

在Catalyst 9800 WLC上設定VideoStream

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簡介

此配置示例說明如何在 Catalyst 9800系列無線控制器(9800 WLC)(通過圖形使用者介面(GUI))。

必要條件

需求

思科建議您瞭解以下主題：

- 9800 WLC配置指南
- WLC上的多點傳送

採用元件

本文中的資訊係根據以下軟體和硬體版本：

- Catalyst 9800系列無線控制器，IOS-XE版本16.11.1b
- Aironet 3700系列存取點

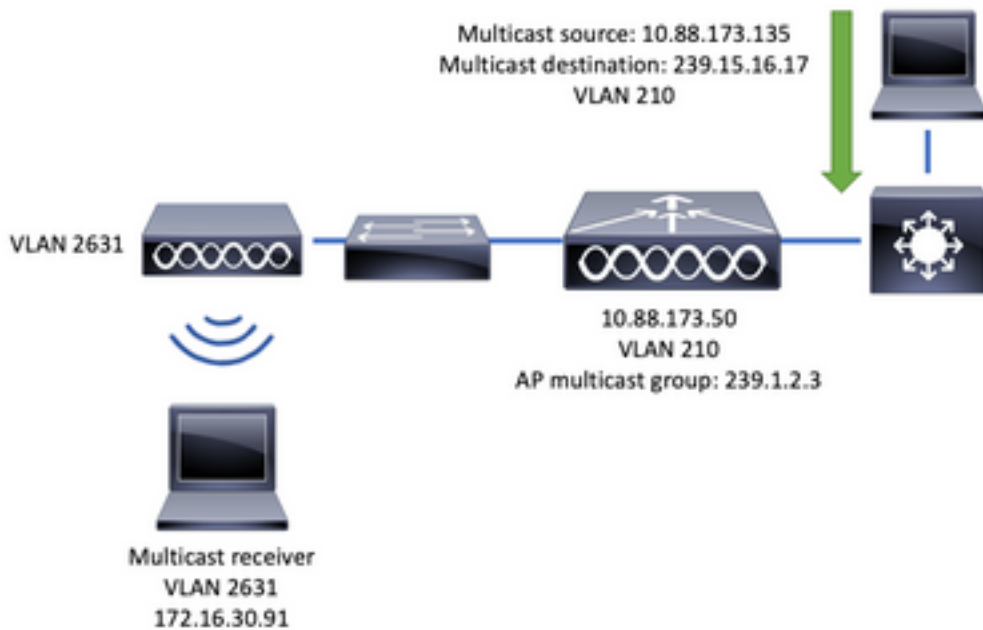
本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除（預設

