

Preface

Revised: April 04, 2013,

This section discusses the objectives, audience, conventions, and organization of the *Cisco Bonjour Gateway Deployment Guide* and provides general information about Cisco IOS software documentation.

Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM, a member of the Cisco Connection Family, is updated monthly. Therefore, it might be more up to date than printed documentation. To order additional copies of the Documentation CD-ROM, contact your local sales representative or call customer service. The CD-ROM package is available as a single package or as an annual subscription.

Objectives

This document provides information on the theory of operation and configuration for the Cisco Unified Wireless LAN solution in support of multicast applications such as the Apple Bonjour protocol. The Bonjour protocol enables Apple devices to query and announce for specific services such as AirPlay, which allows audio and video to be shared between devices dynamically.

Audience

This publication is intended primarily for users who configure and maintain routers, but are not necessarily familiar with tasks, the relationship between tasks, or the commands necessary to perform particular tasks. In addition, this publication is intended for users with some familiarity with IP and telephony networks.

Cisco IOS Software Documentation

In addition to the information provided in this publication, you might need to refer to the Cisco IOS documentation set. The Cisco IOS software documentation is divided into nine modules and two master indexes. Each module consists of two books: a configuration guide and a corresponding command reference. Chapters in a configuration guide describe protocols, configuration tasks, and Cisco IOS software functionality and contain comprehensive configuration examples. Chapters in a command reference provide complete command syntax information. Each configuration guide can be used in conjunction with its corresponding command reference.

Organization

This chapter describes the contents of each chapter in this document.

Chapter	Title	Description
Chapter 1	Bonjour Deployment	Overview of the Bonjour Deployment.
Chapter 2	Printer Services	A general description of Printer Services and commands.

Command Syntax Conventions

Table 2 describes the syntax used with the commands in this document.

Table 2	Command S	Svntax Guide
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Convention	Description
boldface	Commands and keywords.
italic	Command input that is supplied by you.
[]	Keywords or arguments that appear within square brackets are optional.
{ x x x }	A choice of keywords (represented by x) appears in braces separated by vertical bars. You must select one.
^ or Ctrl	Represent the key labeled <i>Control</i> . For example, when you read ^ <i>D</i> or <i>Ctrl-D</i> , you should hold down the Control key while you press the D key.
screen font	Examples of information displayed on the screen.
boldface screen font	Examples of information that you must enter.
< >	Nonprinting characters, such as passwords, appear in angled brackets.
[]	Default responses to system prompts appear in square brackets.



Bonjour Deployment

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Deployment Considerations

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The Bonjour protocol operates on service announcements and service queries, which allow devices to ask and advertise specific applications such as:

- Printing Services
- File Sharing Services
- Remote Desktop Services
- iTunes File Sharing
- iTunes Wireless iDevice Syncing (in Apple iOS v5.0+)
 - Music broadcasting in iOS v4.2+
 - Video broadcasting in iOS v4.3+
 - Full screen mirroring in iOS v5.0+ (iPad2, iPhone4S, or later)

Each query or advertisement is sent to the Bonjour multicast address for delivery to all clients on the subnet. The Apple Bonjour protocol relies on Multicast DNS (mDNS) operating at User Datagram Protocol (UDP) port 5353 and sending to the reserved group addresses listed below:

- IPv4 Group Address 224.0.0.251
- IPv6 Group Address FF02::FB

The addresses used by the Bonjour protocol are link-local multicast addresses and are only forwarded on the local Layer 2 (L2) domain, since link-local multicast is meant to stay local by design. Routers cannot use multicast routing to redirect the traffic because the time to live (TTL) is set to one.



Cisco Bonjour Gateway Solution in Release 7.4

In the 7.4 release, the wireless LAN controller (WLC) supports Bonjour gateway functionality on the WLC itself. You do not need to enable multicast on the controller. The WLC snoops all Bonjour discovery packets but does not forward them on the AIR or Infra network.

Bonjour is the Apple version of zero configuration networking (Zeroconf); it is mDNS with DNS Service Discovery (DNS-SD). Apple devices advertise their services via IPv4 and IPv6 simultaneously (IPv6 link local and Globally Unique). The current 7.4 implementation does not support Bonjour Snooping for IPv6 Addresses. On the iPad, you cannot turn off IPv6 or change any of the Bonjour settings.

