

Configuration

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Example of Enabling Service Discovery Gateway (mDNS Gateway—Phase 2)

To configure and demonstrate the Service Discovery Gateway feature on WLC5760, we created a VLAN interface for Bonjour Services (AirPlay, AirPrint, and so on) on a separate VLAN than the Client VLAN.

Here is an example showing different VLANs, one for Clients (VLAN30) and another one for mDNS services (AirPlay, AirPrint and so on—VLAN31), configured on the WLC5760. Also, these VLANs are tied to the client WLAN (SSID) and the mDNS Services WLAN (SSID) respectively.

cisco Wireless Controller			🟡 Home Monito	or 🔻 Configuration 🔻
Controller	VL/	Ŵ		
* 📴 System	Ne	w Remove		
📄 General		VLAN ID	Name	Status
Multicast		1	default	active
Interfaces		30	VLAN0030	active
VI AN		31	VLAN0031	active
		105	VLAN0105	active
Layer2 VLAN		1002	fddi-default	act/unsup
Layer3 Interface		1003	token-ring-default	act/unsup

Controllor				
* Bystem	Vlan Configuration			
General	New Remove		Show All	*
Multicast	Interface Name	Status	Protocol	IP-Address
▶	Vian1	administratively down	down	unassigned
Interfaces	Vian1 Vian30	administratively down up	down up	unassigned 10.10.30.2
 ▶ Interfaces ▼ ▼ ► VLAN 	Vlan1 Vlan30 Vlan31	administratively down up up	down up up	unassigned 10.10.30.2 10.10.31.2

Step 1

To enable the Bonjour Gateway feature, go to **Configuration > Controller > mDNS > Global**.

CISCO Wireless Controller	🟠 Home	Monitor 🔻	Configuration 🔻
Controller	General		
 System General Multicast Multicast Interfaces VLAN Internal DHCP Server Management Mobility Management mDNS 	Name 576 AP Multicast Mode Unio Fast SSID change AP Fallback Default Mobility Domain def RF group name def User idle timeout 300 Temperature Value 30 Temperature Status GRE Password encryption	50 ault ault Degree Celsius EEN	Wizard Controller Wireless Security Commands

Under Global Rule, enable mDNS Gateway by checking the mDNS Gateway check box and click Apply.

I

cisco Wirele	ss Controller 🏠 Home Monitor 🔹 Configuration 🔹	Administration
Controller	Global Rule	Apply
• 🧮 System	mDNS Gateway	
Internal DHCP :	Down Stream Rules UP Stream Rules Advanced	
Management Mobility Manage mDNS	Service List Name None 💌	
Global	Add 🗙 Delete 💒 Move to 🥠 🎾 Show All	- 8
Interface Static Servic	Service Rule Message Type Se No data available	ervice Instance

Step 2To create a global service list, in the Down Stream Rules tab, from the Service List Name drop-down list, select Create
New. Provide an arbitrary name, for example, permit-all in the Service List Name text box.

cisco Wireless	Controller		Configuration Administration
Controller	Global Rule		Apply
▼ 🚞 System	mDNS Gateway	ream Rules Advanced	
Multicast Multicast Multicast Multicast	Service List Name None - K None Create New		
Internal DHCP Ser	Add XDelete	🔸 🏫 💙 Show	Al V
Management	Service Rule	Message Type	Service Instance
Mooiity Manageme Mooiity Manageme Global Interface Static Service	No data available		

Step 3Service lists are made up of service rules that are essentially permit or deny statements matching a certain part of the
mDNS record. This match criteria use regular expressions for string matching, for example, message type—announcement
or query, service type matching—Airplay, AirTunes and so on, or instance name matching—AirPrint1 or AirPrint2.
The global policy allows all services to be learned and cached. Under mDNS > Global > Down Stream Rules, click
Add. In the Add rule popup that appears, select Permit from the Action drop-down list. Click OK and Apply.

