

在Catalyst 9800 WLC上使用Cisco 8821為語音配置WLAN

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簡介

本檔案介紹如何在中央交換和FlexConnect本地交換上使用Cisco 8821聽筒為語音部署設定9800無線LAN控制器(WLC)。

必要條件

需求

思科建議您瞭解以下主題：

- Catalyst無線9800組態型號
- FlexConnect
- 802.11r
- 通話認可控制(CAC)

採用元件

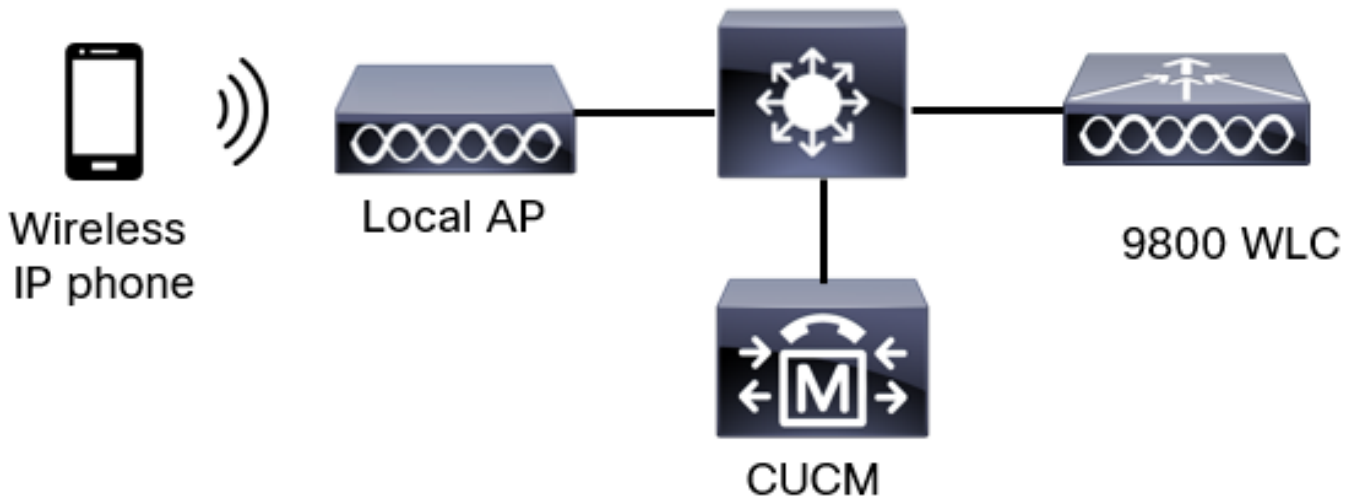
本檔案中的資訊是根據9800L v17.6.1

本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除（預設）的組態來啟動。如果您的網路運作中，請確保您瞭解任何指令可能造成的影響。

配置SSID

選項 A：中央交換

中央交換網路圖



中央交換：標籤和配置檔案

在本檔案中，所有標籤和配置檔案的配置均使用高級無線設定完成，因為所有標籤和配置檔案都可以在同一個選單上配置。

步驟1。導覽至Configuration > Wireless Setup > Advanced > Start Now > WLAN Profile，然後按一下+Add以建立一個新的WLAN。配置SSID、配置檔名稱、WLAN ID和WLAN的狀態。然後，導覽至Security > Layer 2，並設定設定：

Add WLAN

General **Security** Advanced

Layer2 **Layer3** AAA

Layer 2 Security Mode

MAC Filtering

Protected Management Frame

PMF

WPA Parameters

Lobby Admin Access

Fast Transition

Over the DS

Reassociation Timeout

MPSK Configuration

MPSK

WPA Policy	<input type="checkbox"/>
WPA2 Policy	<input checked="" type="checkbox"/>
GTK Randomize	<input type="checkbox"/>
OSEN Policy	<input type="checkbox"/>
WPA2 Encryption	<input checked="" type="checkbox"/> AES(CCMP128) <input type="checkbox"/> CCMP256 <input type="checkbox"/> GCMP128 <input type="checkbox"/> GCMP256
Auth Key Mgmt	<input type="checkbox"/> 802.1x <input checked="" type="checkbox"/> PSK <input type="checkbox"/> Easy-PSK <input type="checkbox"/> CCKM

語音SSID安全設定第2部分

	<input type="checkbox"/> Easy-PSK <input type="checkbox"/> CCKM <input type="checkbox"/> FT + 802.1x <input type="checkbox"/> FT + PSK <input type="checkbox"/> 802.1x-SHA256 <input type="checkbox"/> PSK-SHA256
PSK Format	ASCII
PSK Type	Unencrypted
Pre-Shared Key*

語音SSID安全設定第3部分 語音SSID安全設定第1部分

附註：使用PSK SSID時，沒有必要啟用FT，因為漫遊期間的握手時間很短。配置802.1X WPA企業時，建議將FT+802.1X啟用為AKM，並啟用快速轉換，但將「通過DS」保持為禁用狀態。您也可以配置FT+PSK，但為了簡單起見，此示例使用常規PSK。

步驟2. 導航到**Advanced**頁籤並啟用Aironet IE。確保禁用負載平衡和頻寬選擇：

Add WLAN ✕

General Security **Advanced**

Coverage Hole Detection	<input checked="" type="checkbox"/>	Universal Admin	<input type="checkbox"/>
Aironet IE	<input checked="" type="checkbox"/>	OKC	<input checked="" type="checkbox"/>
Advertise AP Name	<input checked="" type="checkbox"/>	Load Balance	<input type="checkbox"/>
P2P Blocking Action	Disabled	Band Select	<input type="checkbox"/>
Multicast Buffer	DISABLED	IP Source Guard	<input type="checkbox"/>
Media Stream Multicast-direct	<input type="checkbox"/>	WMM Policy	Allowed
11ac MU-MIMO	<input checked="" type="checkbox"/>	mDNS Mode	Bridging
WiFi to Cellular Steering	<input type="checkbox"/>	Off Channel Scanning Defer	