If you want to control mDNS/Bonjour, the key is to limit the size of the local segment.

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To address this issue, the Cisco WLC acts as a Bonjour gateway. The WLC listens for Bonjour services and by caching those Bonjour advertisements (AirPlay, AirPrint, and so forth) from the source/host (such as AppleTV) and responding back to Bonjour clients when they ask for or request a service. This process is shown below.



1. The controller listens for the Bonjour services.

2. The WLC caches the Bonjour services.



3. The WLC listens for the client queries for services.



4. The WLC sends a unicast response to the client queries for Bonjour services.



Bonjour Deployment Using mDNS Gateway

Bonjour Configuration on WLAN Through the User Interface

In the 7.4 release, the WLC supports Bonjour gateway functionality on the WLC itself. You do not need to enable multicast on the WLC. The WLC snoops all Bonjour discovery packets but does not forward them on the AIR or Infra network.

1. To configure and demonstrate the Bonjour feature on the WLC, create a dynamic interface for Bonjour services on a separate VLAN from the client VLAN.

The example below shows different interfaces and VLANs for Apple Clients and Apple TV:

cisco				WIRELESS	SECURITY		IMANDS HELP EEEDBAC	ж
Controller General Inventory Interfaces	Interfaces Interface	Apple Name	τv	VLAN Identifier 11	IP Address 10.10.11.2	Interface Type Dynamic	Dynamic AP Management Disabled	t 🖸
Interface Groups	manageme	*		10	10.10.10.2	Static	Not Supported	
Multicast Internal DHCP Server Mobility Management Ports NTP		Ap	ple Clients			5.00	Hot Sapper au	

- **2.** Create a wireless LAN (WLAN) for clients with any security type. By default, mDNS snooping is enabled on the WLAN.
- **3.** To confirm, click **WLAN id**, click the **Advanced** tab, and make sure that the mDNS Snooping option is Enabled. Select **default-mdns-profile** as the mDNS Profile to allow the Bonjour services you require to advertise on the particular WLAN.
- 4. Click Apply.

ahaha							
CISCO	MONITOR WLANS CONTRO	ILLER WIRELESS	SECURITY MANAGEM	IENT COMMANDS	HELP	EEEDBACK	
/LANs	FlexConnect						
WLANS	FlexConnect Local Switching 4	Enabled					
Advanced	FlexConnect Local Auth	Enabled					
Auvanceu	Learn Client IP Address &	Enabled					
	Vlan based Central Switching 42	Enabled					
	Central DHCP Processing	Enabled					
	Override DNS	Enabled					
	NAT-PAT	Enabled					
	mDNS						
	mDNS Snooping			Enabled			
	mDNS Profile default-mdr	s-profile 💌					



Only one mDNS profile can be applied to one WLAN.

NAS-ID

5. Create another WLAN for services and make sure that the WLAN is mapped to an interface other than management, as shown below.

Note

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Release v5.0 of Apple TV does not support Wi-Fi Protected Access 2 (WPA2)-Enterprise authentication. For 802.1x networks, you can work around this problem by creating a WPA2-Pre- Shared Key (PSK) WLAN using the same wired interface.

ONITOR <u>W</u> LANS <u>C</u> ON	Troller Wireless Security	MANAGEMENT COMMAN	ds he <u>l</u> p i	FEEDBACK		
LANs > New					< Bac	k Apply
Туре	WLAN 💌					
Profile Name	POD1-AppleTV					·/
SSID	POD1-AppleTV					
ID	2					
CISCO	MONITOR WLANS CO	NTROLLER WIRELESS	SECURIT	Y MANAGEMENT	COMMANDS HE	LP FEEDBAC
ANs.	WLANs > Edit 'POD1	-AppleTV'				
WLANS	General Security	OnS Advanced				
WLANS	dentral becamy	- Quo - maraneca				
Advanced	Profile Name	POD1-AppleTV				
	Туре	WLAN				
	SSID	POD1-AppleTV	-			
	SSID Status	POD1-AppleTV	_			
	SSID Status	POD1-AppleTV	_			
	SSID Status Security Policies	PODI-AppleTV				
	SSID Status Security Policies	PODI-AppleTV Enabled None (Modifications done und	er security ta	b will appear after a	pplying the changes.)	
	SSID Status Security Policies Radio Policy	PODI-AppleTV Enabled None (Modifications done und All	er security ta	b will appear after a	pplying the changes.)	
	SSID Status Security Policies Radio Policy Interface/Interface Group(G)	PODI-AppleTV Pobled None (Modifications done und All dynamic	er security ta	b will appear after a	pplying the changes.)	
	SSID Status Security Policies Radio Policy Interface/Interface Group(G) Multicast VIan Feature	PODI-AppleTV Pobled None (Modifications done und All dynamic Enabled	er security ta	b will appear after a	oplying the changes.)	

