Configuration Example: Converged Access for WLC EAP-FAST with Internal RADIUS Server

This document describes how to configure the Cisco Converged Access Wireless LAN Controllers (WLCs), Cisco Catalyst 3850 Series, and Cisco Catalyst 3650 Series Switches to act as RADIUS servers that perform Cisco Extensible Authentication Protocol-Flexible Authentication via Secure Protocol (EAP-FAST, in this example) for client authentication.

An external RADIUS server is usually used to authenticate users, which in some cases is not a feasible solution. In situations where the RADIUS server is not a feasible solution to authenticate users, a Converged Access WLC can act as a RADIUS server, where users are authenticated against the local database that is configured in the WLC. The previously explained feature is called a Local RADIUS Server feature.

Prerequisites

We recommend that you have knowledge of the following topics before starting the configuration:

- Cisco IOS GUI or CLI with the Converged Access 3850 Series Switches WLCs, Cisco Catalyst 3850 Series, and Cisco Catalyst 3650 Series Switches.
- Extensible Authentication Protocol (EAP) concepts
- Service Set Identifier (SSID) configuration.
- RADIUS

Supported Platform and Releases

- Cisco Catalyst 3650 Series Switches
- Cisco Catalyst 3850 Series Switches

The information in this document is based on the following software and hardware versions:

- Cisco 3602 Series Lightweight Access Point (AP)
- Microsoft Windows XP with Intel PROset Supplicant
- Cisco Catalyst 3560 Series Switches

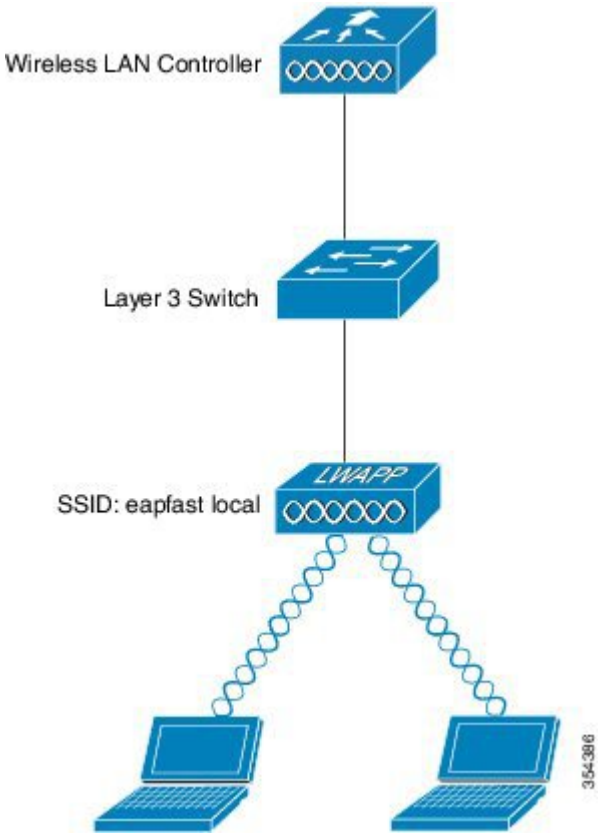
Note The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a specific (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Configuring Converged Access WLC as RADIUS Server

Network Diagram for Converged Access

The following figure describes the network diagram of converged access:

Figure 1: Network Diagram



Configuring Converged Access

Configuring Converged Access WLC as RADIUS Server is based on the following steps:

- Configure the WLC for the local EAP method and the related authentication and authorization profiles with the CLI or GUI.
- Configure the WLAN and map the method list that has the authentication and authorization profiles.

Configuring WLC with CLI

Perform the following tasks to configure the WLC with the CLI:

1. To enable the AAA model on the WLC, use the following commands:

```
aaa new-model
```

2. To define authentication and authorization, use the following commands:

```
aaa local authentication eapfast authorization eapfast
aaa authentication dot1x eapfast local
aaa authorization credential-download eapfast local
aaa authentication dot1x default local
```

3. To configure the local EAP profile and the method, use the following commands (EAP-FAST is used in the following example):

```
eap profile eapfast
 method fast
!
```

4. To configure advanced EAP-FAST parameters, use the following commands:

```
eap method fast profile eapfast
 description test
 authority-id identity 1
 authority-id information 1
 local-key 0 cisco123
```

5. To configure WLAN and to map the local authorization profile to the WLAN, use the following commands:

```
wlan eapfastlocal 13 eapfastlocal
 client vlan VLAN0020
 local-auth eapfast
 session-timeout 1800
 no shutdown
```

