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



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<u>9800系列无线控制器软件配置指南</u>。

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"

Q Search Menu Items	Configuration - > Wireless - > Media Stream
Dashboard	General Streams
Monitoring	Multicast Direct Enable
🔍 Configuration 💦 🔿	Session Message Config
Administration >	Session Announcement State
💥 Troubleshooting	Session Announcement URL
	Session Announcement Email
	Session Announcement Phone
	Session Announcement Note
	🛩 Apply

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

Configuration	Vireless * >	Media Stream
General	Streams	
+ Add	× Delete	

步骤3.输入图像中所示的流信息:

Add Media Stream		×
General		
Stream Name*	movie	
Multicast Destination Start IPv4/IPv6 Address*	239.15.16.17	
Multicast Destination End IPv4/IPv6 Address*	239.15.16.17	
Maximum Expected Bandwidth*	5000	
Resource Reservation Control (RRC)	Parameters	
Average Packet Size*	1200	
Policy	admit 🔹	
Priority	4	
QOS	Video	
Violation	Drop	
D Cancel	Save	& Apply to Device

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

Q. Search Menu tems	Configuration - > Radio Configuration	ns - > Network
Dashboard	5 GHz Band 2.4 GHz Band	
Monitoring	General	
\sim Configuration \rightarrow	5 GHz Network Status	
\bigcirc Administration \longrightarrow	Beacon Interval*	100
* Troubleshooting	Fragmentation Threshold(bytes)*	2346
	DTPC Support	

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

Configuration * > Radio Configurations	 Media Parameters
5 GHz Band 2.4 GHz Band	
▲ 5 GHz Network is operational. Piece	se disable it at Network to configure Media Parameters
Media	
General	
Unicast Video Redirect	
Multicast Direct Admission Control	
Media Stream Admission Control (ACM)	
Maximum Media Stream RF bandwidth (%)*	80
Maximum Media Bandwidth (%)*	85
Client Minimum Phy Rate (kbps)	6000 ¥
Maximum Retry Percent (%)*	80
Media Stream - Multicast Direct Par	ameters
Multicast Direct Enable	
Max streams per Radio	No Limit 🔹
Max streams per Client	No Limit •
Best Effort QOS Admission	
	at herein

运行下一命令以检验CLI配置。

9800-40-1#sh run all | i 5ghz media|cac media

ap dotll 5ghz cac media-stream acm ap dotll 5ghz cac media-stream max-bandwidth 80 ap dotll 5ghz cac media-stream multicast-direct max-retry-percent 80 ap dotll 5ghz cac media-stream multicast-direct min-client-rate 6 ap dotll 5ghz media-stream multicast-direct ap dotll 5ghz media-stream multicast-direct admission-besteffort ap dotll 5ghz media-stream multicast-direct client-maximum 0 ap dotll 5ghz media-stream multicast-direct radio-maximum 0 ap dotll 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

Q. Search Meru Items	Configuration - > R	adio Configurations - > Network
E Dashboard	5 GHz Band	2.4 OHz Band
Monitoring	General	
Configuration	5 GHz Network Sta	tus 🗸
Administration	A Please disable 5 Gi	Iz Network Status to configure Beacon Interval, Fragmentation Threshold, DTPC Support.

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

Create VLAN			×
VLAN ID*	2631		
Name	rafa-mgmt		
State			
RA Throttle Policy	None		
IGMP Snooping	ENABLED		
ARP Broedcast	DISABLED		
Port Members		Q. Search	
	Available (0)	Associated (0)	
	No Available Members	No Associated Members	
D Cancel		📄 Save & Apply	to Device

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

Add WLAN				×
General Secu	rity Advanced			
Profile Name*	videoStream	Radio Policy	802.11a only •	
SSID	videoStream	Broadcast SSID	ENABLED	
WLAN ID*	4			
Status	ENABLED			
"D Cancel			III Save & Analy	to Device

Add WLAN	×
General Security Advanced	
Layer2 Layer3 AAA	
Layer 2 Security Mode None MAC Filtering	Fast Transition Adaptive Enabled Over the DS Reassociation Timeout 20
"D Cancel	🔡 Save & Apply to Device
Add WLAN	×
General Security Advanced	
Coverage Hole Detection	Universal Admin
Aironet IE	Loed Balance
P2P Blocking Action Disabled •	Band Select
Multicast Buffer	IP Source Guard
Media Stream Multicast-	WMM Policy Allowed •
Max Client Connections	mDNS Mode Bridging +
	Off Channel Scanning Defer
Per WLAN 0	Defer Priority
"D Cancel	Save & Apply to Device

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)

Policy Profile				
Access Policies	QOS and AVC	Mobility	Advanced	
A Configur	ing in enabled state will re-	sult in loss of o	onnectivity for clients associated w	ith this profile.
Name*	PP-stream		WLAN Switching Policy	
Description	Enter Description		Central Switching	ENABLED
Status	ENABLED		Central Authentication	ENABLED
Passive Client	DISABLED		Central DHCP	ENABLED
Encrypted Traffic Analytics	DISABLED		Central Association	ENABLED
CTS Policy			Flex NAT/PAT	DISA8LED
Inline Tagging				
SGACL Enforcement				
Default SGT	2-65519			
				170 a
				Seve & Apply to Devi