6. Connect the Apple TV to the service set identifier (SSID) created for device services, and connect the Bonjour client (iPad/iPhone) to the SSID for clients.

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7. Navigate to **Monitor > Clients** to see that the Bonjour servicing Apple TV and the Bonjour client (your iPad/IPhone) are associated with two different SSIDs, as shown below:

CISCO	MONITOR WLANS	CONTROLLER	WIRELESS	SECURITY	MANAGEMENT	COMMANDS	HELP	EEEOBACK			
Monitor	Clients									Entr	ies 1 - 2
Summary Access Points	Current Filter	Apple TV	[Change Filts	r) (Clear Filter	1						
Cisco CleanAir	Client MAC Adde	AP Name		WLAN	Profile	WLAN SSID		User Name	Protocol	Status	Auth
Statistics	10:40:f3:e5:d1:b5	AP36021-303f		POD1	AppleTV	POD1-AppleTV	1		802.11bn	Associated	Yes
> CDP	7c:d1:c3:80:2b:c0	AP36021-303f		POD1	Client	P001-Client	l		802.11bn	Associated	Yes
Rogues		~				Representation of the local distance of the	·				
Clients		iDad/(Dhay									7
Multicast		Faunenoi	16								200
Applications											126

As shown above, it is implied that the Apple TV and the client are connected on different VLANs. This mapping will be confirmed in the next steps.

- **8.** Click the client MAC address of the Bonjour device Apple TV, as shown above, to view its details.
- **9.** Verify that the Apple TV associated to the interface is mapped to a different VLAN than the VLAN of the client. In this case, it is VLAN 11.

Monitor	Clients > Detail				< Back Link Test
Summary Access Points	General AVC St	atistics			
Cisco CleanAir	Client Properties		AP Properties		
CDP	MAC Address	10:40:f3:e5:d1:b5	AP Address	64:d9:89:42:22:d0	
Roques	IPv4 Address	10.10.11.132	AP Name	AP36021-303f	
Clients	IPv6 Address	fe80::1240:f3ff:fee5:d1b5,	AP Type	802.11bn	
Multicast			WLAN Profile	POD1-AppleTV	
Applications			Status	Associated	
			Association ID	4	
			802.11 Authentication	Open System	
			Reason Code	1	
			Status Code	0	
			CF Pollable	Not Implemented	
			CF Poll Request	Not Implemented	
	Client Type	Regular	Short Preamble	Implemented	
	User Name		PBCC	Not Implemented	
	Port Number	1	Channel Agility	Not Implemented	
	Interface	dynamic	Timeout	1800	
	VLAN ID	11	WEP State	WEP Disable	

10. Click the MAC address of the client (iPad/iPhone) to view its details. As shown below, ensure that the iPad/iPhone is associated to an interface other than the services interface. In this case, it is VLAN 10.

Monitor	Clients > Detail				< Back Link Test
Summary	General AVC St	atistics			
Access Points Cisco CleanAir Statistics	Client Properties		AP Properties		10.000
CDP	MAC Address	7c:d1:c3:80:2b:c0	AP Address	64:d9:89:42:22:d0	
Roques	IPv4 Address	10.10.10.162	AP Name	AP36021-303f	
Clients	IPv6 Address	fe80::7ed1:c3ff:fe80:2bc0,	AP Type	802.11bn	
Multicast			WLAN Profile	POD1-Client	
Applications			Status	Associated	
			Association ID	2	
			802.11 Authentication	Open System	
			Reason Code	1	
			Status Code	0	
			CF Pollable	Not Implemented	
			CF Poll Request	Not Implemented	
	Client Type	Regular	Short Preamble	Implemented	
	User Name		PBCC	Not Implemented	
	Port Number	1	Channel Agility	Not Implemented	
	Interface	management	Timeout	1800	
	VLAN ID	10	WEP State	WEP Disable	

