Configuring 802.11r BSS Fast Transition

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the Feature Information Table at the end of this document.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Restrictions for 802.11r Fast Transition

- 802.11r client association is not supported on access points in standalone mode.
- 802.11r fast roaming is not supported on access points in standalone mode.
- 802.11r fast roaming between local authentication and central authentication WLAN is not supported.
- EAP LEAP method is not supported.
- TSpec is not supported for 802.11r fast roaming. Therefore, RIC IE handling is not supported.
- If WAN link latency exists, fast roaming is also delayed. Voice or data maximum latency should be verified. The controller handles 802.11r Fast Transition authentication request during roaming for both Over-the-Air and Over-the-DS methods.

- This feature is supported only on open and WPA2 configured WLANs.
- Legacy clients cannot associate with a WLAN that has 802.11r enabled if the driver of the supplicant that is responsible for parsing the Robust Security Network Information Exchange (RSN IE) is old and not aware of the additional AKM suites in the IE. Due to this limitation, clients cannot send association requests to WLANs. These clients, however, can still associate with non-802.11r WLANs. Clients that are 802.11r capable can associate as 802.11i clients on WLANs that have both 802.11i and 802.11r Authentication Key Management Suites enabled.

  The workaround is to enable or upgrade the driver of the legacy clients to work with the new 802.11r AKMs, after which the legacy clients can successfully associate with 802.11r enabled WLANs.

  Another workaround is to have two SSIDs with the same name but with different security settings (FT and non-FT).
- Fast Transition resource request protocol is not supported because clients do not support this protocol. Also, the resource request protocol is an optional protocol.
- To avoid any Denial of Service (DoS) attack, each controller allows a maximum of three Fast Transition handshakes with different APs.

Related Topics

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Information About 802.11r Fast Transition

802.11r, which is the IEEE standard for fast roaming, introduces a new concept of roaming where the initial handshake with the new AP is done even before the client roams to the target AP, which is called Fast Transition (FT). The initial handshake allows the client and APs to do the Pairwise Transient Key (PTK) calculation in advance. These PTK keys are applied to the client and AP after the client does the reassociation request or response exchange with new target AP.

802.11r provides two methods of roaming:

- Over-the-Air
- Over-the-DS (Distribution System)

The FT key hierarchy is designed to allow clients to make fast BSS transitions between APs without requiring reauthentication at every AP. WLAN configuration contains a new Authenticated Key Management (AKM) type called FT (Fast Transition).

From Release 3E, you can create an 802.11r WLAN that is also an WPAv2 WLAN. In earlier releases, you had to create separate WLANs for 802.11r and for normal security. Non-802.11r clients can now join 802.11r-enabled WLANs as the 802.11r WLANs can accept non-802.11r associations. If clients do not support mixed mode or 802.11r join, they can join non-802.11r WLANS. When you configure FT PSK and later define PSK, clients that can join only PSK can now join the WLAN in mixed mode.

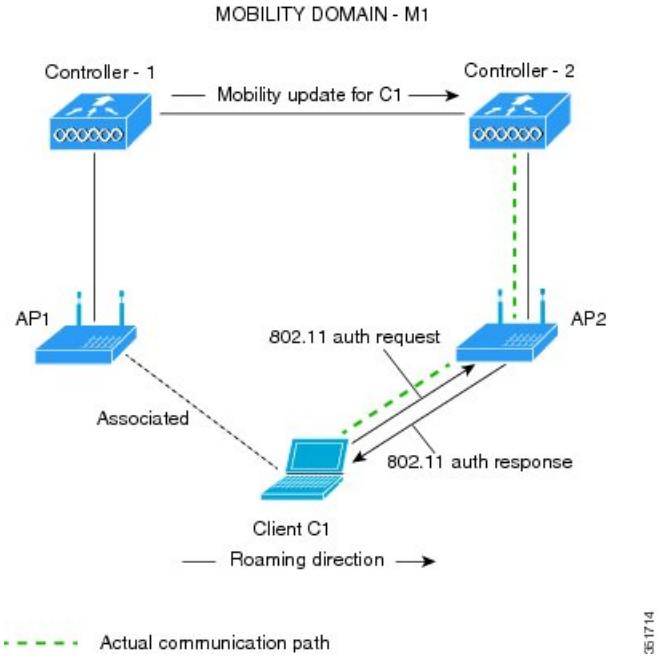
How a Client Roams

For a client to move from its current AP to a target AP using the FT protocols, the message exchanges are performed using one of the following two methods:

- Over-the-Air—The client communicates directly with the target AP using IEEE 802.11 authentication with the FT authentication algorithm.
- Over-the-DS—The client communicates with the target AP through the current AP. The communication between the client and the target AP is carried in FT action frames between the client and the current AP and is then sent through the controller.