步骤2.将VLAN映射到策略配置文件

d Policy Profile			
General Access Policie	s QOS and AVC Mobility Adv	anced	
RADIUS Profiling		WLAN ACL	
ocal Subscriber Policy Name	Search or Select 🔹	IPv4 ACL	
WLAN Local Profiling		IPv6 ACL	•
Global State of Device Classification	۲	URL Filters	
HTTP TLV Caching		Pre Auth	٠
DHCP TLV Caching		Post Auth	٠
VLAN			
VLAN/VLAN Group	rafa-mgmt.		
Multicast VLAN	Enter Multicast VLAN		

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*	PT-mcast		
Description	Enter Description		
V WLAN-POLI	CY Maps: 0		
+ Add X De			
WLAN Profile		 Policy Profile 	~
H 4 0 + H	10 v items per page		No items to display
Map WLAN and F	Policy		
WLAN Profile*	videoStream +	Policy Profile*	PP-mcast v
		× 🔽	
> RLAN-POLIC	CY Maps: 0		
ී Cancel			Apply to Device

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

High Availability Inve	ntory ICap Advanced	
	Version	
AP-3700i-Rah	Primary Software Version	16.11.1.134
default location	Predownloaded Status	N/A
1071.06ec.6b40	Predownloaded Version	N/A
f07f.06e2.7db4	Next Retry Time	N/A
ENABLED	Boot Version	15.2.4.0
Local v	IOS Version	15.3(3)JPH3\$
Registered	Mini IOS Version	7.6.1.118
Disabled	IP Config	
	CAPWAP Preferred Mode Not	Configured
	DHCP IPv4 Address 172	16.30.98
PT-meast	Static IP (Pv4/IPv6)	
default-site-tag 🗸	Time Statistics	
default-rf-tag +	Up Time	0 days 8 hrs 5 mins 58 secs
	Controller Association Latency	0 days 0 hrs 1 mins 55 secs
	AP-3700i-Rafi default location N071.06ec.6b40 N071.06e2.7db4 ENABLED Local • Registered Ditabled PT-mcast • default-site-tag •	AP-3700i-Rafi Primary Software Version default location Predownicaded Status N07f.06ec.6b40 Predownicaded Version h07f.06e2.7db4 Next Retry Time ENABLED Boot Version Local NOS Version Registered Mini IOS Version Disabled IP Config PT-mcast v Static IP (IPv4, MPv6) default-site-tag utersite rist 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 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

用于验证客户端视频流的命令

Min PHY Rate (Kbps) : 6000 Max Retry Percentage : 80

为了更详细

要验证客户端连接,请执行以下操作:监控>无线>客户端

Tutal Clent(s) is the Network: 1				
Cleat MAC Address - Put/Put Address	A - AP Name - SSID - WAN B	D - State - Protocol - User-Name	- Device Type - Rais	
GB06-5x25.1x40 172.14.3551	AP-3708-Bub Interdingen 4	R.A 1140	Local	
n n B n 10 m inners per page			1-1 of 1 clients	6
9800-40-1#snow wirele	ess client summary			
Number of Local Clier	nts: 1			
MAC Address AP Name 7	Type ID State Protoc	col Method Role		
8866 6026 1040 ND 270	OO: Dof: WINN 4 Dup	110g Noro Logol		
000D.0623.1640 AP-3/0	UUI-RALI WLAN 4 RUII	IIAC NONE LOCAL		

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)
145		4161		(0.0.0.0, 239.15.16.17, 2631)
578		4160		[0.0.0.0, 239.255.255.250, 2631

F

> 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。

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

Layer 2 Layer 3	Media Stream Clients					
Local Mode Fire C	lonnect					
CRIMIN MAC	- Sease Name -	P ANENIA	AP-Name	Rada -	WLAN -	- 005 - Statut -
88565e25.5e40	revie	230-15.16.17	AP-3700-8yA	5.0%	4	nideo Admitted
	18 x Interprete					1 - 1 of 1 home

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-main debug set platform software trace wncd chassis active R0 multicast-rmc debug set platform software trace wncd chassis active R0 multicast-rrc debug set platform software trace wncd chassis active R0 multicast-rrc debug

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

```
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 WNCD_INFORM_CLIENT with
capwap id = 0x9000006
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
. . . . .
```

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

打开日志文件

```
9800#
```

```
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%
```

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

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

```
4. 收集日志
收集日志。执行运行下一个命令。
```

will be processed. Use CTRL+SHIFT+6 to break.

```
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 algoithm 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): Submiting 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 gos 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

er2 Layer3	Media Stream Clients					
Install Manda Plan	Personal					
Local Mode This	Connect					
Incel Mode Pro	Covert					[m]
Dient Web	- Stean Name	- IP Address	- Al-June	- Indo	- 16,48	- 005 - Status

从调试

```
Starting RRC algoithm 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): Submiting 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. Bandwdith 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
....
```