) 的組態來啟動。如果您的網路運作中，請確保您瞭解任何組態可能造成的影響。

設定

網路圖表

此示例基於本地模式AP集中交換流量。支援FlexConnect本機交換，但流量會有所不同，因為多點傳送不會通過WLC，而AP是執行大部分工作的路由器。

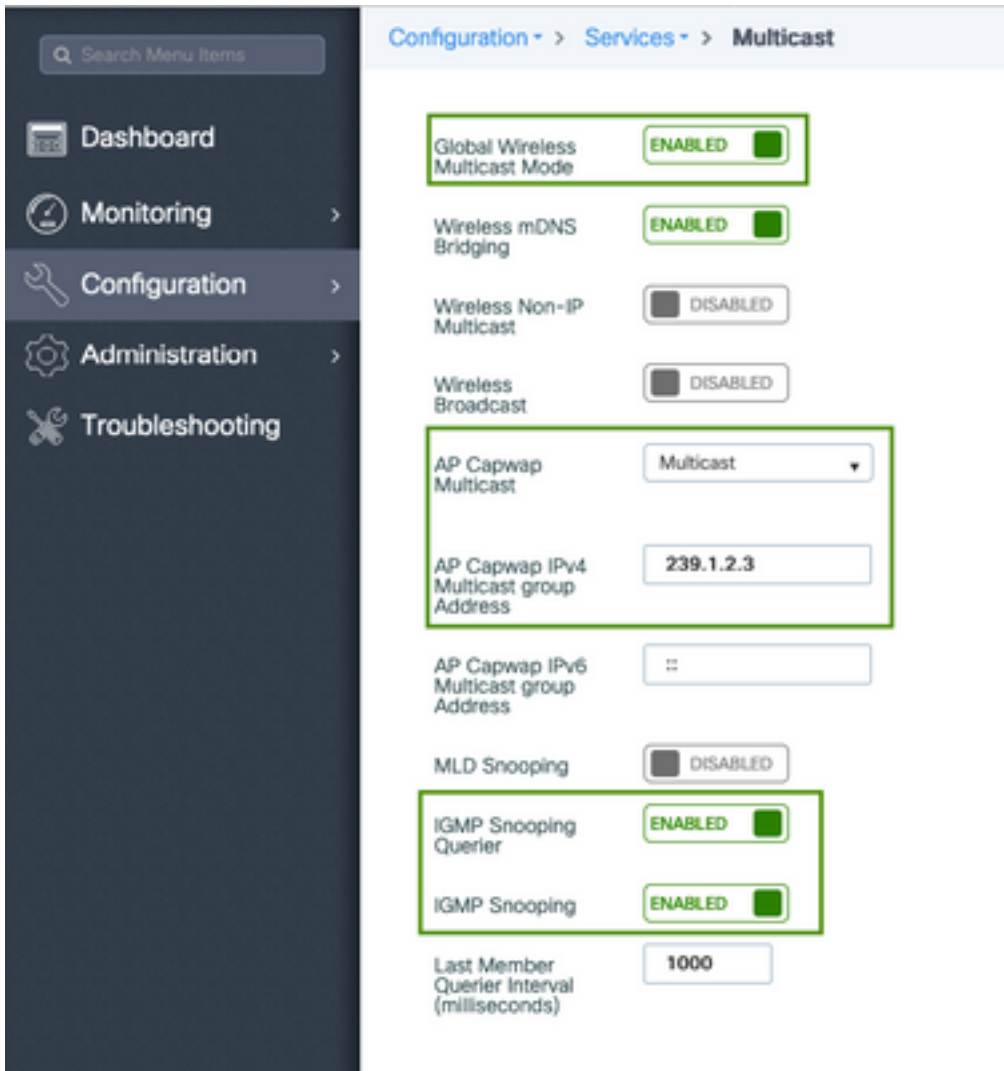


流量

1. 使用者端 (多點傳送接收器) 連線到服務組識別碼(SSID):影片流
2. 客戶端傳送IGMP加入資料包以請求IP地址239.15.16.17上的影片
3. WLC建立L3 MGID並將IGMP加入轉發到有線網路
4. 路由器將開始將來自組播源(10.88.173.135)的流量轉發到WLC，VLAN 210和VLAN 2631之間需要組播路由
5. WLC知道無線客戶端通過MGID請求此流量，並封裝該流量以使用IP地址239.1.2.3 - AP組播組將其傳送到AP
6. AP接收資料包並將組播流量單播到無線客戶端

配置組播

導覽至： Configuration > Services > Multicast



運行下一個命令以驗證CLI配置。

```
9800-40-1#sh run all | sec wireless multicast|igmp snooping
.
.
ip igmp snooping querier
ip igmp snooping
.
.
wireless multicast
wireless multicast 239.1.2.3
```

在本示例中，使用組播模式。在此模式中，WLC僅將一個封包傳送到已設定的多點傳送群組（在本案例中為239.1.2.3），因此只有對此流量有興趣的存取點(AP)可以偵聽。有關可設定模式的詳細資訊，請參閱此[9800系列無線控制器軟體組態設定指南](#)。