altato cisco Wireless Cor	troller 🙆 Home Moni	tor • Configuration •	Administration I • Help	
Controller	Global Rule			Apply
	mDNS Gateway	Advanced Add rule Action Message type Service instanc Service Type	Permit - <-Select-> - e <-Select-> - CK Cancel	Service E
ilobal Rule	_			
nDNS Gateway	LIP Stream Rules Advance	ed		-
Service List Name pe	mit-all –	Show	All	12
Service Rule	Message Type	Service	Instance	Service *
permit				

Step 4

Apply the policy that we just created, permit-all, in the upstream direction as well. Go to Configuration > Controller > mDNS > Global. In the Up Stream Rules tab, from the Service List Name drop-down list, select permit-all and click Apply.

cisco Wireless (Controller	A Home	Monitor 🔻	Configuration	 Administrati 	on I 🔻 Help
Controller	Global Rule					Apple
* 🗁 System	mDNS Gateway	V 4				
General	Down Stream Rules	UP Stream	Rules Ad	vanced		
Multicast Interfaces	Service List Name	None -	<u></u>			
VLAN		None	_			
Layer2 VLAN	Add 🗙 Delete 🚦	Create New	-U-	> Show	All	- 8
Layer3 Interfa	Service Rule		Message Type		Service Insta	ince
Internal DHCP Serv	No data available					
🕨 🧱 Management						
🔸 🪞 Mobility Manageme						
* 🚞 mDNS						
Global						
Interface						
interrace						
Static Service						
Controller	ontroller Global Rule	A Home N	ionitor 👻 Cor	nfiguration 🔻	Administration 🔻	Help
Static Service	ontroller Global Rule mDNS Gateway	A Home N	Ionitor 👻 Cor	nfiguration 🔻	Administration 🔻	Help Apply
Static Service	ontroller Global Rule mDNS Gateway Down Stream Rules	€ Home N UP Stream Rule	ionitor I 👻 Cor	nfiguration 🔻	Administration 💌	Help Apply
Static Service Static Service Controller General Multicast	Introller Global Rule mDNS Gateway Down Stream Rules Service List Name	Home K UP Stream Rule Dermit-al	tonitor Cor Advance	nfiguration 🔻	Administration •	Help Apply
Static Service Static Service Controller General Multicast Multicast VIAN	Introller Global Rule mDNS Gateway Down Stream Rules Service List Name	Home K C Pstream Rule permit-al	Ionitor Cor Advance	nfiguration I ▼ d	Administration ¥	Help Apply
Static Service Static Service Static Service Controller General Multicast Multicast Layer2 VLAN Layer2 VLAN	Introller Global Rule mDNS Gateway Down Stream Rules Service List Name	Home V UP Stream Ruds permit-al -	ionitor V Cor	nfiguration v	Administration 🔻	Help Apply A
Static Service Static Service Static Service Controller General Multicast General Interfaces VLAN Layer2 VLAN Layer3 Interf;	Introller Global Rule mDNS Gateway Down Stream Rules Service List Name Add X Delete St	Home V UP Stream Ruls permit-al -	ionitor Cor Advance Stage Type	nfiguration v d Show All	Administration •	Help Apply
Static Service Static Service Static Service Controller General Multicast General Interfaces VLAN Layer2 VLAN Layer3 Interface Vlan Group	Introller Global Rule mDNS Gateway Down Stream Rules Service List Name Add XDelete Strike Service Rule permit	Home V UP Stream Rule permit-al Ke Me	ionitor Cor Advance Ssage Type	nfiguration v d Show <u>All</u>	Administration ¥	Help Apply
Static Service Static Service Static Service Controller	Introller Global Rule mDNS Gateway Down Stream Rules Service List Name Add XDelete Sign Service Rule permit	Home V UP Stream Rule permit-al Kee Kee Kee Kee Kee Kee Kee Kee Kee Ke	ionitor Con Advance Sage Type	nfiguration v d Show All	Administration ¥	Help Apply
Static Service Static Service Static Service Controller General Multicast General Multicast Auticast Layer2 VLAN Layer2 VLAN Layer2 VLAN Layer2 Interfa Management Manageme	Introller Global Rule mDNS Gateway Down Stream Rules Service List Name Add XDelete Sign Service Rule permit	Home V UP Stream Rule permit-al Key Me	onitor Con Advance Stage Type	nfiguration ▼ d Show <u>All</u> s	Administration ¥	Help Apply
Static Service Static Service Static Service Controller System General Multicast Multicast Multicast Cuyer2 VLAN Layer3 Interfs VLAN Layer3 Interfs Vlan Group Management Manag	Introller Global Rule mDNS Gateway Down Stream Rules Service List Name Add XDelete Sign Service Rule Dermit	Home V UP Stream Rule permit-al Key Ma	Ionitor Con Advance Stage Type	nfiguration ▼ d Show <u>All</u> s	Administration ¥	Help Apply
Static Service Static Service Static Service Controller	Introller Global Rule mDNS Gateway Down Stream Rules Service List Name Add X Delete Strike Service Rule permit	Home UP Stream Rule UP Stream Rule permit-al Kove to Kee	Ionitor V Con Advance	nfiguration ▼ d Show <u>All</u> s	Administration ¥	Help Apply
Static Service Static Service Static Service Controller System General Multicast General Multicast Cuyer2 VLAN Layer2 VLAN Layer3 Interfa VIan Group Management Management Management Global Interface	Introller Global Rule mDNS Gateway Down Stream Rules Service List Name Add Celete Stand Service Rule permt	Home M UP Stream Rule permit-al - tove to Me	Ionitor V Con	nfiguration v d	Administration ¥	Help Apply