在同一頁中，確保為優先順序5、6和7啟用非通道掃描延遲。這可以防止在收到具有這些UP優先順序的幀（基本上是語音幀）後AP在100毫秒內離開通道。

Add WLAN ✕

WiFi to Cellular Steering	<input type="checkbox"/>	Off Channel Scanning Defer Defer Priority <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 5 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 7 Scan Defer Time <input type="text" value="100"/>
Fastlane+ (ASR)	<input checked="" type="checkbox"/>	
Deny LAA (RCM) clients	<input type="checkbox"/>	
Max Client Connections		
Per WLAN	<input type="text" value="0"/>	
Per AP Per WLAN	<input type="text" value="0"/>	
Per AP Radio Per WLAN	<input type="text" value="200"/>	Assisted Roaming (11k)
11v BSS Transition Support		Prediction Optimization <input type="checkbox"/>
		Neighbor List <input checked="" type="checkbox"/>

步驟3.選擇Policy Profile，然後按一下Add:

The screenshot displays a configuration interface for wireless setup. On the left, a vertical flow starts with a 'Start' button, followed by a section titled 'Tags & Profiles'. This section contains several items: 'WLAN Profile', 'Policy Profile' (highlighted with a blue box), 'Policy Tag', 'AP Join Profile', 'Flex Profile', and 'Site Tag'. Below this is an 'Apply' section with 'Tag APs'. The flow ends with a 'Done' button. On the right, a panel shows a list of 'Policy Profile Name' with 'default-policy-profile' selected. Above the list are '+ Add' and 'Delete' buttons, with the '+ Add' button highlighted with a blue box. The list also includes navigation controls and a '10 items per page' setting.

配置策略配置檔名稱，將Status (狀態) 設定為Enabled (啟用) ，並啟用集中交換、身份驗證、DHCP和關聯 (17.6之後，集中關聯覈取方塊消失) ：

Add Policy Profile

⚠ Disabling a Policy or configuring it in 'Enabled' state, will result in loss of connectivity for clients associated with this Policy profile.

General

Access Policies

QOS and AVC

Mobility

Advanced

Name*

Description

Status ENABLED

Passive Client DISABLED

Encrypted Traffic Analytics DISABLED

CTS Policy

Inline Tagging

SGACL Enforcement

Default SGT

WLAN Switching Policy

Central Switching ENABLED

Central Authentication ENABLED

Central DHCP ENABLED

Flex NAT/PAT DISABLED

Cancel

Apply to Device

按一下**Access Policies**並配置無線客戶端在連線到SSID **Voice**時將分配到的VLAN:

Add Policy Profile

⚠ Disabling a Policy or configuring it in 'Enabled' state, will result in loss of connectivity for clients associated with this Policy profile.

General **Access Policies** QOS and AVC Mobility Advanced

RADIUS Profiling

HTTP TLV Caching

DHCP TLV Caching

WLAN Local Profiling

Global State of Device Classification ⓘ

Local Subscriber Policy Name

VLAN

VLAN/VLAN Group

Multicast VLAN

WLAN ACL

IPv4 ACL

IPv6 ACL

URL Filters

Pre Auth

Post Auth

策略配置檔案訪問策略設定頁

按一下QoS和AVC，並將Auto QoS引數配置為Voice。按一下「Save & Apply to Device」。

Add Policy Profile

General Access Policies **QOS and AVC** Mobility Advanced

Auto QoS

SIP-CAC

Call Snooping

Send Disassociate

Send 486 Busy

Flow Monitor IPv4

Egress

Ingress

Flow Monitor IPv6

Egress

Ingress

按一下Advanced，將會話超時設定為84000，確保禁用所需的IPv4 DHCP並啟用ARP代理。

General

Access Policies

QOS and AVC

Mobility

Advanced**WLAN Timeout**Session Timeout (sec) Idle Timeout (sec) Idle Threshold (bytes) Client Exclusion Timeout (sec) Guest LAN Session Timeout **DHCP**IPv4 DHCP Required DHCP Server IP Address [Show more >>>](#)**AAA Policy**Allow AAA Override NAC State Policy Name Accounting List ⓘ**WGB Parameters**Broadcast Tagging WGB VLAN **Policy Proxy Settings**ARP Proxy IPv6 Proxy Fabric Profile Link-Local Bridging mDNS Service Policy [Clear](#)Hotspot Server **User Defined (Private) Network**Status Drop Unicast **DNS Layer Security**DNS Layer Security Parameter Map [Clear](#)Flex DHCP Option for DNS Flex DNS Traffic Redirect IGNORE**WLAN Flex Policy**VLAN Central Switching Split MAC ACL **Air Time Fairness Policies**2.4 GHz Policy 5 GHz Policy **EoGRE Tunnel Profiles**Tunnel Profile [Cancel](#)[Update & Apply to Device](#)

策略配置檔案高級設定頁

步驟4.選擇Policy Tag，然後按一下Add。配置策略標籤名稱。在WLAN-Policy Maps下，按一下+Add。從下拉選單中選擇WLAN Profile和Policy Profile，按一下選中要配置的對映。然後，點選儲存並應用到裝置。

Add Policy Tag ✕

Name*

Description

▼ WLAN-POLICY Maps: 0

+ Add
✕ Delete

WLAN Profile ▼
Policy Profile ▼

◀ ◀ 0 ▶ ▶
10 ▼ items per page
No items to display

Map WLAN and Policy

WLAN Profile* ▼

Policy Profile* ▼

✕
✓

➤ RLAN-POLICY Maps: 0

↶ Cancel
📄 Save & Apply to Device

步驟5.選擇Site Tag，然後按一下Add。選中Enable Local Site框，以使AP在本地模式下運行。然後點選儲存並應用到裝置：

Add Site Tag ✕

Name*

Description

AP Join Profile ▼

Control Plane Name ▼

Enable Local Site

↶ Cancel
📄 Save & Apply to Device

步驟6.選擇RF配置檔案，然後按一下Add。為每個頻段配置RF配置檔案。

Add RF Profile ✕

General 802.11 RRM Advanced

Name*

Radio Band

Status **ENABLE**

Description

↶ Cancel Save & Apply to Device

Add RF Profile ✕

General 802.11 RRM Advanced

Name*

Radio Band

Status **ENABLE**

Description

↶ Cancel Save & Apply to Device

導航到**802.11**選單。禁用所有低於12Mbps的速率，將12Mbps設定為強制速率，並將兩個頻段均支援的18 Mbps及以上速率設定為強制速率。

2.4 GHz資料速率：

General

802.11

RRM

Advanced

Operational Rates

1 Mbps	Disabled ▼
2 Mbps	Disabled ▼
5.5 Mbps	Disabled ▼
6 Mbps	Disabled ▼
9 Mbps	Disabled ▼
11 Mbps	Disabled ▼
12 Mbps	Mandatory ▼
18 Mbps	Supported ▼
24 Mbps	Supported ▼
36 Mbps	Supported ▼
48 Mbps	Supported ▼
54 Mbps	Supported ▼