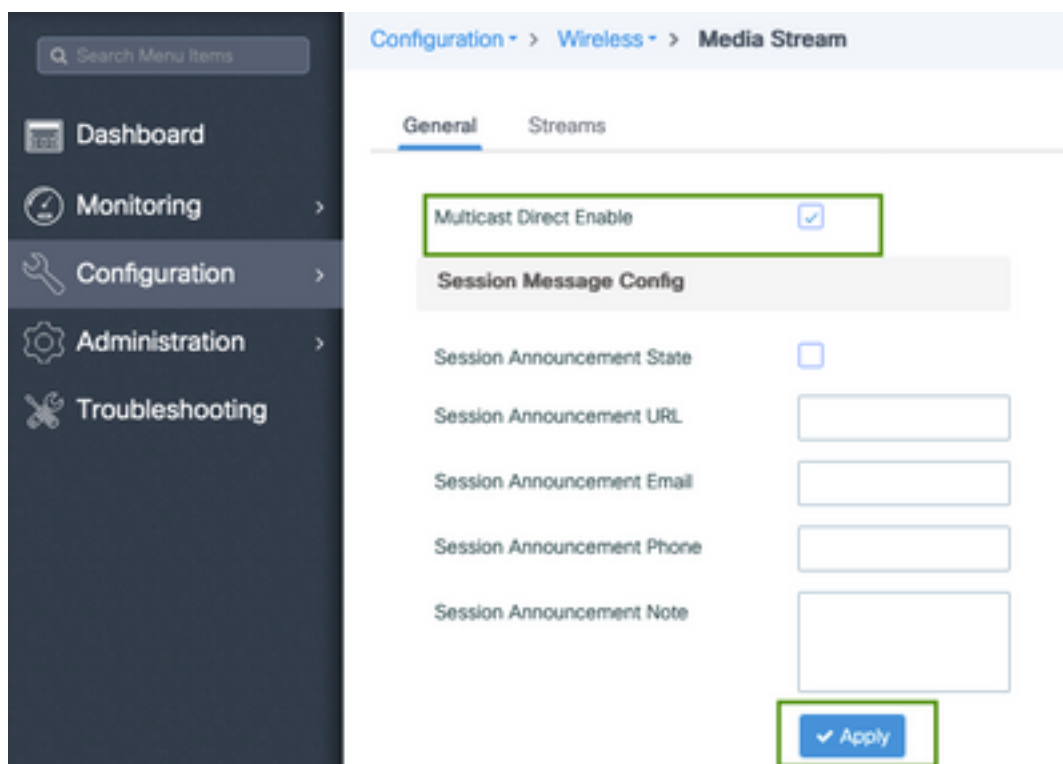
附註：需要以全球和每個VLAN為單位啟用IGMP監聽，以便WLC可以監聽無線客戶端的IGMP消息。

IGMP窺探查詢器幫助更新WLC表。驗證特定組播組是否存在任何客戶端非常有用。

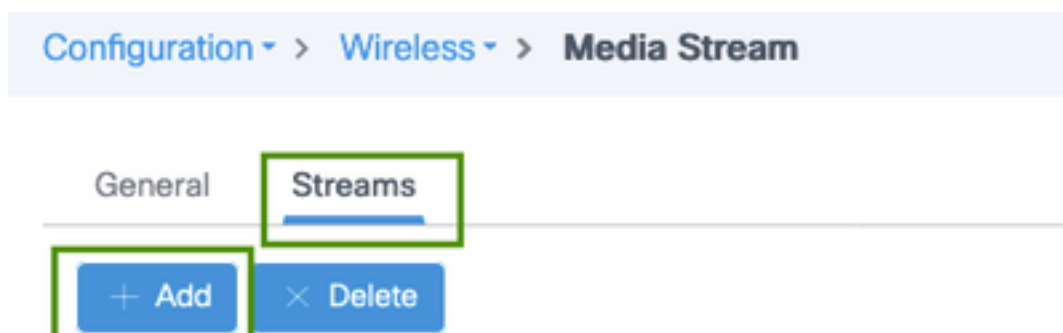
應用更改。

媒體流配置

步驟1.全域性啟用媒體流：Configuration > Wireless > Media Stream > Tab "General"



