Configuring the Client Adapter through Windows CE .NET

This appendix explains how to configure and use the client adapter with Windows CE .NET.

The following topics are covered in this appendix:

Overview

This appendix provides instructions for configuring the client adapter through Windows CE .NET (instead of through ACU). The "Overview of Security Features" section below describes the security options that are available for use with this operating system so that you can make an informed decision before you begin the configuration process. In addition, the appendix also provides basic information on using Windows CE .NET to specify the networks to which the client adapter associates.

Note The instructions in this appendix are specific to PPC 2003 devices. The same configuration parameters must be set on other Windows CE .NET devices; however, the procedure used to set those parameters may differ. If you require more information on configuring or using your client adapter with Windows CE .NET, refer to the documentation that came with your device and Microsoft's documentation for Windows CE .NET.

Overview of Security Features

When you use your client adapter with Windows CE .NET, you can protect your data as it is transmitted through your wireless network by encrypting it through the use of wired equivalent privacy (WEP) encryption keys. With WEP encryption, the transmitting device encrypts each packet with a WEP key, and the receiving device uses that same key to decrypt each packet.

The WEP keys used to encrypt and decrypt transmitted data can be statically associated with your adapter or dynamically created as part of the EAP authentication process. The information in the "Static WEP Keys" and "Dynamic WEP Keys with EAP" sections below can help you to decide which type of WEP keys you want to use. Dynamic WEP keys with EAP offer a higher degree of security than static WEP keys.

WEP keys, whether static or dynamic, are either 40 or 128 bits in length. 128-bit WEP keys offer a greater level of security than 40-bit WEP keys.

Static WEP Keys

Each device (or profile) within your wireless network can be assigned up to four static WEP keys. If a device receives a packet that is not encrypted with the appropriate key (as the WEP keys of all devices that are to communicate with each other must match), the device discards the packet and never delivers it to the intended receiver.

Static WEP keys are write-only and temporary; however, you do not need to re-enter them each time the client adapter is inserted or the Windows CE .NET device is reset. This is because the keys are stored (in an encrypted format for security reasons) in the registry of the device. When the driver loads and reads the client adapter's registry parameters, it also finds the static WEP keys, unencrypts them, and stores them in volatile memory on the adapter.

Dynamic WEP Keys with EAP

The new standard for wireless LAN security, as defined by IEEE, is called *802.1X for 802.11*, or simply *802.1X*. An access point that supports 802.1X and its protocol, Extensible Authentication Protocol (EAP), acts as the interface between a wireless client and an authentication server, such as a RADIUS server, to which the access point communicates over the wired network.

Two 802.1X authentication types are available for PPC 2003 and other Windows CE .NET 4.2 devices when you configure your client adapter through Windows CE .NET:

- **EAP-TLS**—This authentication type is enabled or disabled through the operating system and uses a dynamic session-based WEP key, which is derived from the client adapter and RADIUS server, to encrypt data. EAP-TLS requires the use of certificates for authentication.

  RADIUS servers that support EAP-TLS include Cisco Secure ACS version 3.0 or later and Cisco Access Registrar version 1.8 or later.
- **Cisco PEAP**—Cisco PEAP authentication (also known as *PEAP-GTC*) is designed to support One-Time Password (OTP), Windows NT or 2000 domain, and LDAP user databases over a wireless LAN. It is based on EAP-TLS authentication but uses a password instead of a client certificate for authentication. Cisco PEAP is enabled or disabled through the operating system and uses a dynamic session-based WEP key, which is derived from the client adapter and RADIUS server, to encrypt data. Cisco PEAP requires you to enter your username and password in order to start the authentication process and gain access to the network. RADIUS servers that support Cisco PEAP authentication include Cisco Secure ACS version 3.1 or later.

Note To use Cisco PEAP authentication, you must have checked the **Install Cisco PEAP Support** check box during installation.

When you enable Require EAP on your access point and configure your client adapter for EAP-TLS or PEAP using Windows CE .NET, authentication to the network occurs in the following sequence:

1. The client associates to an access point and begins the authentication process.

   Note The client does not gain access to the network until authentication between the client and the RADIUS server is successful.

2. Communicating through the access point, the client and RADIUS server complete the authentication process, with the password (PEAP) or certificate (EAP-TLS) being the shared secret for authentication. The password is never transmitted during the process.
3. If authentication is successful, the client and RADIUS server derive a dynamic, session-based WEP key that is unique to the client.
4. The RADIUS server transmits the key to the access point using a secure channel on the wired LAN.
5. For the length of a session, or time period, the access point and the client use this key to encrypt or decrypt all unicast packets (and broadcast packets if the access point is set up to do so) that travel between them.