802.11n MCS Rates

Enabled Data Rates:

```
[0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31]
```

Enable	MCS Index ▼
<input checked="" type="checkbox"/>	0
<input checked="" type="checkbox"/>	1
<input checked="" type="checkbox"/>	2
<input checked="" type="checkbox"/>	3
<input checked="" type="checkbox"/>	4
<input checked="" type="checkbox"/>	5
<input checked="" type="checkbox"/>	6
<input checked="" type="checkbox"/>	7
<input checked="" type="checkbox"/>	8
<input checked="" type="checkbox"/>	9

◀ 1 2 3 4 ▶▶

10 items per page

1 - 10 of 32 items

Cancel

Save & Apply to Device

5 GHz資料速率：

General

802.11

RRM

Advanced

Operational Rates

6 Mbps	Disabled
9 Mbps	Disabled
12 Mbps	Mandatory
18 Mbps	Supported
24 Mbps	Supported
36 Mbps	Supported
48 Mbps	Supported
54 Mbps	Supported

802.11n MCS Rates

Enabled Data Rates:

```
[0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31]
```

Enable	MCS Index
<input checked="" type="checkbox"/>	0
<input checked="" type="checkbox"/>	1
<input checked="" type="checkbox"/>	2
<input checked="" type="checkbox"/>	3
<input checked="" type="checkbox"/>	4
<input checked="" type="checkbox"/>	5
<input checked="" type="checkbox"/>	6
<input checked="" type="checkbox"/>	7
<input checked="" type="checkbox"/>	8
<input checked="" type="checkbox"/>	9

10 items per page
1 - 10 of 32 items

Cancel

Save & Apply to Device

步驟7.選擇RF Tag並點選Add。選擇在此部分的第5步中建立的RF配置檔案。然後，點選儲存並應用到裝置。

Add RF Tag ✕

Name*	RT1
Description	Enter Description
5 GHz Band RF Profile	Voice5GHz ▼
2.4 GHz Band RF Profile	Voice24GHz ▼

步驟8.選擇標籤AP，選擇AP並新增之前建立的策略、站點和RF標籤。然後，點選儲存並應用到裝置。

Tag APs ✕

Tags

Policy	PT1 ▼
Site	ST1 ▼
RF	RT1 ▼

Changing AP Tag(s) will cause associated AP(s) to reconnect

中央交換：命令列介面(CLI)

在CLI中運行以下命令：

```

////////// WLAN Configuration
wlan Voice 1 Voice
ccx aironet-iesupport

```

```
no security ft adaptive
security wpa psk set-key ascii 0 Cisco123
no security wpa akm dot1x
security wpa akm psk
no shutdown
```

//////// Policy Profile Configuration

```
wireless profile policy PP1
autoqos mode voice
ipv4 arp-proxy
service-policy input platinum-up
service-policy output platinum
session-timeout 84000
vlan 1
no shutdown
```

//////// Policy Tag Configuration

```
wireless tag policy PT1
wlan Voice policy PP1
```

//////// Site Tag Configuration

```
wireless tag site ST1
local-site
```

//////// 2.4 GHz RF Profile Configuration

```
ap dot11 24ghz rf-profile Voice24GHz
rate RATE_11M disable
rate RATE_12M mandatory
rate RATE_1M disable
rate RATE_2M disable
rate RATE_5_5M disable
rate RATE_6M disable
rate RATE_9M disable
no shutdown
```

//////// 5 GHz RF Profile Configuration

```
ap dot11 5ghz rf-profile Voice5GHz
rate RATE_24M supported
rate RATE_6M disable
rate RATE_9M disable
no shutdown
```

//////// RF Tag Configuration

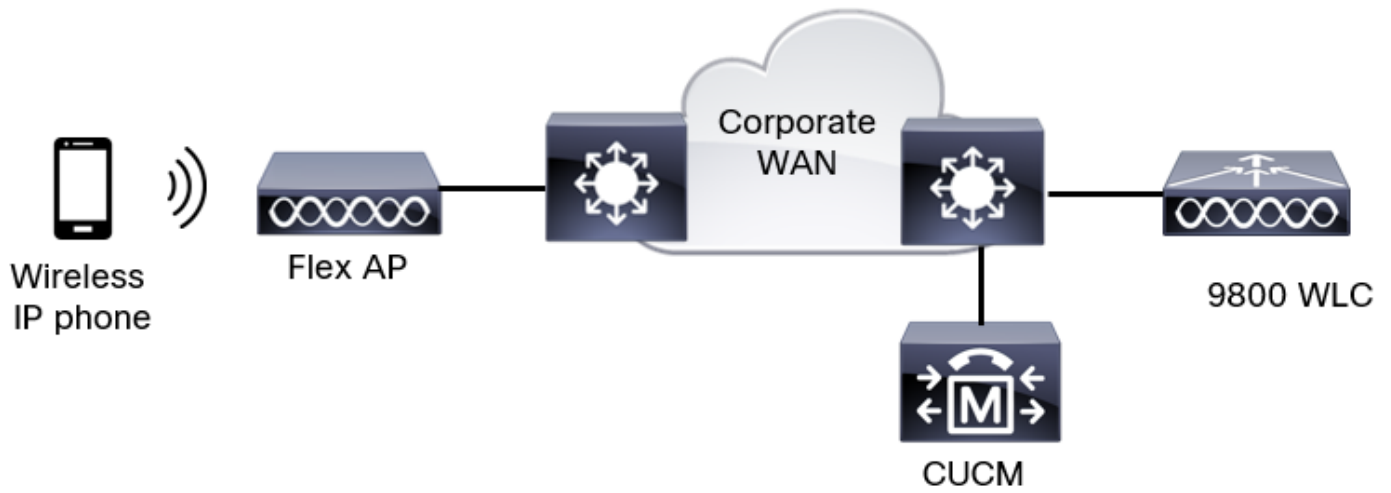
```
wireless tag rf RT1
24ghz-rf-policy Voice24GHz
5ghz-rf-policy Voice5GHz
```

//////// AP Configuration

```
ap a023.9f86.52c0
policy-tag PT1
rf-tag RT1
site-tag ST1
```