步驟2.定義媒體流：Configuration > Wireless > Media Stream > Tab "Streams"



步驟3.輸入流資訊，如下圖所示：

運行下一個命令以驗證CLI配置。

```
9800-40-1#sh run | sec media
.
wireless media-stream group movie 239.15.16.17 239.15.16.17
max-bandwidth 5000
wireless media-stream multicast-direct
.
.
```

流資訊

- 名稱:使用任何字串引用您的組播流量
- 組播目標開始/結束：定義客戶端可以訪問以流式傳輸影片的組播組範圍。在這種情況下，僅使用一個IP地址。
- 最大預期頻寬：影片頻寬，以Kbps配置。範圍從0到35000 Kbps

無線電保留控制(RRC)

它是WLC和AP用來評估AP是否擁有足夠的資源來支援對影片流的新請求的決策演算法。

- 平均資料包大小：範圍從0到1500位元組
- 原則：選擇admit，以便在RRC接受流請求的情況下，可以流式傳輸影片。
- 優先順序機制:選擇無線資料包的QoS Up標籤
- QoS：選擇在AP傳輸影片包時放置影片包的隊列。
- 違規:如果RRC拒絕，請求流可能會被丟棄或回退到盡力而為隊列。

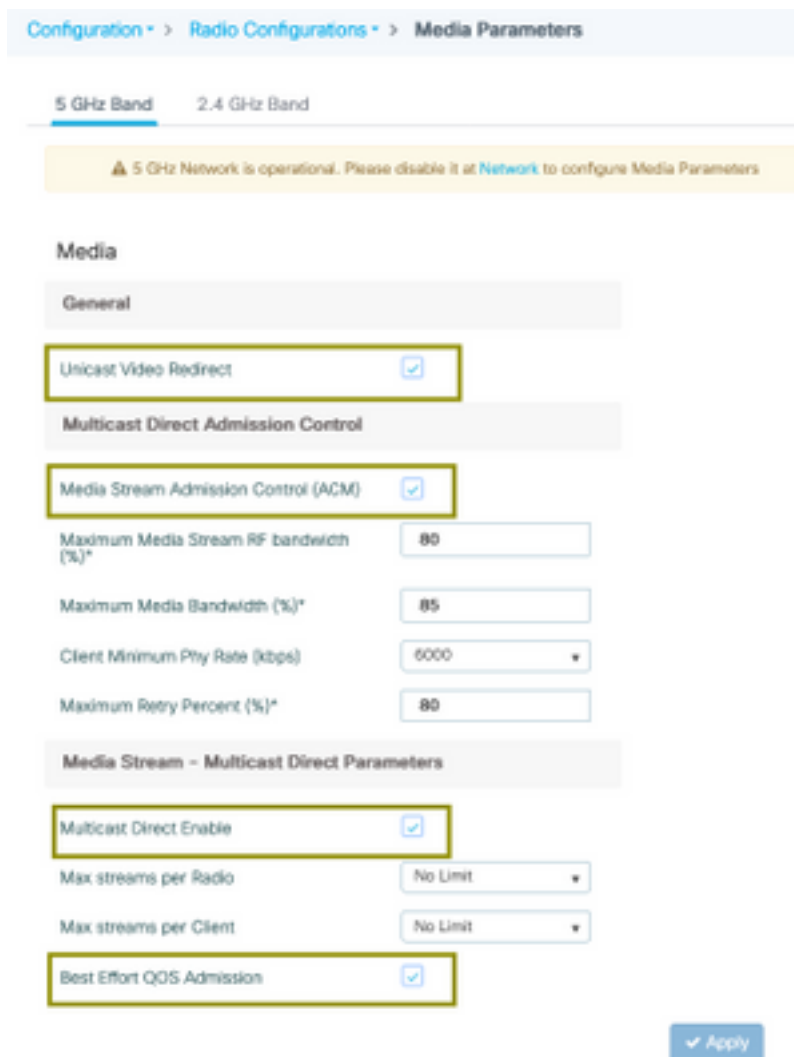
配置頻帶媒體流

在本示例中，媒體流配置為5GHz頻段，2.4GHz頻段的步驟相同。

步驟1.禁用5 GHz頻段：Configuration > Radio Configurations > Network > Tab 5 Ghz Band



步驟2.配置頻帶介質引數： Configuration > Radio Configurations > Media Parameters > Tab 5 Ghz Band