mDNS Profile Configuration Through the User Interface

- 1. To create and apply the Bonjour services, go to CONTROLLER > mDNS > General.
- **2.** Under Global Configuration, check the mDNS Global Snooping checkbox to enable snooping; it is disabled by default. The Master Services Database shows the default profiles, which are preconfigured.

cisco	MONITOR	WLANS		WIRELESS	SECURITY	MANAGEMENT	COMMANDS	HEL
Controller	mDNS							
General Inventory	Global Co	nfiguratio	n					
Interfaces Interface Groups	mDNS Gl	obal Snoopi	ing					
Multicast	Query Int	erval (10-1	20)			15 (mins)		
 Internal DHCP Server Mobility Management 	Master Se	rvices Da	itabase					
Ports	Select Se	rvice	N	lone		~		
▶ NTP	Query Sta	atus						
▶ IPv6		Add	1					
* mDNS			Ser	vice			-	
General - Profiles	Service N	ame	Stri	ng		Query Status	-	
Domain Names	AirPrint		_ipp	tcp.local.				
Advanced	AppleTV		_air	play_tcp.local.			-	
	Printer		_pri	ntertcp.local.				

The Master Service Database is a user-configured database for all Bonjour services supported by the WLC. As shown above, a default list of services, like Apple TV and Printer, are added to this list on start-up. The WLC snoops and learns about mDNS service advertisements only if the service is present in the master-service-list database. Similarly, only those queries for services listed in the master-service-list are responded back to clients, as long as the Bonjour profile name associated with the client allows for the service query. A maximum of 64 services can be included in the master-service-list database, so the controller has the potential to snoop and learn about 64 different services.

Select Service	None	
Query Status	None	
	Apple File Sharing Protocol(AFP)	L.
ordel	Scanner	
Proto	FTP	L.
	iTunes Music Sharing	L.
Service Name	stitutes Home Sharing stitutes Wireless Device Syncing	er
AirPrint	Apple CD/DVD Sharing	Г
AppleTV	Time Capsule Backup	
	Oulei	

3. To add Bonjour services, select the desired option from the Select Service drop-down list. In this example, select Scanner.

cisco	HONITOR	WLANS	CONTROLLER	WIRELESS	SECURITY	MANAGEMENT	COMMANDS	нецр	EEEDBACK	Sage Configuration	Eng	Logout Befresh
Controller	mDNS	6										Apply
General Inventory	Global Cont	liguratio	n									
Interface Groups	mONS Glob	al Snoop	na			V.						
Multicast	Query Inter	rval (10-1	20)			15 (mins)						
Internal DHCP Server	Master Serv	vices Da	tabase									
Mobility Management	Select Serv	rice		lone		-						
NTP	Query State	us 🗌		pple File Shari	ng Protocol(A/I	(9)						
CDP		Add		rcanner TP Funes Music Sh	aring							
IPv6	Service Nan	ne	1	funes Home Sh	aring Deuce Suscia	Query Statu	5					
mDNS	AirPrint		- 4	ople Remote D	esktop	× ×						
General	AppleTy		- 4	ople CD/DVD ! me Capsule B	sharing	R	•					
Profiles Domain Names	Printer			ther		N						
Advanced												

4. Click the Add button, then click Apply. Each service name has a predefined service string.

cisco	MONITOR WLANS CONT	TROLLER WIJRELESS SECU	RITY MANAGEMENT CO	MMANDS HEL	P EEEDBACK	nate construction (Cast) reflect Descent
Controller	mDNS					Apply
Inventory	Global Configuration					
Interface Groups	mDNS Global Snooping		×			
Multicast	Query Interval (10-120)		15 (mins)			
Internal DHCP Server	Master Services Databas	e				
Mobility Management	Select Service	Scanner	•			
> NTP	Query Status					
IPv6	Service Name	Service String	Query Status			
mDNS	AirPrint	_ipptcp.local.	1 N			
General	AppleTV	_airplaytcp.local.	N.			
Domain Names	Printer	_printertcp.local.	X			
Advanced						