選項 B : FlexConnect本地交換

Flexconnect本地交換網路圖



Flexconnect本地交換標籤和配置檔案

步驟1。導覽至**Configuration > Wireless Setup > Advanced > Start Now > WLAN Profile**，然後按一下**+Add**以建立一個新的WLAN。配置SSID、配置檔名稱、WLAN ID和WLAN的狀態。然後，導覽至**Security > Layer 2**，並設定設定：

Add WLAN ✕

General
Security
Advanced

Layer2
Layer3
AAA

Layer 2 Security Mode WPA + WPA2 ▼

MAC Filtering

Protected Management Frame

PMF Disabled ▼

WPA Parameters

Lobby Admin Access

Fast Transition Disabled ▼

Over the DS

Reassociation Timeout

MPSK Configuration

MPSK

WPA Policy	<input type="checkbox"/>
WPA2 Policy	<input checked="" type="checkbox"/>
GTK Randomize	<input type="checkbox"/>
OSEN Policy	<input type="checkbox"/>
WPA2 Encryption	<input checked="" type="checkbox"/> AES(CCMP128) <input type="checkbox"/> CCMP256 <input type="checkbox"/> GCMP128 <input type="checkbox"/> GCMP256
Auth Key Mgmt	<input type="checkbox"/> 802.1x <input checked="" type="checkbox"/> PSK <input type="checkbox"/> Easy-PSK <input type="checkbox"/> CCKM

語音SSID安全設定第2部分

	<input type="checkbox"/> Easy-PSK <input type="checkbox"/> CCKM <input type="checkbox"/> FT + 802.1x <input type="checkbox"/> FT + PSK <input type="checkbox"/> 802.1x-SHA256 <input type="checkbox"/> PSK-SHA256
PSK Format	ASCII
PSK Type	Unencrypted
Pre-Shared Key*

語音SSID安全設定第3部分 語音SSID安全設定第1部分

附註：使用PSK SSID時，沒有必要啟用FT，因為漫遊期間的握手時間很短。配置802.1X WPA企業時，建議將FT+802.1X啟用為AKM，並啟用快速轉換，但將「通過DS」保持為禁用狀態。您也可以配置FT+PSK，但為了簡單起見，此示例使用常規PSK。

步驟2. 導航到**Advanced**頁籤並啟用Aironet IE。確保禁用負載平衡和頻寬選擇：

Add WLAN ✕

General Security **Advanced**

Coverage Hole Detection	<input checked="" type="checkbox"/>	Universal Admin	<input type="checkbox"/>
Aironet IE	<input checked="" type="checkbox"/>	OKC	<input checked="" type="checkbox"/>
Advertise AP Name	<input checked="" type="checkbox"/>	Load Balance	<input type="checkbox"/>
P2P Blocking Action	Disabled	Band Select	<input type="checkbox"/>
Multicast Buffer	DISABLED	IP Source Guard	<input type="checkbox"/>
Media Stream Multicast-direct	<input type="checkbox"/>	WMM Policy	Allowed
11ac MU-MIMO	<input checked="" type="checkbox"/>	mDNS Mode	Bridging
WiFi to Cellular Steering	<input type="checkbox"/>	Off Channel Scanning Defer	

在同一頁中，確保為優先順序5、6和7啟用非通道掃描延遲。這可以防止在收到具有這些UP優先順序的幀（基本上是語音幀）後AP在100毫秒內離開通道。

Add WLAN ✕

WiFi to Cellular Steering	<input type="checkbox"/>	Off Channel Scanning Defer Defer Priority <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 5 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 7 Scan Defer Time <input type="text" value="100"/>
Fastlane+ (ASR)	<input checked="" type="checkbox"/>	
Deny LAA (RCM) clients	<input type="checkbox"/>	
Max Client Connections		
Per WLAN	<input type="text" value="0"/>	
Per AP Per WLAN	<input type="text" value="0"/>	
Per AP Radio Per WLAN	<input type="text" value="200"/>	Assisted Roaming (11k)
11v BSS Transition Support		Prediction Optimization <input type="checkbox"/>
		Neighbor List <input checked="" type="checkbox"/>

步驟3.選擇Policy Profile，然後按一下Add:

The screenshot displays a configuration interface with a vertical flow from a 'Start' button at the top to a 'Done' button at the bottom. The flow is divided into sections: 'Tags & Profiles', 'Apply', and 'Done'. Under 'Tags & Profiles', there are several options: 'WLAN Profile', 'Policy Profile' (highlighted with a blue box), 'Policy Tag', 'AP Join Profile', 'Flex Profile', and 'Site Tag'. Under 'Apply', there is 'Tag APs'. To the right of the main flow, there is a panel with a '+ Add' button (highlighted with a blue box) and a 'Delete' button. Below these buttons is a list titled 'Policy Profile Name' with a dropdown arrow. The list contains one item: 'default-policy-profile'. Below the list are navigation controls: a left arrow, a page number '1', a right arrow, and a dropdown menu showing '10 items per page'.

配置策略配置檔名稱，將Status設定為Enabled，禁用Central Switching和Central DHCP。對於PSK SSID，可將身份驗證移至本地，以便讓接入點承擔驗證PSK的角色。對於802.1X，您通常希望WLC繼續執行802.1X身份驗證。

Add Policy Profile ✕

⚠ Disabling a Policy or configuring it in 'Enabled' state, will result in loss of connectivity for clients associated with this Policy profile.

General Access Policies QoS and AVC Mobility Advanced

Name*

Description

Status ENABLED

Passive Client DISABLED

Encrypted Traffic Analytics DISABLED

CTS Policy

Inline Tagging

SGACL Enforcement

Default SGT

WLAN Switching Policy

Central Switching DISABLED

Central Authentication ENABLED

Central DHCP DISABLED

Flex NAT/PAT DISABLED

Flex Local交換策略配置檔案配置

導航到**Access Policies**頁籤，分配無線客戶端在預設情況下連線到此WLAN時分配到的VLAN。您可以從下拉選單中選擇一個VLAN名稱，也可以手動鍵入VLAN ID。

按一下**QoS和AVC**，並將Auto QoS引數配置為Voice。按一下「**Save & Apply to Device**」。

Add Policy Profile ✕

General Access Policies **QoS and AVC** Mobility Advanced

Auto QoS Voice ▼

SIP-CAC

Call Snooping

Send Disassociate

Send 486 Busy

Flow Monitor IPv4

Egress ▼

Ingress ▼

Flow Monitor IPv6

Egress ▼

Ingress ▼

按一下**Advanced**，將會話超時設定為84000，確保禁用所需的IPv4 DHCP並禁用ARP代理。

Edit Policy Profile

General Access Policies QOS and AVC Mobility **Advanced**

WLAN Timeout

Session Timeout (sec)	<input type="text" value="84000"/>
Idle Timeout (sec)	<input type="text" value="300"/>
Idle Threshold (bytes)	<input type="text" value="0"/>
Client Exclusion Timeout (sec)	<input checked="" type="checkbox"/> <input type="text" value="60"/>
Guest LAN Session Timeout	<input type="checkbox"/>