運行下一個命令以驗證CLI配置。

```
9800-40-1#sh run all | i 5ghz media|cac media
.
.
ap dot11 5ghz cac media-stream acm
ap dot11 5ghz cac media-stream max-bandwidth 80
ap dot11 5ghz cac media-stream multicast-direct max-retry-percent 80
ap dot11 5ghz cac media-stream multicast-direct min-client-rate 6
ap dot11 5ghz media-stream multicast-direct
ap dot11 5ghz media-stream multicast-direct admission-besteffort
ap dot11 5ghz media-stream multicast-direct client-maximum 0
ap dot11 5ghz media-stream multicast-direct radio-maximum 0
ap dot11 5ghz media-stream video-redirect
```

附註：媒體流准入控制和盡力服務QoS准入是可選配置

一般

- 單播影片重定向：允許單播影片流向無線客戶端。

多點傳送直接存取控制

- 媒體流准入控制 — 我們為媒體=語音+影片啟用CAC。

媒體流 — 組播直接引數

- Multicast Direct Enable：您必須啟用此覈取方塊
- 每無線電最大流：限制AP無線電上允許的影片流數，在本例中為5Ghz無線電上。
- 每個客戶端的最大流數：限制每個無線客戶端允許的影片流數。
- 盡力而為QoS允許：允許將影片流量回退到盡力而為隊列。

步驟3.啟用5 Ghz頻段：Configuration > Radio Configurations > Network > Tab 5 Ghz Band



配置客戶端VLAN

建立用於客戶端的VLAN並啟用IGMP監聽。導覽至Configuration > Layer 2 > VLAN

Create VLAN
✕

VLAN ID*
Name
State ACTVATED

RA Throttle Policy

IGMP Snooping ENABLED

ARP Broadcast DISABLED

Port Members

Available (0)

No Available Members

Associated (0)

No Associated Members

運行下一個命令以驗證CLI配置。

```
9800-40-1#sh run | sec 2631
vlan 2631
name rafa-mgmt
```

WLAN配置

在本示例中，使用開放式身份驗證SSID，僅在5GHz頻段上廣播。請遵循以下步驟。

導覽至：Configuration > Tags & Profiles > WLANs > Click on Add

Add WLAN
✕

General

Security

Advanced

Profile Name*
SSID
WLAN ID*
Status ENABLED

Radio Policy
Broadcast SSID ENABLED

Add WLAN

General **Security** Advanced

Layer2 Layer3 AAA

Layer 2 Security Mode Fast Transition

MAC Filtering Over the DS

Reassociation Timeout

Add WLAN

General Security **Advanced**

Coverage Hole Detection Universal Admin

Aironet IE Load Balance

P2P Blocking Action Band Select

Multicast Buffer IP Source Guard

Media Stream Multicast-direct WMM Policy

mDNS Mode

Max Client Connections

Per WLAN Off Channel Scanning Defer

Defer Priority 0 1 2

運行下一個命令以驗證CLI配置。

```
9800-40-1#sh run | sec videoStream
wlan videoStream 4 videoStream
media-stream multicast-direct
radio dot11a
no security wpa
no security wpa akm dot1x
no security wpa wpa2 ciphers aes
no shutdown
```

原則設定檔組態

步驟1. 建立策略配置檔案。 Configuration > Tag & Profiles > Policy

Add Policy Profile [X]

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

⚠ Configuring in enabled state will result in loss of connectivity for clients associated with this profile.