6. To configure infrastructure to support the client connectivity, use the following commands:

```
ip dhcp snooping vlan 12,20,30,40,50
ip dhcp snooping
!
ip dhcp pool vlan20
 network 203.0.113.0 255.255.255.0
 default-router 203.0.113.251
 dns-server 203.0.113.251

interface TenGigabitEthernet1/0/1
 switchport trunk native vlan 12
 switchport mode trunk
 ip dhcp relay information trusted
 ip dhcp snooping trust
```

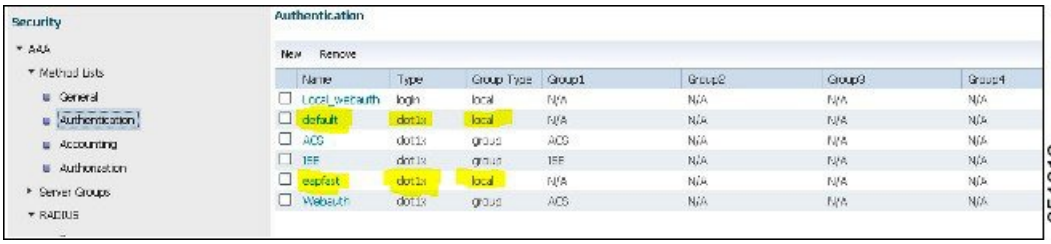
Configuring the WLC with the GUI

Perform the following tasks to configure the WLC with the GUI:

1 To configure the method list of Authentication, perform the following:

- Configure the eapfast Type as **Dot1x**.
- Configure the eapfast Group Type as **Local**.

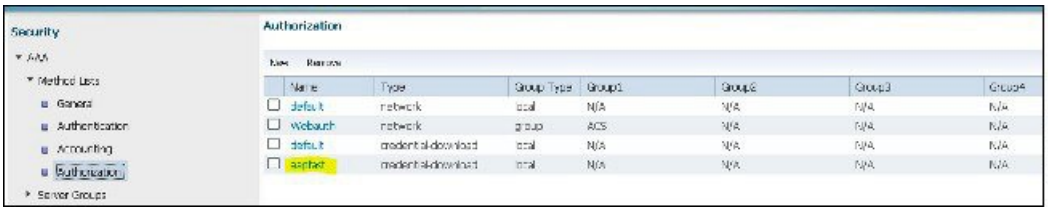
Figure 2: Authentication



2 To configure the method list for Authorization, perform the following:

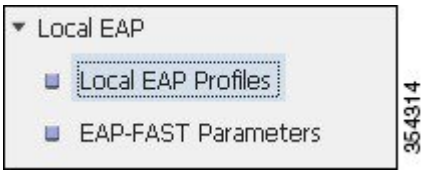
- Configure the eapfast Type as **Credential-Download**.
- Configure the eapfast Group Type as **Local**.

Figure 3: Authorization



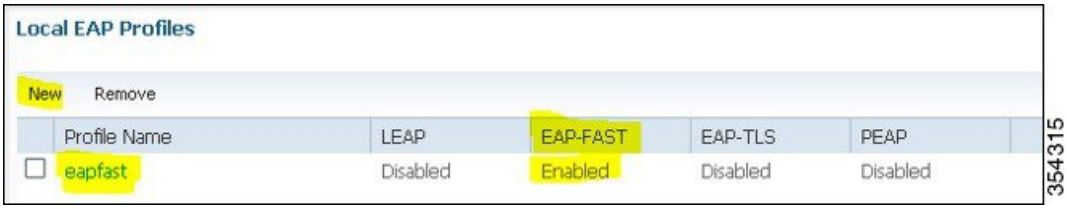
3 Configure the Local EAP profile.

Figure 4: EAP Profile



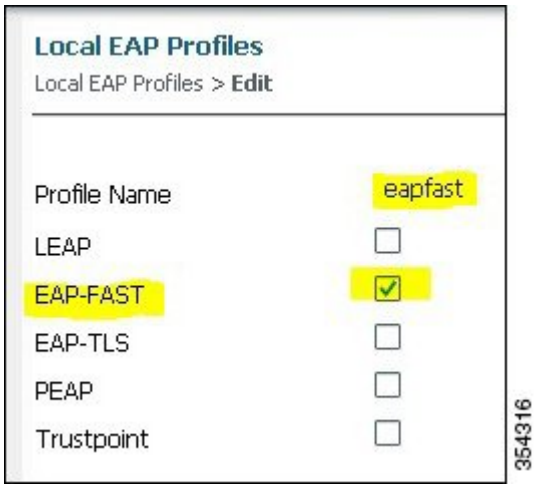
4 Create a new profile and choose the EAP type.