DHCP

IPv4 DHCP Required	<input type="checkbox"/>
DHCP Server IP Address	<input type="text"/>

Show more >>>

AAA Policy

Allow AAA Override	<input type="checkbox"/>
NAC State	<input type="checkbox"/>
Policy Name	default-aaa-policy ✕ ▼
Accounting List	Search or Select ▼ ⓘ

WGB Parameters

Broadcast Tagging	<input type="checkbox"/>
WGB VLAN	<input type="checkbox"/>

Policy Proxy Settings

ARP Proxy	<input type="checkbox"/> DISABLED
IPv6 Proxy	None ▼

Fabric Profile

Fabric Profile	<input type="checkbox"/> Search or Select ▼
Link-Local Bridging	<input type="checkbox"/>
mDNS Service Policy	default-mdns-ser... ▼ Clear
Hotspot Server	Search or Select ▼

User Defined (Private) Network

Status	<input type="checkbox"/>
Drop Unicast	<input type="checkbox"/>

DNS Layer Security

DNS Layer Security Parameter Map	Not Configured ▼ Clear
Flex DHCP Option for DNS	ENABLED <input checked="" type="checkbox"/>
Flex DNS Traffic Redirect	<input type="checkbox"/> IGNORE

WLAN Flex Policy

VLAN Central Switching	<input type="checkbox"/>
Split MAC ACL	Search or Select ▼

Air Time Fairness Policies

2.4 GHz Policy	Search or Select ▼
5 GHz Policy	Search or Select ▼

EoGRE Tunnel Profiles

Tunnel Profile	Search or Select ▼
----------------	--------------------

彈性策略配置檔案的高級設定

步驟4.選擇Policy Tag，然後按一下Add。配置策略標籤名稱。在WLAN-Policy Maps下，按一下+Add。從下拉選單中選擇WLAN Profile和Policy Profile，然後按一下檢查要配置的對映。然後，點

選儲存並應用到裝置。

Add Policy Tag

Name*

Description

▼ WLAN-POLICY Maps: 0

WLAN Profile	Policy Profile
No items to display	

Map WLAN and Policy

WLAN Profile* Policy Profile*

➤ RLAN-POLICY Maps: 0

步驟5. 按一下 **Flex Profile**，然後按一下 **Add**。配置 Flex 配置檔名稱、本地 VLAN ID 和啟用 ARP 快取：

Edit Flex Profile

General	Local Authentication	Policy ACL	VLAN	DNS Layer Security
Name*	FP2			Fallback Radio Shut <input type="checkbox"/>
Description	Enter Description			Flex Resilient <input type="checkbox"/>
Native VLAN ID	1			ARP Caching <input checked="" type="checkbox"/>
HTTP Proxy Port	0			Efficient Image Upgrade <input checked="" type="checkbox"/>
HTTP-Proxy IP Address	0.0.0.0			OfficeExtend AP <input type="checkbox"/>
CTS Policy				Join Minimum Latency <input type="checkbox"/>
Inline Tagging	<input type="checkbox"/>			IP Overlap <input type="checkbox"/>
SGACL Enforcement	<input type="checkbox"/>			mDNS Flex Profile <input type="text" value="Search or Select"/>
CTS Profile Name	default-sxp-profile			

Flex配置檔案策略設定

附註：本徵VLAN ID是指在AP所連線的交換機埠中配置的本徵VLAN（與此Flex配置檔案關聯）。

步驟6.選擇Site Tag，然後按一下Add。配置站點標籤名稱，取消選中Enable Local Site選項並新增Flex配置檔案。然後，按一下Save & Apply to Device。

Add Site Tag

Name*	ST2
Description	Enter Description
AP Join Profile	default-ap-profile
Flex Profile	FP2
Control Plane Name	default-control-plane
Enable Local Site	<input type="checkbox"/>

附註：禁用啟用本地站點後，分配給此站點標籤的AP將自動配置為FlexConnect AP。

步驟7.選擇RF配置檔案，然後按一下Add。為每個頻段配置RF配置檔案。

Add RF Profile ✕

General 802.11 RRM Advanced

Name*	<input type="text" value="Voice24GHz"/>
Radio Band	<input type="text" value="2.4 GHz Band"/>
Status	<input checked="" type="checkbox"/> ENABLE
Description	<input type="text" value="Enter Description"/>

Add RF Profile ✕

General 802.11 RRM Advanced

Name*	<input type="text" value="Voice5GHz"/>
Radio Band	<input type="text" value="5 GHz Band"/>
Status	<input checked="" type="checkbox"/> ENABLE
Description	<input type="text" value="Enter Description"/>

導航到**802.11**選單。禁用所有低於12Mbps的速率，將12Mbps設定為強制速率，並將兩個頻段均支援設定為18 Mbps及更高的速率。

2.4 GHz資料速率：

General

802.11

RRM

Advanced

Operational Rates

1 Mbps	Disabled
2 Mbps	Disabled
5.5 Mbps	Disabled
6 Mbps	Disabled
9 Mbps	Disabled
11 Mbps	Disabled
12 Mbps	Mandatory
18 Mbps	Supported
24 Mbps	Supported
36 Mbps	Supported
48 Mbps	Supported
54 Mbps	Supported

802.11n MCS Rates

Enabled Data Rates:

```
[0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31]
```

Enable	MCS Index
<input checked="" type="checkbox"/>	0
<input checked="" type="checkbox"/>	1
<input checked="" type="checkbox"/>	2
<input checked="" type="checkbox"/>	3
<input checked="" type="checkbox"/>	4
<input checked="" type="checkbox"/>	5
<input checked="" type="checkbox"/>	6
<input checked="" type="checkbox"/>	7
<input checked="" type="checkbox"/>	8
<input checked="" type="checkbox"/>	9

◀ 1 2 3 4 ▶▶

10 items per page

1 - 10 of 32 items

Cancel

Save & Apply to Device

5 GHz資料速率：

General

802.11

RRM

Advanced

Operational Rates

6 Mbps	Disabled
9 Mbps	Disabled
12 Mbps	Mandatory
18 Mbps	Supported
24 Mbps	Supported
36 Mbps	Supported
48 Mbps	Supported
54 Mbps	Supported