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

Central Association ENABLED

Flex NAT/PAT DISABLED

步驟2.將VLAN對映到策略配置檔案

Add Policy Profile [X]

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

RADIUS Profiling

Local Subscriber Policy Name

WLAN Local Profiling

Global State of Device Classification ⓘ

HTTP TLV Caching

DHCP TLV Caching

VLAN

VLAN/VLAN Group

Multicast VLAN

WLAN ACL

IPv4 ACL

IPv6 ACL

URL Filters

Pre Auth

Post Auth

運行下一個命令以驗證CLI配置。

```
9800-40-1#sh run | sec PP-stream
wireless profile policy PP-stream
vlan rafa-mgmt
no shutdown
```

建立策略標籤

將WLAN對映到策略配置檔案，導航到Configuration > Tag & Profiles > Tags

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

運行下一個命令以驗證CLI配置。

```
9800-40-1#sh run | sec PT-mcast
wireless tag policy PT-mcast
wlan videoStream policy PP-mcast
policy-tag PT-mcast
```

將策略標籤應用於AP

導航到Configuration > Wireless > Access Point >按一下AP

Edit AP ✕

General
Interfaces
High Availability
Inventory
ICap
Advanced

General

AP Name*

Location*

Base Radio MAC

Ethernet MAC

Admin Status ENABLED

AP Mode

Operation Status

Fabric Status

CleanAir NSI Key

Tags

Policy

Site

RF

Version

Primary Software Version

Predownloaded Status

Predownloaded Version

Next Retry Time

Boot Version

IOS Version

Mini IOS Version

IP Config

CAPWAP Preferred Mode

DHCP IPv4 Address

Static IP (IPv4/IPv6)

Time Statistics

Up Time

Controller Association Latency

運行下一個命令以驗證配置。

```
9800-40-1#show ap tag summary
Number of APs: 2
```

```
AP Name AP Mac Site Tag Name Policy Tag Name RF Tag Name
-----
AP-3702i-Rafi f07f.06e2.7db4 default-site-tag PT-mcast default-rf-tag
```

此時，您可以看到廣播的SSID，並且可以連線無線客戶端以接收影片流。

驗證

用於檢查配置的命令

```
9800-40-1#show wireless media-stream multicast-direct state
Multicast-direct State..... : enabled
Allowed WLANs:
WLAN-Name WLAN-ID
-----
emcast 3
videoStream 4
```

```
9800-40-1#show wireless media-stream group summary
Number of Groups:: 1
```

```
Stream Name Start IP End IP Status
-----
movie 239.15.16.17 239.15.16.17 Enabled
```

```
9800-40-1#show wireless media-stream group detail movie
```

```
Media Stream Name : movie
Start IP Address : 239.15.16.17
End IP Address : 239.15.16.17
RRC Parameters:
Avg Packet Size(Bytes) : 1200
Expected Bandwidth(Kbps) : 5000
Policy : Admitted
RRC re-evaluation : Initial
QoS : video
Status : Multicast-direct
Usage Priority : 4
Violation : Drop
```

```
9800-40-1#show ap dot11 5ghz media-stream rrc
```

```
Multicast-direct : Enabled
Best Effort : Enabled
Video Re-Direct : Enabled
Max Allowed Streams Per Radio : Auto
Max Allowed Streams Per Client : Auto
Max Media-Stream Bandwidth : 80
Max Voice Bandwidth : 75
Max Media Bandwidth : 85
Min PHY Rate (Kbps) : 6000
Max Retry Percentage : 80
```

用於驗證客戶端影片流的命令

要驗證客戶端連線：Monitoring > Wireless > Clients

Client MAC Address	IP/IPv6 Address	AP Name	SSID	WLAN ID	State	Protocol	User Name	Device Type	Role
886b-6e25-1e40	172.16.30.21	AP-3700i-Rafi	videoStream	4	Run	T1ac			Local

```
9800-40-1#show wireless client summary
Number of Local Clients: 1
```

```
MAC Address AP Name Type ID State Protocol Method Role
-----
886b.6e25.1e40 AP-3700i-Rafi WLAN 4 Run 1lac None Local
```

為了獲得更多細節

```
9800-40-1#show wireless client mac-address aaaa.bbbb.cccc detail
```

