

在Catalyst 9800 WLC上配置VideoStream

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简介

本配置示例介绍如何在上配置VideoStream (也称为MediaStream或Multicast-Direct) a Catalyst 9800系列无线控制器(9800 WLC)通过图形用户界面(GUI)。

先决条件

要求

Cisco 建议您了解以下主题：

- 9800 WLC配置指南
- WLC上的组播

使用的组件

本文档中的信息基于以下软件和硬件版本：

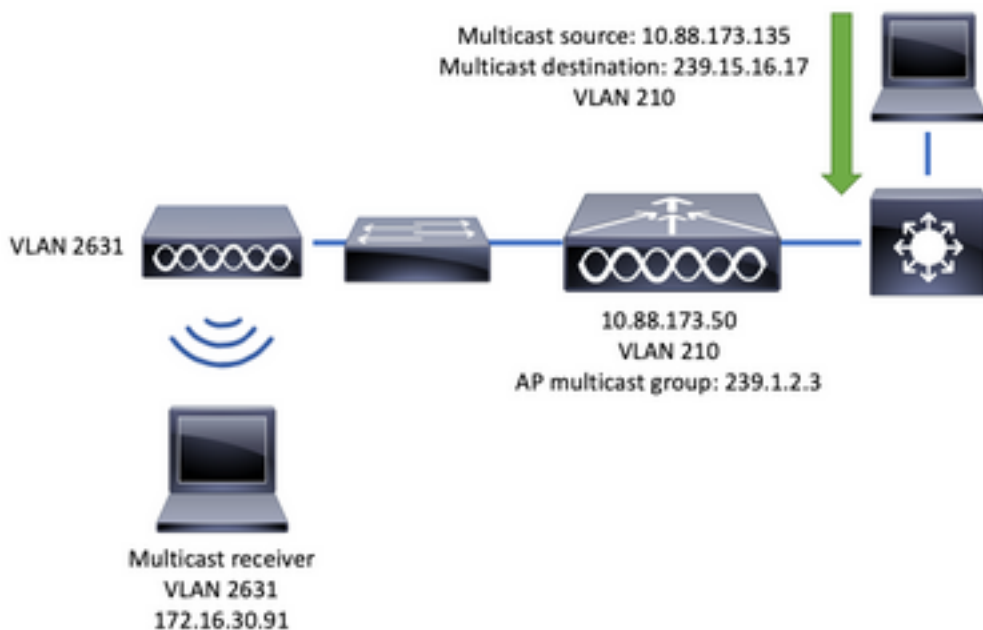
- Catalyst 9800系列无线控制器，IOS-XE版本16.11.1b
- Aironet 3700系列接入点