802.11n MCS Rates

Enabled Data Rates:

[0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31]

Enable	MCS Index
<input checked="" type="checkbox"/>	0
<input checked="" type="checkbox"/>	1
<input checked="" type="checkbox"/>	2
<input checked="" type="checkbox"/>	3
<input checked="" type="checkbox"/>	4
<input checked="" type="checkbox"/>	5
<input checked="" type="checkbox"/>	6
<input checked="" type="checkbox"/>	7
<input checked="" type="checkbox"/>	8
<input checked="" type="checkbox"/>	9

10 items per page
1 - 10 of 32 items

Cancel

Save & Apply to Device

步驟8.選擇RF Tag並點選Add。配置在本節的步驟6中建立的RF配置檔案。然後，點選儲存並應用到裝置。

Add RF Tag ✕

Name*

Description

5 GHz Band RF Profile

2.4 GHz Band RF Profile

步驟9.選擇標籤AP，選擇AP並新增之前建立的策略、站點和RF標籤。然後，點選儲存並應用到裝置。

Tag APs ✕

Tags

Policy

Site

RF

Changing AP Tag(s) will cause associated AP(s) to reconnect

AP將重新啟動其CAPWAP隧道，並返回9800 WLC。導覽至**Configuration > Wireless > Access Points**，確認AP模式為**Flex**：

AP Name ▲	Total Slots	AP Model	Base Radio MAC	AP Mode	Admin Status	Operation Status	Policy Tag	Site Tag	RF Tag	Tag Source	Location	Country
AP2802i-21	2	AIR-AP2802i-B-K9	a023.9f86.52c0	Flex	Enabled	Registered	PT2	ST2	RT2	Static	default location	US

Flexconnect本地交換命令列介面(CLI)

在CLI中運行以下命令：

///////// WLAN Configuration

```
wlan Voice 1 Voice
  ccx aironet-iesupport
no security ft adaptive
security wpa psk set-key ascii 0 Cisc0123
no security wpa akm dot1x
security wpa akm psk
no shutdown
```

///////// Policy Profile Configuration

```
wireless profile policy PP2
do wireless autoqos policy-profile PP2 mode voice
service-policy input platinum-up
service-policy output platinum
vlan 2672
no shutdown
```

///////// Policy Tag Configuration

```
wireless tag policy PT2
wlan Voice policy PP2
```

///////// Flex Profile Configuration

```
wireless profile flex FP2
arp-caching
vlan-name 1
native-vlan-id 1
```

///////// Site Tag Configuration

```
wireless tag site ST2
no local-site
flex-profile FP2
```

///////// 2.4 GHz RF Profile Configuration

```
ap dot11 24ghz rf-profile Voice24GHz
rate RATE_11M disable
rate RATE_12M mandatory
rate RATE_1M disable
rate RATE_2M disable
rate RATE_5_5M disable
rate RATE_6M disable
rate RATE_9M disable
no shutdown
```

///////// 5 GHz RF Profile Configuration

```
ap dot11 5ghz rf-profile Voice5GHz
rate RATE_24M supported
rate RATE_6M disable
rate RATE_9M disable
no shutdown
```

///////// RF Tag Configuration

```
wireless tag rf RT2
24ghz-rf-policy Voice24GHz
5ghz-rf-policy Voice5GHz
```

///////// AP Configuration

```
ap a023.9f86.52c0
policy-tag PT2
rf-tag RT2
site-tag ST2
```

配置介質引數

GUI配置

步驟1.導覽至Configuration > Radio Configuration > Network。禁用5 GHz和2.4 GHz頻段，然後按一下應用。

請注意，這將暫時禁用所有5GHz wifi網路！僅在處於維護視窗時運行此命令

Configuration > Radio Configurations > Network

5 GHz Band

2.4 GHz Band

General

5 GHz Network Status

Beacon Interval*

100

Fragmentation Threshold(bytes)*

2346

DTPC Support

步驟2.導覽至Configuration > Radio Configuration > Media Parameters。在2.4 GHz和5 GHz頻段上啟用准入控制和基於負載的呼叫准入控制(CAC)，然後按一下Apply:

Voice

Call Admission Control (CAC)

Admission Control (ACM)	<input checked="" type="checkbox"/>
Load Based CAC	<input checked="" type="checkbox"/>

Max RF Bandwidth (%)*

Reserved Roaming Bandwidth (%)*

Expedited Bandwidth

SIP CAC and Bandwidth

SIP CAC Support

步驟3.導覽至Configuration > Radio Configurations > Parameters。在兩個頻段上將EDCA配置檔案配置為optimized-voice，然後按一下Apply。

Configuration > Radio Configurations > Parameters

5 GHz Band

2.4 GHz Band

EDCA Parameters

EDCA Profile

optimized-voice

DFS (802.11h)

步驟4.導覽至Configuration > Radio Configuration > Network。啟用5 GHz和2.4 Ghz頻段，然後點選Apply。

命令列介面(CLI)

在CLI上運行以下命令：

```
Andressi_9800(config)#ap dot11 24ghz shutdown
Andressi_9800(config)#ap dot11 5ghz shutdown

Andressi_9800(config)#dot11 24ghz cac voice acm

Andressi_9800(config)#dot11 5ghz cac voice acm

Andressi_9800(config)#ap dot11 24ghz edca-parameters optimized-voice
Andressi_9800(config)#ap dot11 5ghz edca-parameters optimized-voice

Andressi_9800(config)#no ap dot11 24ghz shutdown
Andressi_9800(config)#no ap dot11 5ghz shutdown
```

驗證

您可以使用這些命令驗證當前配置：

```
# show wlan { summary | id | name | all }
# show run wlan
# show run aaa
# show aaa servers
# show ap config general
# show ap name <ap-name> config general
# show ap tag summary
# show ap name <AP-name> tag detail
# show wlan { summary | id | name | all }
# show wireless tag policy detailed <policy-tag-name>
# show wireless profile policy detailed <policy-profile-name>
```

要檢視CAC統計資訊和呼叫控制指標，請運行以下命令：

```
#show ap name AP2802I-21 dot11 5ghz voice stats
#show ap name <ap-name> dot11 5ghz call-control metrics
```