Figure 5: Local EAP Profiles



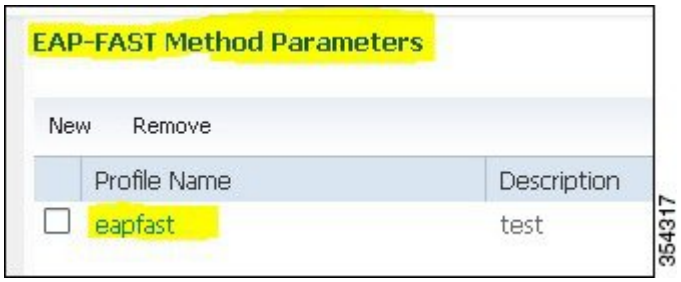
The Profile Name is **eapfast** and the chosen EAP type is **EAP-FAST** as shown in the following figure:

Figure 6: Local EAP Profiles



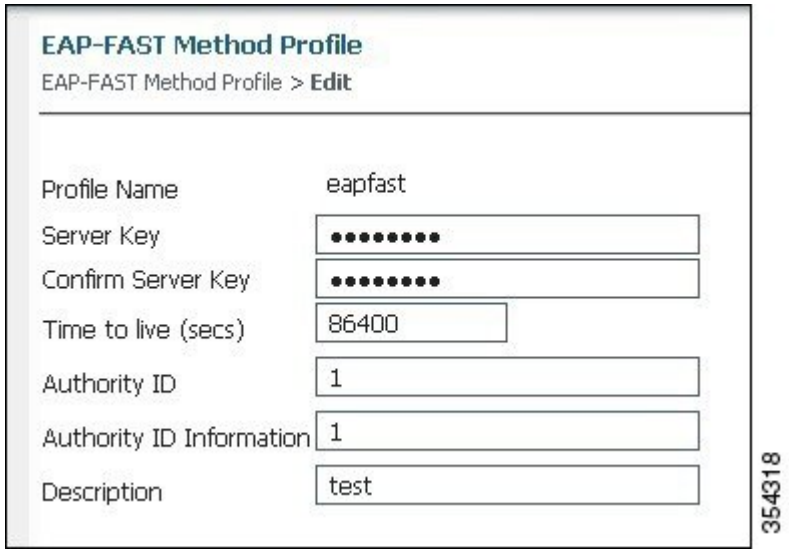
5 Configure the EAP-FAST Method Parameters:

Figure 7: EAP-FAST Method Parameters



The Server Key is configured as **Cisco123**.

Figure 8: EAP-FAST Method Profile



6 Check the **Dot1x System Auth** Control check box and choose **eapfast** for the Method Lists. Selecting Dot1x System Auth control and eapfast Method Lists helps you to perform the local EAP authentication.

Figure 9: Security

7 Configure the WLAN for WPA2 AES encryption.

Figure 10: WLAN

8 On the AAA Server tab, map the EAP Profile Name eapfast to the WLAN:

Figure 11: WLAN

Verifying Configuration for Converged Access

Perform the following steps to verify the configuration:

1 Connect the client to the WLAN as shown in the following figure:

Figure 12:

2 Verify that the Protected Access Credentials (PAC) popup appears. Accept the PAC popup to authenticate successfully.

Figure 13:

Troubleshooting the Configuration for Converged Access

We recommend that you use traces to troubleshoot wireless issues. Traces are saved in the circular buffer and are not processor intensive.

To enable the traces to obtain the Layer 2 (L2) auth logs, use the following commands:

- **set trace group-wireless-secure level debug**
- **set trace group-wireless-secure filter mac0021.6a89.51ca**

To enable these traces to obtain the DHCP events logs, use the following commands:

- **set trace dhcp events level debug**
- **set trace dhcp events filter mac 0021.6a89.51ca**