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您的网络处于活动状态，请确保您了解任何配置的潜在影响。

配置

网络图

此示例基于本地模式AP集中交换流量。支持FlexConnect本地交换，但由于组播不通过WLC，AP是执行大部分工作的AP，因此流量会有所不同。

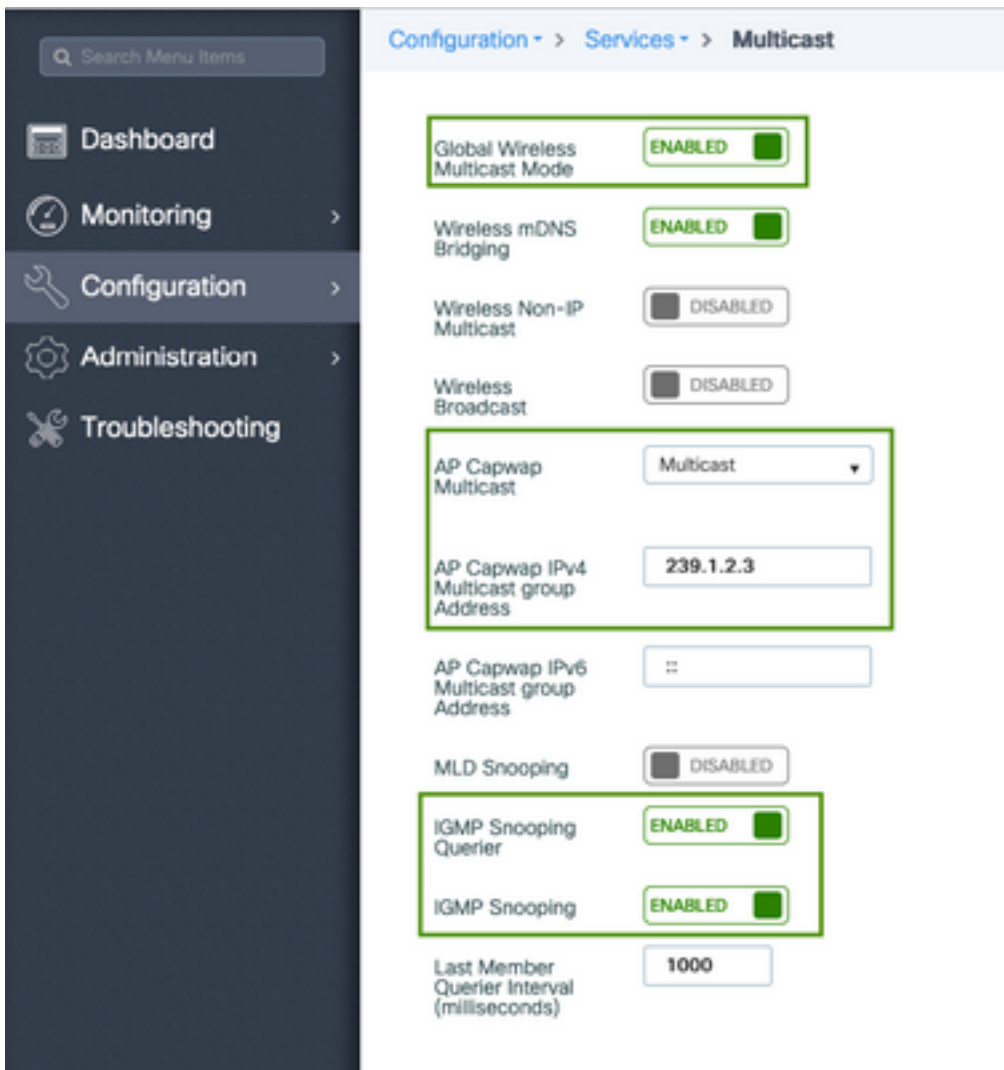


流量传输

1. 客户端（组播接收器）连接到服务集标识符(SSID):视频流
2. 客户端发送IGMP加入数据包以请求IP地址239.15.16.17上的视频
3. WLC创建L3 MGID并将IGMP加入转发到有线网络
4. 路由器将开始将流量从组播源(10.88.173.135)转发到WLC，VLAN 210和VLAN 2631之间需要组播路由
5. WLC知道无线客户端正在通过MGID请求此流量，并使用IP地址239.1.2.3 - AP组播组封装流量以将其发送到AP
6. AP接收数据包并将组播流量单播到无线客户端