要驗證從客戶端收到IGMP加入消息並且WLC正確建立MGID，請導航到Monitor > General >

Index	MGID	(S,G,V)
345	4161	(0.0.0.0, 239.15.16.17, 2631)
578	4160	(0.0.0.0, 239.255.255.250, 2631)

Multicast > Layer 3

面顯示，客戶端已請求VLAN 2631上的組播組239.15.16.17的流量。

上

使用已配置的選項驗證WLC影片流。Monitor > General > Multicast > Media Stream Clients

Client MAC	Stream Name	IP Address	AP Name	Radio	WLAN	QoS	Status
88:9e:25:1e:40	movie	239.15.16.17	AP-3700-B4A	5 Dng	4	video	Admitted

```
9800-40-1#show wireless multicast group 239.15.16.17 vlan 2631
```

```
Group : 239.15.16.17
Vlan : 2631
MGID : 4160
```

```
Client List
```

```
Client MAC Client IP Status
```

```
886b.6e25.1e40 172.16.30.64 MC2UC_ALLOWED
```

疑難排解

為了排查問題，您可以使用後續追蹤。

```
set platform software trace wncd chassis active R0 multicast-api debug
set platform software trace wncd chassis active R0 multicast-config debug
set platform software trace wncd chassis active R0 multicast-db debug
set platform software trace wncd chassis active R0 multicast-ipc debug
set platform software trace wncd chassis active R0 multicast-main debug
set platform software trace wncd chassis active R0 multicast-rrc debug
```

您可以使用下一命令驗證跟蹤是否正確啟用。

```
9800# show platform software trace level wncd chassis active R0 | i Debug
multicast-api Debug
multicast-config Debug
multicast-db Debug
multicast-ipc Debug
multicast-main Debug
multicast-rrc Debug
```

現在，重現問題

1. 連線無線客戶端
2. 請求影片 (組播流量)
3. 等待問題發生

4. 收集日誌

以便收集日誌。執行，運行下一個命令。

```
9800#show logging process wncd internal to-file bootflash:<file-name>.log
Displaying logs from the last 0 days, 0 hours, 10 minutes, 0 seconds
executing cmd on chassis 1 ...
Files being merged in the background, result will be in bootflash:mcast-1.log log file.
Collecting files on current[1] chassis.
# of files collected = 1
```

```
btrace decoder: [1] number of files, [40999] number of messages
will be processed. Use CTRL+SHIFT+6 to break.
```

```
2019-11-28 20:25:50.189 - btrace decoder processed 7%
2019-11-28 20:25:50.227 - btrace decoder processed 12%
2019-11-28 20:25:50.263 - btrace decoder processed 17%
2019-11-28 20:25:50.306 - btrace decoder processed 24%
2019-11-28 20:25:50.334 - btrace decoder processed 29%
2019-11-28 20:25:50.360 - btrace decoder processed 34%
2019-11-28 20:25:50.388 - btrace decoder processed 39%
2019-11-28 20:25:50.430 - btrace decoder processed 46%
2019-11-28 20:25:50.457 - btrace decoder processed 51%
2019-11-28 20:25:50.484 - btrace decoder processed 56%
2019-11-28 20:25:50.536 - btrace decoder processed 63%
2019-11-28 20:25:50.569 - btrace decoder processed 68%
2019-11-28 20:25:50.586 - btrace decoder processed 73%
2019-11-28 20:25:50.587 - btrace decoder processed 78%
2019-11-28 20:25:50.601 - btrace decoder processed 85%
2019-11-28 20:25:50.607 - btrace decoder processed 90%
2019-11-28 20:25:50.619 - btrace decoder processed 95%
2019-11-28 20:25:50.750 - btrace decoder processed 100%
9800#
```