The following output is an example of a successful trace:

```
[04/10/14 18:49:50.719 IST 3 8116] 0021.6a89.51ca Association received from
 mobile on AP  c8f9.f983.4260

[04/10/14 18:49:50.719 IST 4 8116] 0021.6a89.51ca qos upstream policy is
 unknown and downstream policy is unknown
[04/10/14 18:49:50.719 IST 5 8116] 0021.6a89.51ca apChanged 1 wlanChanged 0
 mscb ipAddr 20.20.20.6, apf RadiusOverride 0x0, numIPv6Addr=0
[04/10/14 18:49:50.719 IST 6 8116] 0021.6a89.51ca Applying WLAN policy on MSCB.
[04/10/14 18:49:50.719 IST 7 8116] 0021.6a89.51ca Applying WLAN ACL policies
 to client

[04/10/14 18:49:50.719 IST 9 8116] 0021.6a89.51ca Applying site-specific IPv6
 override for station  0021.6a89.51ca  - vapId 13, site 'default-group',
 interface 'VLAN0020'
[04/10/14 18:49:50.719 IST a 8116] 0021.6a89.51ca Applying local bridging
 Interface Policy for station  0021.6a89.51ca  - vlan 20, interface 'VLAN0020'
[04/10/14 18:49:50.719 IST b 8116] 0021.6a89.51ca STA - rates (8):
 140 18 152 36 176 72 96 108 48 72 96 108 0 0 0 0

[04/10/14 18:49:50.727 IST 2f 8116] 0021.6a89.51ca Session Manager Call Client
 57ca4000000048, uid 42, capwap id 50b94000000012,Flag 4, Audit-Session ID
 0a6987b253468efb0000002a, method list

[04/10/14 18:49:50.727 IST 30 22] ACCESS-CORE-SM-CLIENT-SPI-NOTF:
 [0021.6a89.51ca, Ca3] Session update from Client[1] for 0021.6a89.51ca,
 ID list 0x00000000
[04/10/14 18:49:50.727 IST 31 22] ACCESS-CORE-SM-CLIENT-SPI-NOTF:
 [0021.6a89.51ca, Ca3]  (UPD): method: Dot1X, method list: none, aaa id:
 0x0000002A
[04/10/14 18:49:50.727 IST 32 22] ACCESS-CORE-SM-CLIENT-SPI-NOTF:
 [0021.6a89.51ca, Ca3]  (UPD): eap profile: eapfast

[04/10/14 18:49:50.728 IST 4b 278] ACCESS-METHOD-DOT1X-DEB:[0021.6a89.51ca,Ca3]
 Posting AUTH_START for 0xF700000A
[04/10/14 18:49:50.728 IST 4c 278] ACCESS-METHOD-DOT1X-DEB:[0021.6a89.51ca,Ca3]
 0xF700000A:entering request state
[04/10/14 18:49:50.728 IST 4d 278] ACCESS-METHOD-DOT1X-NOTF:[0021.6a89.51ca,Ca3]
 Sending EAPOL packet
[04/10/14 18:49:50.728 IST 4e 278] ACCESS-METHOD-DOT1X-INFO:[0021.6a89.51ca,Ca3]
 Platform changed src mac  of EAPOL packet
[04/10/14 18:49:50.728 IST 4f 278] ACCESS-METHOD-DOT1X-INFO:[0021.6a89.51ca,Ca3]
 EAPOL packet sent to client 0xF700000A
[04/10/14 18:49:50.728 IST 50 278] ACCESS-METHOD-DOT1X-DEB:[0021.6a89.51ca,Ca3]
 0xF700000A:idle request action
[04/10/14 18:49:50.761 IST 51 8116] 0021.6a89.51ca 1XA: Received 802.11 EAPOL
 message (len 5) from mobile
[04/10/14 18:49:50.761 IST 52 8116] 0021.6a89.51ca 1XA: Received EAPOL-Start
 from mobile
[04/10/14 18:49:50.761 IST 53 8116] 0021.6a89.51ca 1XA:  EAPOL-Start -
 EAPOL start message from mobile as mobile is in Authenticating state, restart
 authenticating

[04/10/14 18:49:50.816 IST 95 278] ACCESS-METHOD-DOT1X-DEB:[0021.6a89.51ca,Ca3]
 0xF700000A:entering response state
[04/10/14 18:49:50.816 IST 96 278] ACCESS-METHOD-DOT1X-NOTF:[0021.6a89.51ca,Ca3]
 Response sent to the server from 0xF700000A
[04/10/14 18:49:50.816 IST 97 278] ACCESS-METHOD-DOT1X-DEB:[0021.6a89.51ca,Ca3]
 0xF700000A:ignore response action