Step 5 Now, connect the Apple TV to the WLAN for mDNS services (in this setup, it is **POD3-AppleTV**) and the client iOS device (iPad/iPhone) to client WLAN (in this setup, it is POD3-Client). Navigate to **Monitor > Clients** and you will see that the Bonjour servicing the Apple TV and the Bonjour Client (your iPad/IPhone) are associated to two different SSIDs as shown below.

ahaha			K		
cisco Wirele	ss Controller	🟠 Home	Monitor •	Configuration •	Administration 🔻
Clients	Clients				
🕶 📴 Client Details	Number of Clients : 2				
Clients	Remove		S	how All	- 8
	Client MAC Address	AP Name	WLAN	State	Protocol
	🔲 7cd1.c339.582f 🕑	AP18e7.2861.	2	UP	802.11n-5ghz
	8438.353e.8244 🗹	AP18e7.2861.	1	UP	802.11ac-5ghz

To view client details, click the MAC address of client.

Apple TV:

flients Client Details Clients	Client Client > Detail General AVC Statistics	QOS Statistics		
	▼ Client Properties	K	▼ AP Properties	
	Mac Address	7cd1.c339.582f	AP Address	18:E7:28:69:84:B0
	IPv4 Address	10.10.31.51	AP Name	AP19e7.2861.6848
	JPv6 Address	None	AP Type	802.11n
	User Name	NA	Wan Profie	POD3-AppleTV
	Port Number	1	Status	Associated
	Interface	VLAN0031	Association ID	1

iOS Client:

cisco Wireless Controller	A Home	Monitor • Configuration • Administration •	Help	
Clients Client Detais Client	Client Clent > Detail General AVC Statistics	QOS Statistics		
	▼ Client Properties	8428 2536 9244	▼ AP Properties	19-57-29-60-94-90
	IPv4 Address	10.10.30.60	AP Address AP Name	AP18e7.2861.6848
	IPv6 Address	None	AP Type	11ac 🖌
	User Name	NA	Wan Profile	POD3-Client
	Port Number	1	Status	Associated
	Interface	VLAN0030	Association ID	2
	Vian ID	30	802.11 Authentication	Open System

Step 6 When multicast is enabled globally, mDNS bridging is enabled by default. This will cause Bonjour services in the same VLAN as Client to be learnt via mDNS bridging rather than through the mDNS gateway. Therefore, it is recommended to disable mDNS Bridging.

cisco Wirele	ss Controller	🟠 Home	Monitor •	Configuration •	Administration
Controller	Multicast				Apply
 System General Multicast 	Enable Global Multicast Mode Enable IGMP Snooping Enable mDNS Bridging	V V			
 Interfaces VLAN 	IGMP Timeout (seconds)	1000			

Go to **Configuration > Controller > System > Multicast** and uncheck the **Enable mDNS Bridging** check box and click **Apply**.

