390 mW	390 mW
Power Consumption, Sleep mode	20 mW	20 mW	30 mW	20 mW	20 mW	20 mW
Power Management	ACPI compliant power management 802.11 compliant power saving mode	ACPI compliant power management 802.11 compliant power saving mode	ACPI compliant power management 802.11 compliant power saving mode	ACPI compliant power management 802.11 compliant power saving mode	ACPI compliant power management 802.11 compliant power saving mode	ACPI compliant power management 802.11 compliant power saving mode
Receiver Sensitivity	300 Mbps: -68 dBm, 54 Mbps: -74 dBm, 6 Mbps: -90 dBm	54 Mbps: -74 dBm, 6 Mbps: -90 dBm	54 Mbps: -73 dBm, 11 Mbps: -88 dBm , 1 Mbps: -95 dBm	270 Mbps: -66dBm, 162 Mbps: -72 dBm, 54 Mbps: -72 dBm, 11 Mbps: -85 dBm , 1 Mbps: -94 dBm	54 Mbps: -73 dBm, 11 Mbps: -88 dBm , 1 Mbps: -95 dBm	54 Mbps: -73 dBm, 11 Mbps: -88 dBm , 1 Mbps: -95 dBm
Range, Outdoor (typical) 802.11a	600 ft. at 6 Mbps	600 ft. at 6 Mbps	600 ft. at 6 Mbps	600 ft. at 6 Mbps	600 ft. at 6 Mbps	N/A
Range, Indoor (typical) 802.11a	150 ft. at 6 Mbps	150 ft. at 6 Mbps	150 ft. at 6 Mbps	150 ft. at 6 Mbps	150 ft. at 6 Mbps	N/A
Range, Outdoor (typical) 802.11b	1200 ft. at 1 Mbps	1200 ft. at 1 Mbps	1200 ft. at 1 Mbps	1200 ft. at 1 Mbps	1200 ft. at 1 Mbps	1200 ft. at 1 Mbps
Range, Indoor (typical) 802.11b	300 ft. at 1 Mbps	300 ft. at 1 Mbps	300 ft. at 1 Mbps	300 ft. at 1 Mbps	300 ft. at 1 Mbps	300 ft. at 1 Mbps
Range, Outdoor (typical) 802.11g	1200 ft. at 1 Mbps	1200 ft. at 1 Mbps	1200 ft. at 1 Mbps	1200 ft. at 1 Mbps	1200 ft. at 1 Mbps	1200 ft. at 1 Mbps
Range, Indoor (typical) 802.11g	300 ft. at 1 Mbps	300 ft. at 1 Mbps	300 ft. at 1 Mbps	300 ft. at 1 Mbps	300 ft. at 1 Mbps	300 ft. at 1 Mbps
Form Factor	PCIe minicard	PCIe minicard	PCIe minicard	PCIe minicard	PCIe minicard	PCIe minicard
Weight	0.013 lb / 6 gm (max)	0.013 lb / 6 gm (max)	0.013 lb / 6 gm (max)	0.026 lb/ 12 gm (max)	0.026 lb/ 12 gm (max)	0.026 lb/ 12 gm (max)
Dimensions	0.19 x 1.2 x 2.0" (4.75 x 29.85 x 50.8 mm)	0.19 x 1.2 x 2.0" (4.75 x 29.85 x 50.8 mm)	0.19 x 1.2 x 2.0" (4.75 x 29.85 x 50.8 mm)	0.19 x 1.2 x 2.0" (4.75 x 29.85 x 50.8 mm)	0.19 x 1.2 x 2.0" (4.75 x 29.85 x 50.8 mm)	0.19 x 1.2 x 2.0" (4.75 x 29.85 x 50.8 mm)
Voltage, Operating	3.3V, 1.5V	3.3V, 1.5V	3.3V, 1.5V	3.3V, 1.5V	3.3V, 1.5V	3.3V, 1.5V
Temperature, Operating	32 to 176 F/0 to 80 C	32 to 176 F/0 to 80 C	32 to 176 F/0 to 80 C	32 to 158 F/0 to 70 C	32 to 158 F/0 to 70 C	32 to 122 F/0 to 50 C