配置组播

导航至： Configuration > Services > Multicast



运行下一命令以检验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
```

在本例中，使用组播模式。在此模式下，WLC仅向配置的组播组（在本例中为239.1.2.3）发送一个数据包，因此只有对此流量感兴趣的接入点(AP)才能侦听它。有关可以配置哪些模式的详细信息，请参阅本[9800系列无线控制器软件配置指南](#)。

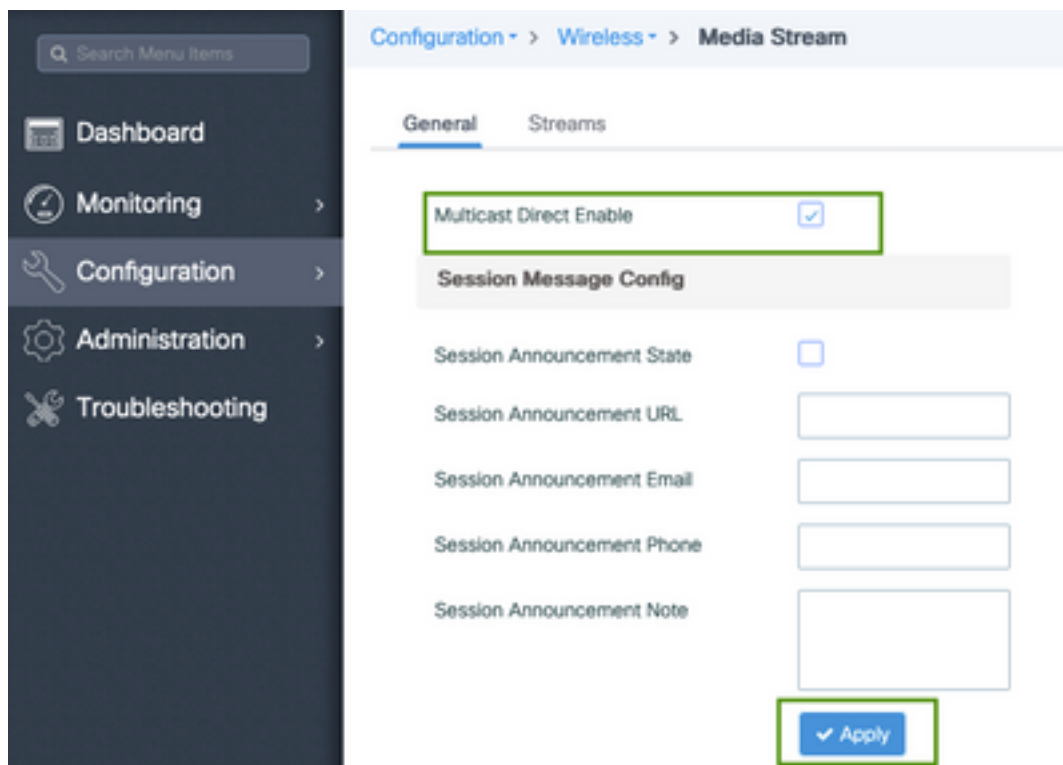
注意：需要全局启用IGMP监听，并基于每个VLAN，以便WLC能够监听无线客户端的IGMP消息。

IGMP监听查询器有助于更新WLC表。验证特定组播组是否存在任何客户端非常有用。

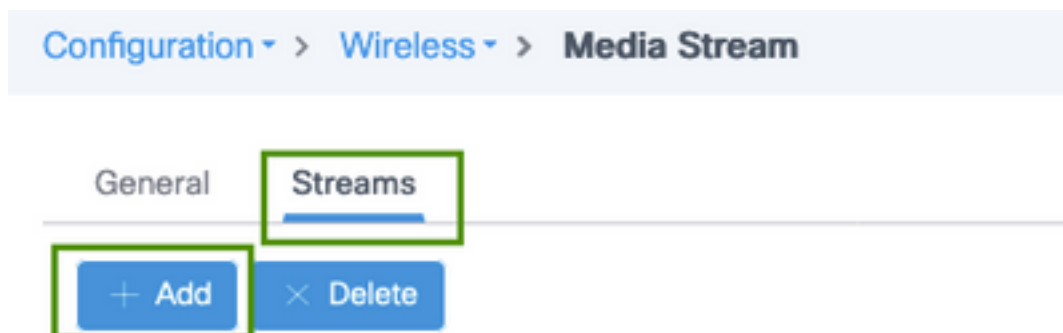
应用更改。

媒体流配置

步骤1.全局启用媒体流 : Configuration > Wireless > Media Stream > Tab "General"



步骤2.定义媒体流 : Configuration > Wireless > Media Stream > Tab "Streams"



步骤3.输入图像中所示的流信息 :

Add Media Stream

General

Stream Name*

Multicast Destination Start IPv4/IPv6 Address*

Multicast Destination End IPv4/IPv6 Address*

Maximum Expected Bandwidth*

Resource Reservation Control (RRC) Parameters

Average Packet Size*

Policy

Priority

QoS

Violation

运行下一命令以检验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
.
.
```