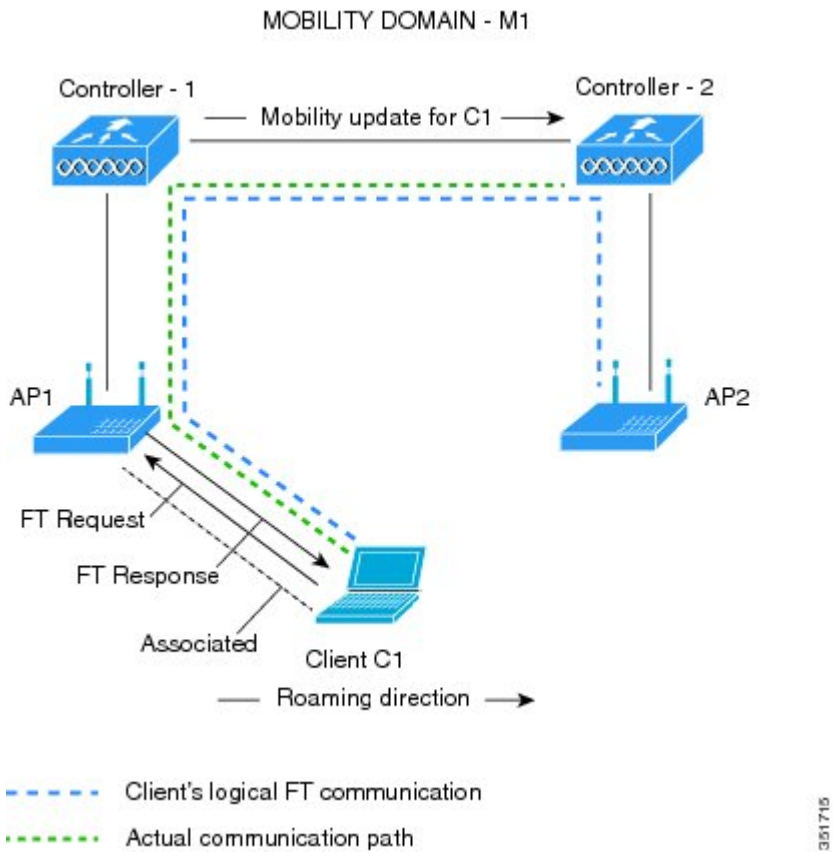
This figure shows the sequence of message exchanges that occur when Over the Air client roaming is configured.

Figure 1: Message Exchanges when Over the Air client roaming is configured



This figure shows the sequence of message exchanges that occur when Over the DS client roaming is configured.

Figure 2: Message Exchanges when Over the DS client roaming is configured



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How to Configure 802.11r Fast Transition

Configuring 802.11r Fast Transition in an Open WLAN (CLI)

SUMMARY STEPS

1. **configure terminal**
2. **wlan** *profile-name*
3. **client vlan** *vlan-id*
4. **no security wpa**
5. **no security wpa akm dot1x**
6. **no security wpa wpa2**
7. **no wpa wpa2 ciphers aes**
8. **security ft**
9. **no shutdown**
10. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Controller# configure terminal`	Enters global configuration mode.
Step 2	**wlan** *profile-name* **Example:** `Controller# wlan test4`	Enters the WLAN configuration submode. The *profile-name* is the profile name of the configured WLAN.
Step 3	**client vlan** *vlan-id* **Example:** `Controller(config-wlan)# client vlan 0120`	Associate the client VLAN to the WLAN.
Step 4	**no security wpa** **Example:** `Controller(config-wlan)# no security wpa`	Disable WPA secuirty.
Step 5	**no security wpa akm dot1x** **Example:** `Controller(config-wlan)# no security wpa akm dot1x`	Disable security AKM for dot1x.