疑難排解

條件式偵錯和無線電主動式追蹤

Radio Active(RA)跟蹤為與指定條件（本例中為客戶端MAC地址）互動的所有進程提供調試級別跟蹤。若要啟動條件式偵錯，請遵循以下步驟執行。我們重點介紹9800 WLC在通話期間提供的輸出。

步驟1.確保未啟用調試條件。

```
# clear platform condition all
```

步驟2.為要監控的無線客戶端MAC地址啟用調試條件。此命令開始監控提供的mac地址達30分鐘（1800秒）。您可選擇將此時間增加至 2085978494 秒。

```
# debug wireless mac <8821-MAC-address> {monitor-time <seconds>}
```

注意:為了同時監控多個客戶端，請對每個mac地址運行debug wireless mac <aaaa.bbb.cccc>命令。

注意:您看不到終端會話上客戶端活動的輸出，因為所有內容都在內部緩衝，供以後檢視。

步驟3.從8821 Cisco IP電話建立呼叫。

步驟4.當呼叫完成時或在預設或配置的監控時間到期前重現問題時，停止調試。

```
# no debug wireless mac <8821-MAC-address>
```

當監控時間結束或偵錯無線停止後，9800 WLC 會產生本機檔案，名稱如下：

```
ra_trace_MAC_aaaabbbbcccc_HHMMSS.XXX_timezone_DayWeek_Month_Day_year.log
```

步驟5. 收集mac地址活動的檔案。您可以將ra跟蹤.log複製到外部伺服器，也可以直接在螢幕上顯示輸出。檢查RA跟蹤檔案的名稱

```
# dir bootflash: | inc ra_trace
```

將檔案複製到外部伺服器：

```
# copy bootflash:ra_trace_MAC_aaaabbbbcccc_HHMMSS.XXX_timezone_DayWeek_Month_Day_year.log
```

```
tftp://a.b.c.d/ra-FILENAME.txt
```

顯示內容：

```
# more bootflash:ra_trace_MAC_aaaabbbbcccc_HHMMSS.XXX_timezone_DayWeek_Month_Day_year.log
```

步驟6.刪除調試條件。

```
# clear platform condition all
```

附註：疑難排解作業階段後，請務必移除偵錯條件。

在RA跟蹤的輸出中，將發生流量規範(TSPEC)協商，這將確定8821是否允許將其流量標為使用者優先順序6，以及是否可以建立呼叫。為了協商使用隊列6,8821會傳送請求許可權的運算元據包。

```
2019/08/25 18:53:54.510 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): MAC: 0027.902a.ab24  
Got action frame from this client.
```

```
2019/08/25 18:53:54.510 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): MAC: 0027.902a.ab24  
Received Action frame with code 0: ADDTS request
```

```
2019/08/25 18:53:54.510 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): MAC: 0027.902a.ab24  
Got LBCAC Metrics IE:
```

```
2019/08/25 18:53:54.510 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): MAC: 0027.902a.ab24  
ADD TS from mobile slot_id 1 direction = 3
```

```
up = 6, tid = 6, upsd = 1, medium_time = 653, TSRSIE: No
```

```
2019/08/25 18:53:54.510 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): MAC: 0027.902a.ab24
```

在封包擷取中：

```
▶ IEEE 802.11 Action, Flags: .....C
▼ IEEE 802.11 wireless LAN
  ▼ Fixed parameters
    Category code: Management Notification (17)
    Action code: Setup request (0x0000)
    Dialog token: 0x2a
    Status code: Admission accepted (0x0000)
  ▼ Tagged parameters (84 bytes)
    ▼ Tag: Vendor Specific: Microsoft Corp.: WMM/WME: TSPEC Element
      Tag Number: Vendor Specific (221)
      Tag length: 61
      OUI: 00:50:f2 (Microsoft Corp.)
      Vendor Specific OUI Type: 2
      Type: WMM/WME (0x02)
      WME Subtype: TSPEC Element (2)
      WME Version: 1
    ▼ TS Info: 0x0034ec
      .... .. 0 110. = TID: 6
      .... .. 11. .... = Direction: Bidirectional link (3)
      .... .. 1.. .... = PSB: U-APSD (1)
      .... .. 11 0... .... = UP: Voice (6)
      0000 0000 00... 00 1... ..0 = Reserved: 0x000080
```

WLC會判斷是否有足夠的頻寬來分配呼叫，如果是，則會傳送接受TSPEC交涉的操作框架：

```
2019/08/25 18:53:54.510 {wncd_x_R0-0}{1}: [auth-mgr] [18106]: (info): [0000.0000.0000:unknown]
Session info 0x559e2019/08/25 18:53:54.510 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info):
MAC: 0027.902a.ab24 LBCAC checks for tspec PASSED for ms slot_id 1 bw_req = 653, tot_available
MT for tspecs = 22031 tx_queue_req = 20, current tx queue util = 0
2019/08/25 18:53:54.510 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): Calls in progress
incremented to 1
2019/08/25 18:53:54.510 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): allocating voice bw
for client: maxBW = 23437, BW requested = 653, total voice bw alloc = 653
2019/08/25 18:53:54.511 {wncd_x_R0-0}{1}: [ewlc-qos-client] [18106]: (info): MAC: 0027.902a.ab24
Call Accepted for tspec client
2019/08/25 18:53:54.511 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (ERR): MAC: 0027.902a.ab24
TCLAS Set Not used for TCLAS of tid=6
2019/08/25 18:53:54.511 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): Recommended rate
6500kbps:MCS 0 is not operational for radio: 6
2019/08/25 18:53:54.511 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): Recommended rate
13000kbps:MCS 1 is not operational for radio: 6
2019/08/25 18:53:54.511 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): Recommended rate
26000kbps:MCS 3 is not operational for radio: 6
2019/08/25 18:53:54.511 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): MAC: 0027.902a.ab24
Sending Successful ADD TS resp to mobile slot_id 1
2019/08/25 18:53:54.511 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): MAC: 0027.902a.ab24
Build ADD TS slot:1, tid:6, user_priority:6, upsd_enable:1, dir:3,bandwidth:653, avail_bw:0,
inactive_timer:0, tsm_req_id:0
2019/08/25 18:53:54.511 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): MAC: a023.9f86.52c0
send qos ADD TS payload to AP
```