Feature	Intel Wireless Wi-Fi Link 4965AGN	Intel Wireless Wi-Fi Link 4965AG	Intel Pro/Wireless 3945ABG Network Connection	Broadcom 4321AGN 802.11a/g/draft-n WiFi Adapter	Broadcom 4311AG 802.11a/b/g WiFi Adapter	Broadcom 4311BG 802.11b/g WiFi Adapter
Temperature, Non-operating	-40 to 176 F/-40 to 80 C	-40 to 176 F/-40 to 80 C	-40 to 176 F/-40 to 80 C	-40 to 176 F/-40 to 80 C	-40 to 176 F/-40 to 80 C	-40 to 158 F/-10 to 70 C
Humidity, Operating	10 to 90% (non-condensing)	10 to 90% (non-condensing)	10 to 90% (non-condensing)	10 to 90% (non-condensing)	10 to 90% (non-condensing)	10 to 90% (non-condensing)
Humidity, Non-operating	5 to 95% (non-condensing)	5 to 95% (non-condensing)	5 to 95% (non-condensing)	5 to 95% (non-condensing)	5 to 95% (non-condensing)	5 to 95% (non-condensing)
Altitude, Operating	0 to 10,000 ft/3,048 m	0 to 10,000 ft/3,048 m	0 to 10,000 ft/3,048 m	0 to 10,000 ft/3,048 m	0 to 10,000 ft/3,048 m	0 to 10,000 ft/4,572 m
Altitude, Non-operating	0 to 50,000 ft/15,240 m	0 to 50,000 ft/15,240 m	0 to 50,000 ft/15,240 m	0 to 50,000 ft/15,240 m	0 to 50,000 ft/15,240 m	0 to 50,000 ft/12,192 m

Table 2: WLAN adapter availability by product

HP Notebook	Intel Wireless Wi-Fi Link 4965AGN	Intel Wireless Wi-Fi Link 4965AG	Intel Pro/Wireless 3945ABG Network Connection	Broadcom 4321AGN 802.11a/g/draft-n WiFi Adapter	Broadcom 4311AG 802.11a/b/g WiFi Adapter	Broadcom 4311BG 802.11b/g WiFi Adapter
HP Compaq 2510p Notebook PC	Yes	Yes	No	Yes	Yes	Yes
HP Compaq Notebook 2710p PC	Yes	Yes	No	Yes	Yes	Yes
HP Compaq 6510b PC	Yes	Yes	Yes	Yes	Yes	Yes
HP Compaq Notebook 6515b PC	No	No	No	Yes	Yes	Yes
HP Compaq Notebook 6710s PC	Yes	Yes	Yes	Yes	Yes	Yes
HP Compaq Notebook 6710b PC	Yes	Yes	Yes	Yes	Yes	Yes
HP Compaq Notebook 6715s PC	No	No	No	No	Yes	Yes
HP Compaq Notebook 6715b PC	No	No	No	Yes	Yes	Yes
HP Compaq Notebook 6910p PC	Yes	Yes	No	Yes	Yes	Yes
HP Compaq Notebook 8510p PC	Yes	Yes	No	No	Yes	Yes
HP Compaq Notebook 8510w PC	Yes	Yes	No	No	Yes	Yes
HP Compaq Notebook 8710p PC	Yes	Yes	No	No	Yes	Yes
HP Compaq Notebook 8710w PC	Yes	Yes	No	No	Yes	Yes

HP WLAN Client Software

The previous section summarized the WLAN adapters and their availability on HP notebooks and Tablet PCs for enterprise. This section summarizes the features of the WLAN Client software that are supported by the adapters.

WLAN Client Software is used to manage the configuration of the WLAN adapter, create and manage network profiles, provide connection status and diagnostic information, and implement security features that help enable a secure connection between the client and the WLAN infrastructure. These security tasks include entering encryption keys and configuring and executing 802.1x authentication[4]. Also, the WLAN client software often implements additional features proprietary to the WLAN manufacturer.

All WLAN adapters used in HP notebooks support the Microsoft Windows XP Wireless Network Connection Manager that is native to the operating system, as well as client software provided by the WLAN manufacturer. For the Intel Wireless WiFi Link 4965AGN, Intel Wireless WiFi Link 4965AG, and Intel Pro/Wireless 3945ABG Network Connection, the manufacturer's software is the *Intel PROSet Network Configuration Utility*. For the Broadcom 4321AGN 802.11a/g/draft-n, Broadcom 4311AG 802.11a/b/g, and Broadcom 4311BG 802.11b/g WiFi Adapters, the manufacturer's software is the *Broadcom Client Utility*.

[4] The WLAN software is sometimes referred to as the supplicant, but actually the security software supplicant is only the component of the client software application that requests authentication from the network's authentication server.