Note Refer to the IEEE 802.11 Standard for more information on 802.1X authentication and to the following URL for additional information on RADIUS servers:
http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/12cgcr/secur_c/scprt2/scrad.htm

Preparing for Configuration (EAP-TLS and PEAP Only)

If you are planning to use EAP-TLS or PEAP authentication with your Windows CE .NET device, you must make sure that your system meets certain requirements and obtain any necessary certificates before you can configure your client adapter. If you are not planning to use EAP-TLS or PEAP authentication, go to the "Configuring the Client Adapter" section on page E-5.

System Requirements

Before you can enable EAP-TLS or PEAP authentication, your network devices must meet the following requirements:

- The Windows CE device must be a PPC 2003 or other Windows CE .NET 4.2 device.
- Client adapters must support WEP and use firmware version 5.40.10 or later.
- Access points to which your client adapter will attempt to authenticate must use the following firmware versions or later: 11.23T (340 and 350 series access points), 12.2(4)JA (1100 series access points), or 11.54T (1200 series access points).
- All necessary infrastructure devices (for example, access points, servers, gateways, user databases, etc.) must be properly configured for the authentication type you plan to enable on the client.

Obtaining and Importing CA and User Certificates

EAP-TLS and PEAP authentication require the use of certificates. EAP-TLS requires both a Certificate Authority (CA) certificate and a user certificate while PEAP requires only a CA certificate. Contact your system administrator to obtain the necessary certificate(s). Then import the certificate(s) on your Windows CE .NET device. Once you import the necessary certificates, you should not have to repeat this procedure until the certificates expire (at a time that is predetermined by the server).

Note Refer to your Microsoft documentation for instructions on importing certificate files on your Windows CE .NET device.

Configuring the Client Adapter

Follow these steps to configure your client adapter using Windows CE .NET.

Step 1 Make sure the client adapter is inserted in the Windows CE .NET device.

Step 2 Double-tap the **ACU** icon on your desktop or select **Start** > **Programs** > **Cisco** > **ACU**.

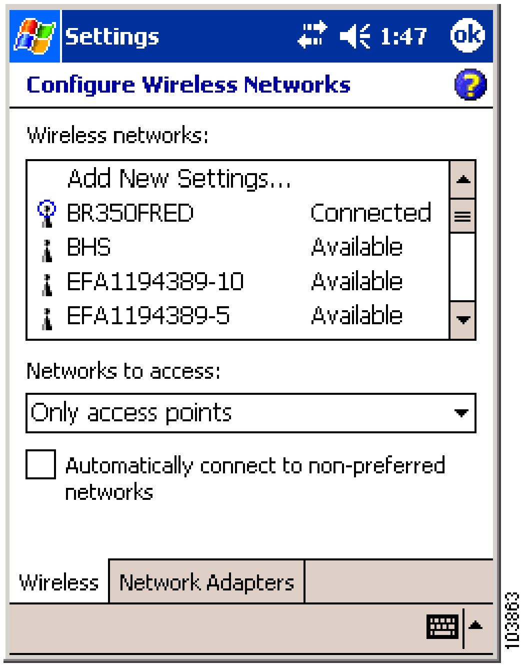
Step 3 On the Profiles screen, select **<External Settings>** from the Select Active Profile drop-down menu.

Step 4 When prompted, tap **OK**. Then reset your Windows CE .NET device or eject and reinsert the client adapter.

Step 5 Tap **OK** to save your settings.

Step 6 Select **Start** > **Settings** > the **Connections** tab > **Connections** > the **Advanced** tab > **Network Card**. The Configure Wireless Networks screen (Wireless tab) appears (see Figure E-1).

Figure E-1 Configure Wireless Networks Screen (Wireless Tab)



Configure Wireless Networks

Wireless networks:

Add New Settings...	
BR350FRED	Connected
BHS	Available
EFA1194389-10	Available
EFA1194389-5	Available

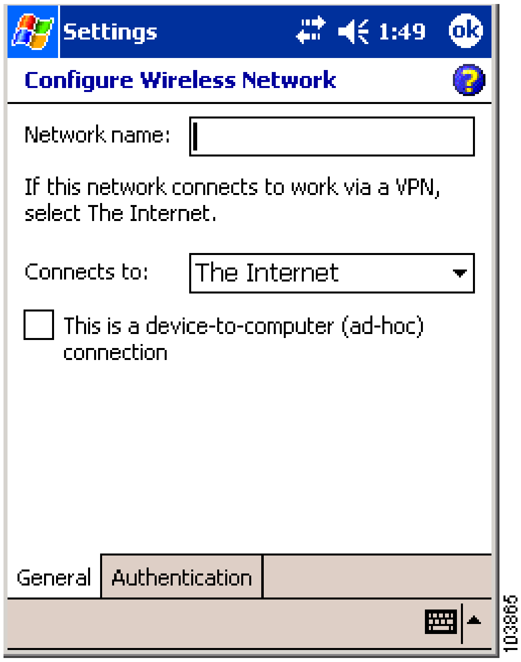
Networks to access: Only access points

□ Automatically connect to non-preferred networks

Step 7 Tap the SSID of the access point to which you want the client adapter to associate from the list of wireless networks. If the SSID of the access point you want to use is not listed or you are planning to operate the client adapter in an *ad hoc network* (a computer-to-computer network without access points), tap **Add New Settings**.