- 5. To select the services to be advertised, click **mDNS > Profiles.** The default profile appears.
- 6. Navigate to Controller > mDNS > Profiles, and select the default-mdns-profile.

cisco	MONITOR	<u>W</u> LANs	CONTROLLER	WIRELESS	<u>s</u> ecurity	MANAGEMENT	C <u>O</u> MMANDS
Controller	mDNS P	rofiles					
General Inventory	Number of	Profiles 2					
Interfaces	default-hou	sieur erefik			2	o. Of Services	
Interface Groups Multicast	default-md	Ins-profile			3		2
Internal DHCP Server Mobility Management							
Ports							
▶ NTP							
CDP							
Pv6							
mDNS General Profiles Domain Names							



If the requirement is to use only default services, assign the default?mdns?profile to that particular WLAN.

	MONITOR	<u>W</u> LANs		WIRELESS	SECURITY	MANAGEMENT	C <u>O</u> MMANDS	HELP
Controller	mDNS Pr	ofile > E	dit					
General Inventory Interfaces Interface Groups Multicast Internal DHCP Server Mobility Management Ports	Profile Na Profile Id Service C No. of Int No. of Int No. of WI Services I	ame Count terfaces Att terface Gro ans Attache List	ached ups Attached ed			def 1 3 0 0 2	ault-mdns-profile	•
CDP IPv6 mDNS General Profiles Domain Names Advanced	Service M Service Name AirPrint AppleTV Printer	lame		AirPrint 🔽			0	

To check which Bonjour services are running, click mDNS > Domain Names.

In the example below, Apple TV is being discovered as the wireless medium.

Controller	mDNS Domain Name	IP > Summary			
General Inventory	Number of Domain Name	e-IP Entries 1			
Interfaces	Domain Name	MAC Address	IP Address	Vian Id	Туре
Interface Groups Multicast	Apple-TV-2.local.	10:40:f3:e5:d1:b5	10.10.11.132	11	Wireless
▶ Internal DHCP Server					
▶ Mobility Management					
Ports					
▶ NTP					
▶ CDP					
▶ IPv6					
 mDNS General Profiles Domain Names 					
Advanced					

7. When the Bonjour service appears under Domain Name, navigate to mDNS > General > AppleTV to check which mDNS profile the service is using. Since this example uses the default profile, the services appear under default-mdns-profile.

cisco		LLER WIRELESS SECU	UTY MANAGEMENT (OMMANDS HELP EEEDBA	Saye Configuration	Bing Logout Befresh
Controller General Inventory Interface Groups Multicast Network Routes Hernal DHCP Server Hobility Management Ports NTP > NTP > DDP POTP6	mDNS Service > Detail Service Name Service String Service Id Service Query Status Profile Court Service Provider Court Profile Information Profile Information Service Provider Informatio	n	AosletV sirplay_top 3 Enabled 1 1	Jocal		< bot
IPv6 mDNS General Profiles Domain Names	MAC Address 9c:20:7b:7a:de:85	Service Provider Nam Apple TV1airplaytcp.	e Vlan Id ocal. 11	Type Wireless	TTL (seconds) 4500	Time Left (seconds)

8. Once the profile is attached to the WLAN, check to see if the Bonjour services are routed across the VLANs.

- 9. Make sure your Apple iPhone/iPad Client is connected to the client SSID.
- **10.** Using the TV remote for the monitor, select AirPlay from the Settings menu, and ensure AirPlay is enabled. You can set an optional passcode for security.
- 11. On your Apple iOS device, double-click the home button to reveal the multi-tasking view.



12. Swipe left to right (twice for an iPhone, once for an iPad) to reveal a menu with the AirPlay icon, as shown below.



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

AirPlay	AirPlay 🔤
🖵 iPad	D iPhone
Apple TV 🗸	AirPort
Mirroring ON	C Apple TV
Ith AirPlay Mirroring you can send everything on your iPad's display to an Apple TV, wirelessly.	Mirroring ON
	With AirPlay Mimoring you can send everything on your iPhone's display to an Apple TV, winelessly.