	Command or Action	Purpose
Step 6	**no security wpa wpa2** **Example:** `Controller(config-wlan)# no security wpa wpa2`	Disables WPA2 security.
Step 7	**no wpa wpa2 ciphers aes** **Example:** `Controller(config-wlan)# no security wpa wpa2 ciphers aes`	Disables WPA2 ciphers for AES.
Step 8	**security ft** **Example:** `Controller(config-wlan)# security ft`	Specifies the 802.11r fast transition parameters.
Step 9	**no shutdown** **Example:** `Controller(config-wlan)# shutdown`	Shutdown the WLAN.
Step 10	**end** **Example:** `Controller(config-wlan)# end`	Returns to privileged EXEC mode. Alternatively, you can also press **Ctrl-z** to exit global configuration mode

Related Topics

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Configuring 802.11r BSS Fast Transition on a Dot1x Security Enabled WLAN (CLI)

SUMMARY STEPS

1. **configure terminal**
2. **wlan** *profile-name*
3. **client vlan** *vlan-name*
4. **local-auth** *local-auth-profile-eap*
5. **security dot1x authentication-list default**
6. **security ft**
7. **security wpa akm ft dot1x**
8. **no shutdown**
9. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Controller# configure terminal`	Enters global configuration mode.
Step 2	**wlan** *profile-name* **Example:** `Controller# wlan test4`	Enters the WLAN configuration submode. The *profile-name* is the profile name of the configured WLAN.
Step 3	**client vlan** *vlan-name* **Example:** `Controller(config-wlan)# client vlan 0120`	Associate the client VLAN to this WLAN.
Step 4	**local-auth** *local-auth-profile-eap* **Example:** `Controller(config-wlan)# local-auth`	Enable the local auth EAP profile.
Step 5	**security dot1x authentication-list default** **Example:** `Controller(config-wlan)# security dot1x authentication-list default`	Enable security authentication list for dot1x security. The configuration is similar for any dot1x security WLAN.
Step 6	**security ft** **Example:** `Controller(config-wlan)# security ft`	Enables 802.11r Fast Transition on this WLAN.

	Command or Action	Purpose
Step 7	**security wpa akm ft dot1x** **Example:** `Controller(config-wlan)# security wpa akm ft dot1x`	Enables 802.1x security on the WLAN.
Step 8	**no shutdown** **Example:** `Controller(config-wlan)# no shutdown`	Enable the WLAN.
Step 9	**end** **Example:** `Controller(config-wlan)# end`	Returns to privileged EXEC mode. Alternatively, you can also press **Ctrl-z** to exit global configuration mode

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Configuring 802.11r Fast Transition on a PSK Security Enabled WLAN (CLI)

SUMMARY STEPS

1. **configure terminal**
2. **wlan** *profile-name*
3. **client vlan** *vlan-name*
4. **no security wpa akm dot1x**
5. **security wpa akm ft psk**
6. **security wpa akm psk set-key** {**ascii** {**0** | **8**} | **hex** {**0** | **8**}}
7. **security ft**
8. **no shutdown**
9. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Controller# configure terminal`	Enters global configuration mode.
Step 2	**wlan** *profile-name* **Example:** `Controller# wlan test4`	Enters the WLAN configuration submode. The *profile-name* is the profile name of the configured WLAN.
Step 3	**client vlan** *vlan-name* **Example:** `Controller(config-wlan)# client vlan 0120`	Associates the client VLAN to this WLAN.
Step 4	**no security wpa akm dot1x** **Example:** `Controller(config-wlan)# no security wpa akm dot1x`	Disables security AKM for dot1x.
Step 5	**security wpa akm ft psk** **Example:** `Controller(config-wlan)# security wpa akm ft psk`	Configures FT PSK support.
Step 6	**security wpa akm psk set-key** {**ascii** {**0** | **8**} | **hex** {**0** | **8**}} **Example:** `Controller(config-wlan)# security wpa akm psk set-key ascii 0 test`	Configures PSK AKM shared key.
Step 7	**security ft** **Example:** `Controller(config-wlan)# security ft`	Configures 802.11r Fast Transition.
Step 8	**no shutdown** **Example:** `Controller(config-wlan)# no shutdown`	Enables the WLAN.
Step 9	**end** **Example:** `Controller(config-wlan)# end`	Returns to privileged EXEC mode. Alternatively, you can also press **Ctrl-z** to exit global configuration mode

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Configuring 802.11 Fast Transition (GUI)

Step 1 Click **Configuration** > **Wireless** > **WLANs**
The **WLANs** page is displayed.

Step 2 Locate the WLAN you want to configure by using the search mechanism on the page.

Step 3 Click on the **WLAN Profile** of the WLAN.
The **WLAN > Edit** page is displayed.

Step 4 Click the **Security** and **Layer 2** tab.