The Configure Wireless Network screen (General tab) appears (see Figure E-2).

Figure E-2 Configure Wireless Network Screen (General Tab)



Settings 1:49 ok

Configure Wireless Network

Network name:

If this network connects to work via a VPN, select The Internet.

Connects to: The Internet

□ This is a device-to-computer (ad-hoc) connection

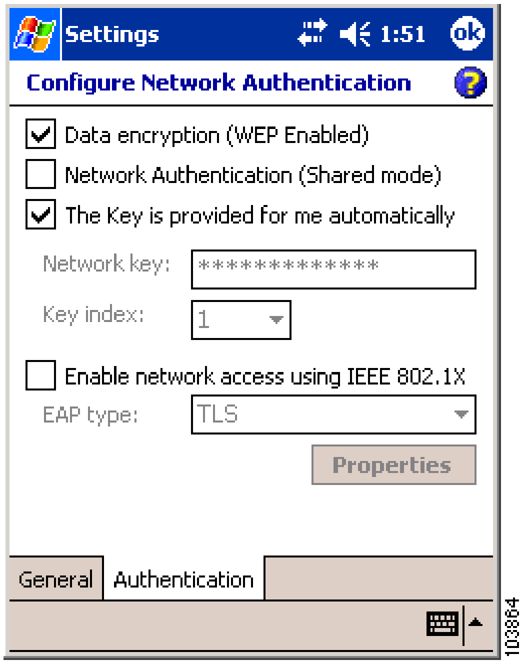
Step 8 Perform one of the following:

- If you selected an SSID from the list of wireless networks, make sure the SSID appears in the Network name field.
- If you selected Add New Settings, enter the case-sensitive SSID of the access point to which you want the client adapter to associate or the name of the ad hoc network in the Network name field.

Step 9 Check the **This is a device-to-computer (ad-hoc) connection** check box if you are planning to operate the client adapter in an ad hoc network.

Step 10 Tap the **Authentication** tab. The Configure Network Authentication screen appears (see Figure E-3).

Figure E-3 Configure Network Authentication Screen



Settings 1:51 ok

Configure Network Authentication

☑ Data encryption (WEP Enabled)

☐ Network Authentication (Shared mode)

☑ The Key is provided for me automatically

Network key: *************

Key index: 1

☐ Enable network access using IEEE 802.1X

EAP type: TLS

Step 11 Check the **Data encryption (WEP Enabled)** check box if you are planning to use static or dynamic WEP.

Step 12 Check the **Network Authentication (Shared mode)** check box if you want to use shared key (rather than open) authentication with the access point.

Open authentication enables your client adapter, regardless of its WEP settings, to authenticate and attempt to communicate with an access point.

Shared key authentication enables your client adapter to communicate only with access points that have the same WEP key. Cisco recommends that shared key authentication not be used because it presents a security risk.

Note If you are planning to use EAP-TLS authentication, do not select this check box. EAP-TLS does not work with shared key authentication because shared key authentication requires the use of a WEP key, and a WEP key is not set for EAP-TLS until after the completion of EAP authentication.

Step 13 Perform one of the following:

- If you are planning to use EAP-TLS or PEAP, which uses dynamic WEP keys, check the **The Key is provided for me automatically** check box.
- If you are planning to use static WEP, follow these steps to enter up to four WEP keys.

  a. Uncheck the **The Key is provided for me automatically** check box.

  b. Obtain the WEP key for the access point (in an infrastructure network) or other clients (in an ad hoc network) from your system administrator.

c. Enter the WEP key in the Network key field. In order to communicate, the client adapter must use the same WEP key as the access point or other clients.

d. In the Key index field, enter the number of the WEP key you are creating (**1**, **2**, **3**, or **4**).

Note The WEP key must be assigned to the same number on both the client adapter and the access point (in an infrastructure network) or other clients (in an ad hoc network).