開啟日誌檔案

```
9800#more bootflash:<file-name.log>
```

AP/WLC中允許的影片流

```
IGMP request from wireless client
2019/11/28 20:18:54.867 {wncd_x_R0-0}{1}: [multicast-ipc] [19375]: (debug): IOSD IGMP/MLD has
sent the WNCNCD_INFORM_CLIENT with
capwap id = 0x90000006
num_entry = 1
2019/11/28 20:18:54.867 {wncd_x_R0-0}{1}: [multicast-ipc] [19375]: (debug): Source IP Address
0.0.0.0
2019/11/28 20:18:54.867 {wncd_x_R0-0}{1}: [multicast-ipc] [19375]: (debug): Group IP Address
17.16.15.239
2019/11/28 20:18:54.867 {wncd_x_R0-0}{1}: [multicast-ipc] [19375]: (debug): Client IP Address
71.30.16.172
2019/11/28 20:18:54.867 {wncd_x_R0-0}{1}: [multicast-ipc] [19375]: (debug): index = 0:
source = 0.0.0.0
group = 17.16.15.239 . >>> 239.15.16.17 multicast group for video
client_ip = 71.30.16.172 >>> 172.16.30.71 client ip address
client_MAC = a4f1.e858.950a
vlan = 2631, mgid = 4160 add = 1
.....
```

MGID table updated with client mac address

2019/11/28 20:18:54.867 {wncd_x_R0-0}{1}: [multicast-db] [19375]: (debug): Child table records for MGID 4160 are

2019/11/28 20:18:54.867 {wncd_x_R0-0}{1}: [multicast-db] [19375]: (debug): Client MAC: a4f1.e858.950a

.....

Starting RRC algorithm to assess whether AP has enough resources or not

2019/11/28 20:18:54.867 {wncd_x_R0-0}{1}: [multicast-rrc] [19375]: (debug): Submitting RRC request

2019/11/28 20:18:54.869 {wncd_x_R0-0}{1}: [multicast-rrc] [19375]: (debug): Video Stream Admitted: passed all the checks

2019/11/28 20:18:54.869 {wncd_x_R0-0}{1}: [multicast-rrc] [19375]: (debug): Approve Admission on radio f07f.06ec.6b40 request 3664 vlan 2631 dest_ip 17.16.15.239 decision 1 **qos 4** admit_best 1

.....

WLC matching requested group to the ones defined on WLC

2019/11/28 20:18:54.869 {wncd_x_R0-0}{1}: [multicast-db] [19375]: (debug): Matching video-stream group found Start IP: 17.16.15.239, End IP: 17.16.15.239 that contains the target group IP address 17.16.15.239

.....

Adding client to multicast direct

2019/11/28 20:18:54.869 {wncd_x_R0-0}{1}: [multicast-db] [19375]: (debug): Add rrc Stream Record for dest 17.16.15.239, client a4f1.e858.950a

AP/WLC中不允許影片流，因此AP在盡力隊列上傳送組播流量。

在這種情況下，允許無線客戶端執行影片流，但AP沒有足夠的資源來允許具有影片QoS的流量，因此AP會將客戶端移動到盡力隊列。檢視下一張圖片

Client MAC	Stream Name	IP Address	AP Name	Radio	WLAN	QoS	Status
a4f1.e858.950a	movie	17.16.15.239	SP02-servers	5.0m	4	4	Insufficient Admitted

從調試

Starting RRC algorithm to assess whether AP has enough resources or not

.....

2019/11/28 17:47:40.601 {wncd_x_R0-0}{1}: [multicast-rrc] [19375]: (debug): Submitting RRC request

2019/11/28 17:47:40.603 {wncd_x_R0-0}{1}: [multicast-rrc] [19375]: (debug): RRC Video BW Check Failed: Insufficient Video BW for AP

2019/11/28 17:47:40.603 {wncd_x_R0-0}{1}: [multicast-rrc] [19375]: (debug): Video Stream Rejected. Bandwidth constraint.....

2019/11/28 17:47:40.603 {wncd_x_R0-0}{1}: [multicast-rrc] [19375]: (debug): Approve Admission on radio f07f.06ec.6b40 request 3626 vlan 2631 dest_ip 17.16.15.239 decision 0 **qos 0** admit_best 1

.....