Step 5 Enable the **Fast Transition** check box to enable BSS Fast Transition.
Uncheck the **Fast Transition** check box to disable BSS Fast Transition.

Step 6 To enable BSS Fast Transition over the distributed system, enable the **Over the DS** checkbox. This is enabled by default.
Note Disabling over the DS enables over the air fast transition.

Step 7 (Optional) Specify a reassociation timeout value in seconds in the **Reassociation Timeout** text box. The range is 1 to 100 seconds. The default value is 20 seconds.

Step 8 Click **Apply**.

Step 9 To configure the WLAN in 802.11r mixed-mode, choose one of the following options from the **Auth Key Mgmt** drop-down list:

- **FT + 802.1x**
- **FT + PSK**
- **FT + 802.1x +CCKM**

Related Topics

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Disabling 802.11r Fast Transition (CLI)

SUMMARY STEPS

1. **configure terminal**
2. **wlan** *profile-name*
3. **no security ft** [**over-the-ds** | **reassociation-timeout** *timeout-in-seconds*]
4. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Controller# configure terminal`	Enters global configuration mode.
Step 2	**wlan** *profile-name* **Example:** `Controller# wlan test4`	Enters the WLAN configuration submode. The *profile-name* is the profile name of the configured WLAN.
Step 3	**no security ft** [**over-the-ds** | **reassociation-timeout** *timeout-in-seconds*] **Example:** `Controller(config-wlan)# no security ft over-the-ds`	Disables 802.11r Fast Transition on the WLAN. **Note** Disabling 802.11r Fast Transition for over the data source enables over the air fast transition.
Step 4	**end** **Example:** `Controller(config)# end`	Returns to privileged EXEC mode. Alternatively, you can also press **Ctrl-Z** to exit global configuration mode.

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Monitoring 802.11r Fast Transition (GUI)

You can view the Authentication Key Management details of a client.

Choose **Monitor > Client**. The Clients page appears. Click the corresponding client to view the client details. In the **General** tab, you can view the Authentication Key Management for the client such as FT, PSK, 802.1x, CCKM, 802.1x + CCKM. If the AKM is for 802.11r mixed mode, then FT-802.1x, FT-802.1x-CCKM, or FT-PSK appears.

Monitoring 802.11r Fast Transition (CLI)

The following command can be used to monitor 802.11r Fast Transition:

Command	Description
show wlan name *wlan-name*	Displays a summary of the configured parameters on the WLAN.

Command	Description
show wireless client mac-address *mac-address*	Displays the summary of the 802.11r authentication key management configuration on a client. . . . . . . Client Capabilities CF Pollable : Not implemented CF Poll Request : Not implemented Short Preamble : Not implemented PBCC : Not implemented Channel Agility : Not implemented Listen Interval : 15 Fast BSS Transition : Implemented Fast BSS Transition Details : Client Statistics: Number of Bytes Received : 9019 Number of Bytes Sent : 3765 Number of Packets Received : 130 Number of Packets Sent : 36 Number of EAP Id Request Msg Timeouts : 0 Number of EAP Request Msg Timeouts : 0 Number of EAP Key Msg Timeouts : 0 Number of Data Retries : 1 Number of RTS Retries : 0 Number of Duplicate Received Packets : 1 Number of Decrypt Failed Packets : 0 Number of Mic Failured Packets : 0 Number of Mic Missing Packets : 0 Number of Policy Errors : 0 Radio Signal Strength Indicator : -48 dBm Signal to Noise Ratio : 40 dB . . . . . . If the AKM for the client is 802.11r mixed mode, the following information appears in the output: . . . . . . Authentication Key Management : FT-PSK . . . . . .

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Additional References for 802.11r Fast Transition

Related Documents

Related Topic	Document Title
WLAN Command Reference.	*WLAN Command Reference, Cisco IOS XE Release 3SE (Cisco WLC 5700 Series)*

Error Message Decoder

Description	Link
To help you research and resolve system error messages in this release, use the Error Message Decoder tool.	https://www.cisco.com/cgi-bin/Support/Errordecoder/index.cgi

Standards and RFCs

Standard/RFC	Title
802.11r from IEEE.	IEEE Standard for 802.11r

MIBs

MIB	MIBs Link
All MIBs supported for this release.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/support

Feature Information for 802.11r Fast Transition

This table lists the features in this module and provides links to specific configuration information:

Feature Name	Release	Feature Information
802.11r Fast Transition	Cisco IOS XE 3.3SE	This feature was introduced.