流信息

- 名称：使用任何字符串来引用您的组播流量
- 组播目标开始/结束：定义客户端可以访问的组播组范围以传输视频。在这种情况下，仅使用一个IP地址。
- 最大预期带宽：视频带宽，且配置为Kbps。范围从0到35000 Kbps

无线电预留控制(RRC)

WLC和AP使用这种决策算法来评估AP是否拥有足够的资源来支持对视频流的新请求。

- 平均数据包大小：范围为0到1500字节
- 策略：选择“允许”，以防RRC接受流请求，视频可以流化。
- 优先级：为通过空中数据包选择QoS Up标记
- QoS：选择AP传输视频包时放置视频包的队列。
- 违规：在RRC拒绝请求流时，可以丢弃请求流或回退到尽力队列。

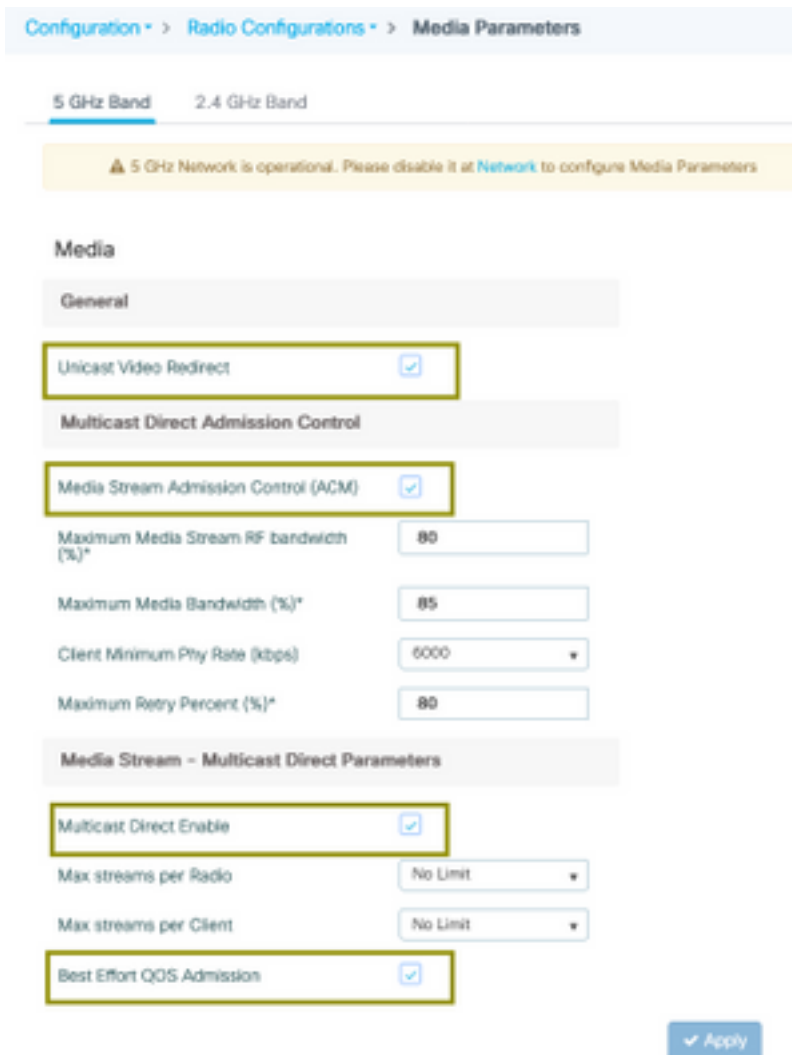
配置频段媒体流

在本例中，媒体流配置为5GHz频段，2.4GHz频段的步骤相同。

步骤1.禁用5 GHz频段：Configuration > Radio Configurations > Network > Tab 5 GHZ Band



步骤2.配置频段介质参数： Configuration > Radio Configurations > Media Parameters > Tab 5 GHz Band