cisco Wirele	ss Controller	🟠 Home	Monitor •	Configuration •	Administration •
Controller	Multicast				Apply
 System General Multicast 	Enable Global Multicast Mode 🗹 Enable IGMP Snooping 🗹 Enable mDNS Bridging]			
 Interfaces VLAN 	IGMP Timeout (seconds) 1000				

Active Queries Configuration

I

Active Queries are specific filters that actively query for services attached to local segments. This helps to keep services "fresh" in the cache. If a device queries for a specific service, the cache already holds a valid record and it does not need to proxy the service query to the attached network segments, but can respond immediately. This also helps to quickly detect the removal of a service (For example: A device is turned off without proper announcement of the service removal).

Currently, the GUI is not available to configure the active query. Telnet or console into your WLC and configure the following to enable active query:

```
service-list mdns-sd active-query query
 service-type _airplay._tcp.local
service-type _raop._tcp.local
service-type _ipp._tcp.local
service-type _sleep-proxy._udp.local
 service-type _printer._tcp.local
 service-type
                 scanner. tcp.local
service-routing mdns-sd
service-policy-query active-query 60
```

Once clients are connected and Global mDNS are enabled, we can confirm the mDNS services that are discovered and cached by navigating to Monitor > Controller > mDNS > Service Cache.

ahaha		K	1.1		
cisco Wireless Co	ntroller 🏠 Home	Monito	r I • Configuration	🛛 💌 Adminis	stration 💌 Help
Controller 🕊	Service Cache				
• System			Show	Al	•
• Ports	Name	Vlan Id	Mac Id	TTL	Remaining
Security	0.E.4.6.7.B.E.F.F.F.B.7.0.2.E.9.0.0.0.0.0.0.0.0.	VI31	9c20.7bb7.64e0	120	117
h atabita	19.31.10.10.in-addr.arpa	VI31	9c20.7bb7.64e0	120	117
	_servicesdns-sdudp.local	VI31	9c20.7bb7.64e0	4500	4497
Management	_airplaytcp.local	V131	9c20.7bb7.64e0	4500	4497
Statistics	_servicesdns-sdudp.local	VI31	9c20.7bb7.64e0	4500	4497
CDP	_raoptcp.local	VI31	9c20.7bb7.64e0	4500	4497
AVC	A_TVairplaytcp.local	VI31	9c20.7bb7.64e0	120	117
Ped indancy	9C207BB764E1@A_TVraoptcp.local	VI31	9c20.7bb7.64e0	120	117
	A-TV.local	VI31	9c20.7bb7.64e0	120	117
* CO MONS	A_TVdevice-infotcp.local	VI31	9c20.7bb7.64e0	4500	4497
Service Cache	A_TVairplaytcp.local	VI31	9c20.7bb7.64e0	4500	4497
Static Service Cac	9C20788764E1@A_TVraoptcp.local	VI31	9c20.7bb7.64e0	4500	4497

Accessing Bonjour Service

- Once the mDNS is enabled and Bonjour services are being cached as shown in above steps, proceed with testing to see if the Bonjour services are routed across the VLANs.
- Make sure your Apple (iPhone/iPad) client is connected to the client WLAN and the Apple TV is connected to a separate WLAN.
- Ensure that the Apple TV has AirPlay enabled by checking the Settings > AirPlay menu from the home screen. An optional passcode can be set for security.

On your Apple iOS device, double-click the home button

0

to reveal the multi-tasking view.

• Swipe left to right (twice for iPhone, once for iPad) to reveal a menu with the AirPlay icon as depicted in the below screenshot. If you are using iOS7, swipe up the screen to see the options.



• Select the Apple TV from the list, and enable mirroring.

AirPlay	AirPlay 😡	AirPlay
🖵 iPad	D iPhone	
🖵 Apple TV 🛛 🗸	AirPort	D iPad
Mirroring ON		C Office Apple TV
With AirPlay Mirroring you can send		Mirroring
to an Apple TV, wirelessly.	Mirroring ON	With AirPlay Mirroring you can send
ه 🐱 🖌	With AirPlay Mirroning you can send everything on your iPhone's display to an Apple TV, wirelessly.	Cifice Apple TV 🔅 —

• The status bar of the Apple device will turn blue along with adding an icon for AirPlay, signifying that you are broadcasting your screen on the Apple TV.