Step 14 Perform one of the following:

- If you are not planning to use EAP authentication, tap **OK** to save your settings and to add this SSID to the list of wireless networks (see Figure E-1). The client adapter automatically attempts to associate to the network(s) in the order in which they are listed. When the client adapter is associated to an access point, the word *Connected* appears to the right of the network name in the list of wireless networks.
- If you are planning to use EAP-TLS authentication, follow the instructions in the "Enabling EAP-TLS Authentication" section below.
- If you are planning to use PEAP authentication, follow the instructions in the "Enabling PEAP Authentication" section on page E-9.

Enabling EAP-TLS Authentication

Follow these steps to prepare the client adapter to use EAP-TLS authentication, provided you have completed the initial configuration.

Step 1 Check the **Enable network access using IEEE 802.1X** check box.

Step 2 Select **TLS** in the EAP type drop-down box.

Step 3 If your Windows CE .NET device has more than one user certificate, tap the **Properties** button. On the Select Certificate screen, select the user certificate that you want to use and tap **OK**.

Step 4 Tap **OK** to save your settings. The configuration is complete. The client adapter automatically attempts to associate to the network(s) in the order in which they are listed. When the client adapter is associated to an access point, the word *Connected* appears to the right of the network name in the list of wireless networks.

Step 5 Refer to the "Using EAP-TLS" section on page 6-4 for instructions on authenticating using EAP-TLS.

Enabling PEAP Authentication

Follow these steps to prepare the client adapter to use PEAP authentication, provided you have completed the initial configuration.

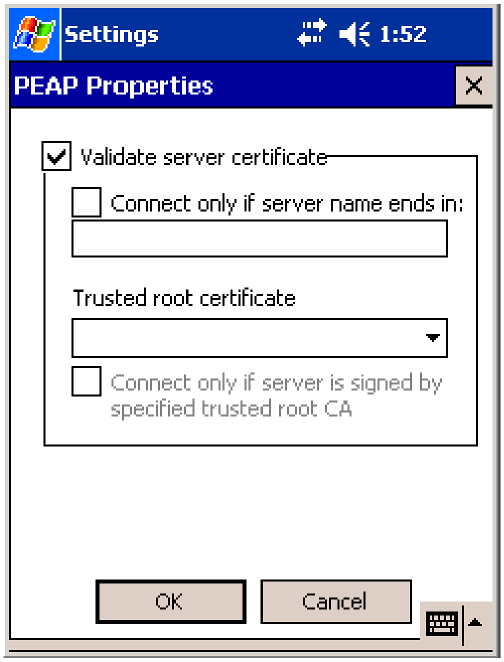
Step 1 Check the **Enable network access using IEEE 802.1X** check box.

Step 2 Select **Cisco PEAP** in the EAP type drop-down box.

> **Note** If the Microsoft PEAP supplicant is installed (rather than the Cisco PEAP supplicant), **PEAP** (rather than Cisco PEAP) appears in the EAP type drop-down box. Follow the instructions in your Microsoft documentation to configure your client adapter to use Microsoft PEAP.

Step 3 Tap the **Properties** button. The PEAP Properties screen appears (see Figure E-4).

Figure E-4 PEAP Properties Screen



Settings
1:52
PEAP Properties
×
☑ Validate server certificate
☐ Connect only if server name ends in:
Trusted root certificate
☐ Connect only if server is signed by specified trusted root CA
OK
Cancel
103866

Step 4 Make sure the **Validate server certificate** check box is checked if server certificate validation is required (recommended).

Step 5 Check the **Connect only if server name ends in** check box and enter the appropriate server name suffix in the text box below.

> **Note** If you leave this field blank, you are prompted to accept a connection to the server to which your client adapter is connected during the authentication process.

Step 6 Make sure that the name of the certificate authority from which the server certificate was downloaded appears in the Trusted root certificate field. If necessary, tap the arrow on the drop-down box and select the appropriate name.

Note If you leave this field blank, you are prompted to accept a connection to the root certification authority during the authentication process.

Step 7 Check the **Connect only if server is signed by specified trusted root CA** check box if you want to ensure that the certificate server uses the trusted root certificate specified in the field above. This prevents the client from establishing connections to rogue access points.

Step 8 Tap **OK** on each open screen to save your settings. The configuration is complete. The client adapter automatically attempts to associate to the network(s) in the order in which they are listed. When the client adapter is associated to an access point, the word *Connected* appears to the right of the network name in the list of wireless networks.

Step 9 Refer to the "Using PEAP" section on page 6-5 for instructions on authenticating using PEAP.

Associating to an Access Point Using Windows CE .NET

Windows CE .NET causes the client adapter's driver to automatically attempt to associate to the first network in the list of wireless networks (see Figure E-1). If the adapter fails to associate or loses association, it automatically switches to the next network in the list of wireless networks. The adapter does not switch networks as long as it remains associated to the access point. To force the client adapter to associate to a different access point, you must select a different network from the list of available networks and tap **OK**.