运行下一命令以检验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
```

注意：媒体流准入控制和尽力而为QoS准入是可选配置

常规

- 单播视频重定向：允许单播视频流到无线客户端。

组播直接准入控制

- 媒体流准入控制 — 我们为媒体=语音+视频启用CAC。

媒体流 — 组播直接参数

- 组播直接启用：必须启用此复选框
- 每个无线电的最大流数：限制AP无线电上允许的视频流数，在本例中为5Ghz无线电。
- 每个客户端的最大流数：限制每个无线客户端允许的视频流数。
- 尽力而为QoS准入：允许将视频流量回退到尽力而为队列。

步骤3.启用5 GHz频段：Configuration > Radio Configurations > Network > Tab 5 GHz Band



配置客户端VLAN

创建用于客户端的VLAN并启用IGMP监听。导航至Configuration > Layer 2 > VLAN

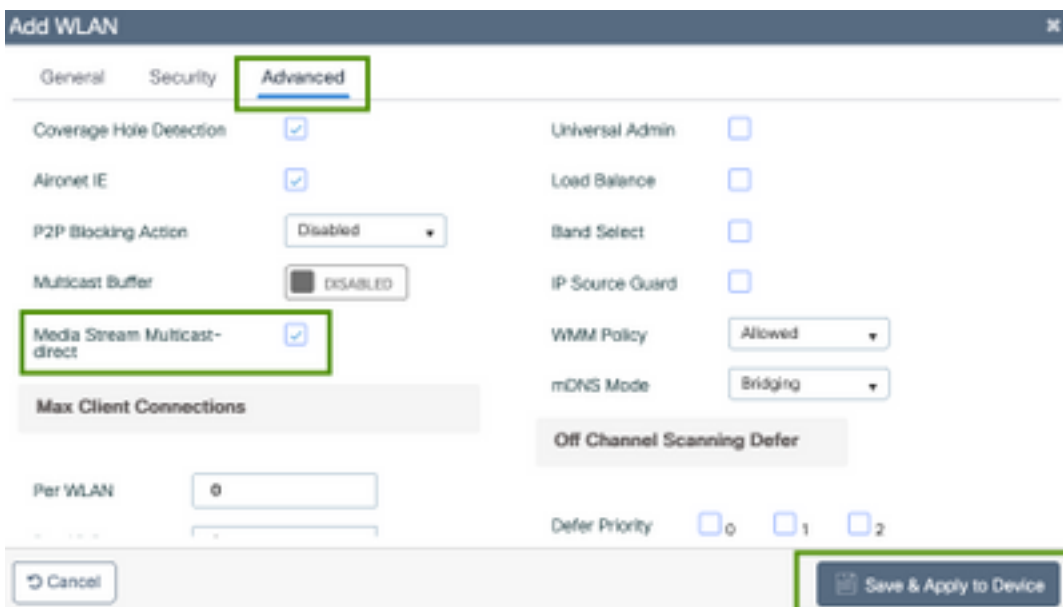
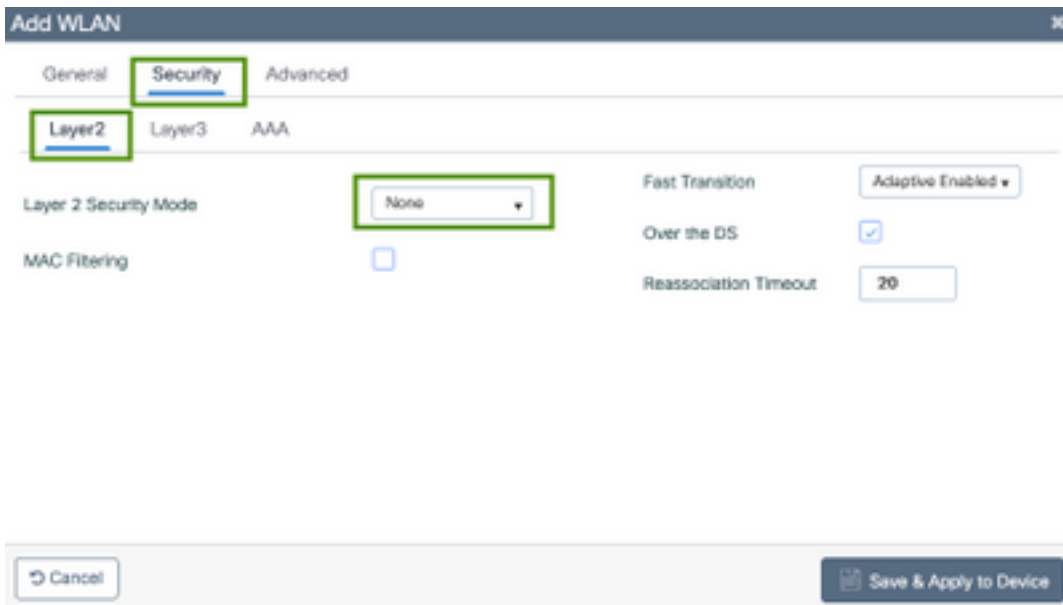
运行下一命令以检验CLI配置。

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

WLAN 配置

在本例中，使用开放式身份验证SSID，仅在5GHz频段广播。执行后续步骤。

导航至：Configuration > Tags & Profiles > WLANs > 点击Add



运行下一命令以检验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
```