[04/10/14 18:49:50.816 IST 98 203] Parsed CLID MAC Address = 0:33:106:137:81:202
[04/10/14 18:49:50.816 IST 99 203] AAA SRV(00000000): process authen req
[04/10/14 18:49:50.816 IST 9a 203] AAA SRV(00000000): Authen method=LOCAL

[04/10/14 18:49:50.846 IST 11d 181] ACCESS-CORE-SM-CLIENT-SPI-NOTF:
 [0021.6a89.51ca, Ca3] Session authz status notification sent to Client[1] for
 0021.6a89.51ca with handle FE000052, list 630007B2
[04/10/14 18:49:50.846 IST 11e 181]ACCESS-METHOD-DOT1X-NOTF:[0021.6a89.51ca,Ca3]
```

```
 Received Authz Success for the client 0xF700000A (0021.6a89.51ca)
[04/10/14 18:49:50.846 IST 11f 271] ACCESS-METHOD-DOT1X-DEB:[0021.6a89.51ca,Ca3]
 Posting AUTHZ_SUCCESS on Client 0xF700000A
[04/10/14 18:49:50.846 IST 120 271] ACCESS-METHOD-DOT1X-DEB:[0021.6a89.51ca,Ca3]
 0xF700000A:entering authenticated state
[04/10/14 18:49:50.846 IST 121 271]ACCESS-METHOD-DOT1X-NOTF:[0021.6a89.51ca,Ca3]
 EAPOL success packet was sent earlier.

[04/10/14 18:49:50.846 IST 149 8116] 0021.6a89.51ca 1XA:authentication succeeded
[04/10/14 18:49:50.846 IST 14a 8116] 0021.6a89.51ca 1XK: Looking for BSSID
 c8f9.f983.4263  in PMKID cache
[04/10/14 18:49:50.846 IST 14b 8116] 0021.6a89.51ca 1XK: Looking for BSSID
 c8f9.f983.4263  in PMKID cache
[04/10/14 18:49:50.846 IST 14c 8116] 0021.6a89.51ca Starting key exchange with
 mobile - data forwarding is disabled
[04/10/14 18:49:50.846 IST 14d 8116] 0021.6a89.51ca 1XA: Sending EAPOL message
 to mobile, WLAN=13 AP WLAN=13
[04/10/14 18:49:50.858 IST 14e 8116] 0021.6a89.51ca 1XA: Received 802.11 EAPOL
 message (len 123) from mobile
[04/10/14 18:49:50.858 IST 14f 8116] 0021.6a89.51ca 1XA: Received EAPOL-Key from
 mobile
[04/10/14 18:49:50.858 IST 150 8116] 0021.6a89.51ca 1XK: Received EAPOL-key in
 PTK_START state (msg 2) from mobile
[04/10/14 18:49:50.858 IST 151 8116] 0021.6a89.51ca 1XK: Stopping retransmission
 timer
[04/10/14 18:49:50.859 IST 152 8116] 0021.6a89.51ca 1XA: Sending EAPOL message
 to mobile, WLAN=13 AP WLAN=13
[04/10/14 18:49:50.862 IST 153 8116] 0021.6a89.51ca 1XA: Received 802.11 EAPOL
 message (len 99) from mobile
[04/10/14 18:49:50.862 IST 154 8116] 0021.6a89.51ca 1XA: Received EAPOL-Key from
 mobile
[04/10/14 18:49:50.862 IST 155 8116] 0021.6a89.51ca 1XK: Received EAPOL-key in
 PTKINITNEGOTIATING state (msg 4) from mobile

[04/10/14 18:49:50.863 IST 172 338] [WCDB] wcdb_ffcp_cb: client (0021.6a89.51ca)
 client (0x57ca4000000048): FFCP operation (UPDATE) return code (0)
[04/10/14 18:49:50.914 IST 173 273] dhcp pkt processing routine is called for pak
 with SMAC = 0021.6a89.51ca and SRC_ADDR = 0.0.0.0
[04/10/14 18:49:50.914 IST 174 219] sending dhcp packet outafter processing with
 SMAC = 0021.6a89.51ca and SRC_ADDR = 0.0.0.0
[04/10/14 18:49:50.914 IST 175 256] DHCPD: address 20.20.20.6 mask 203.0.113.1
[04/10/14 18:49:54.279 IST 176 273] dhcp pkt processing routine is called for pak
 with SMAC = 0021.6a89.51ca and SRC_ADDR = 20.20.20.6
[04/10/14 18:49:54.279 IST 177 219] sending dhcp packet outafter processing with
 SMAC = 0021.6a89.51ca and SRC_ADDR = 20.20.20.6
```