Table 3: Client software features supported HP Compaq Business Notebooks

	Broadcom Client Utility				Microsoft Windows XP Wireless Zero Configuration Utility			Intel ProSet Network Configuration Utility			
WLAN Vendor SW Rev.	4.102.61	4.100.15.5	4.10.47.0	3.100.46	XP SP1	XP SP2	Vista	v11.1	v11.1	v10.1	v9.0.1.9
HP Rev. Control (as on Web)	5.00 B	6.10 A	5.00 C	3.00 A	N/A	N/A	N/A	7.00 A	7.00 A	5.00 C	5.00 A
WLAN HW Support	Broadcom 4321AGN 802.11a/g/draft-n WiFi Adapter, Broadcom 4311AG 802.11a/b/g WiFi Adapter, Broadcom 4311BG 802.11b/g WiFi Adapter		Broadcom 4311AG 802.11a/b/g WiFi Adapter, Broadcom 4311BG 802.11b/g WiFi Adapter	Broadcom 802.11a/b/g WLAN, Broadcom 802.11b/g WLAN	ALL	ALL	ALL	Intel Wireless WiFi Link 4965AGN, 4965AG, Intel Pro/Wireless 3945ABG, 3945BG, 2915ABG, 200BG Network Connection		Intel Pro/Wireless 3945ABG, 3945BG, 2915ABG, 200BG Network Connection	Intel Pro/Wireless 2915ABG, 2200BG Network Connection
OS Support	Vista	2K, XP	2K, XP	2K, XP	2K, XP	2K, XP	Vista	Vista	2K, XP	2K, XP	2K, XP
Availability	Now	Now	Now	Now	Now	Now	Now	Now	Now	Now	Now
WEP (64/128)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WPA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WPA2/ 802.11i	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cisco Compatible Extensions v1		✓	✓	✓					✓	✓	✓
Cisco Compatible Extensions v2		✓	✓	✓					✓	✓	✓
Cisco Compatible Extensions v3		✓	✓	✓					✓	✓	✓
Cisco Compatible Extensions v4		✓	✓						✓	✓	
Auto Profile Switching	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Profile Import/Export		✓	✓	✓					✓	✓	✓
802.1x type support	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EAP-TLS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EAP-TTLS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PEAP-GTC (Cisco)		✓	✓	✓	✓	✓	✓		✓	✓	✓
PEAP-MSCHAPv2 (Microsoft)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Several features in Table 3, above, have particular value in the enterprise environment. The following table highlights the benefits of these selected features.

Table 4: Selected feature benefits for the enterprise environment

Feature	Benefit
Cisco Compatible Extensions Support	• Assurance of tested compatibility with Cisco Aironet infrastructure products. • Support for the latest industry security standards plus selected Cisco proprietary features
Profile import/export	• Allows IT administrators to create a single profile and distribute and implement it in an enterprise environment, reducing support time and errors users make when managing their own profiles.
Automatic Profile switching	• Convenience, avoiding the need to manually change profiles when moving from one network to another.

Selecting the right WLAN solution

Because HP offers a selection of standards-based solutions WLAN solutions as described above, customers can choose the solution that best meets their needs. To assist in this selection, HP offers the following recommendations:

Table 5: HP recommended WLAN solutions

If your environment	Recommended Supplicants	Recommended WLAN adapters
Uses predominantly Microsoft server infrastructure • Microsoft server products manage authentication • Authentication based on Microsoft EAP-TLS or Microsoft PEAP	• Microsoft Windows XP Wireless Network Connection Manager	• Broadcom 4311AG 802.11a/b/g WiFi Adapter, Broadcom 4311BG 802.11b/g WiFi Adapter • Intel Wireless WiFi Link 4965AG
Uses predominantly Cisco Aironet infrastructure	• Broadcom Client Utility • Intel ProSet Network Configuration Utility	• Broadcom 4311AG 802.11a/b/g WiFi Adapter, Broadcom 4311BG 802.11b/g WiFi Adapter • Intel Wireless WiFi Link 4965AG
Is standardized on Intel technology	• Intel ProSet Network Configuration Utility • Microsoft Windows XP Wireless Network Connection Manager	• Intel Wireless WiFi Link 4965AG
Requires 802.11a support	• Broadcom Client Utility • Intel ProSet Network Configuration Utility • Microsoft Windows XP Wireless Network Connection Manager	• Broadcom 4311AG 802.11a/b/g WiFi Adapter, Broadcom 4311BG 802.11b/g WiFi Adapter • Intel Wireless WiFi Link 4965AG

Conclusion

HP enterprise notebook WLAN solutions address the primary concerns of enterprise business:

- **Security**
  - Support for all common encryption methods, including WEP, WPA, and AES.
  - 802.1x provides strong authentication using a highly-manageable industry standard. The HP advantage lies in broad support for all major authentication types, giving enterprise customers the freedom to select an authentication method that is appropriate for their unique environments and security risk assessments.
- **Manageability**
  - Support for profile import/export and restricted user rights.
  - 802.1x to support dynamic key exchange.
  - Managed product lifecycles and software upgrades.
- **Performance**
  - Strategic relationships with leading WLAN-technology providers.
  - HP notebooks feature display mounted, dual-band, diversity antenna design enabling users to stay connected over longer distances and to maximize throughput at all points in the network coverage area.
  - HP rigorous testing and qualification of WLAN solutions from prototype through production.
- **Cisco interoperability and feature support**
  - The Cisco Compatible Extensions program allows HP to incorporate Cisco security and manageability enhancements.
  - The HP advantage lies in the strength of the strategic alliance with Cisco – the HP endorsement and leading support for the Cisco Compatible Extensions program translates into tangible benefits for enterprise customers.

4AA0-4427ENW,Rev 4, 07/2007

invent