Per-Interface mDNS Configuration

It is possible to restrict the WLC to only learn and cache services available on specific interfaces. In this example, we will remove the global service-list created in the previous section and create a service-list tied to a specific VLAN interface.

1 Go to Configuration > Controller > mDNS > Global. In the Down Stream Rules tab, select None from the Service List Name drop-down list.

I

cisco Wireles	s Controller		🟡 Home	Monitor 🔻	Configuration •	Administration 🗸
Controller	Global Rule					Apply
🕨 🚞 System	mDNS Gateway					
Internal DHCP 5	Down Stream R	ules UP S	Stream Rule:	s Advani	ced	
Management Mobility Manage mDNS	Service List Name	None permit-all None				
Global	Add 🔀 Delete	Create New	»	Show [All	- 8
Static Service	Service Rule No data available		Me	ssage Type	S	iervice Instance 🔦

2 In the UP Stream Rules tab, select None from the Service List Name drop-down list.

cisco Wireles	s Controller	👧 Home	Monitor • Configur	ration 🖛 Administration
Controller	Global Rule			Apply
System	mDNS Gateway			
Internal DHCP S	Down Stream Rules	UP Stream Rule	s Advanced	
 Management Mobility Manage mDNS 	Service List Name	None permit-al None	-	
Global	Add XDelete	Mo Create New	Show All	• 8
Interface	Service Rule	Me	issage Type	Service Instance
Static Service	No data available			

3 Go to Configuration > Controller > mDNS > Interface > Vlan Number.

ahaha			K		
cisco Wireless Controller		🟠 Home 🛛 Monitor 🛛 🔻	Configuration •	Administration 🔻	Help
Controller	Interface List				
System					
📒 Internal DHCP Server				Show All	• 5
🧮 Management	Interface Name	Status	Protoco	1	IP-Address
Mobility Management	Vlan1	administratively down	down		unassigned
R ADAK K	Vlan30	up	up		10.10.30.2
	Vlan31	up	up		10.10.31.2
Global	Vlan33	down	down		10.10.33.2
Static Service	Vlan105	up	up		10.10.105.30

4 To filter the services to be learnt on only one VLAN, apply the previously created service-list **permit-all** on the VLAN to which the AppleTV is connected. In our example, this is **VLAN 31**.

Go to *Vlan Number* > Down Stream Rules tab and from the Service List Name drop-down list, select permit-all.

cisco wirele	ss condoner		<u> </u>	me Monitor 🛛	Configuration
Controller	vlan31 Rule	V			Apply
🕨 🚞 System	Down Stream	n Rules UP Stre	am Rules	Advanced	
Internal DHCP Management Mobility Manaç mDNS	Service List Na	me None 4 permit-all None Create New			
Global	Add XDel	ete $\underset{\Phi}{\equiv} Move to$ X	Show /	9.II	- 8
Interface	Service R	ule	Message T	ype	Service I
Chatia Cam	No data availa	ble			

5 Also, apply this policy in the upstream direction as well. Go to *Vlan Number* > UP Stream Rules tab and from the Service List Name drop-down list, select permit-all and click Apply.

cisco Wirele	ess Controller	🏡 Home Moni	tor ▼ Configuration ▼
Controller	vlan31 Rule	1	Apply
🕨 🚞 System	Down Stream Rules UP Stream	Rules Advanced	
Internal DHCP Management Mobility Manaç Mobility Manaç	Service List Name None Permit-al None Create New		
📄 Global	Add 🗙 Delete 💒 Move to 🄉	Show All	- 8
Interface	Service Rule	Message Type	Service Inst
📄 Static Serv	No data available		

6 To receive and process queries from wireless clients, service list must be applied to the client VLAN. For this example, we will apply the same Service List **permit-all** on the client VLAN to which the iOS/Apple client is connected. In our example, this is **VLAN 30**.