策略配置文件配置

步骤1.创建策略配置文件。配置(Configuration)>标记和配置文件(Tag & Profiles)>策略(Policy)

Add Policy Profile

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

步骤2.将VLAN映射到策略配置文件

Add Policy Profile

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

运行下一命令以检验CLI配置。

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

创建策略标记

将WLAN映射到策略配置文件，导航至配置>标记和配置文件>标记

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

运行下一命令以检验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
```

将策略标记应用于AP

导航至Configuration > Wireless > Access Point > 点击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

运行下一命令以检验配置。

```
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
```

此时，您可以看到SSID已广播，并且可以连接无线客户端以接收视频流。

验证

查看配置的命令

```
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
```

用于验证客户端视频流的命令

要验证客户端连接，请执行以下操作：监控>无线>客户端

Client MAC Address	IP/Port 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	4	Run	11ac	None	Local	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 11ac None Local
为了更详细
```

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

要验证是否从客户端收到IGMP加入消息，并且WLC已正确创建MGID，请导航至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

面显示，客户端已请求VLAN 2631上组播组239.15.16.17的流量。

上

要使用已配置的选项验证WLC视频流。监控>常规>组播>媒体流客户端

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
```

故障排除

为了排除故障，您可以使用下一个跟踪。

```
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
```

您可以使用下一个命令验证跟踪是否已正确激活。

```
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
```

现在，重现问题

1. 连接无线客户端
2. 请求视频 (组播流量)
3. 等待问题发生

4. 收集日志

收集日志。执行运行下一个命令。

```
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#
```

打开日志文件

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

AP/WLC中允许的视频流

```
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中不允许视频流，因此，AP在尽力而为队列上发送组播流量。

在这种情况下，允许无线客户端执行视频流，但AP没有足够的资源来允许具有视频QoS的流量，因此AP将客户端移至尽力而为队列。查看下一个图像

Client MAC	Stream Name	IP Address	AP Name	Radio	WLAN	QoS	Status
a4f1.e858.950a	none	17.16.15.239	SP02-mlwls	5-Dry	4	4	Insufficient Admitted

从调试

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

.....