在封包擷取中：


```

▶ IEEE 802.11 Action, Flags: .....C
▼ IEEE 802.11 wireless LAN
  ▼ Fixed parameters
    Category code: Management Notification (17)
    Action code: Setup response (0x0001)
    Dialog token: 0x2a
    Status code: Admission accepted (0x0000)
  ▼ Tagged parameters (119 bytes)
    ▼ Tag: Vendor Specific: Microsoft Corp.: WMM/WME: TSPEC Element
      Tag Number: Vendor Specific (221)
      Tag length: 61
      OUI: 00:50:f2 (Microsoft Corp.)
      Vendor Specific OUI Type: 2
      Type: WMM/WME (0x02)
      WME Subtype: TSPEC Element (2)
      WME Version: 1
    ▼ TS Info: 0x0034ec
      .... .0 110. = TID: 6
      .... .11. .... = Direction: Bidirectional link (3)
      .... .1.. .... = PSB: U-APSD (1)
      .... .11 0... .... = UP: Voice (6)
      0000 0000 00.. ..00 1... ..0 = Reserved: 0x000080

```

然後，通過SIP與呼叫管理器建立呼叫，並轉發RTP流量。

Time	Source	Destination	Transmitter address	Receiver address	Protocol	Info
16:11:41.860804	172.16.78.64	172.16.56.109	00:27:90:2a:ab:24	a0:23:9f:86:52:cf	SIP/SDP	Request: INVITE sip:181@172.16.56.109;user=phone
16:11:41.864384	172.16.56.109	172.16.78.64	a0:23:9f:86:52:cf	00:27:90:2a:ab:24	SIP	Status: 100 Trying
16:11:42.529759	172.16.56.109	172.16.78.64	a0:23:9f:86:52:cf	00:27:90:2a:ab:24	SIP	Status: 180 Ringing
16:11:47.581067	172.16.56.109	172.16.78.64	a0:23:9f:86:52:cf	00:27:90:2a:ab:24	SIP/SDP	Status: 200 OK
16:11:47.594494	172.16.78.64	172.16.56.109	00:27:90:2a:ab:24	a0:23:9f:86:52:cf	SIP	Request: ACK sip:181@172.16.56.109:5060;transport=tcp

RTP資料包：

16:11:47.700968	172.16.78.65	172.16.78.64	00:eb:d5:db:00:d6	a0:23:9f:86:52:cf	RTP
16:11:47.701470	172.16.78.65	172.16.78.64	a0:23:9f:86:52:cf	00:27:90:2a:ab:24	RTP
16:11:47.717783	172.16.78.65	172.16.78.64	00:eb:d5:db:00:d6	a0:23:9f:86:52:cf	RTP
16:11:47.718528	172.16.78.65	172.16.78.64	a0:23:9f:86:52:cf	00:27:90:2a:ab:24	RTP
16:11:47.730826	172.16.78.65	172.16.78.64	00:eb:d5:db:00:d6	a0:23:9f:86:52:cf	RTP
16:11:47.731395	172.16.78.65	172.16.78.64	a0:23:9f:86:52:cf	00:27:90:2a:ab:24	RTP
16:11:47.751602	172.16.78.65	172.16.78.64	00:eb:d5:db:00:d6	a0:23:9f:86:52:cf	RTP
16:11:47.752316	172.16.78.65	172.16.78.64	a0:23:9f:86:52:cf	00:27:90:2a:ab:24	RTP
16:11:47.766859	172.16.78.64	172.16.78.65	00:27:90:2a:ab:24	a0:23:9f:86:52:cf	RTP
16:11:47.776488	172.16.78.65	172.16.78.64	00:eb:d5:db:00:d6	a0:23:9f:86:52:cf	RTP

然後，8821通知呼叫管理器呼叫已終止，並通過傳送另一個操作幀通知WLC不再使用隊列6:

```

2019/08/25 18:54:08.510 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): MAC: 0027.902a.ab24
Got action frame from this client.
2019/08/25 18:54:08.510 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): MAC: 0027.902a.ab24
Received Action frame with code 2: DELTS request
2019/08/25 18:54:08.510 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): MAC: 0027.902a.ab24
DEL TS from mobile slot_id lup = 6, tid = 6, bw deleted = 653
2019/08/25 18:54:08.510 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): MAC: 0027.902a.ab24
Call Terminated for tspec client
2019/08/25 18:54:08.510 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): MAC: 0027.902a.ab24
Calls in progress - 1, Roam calls in progress - 0

```

2019/08/25 18:54:08.510 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): MAC: 0027.902a.ab24
Build DELETE TS slot:1 tid:6 up:6 upsd_enable:1 avail_bw: 0

2019/08/25 18:54:08.510 {wncd_x_R0-0}{1}: [ewlc-qos-voice] [18106]: (info): MAC: a023.9f86.52c0
send qos DELETE TS payload to AP

SIP終止和操作幀：

No.	Time	Source	Destination	Transmitter address	Receiver address	Protocol	Info
7260	16:11:54.400738	172.16.78.64	172.16.56.109	00:27:90:2a:ab:24	a0:23:9f:86:52:cf	SIP	Request: NOTIFY sip:100@172.16.56.109 Status: 200 OK
7266	16:11:54.407572	172.16.56.109	172.16.78.64	a0:23:9f:86:52:cf	00:27:90:2a:ab:24	SIP	Request: 200 OK
7268	16:11:54.409575	172.16.78.64	172.16.56.109	00:27:90:2a:ab:24	a0:23:9f:86:52:cf	SIP	Request: BYE sip:181@172.16.56.109:5060;transport=tcp
7283	16:11:54.428215	172.16.56.109	172.16.78.64	00:27:90:2a:ab:24	a0:23:9f:86:52:cf	SIP	Status: 200 OK
7285	16:11:54.431823	172.16.78.64	172.16.56.109	00:27:90:2a:ab:24	a0:23:9f:86:52:cf	TCP	51254 - 5060 [ACK] Seq=14915 Ack=7435 Win=39736 Len=0 TSval=443233
7340	16:11:54.503030	Cisco_2a:ab:24	Cisco_86:52:cf	00:27:90:2a:ab:24	a0:23:9f:86:52:cf	802.11	Action, SN=3087, FN=0, Flags=...P...C

▶ IEEE 802.11 Action, Flags: ...P...C

▼ IEEE 802.11 wireless LAN

- ▼ Fixed parameters
 - Category code: Management Notification (17)
 - Action code: Teardown (0x0002)
 - Dialog token: 0x00
 - Status code: Admission accepted (0x0000)
- ▼ Tagged parameters (63 bytes)
 - ▼ Tag: Vendor Specific: Microsoft Corp.: WMM/WME: TSPEC Element