Go to *Vlan Number* > Down Stream Rules tab and from the Service List Name drop-down list, select permit-all.

cisco Wirele	ss Controller	torne Monitor I ▼ Configuration I ▼
Controller	Vlan30 Rule 🖌	Apply
System	Down Stream Rules UP St	ream Rules Advanced
Internal DHCP Management Mobility Manag	Service List Name None Permit-all None Create New	
Global	Add 🗙 Delete 🚔 Move to	» Show All • 5
	Service Rule	Message Type Service I
Static Serv	No data available	

7 Also, apply this policy in the upstream direction for the client VLAN. Go to *Vlan Number* > UP Stream Rules tab and from the Service List Name drop-down list, select permit-all and click Apply.

				M H	ome	Monitor 🔻	Configuration	117
Controller	Vlan30 Rule			-0 T				oly
🕨 🚞 System	Down Stream R	tules UP	Stream	Rules	Adv	anced		
 Internal DHCP Management Mobility Manaç mDNS 	Service List Name	None 4 permit-all None Create New						
Global	Add 🗙 Delete	≣¢ Move to	>>	Show	All		• 7	3
Interface	Service Rule			Message	Туре		Service I	inst
Static Serv	No data available							

8 You must wait a minute or so for the query to refresh. Then, verify the interface service lists by mirroring your client to the Apple TV again.



Service Rules are processed in sequence. Also, redistribution is not enabled in this configuration.



Redistribution is the process of forwarding service announcements to other segments. This is turned off by default. If a service is announced on one segment, it will be recorded in the cache. However, other segments will not see this service instance unless the service is actively queried. If the service should be visible on other segments at the time of its original announcement on the originating segment, redistribution must be enabled.

Location Aware Bonjour Services

Location (proximity) is defined based on the AP neighbor list. When enabled, we identify the AP MAC address to which querying client is associated and leverage the AP neighbor list learned via RRM to define proximity. Proximity based filtering only applies to response filtering and not to redistribution or queries sent out.



This is only supported for wireless mDNS services. Wired services will not be filtered.

For Example:

If you have AppleTVs and Bonjour printers in your environment, but want only the AppleTVs within the vicinity/proximity of the client to be made available to the client, you must enable proximity for Airplay services. Assuming that the client is connected to AP 1 that has AP 3, AP 5, and AP 7 in its neighbor list:

- When the client requests for print services, all printers cached on the WLC are sent in response.
- When the same client requests for Airplay, only Airplay service providers associated to APs 1, 3, 5, and 7 are made available to the client.

In the following example, we will set up a proximity query called **query2** (you can assign any name you desire) matching Airplay and with the services limit of 10 (you can assign minimum of 1 and maximum of

100 services for **max services option**). This will return only 10 Apple TVs that are in the RF-vicinity of this client's AP.

Complete these steps:

- 1 Go to Configuration > Controller > mDNS > Global > Advanced tab.
- 2 In the **Proximity** area, define the **max services option** as **10**.
- 3 From the Service List Active Query drop-down list, select Create New.
- 4 Enter the Service List Name as query 2.
- 5 Click New and select the Service Type as AppleTV and click OK.
- 6 To add another service type, click New and select the Service Type as AirTunes and then click OK.
- 7 Click Apply.

altalta cisco Wirele	ss Controller		🟡 Home	Monitor 🔻	Configuration 🔻	- Ac
Controller 🖌	Global Rule				Apply	
🕨 🧱 System	mDNS Gateway					
Internal DHCP Management	Down Stream Rules	UP Stream Ru	es Adv	anced		_
Mobility Manag	Self Designated Gatev	way				
* 🚰 mDNS	Enable Proximity			AFP AirPrint		
📄 Interface	max services option Service List Active Query	10 Create New 💌	K	AirTunes AppleRemo	oteDesktop	I
	Service List Name	query2	Show All	HP_Photos HP_Photos Printer iTuneHome	mart_Printer_1 mart_Printer_2 eSharing	
	Service Type No data available			iTuneMusic iTuneWirel FtpServer Scanner TimeCapsu create Nev Service	Sharing Sharing essDeviceSharing leBackup v Type AFP 7 OK Cance	

ahah cisco Wirele	ss Controller		A Home Monitor ▼ Configuration ▼ A
Controller	Global Rule		Apply
System Internal DHCP	mDNS Gateway	UP Stream Rul	es Advanced
 Management Mobility Manag 	Self Designated Gatev	vay	
▼ 🚰 mDNS	Enable Proximity		AFP AirPrint AirTunes
📄 Interface 📄 Static Servi	max services option Service List Active Query	10 Create New 💌	AppleRemoteDesktop AppleTV HP_Photosmart_Printer_1
	Service List Name	query2	HP_Photosmart_Printer_2 Printer iTuneHomeSharing
	New Remove Service Type		iTuneMusicSharing iTuneWirelessDeviceSharing
			Scanner TimeCapsuleBackup
			Service Type AFP Cancel

At this point, the Apple Client (iPad) will only list the AppleTVs that are associated to the APs in the neighbor list of its own AP.

Proximity filtering works only if the total number of services in the mDNS cache is greater than 10. For example, if the service provider list has lesser than 10 services, all the services are listed irrespective of the presence of AP in the neighbor list. The filtering for neighboring AP occurs only if the service provider list has more than 10 services.

Static Service

You can configure static services that are always present in the cache. This is required for passive Bonjour service providers that are either not capable of advertising on their own or do it infrequently.

In the following example, we will create a static service for a printer in the lobby and verify the services cached for the same.

Complete these steps:

- 1 Go to Configuration > Controller > mDNS > Static Service .
- 2 Click New and enter the printer details as shown in the figure below.
- 3 Click OK and Apply.

cisco Wireless Con	troller 🙆 Home Monitor I + Configurat	ion 🔻 Administration 👻 Help
Controller	Static Services	ADDAY
📲 System	New Remove	Show Al Show
General Multicast	Add	8
VLAN Internal DHCP Server Management	Service Instance Name * Registration Type *	printer ipptcp
mDNS	Domain Name * Hostname * IPv4 Address #	local lobby-printer.local 172.20.229.16
Global Interface // Static Service	IPv6 Address # Port(0 - 65535) Peretru(0 - 260)	[5005 [100
	Text record Weight(0 - 360)	lobbyprinter
	* fields are mandatory # either of IPv4 Address or IPv6 Address is mandatory	CK Cancel

To verify the cached static service entry, go to Monitor > Controller > mDNS > Static Service Cache.

ontroller 🖌	Static Service Cache						
System						Show	All
Ports	Name	Vlan Id	Mac Id	TTL	Remaining	Туре	RR Record Data
Security	_jpptcp.local	0		4500	4500	PTR	testprinterjpptcp.local
- Malata	testprinterjpptcp.local	0		120	120	SRV	lobby-printer.local
	testprinterjpptcp.local	0		4500	4500	TXT	(6)'lobby'
🧱 Management	lobby-printer.local	0		120	120	A	172.10.10.10
Statistics							
CDP							
AVC							
Redundancy							
🖻 mDNS 🖌							
T							

Self-Designated Gateway

When multiple mDNS gateways are configured in the same domain, query and announcement packets are received by all mDNS gateways. Network administrators have the option of configuring a Designated Gateway in a given link local domain to address this issue:

Go to **Controller > mNDS > Global > Advanced** tab. Enable **Self Designated Gateway** by checking the **Enable** check box.

Controller	Global Rule				
• 🚞 System	mDNS Gateway 🔽				
Internal DHCP Server	Down Stream Rules UP Stream Rules Advanced				
Mobility Management	Self Designated Gateway				
 ▼ mDNS Global i Interface Static Service 	Enable Proximity max services option Service List Active Query None				
	New Remove				
	Service Type No data available				

Service Type Enumeration

Service Type Enumeration provides an easy way to find the list of advertised service types in large networks where the number of available services are high. When Enumeration is enabled, it will return only one entry in the cache for each service. Note that, this can only be configured via the CLI at this time and no GUI options are available.

service-routing mdns-sd service-policy permit-all IN service-policy permit-all OUT service-policy-query query2 100 service-type-enumeration period 15	
show mdns service-types	
[<service name="">]</service>	[If-name]
ipp. tcp.local	V1105
http. tcp.local	V1105
scanner. tcp.local	V1105
http-alt. tcp.local	V1105
printer. tcp.local	V1105
pdl-datastream. tcp.local	V1105
airplay. tcp.local	V131
raop. tcp.local	V131
sleep-proxy. udp.local	V131
touch-abletcp.local	V131

Civic Location (Location Awareness for Wired Services)

Wired mDNS service filtering options allow or disallow services that are learnt from or announced to civic location templates. The civic location template includes fields such as country, city, street, building name, and so on. These attributes of the fields are configured and matched with the location template in the wired interface.

In the following example, the filtering enhancement refers to the template ID (corp-office) of the location module, and the actual attributes, for example—city, building name and so on are configured as part of the location template.

Example Configuration 1:

```
location civic-location indentifier corp-office
name SJC-14
number 14
floor 1
int gig 1/0/1
no switchport
location civic-location-id corp-office
ip address 15.1.1.1 255.255.255.0
end
service-list mdns-sd Location-1 permit 10
match location civic corp-office
service-routing mdns-sd
```

Example Configuration 2:

The following is a detailed example of the IN and OUT filtering process using civic location criteria with configuration and use cases.

The OUT filtering use case: To prevent clients in Building-2 from learning the printer services advertised in Building-1.

Building 1 devices are in VLAN 200, 400. Building 2 devices are in VLAN 100, 300.

```
location civic-location identifier Building-1
building Building-1
location civic-location identifier Building-2
```

building Building-2 service-list mdns-sd building-2-list-out deny 20 match service-type _ipp._tcp.local
match location civic Building-1 Service-list mdns-sd building-2-list-out permit 40 service-list mdns-sd building-1-list-out deny 20 match service-type ipp. tcp.local match location civic Building-2 Service-list mdns-sd building-1-list-out permit 40 Service-list mdns-sd permit-all permit 20 Service-routing mdns-sd Service-policy permit-all in Service-policy permit-all out interface Ethernet0/0 ! Building 2 is connected to the interface in vlan 100 location civic-location-id Building-2 switchport access vlan 100 switchport mode access Service-routing mdns-sd Service-policy building-2-list-out OUT // When a query is received from the client in vlan 100 (building 2), building-2-list-out is applied that denies printers from building 1, but allows everything else. interface Ethernet1/0 location civic-location-id Building-2 switchport access vlan 300 switchport mode access Service-routing mdns-sd Service-policy building-2-list-out OUT interface Ethernet2/0 location civic-location-id Building-1 switchport access vlan 200 switchport mode access Service-routing mdns-sd Service-policy building-1-list-out OUT interface Ethernet3/0 location civic-location-id Building-1 switchport access vlan 400 switchport mode access Service-routing mdns-sd Service-policy building-1-list-out OUT

The IN filtering use case: To prevent the mDNS cache from learning apple TVs advertised in the Dorm-room. In the following example, e0/0 vlan 100 is connected to the Dorm-room, while other ports are terminated in class-rooms.

Note

You can configure ports to be in Dorm-room/Class-room as in example below.

```
location civic-location identifier Dorm-room
     building Dorm-room
location civic-location identifier Class-room
     building class-rooms
Service-list mdns-sd example deny 10
  Match service-type airplay. tcp.*
  Match location Dorm-room
Service-list mdns-sd example permit 20
Service-list mdns-sd permit-all permit 20
Service-routing mdns-sd
 Service-policy example IN
 Service-policy permit-all OUT
interface Ethernet0/0
! Dorm room is connected to interface in vlan 100
location civic-location-id Dorm-room
switchport access vlan 100
switchport mode access
interface Ethernet1/0
location civic-location-id Class-room
switchport access vlan 300
switchport mode access
```

Service Discovery Gateway Summary

- 5760 (14K services), 3850 (2K services), and 3650 (2K services).
- Supported with Centralized and Converged Access mode.
- Detect wired and wireless services on VLAN L2 adjacent to the WLC.
- Each Bonjour service has an advertised Time To Live (TTL). The controller will ask the device for an update at 85% of this TTL.



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