14. The status bar at the top of the Apple device turns blue and displays an icon for AirPlay to signify that you are broadcasting your screen on the Apple TV.



mDNS Services with Wired Bonjour Devices

In most scenarios, some Bonjour devices may be directly connected to the switch or device. Bonjour services can be accessed even when the Bonjour device is connected via an Ethernet cable on a network.



The VLAN of wired Bonjour devices must be trunked to the controller so that their advertisements can be seen and sent out to wireless clients. In this example, the Bonjour device (Apple TV) is on VLAN 11 tied to the dynamic interface on the controller.

1. On the WLC user interface, navigate to **Controller > mDNS > Domain Names**. Apple TV is now discovered as the wired medium in the dynamic VLAN, as shown below.

Controller	mDNS Domain Name	IP > Summary			
General Inventory	Number of Domain Name	-IP Entries 1			
Interfaces	Domain Name	MAC Address	IP Address	Vian Id	Туре
Interface Groups Multicast	Apple-TV-2.local.	10:40:f3:e5:d1:b5	10.10.11.132	11	Wired
Internal DHCP Server					
Mobility Management					
Ports					
▶ NTP					
+ CDP					
> IPv6					
 mDNS General Profiles Domain Names 					
Advanced					

2. Use your Apple Client (iPhone/iPad) to check that the Apple services are still being broadcasted.





Printer Services

Bonjour Printer Services

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In most networks, the printers are wired into the network. You can also show case and verify that the AirPrint Services are being cached and advertised by the controller when the client queries for the service. The same principal applies as discussed above for the wired Bonjour device (Apple TV).

To check if the Bonjour Printer Service is discovered by the WLC, navigate to CONTROLLER > mDNS > Domain Names. The printer appears under Domain Name IP Entries with Type Wired and Vlan Id.

cisco	MONITOR WLANS	CONTROLLER	WIRELESS	SECURITY	MANAGEMENT	COMMANDS	нер	EEEDBACK		Bing Logout Befred
Controller	mDNS Domain N	ame IP > Sum	mary							
General Inventory	Number of Domain	Name-IP Entries	2							
Interfaces	Domain Name	,	AC Address		IP Addres	5		Vian Id	Type	TTL (se
Interface Groups	Apple-TV-4.local.	9	c:20:7b:91:c3:	9d	10.10.11.5	5		11	Wireless	4725
Multicast	HPC43CDE-2.local.	0	0:9e:02:04:3e:	de	10.10.105.	6	2	105	Wired	4725
Network Routes							/		1	
Internal DHCP Server									1	
Mobility Management										
Ports										
NTP										
CDP										
PMIPv6										
IPv6										
mDNS General Profiles Domain Names	-									

A single Bonjour device can advertise multiple Bonjour services; for example, a printer can advertise AirPrint, Printer, Scanner, Photosmart, and so forth. To confirm which service is being cached by the WLC, go to CONTROLLER > mDNS > General, and click the appropriate service name.

cisco	MONITOR WLANS	CONTROLLER	WIRELESS	<u>s</u> ecurity	MANAGEMENT	C <u>O</u> MMANDS	HELP	FEEDBACK
Controller	mDNS							
General								
Inventory	Olahal Orafianati							
Interfacer	Global Configurati	on						
Interfaces	mDNS Global Snoor	aina			7			
Interface Groups	Query Interval (10	120)			10 (mins)			
Multicast	Query Interval (10-	120)			(mins)			
Network Routes	Manta Canada a D							
Redundancy	Master Services D	atabase						
Internal DHCP Server	Select Service	1	None					
Mobility Management	Query Status							
Ports		-						
▶ NTP	Add	1						
CDP	Service Name	Se	ervice String		Query Statu	IS		
PMIPv6	AirPrint	i	optcp.local.					
IPv6	AppleTV	_a	irplaytcp.loca	l.				
	HP Photosmart Printe	<u>er 1</u>	niversalsub	ipptcp.local.				
General	HP Photosmart Printe	er 2 _c	upssubipp	tcp.local.				
Profiles	Printer	P	rintertcp.loca	l.				
Domain Names	Scanner	_s	cannertcp.loc	al.	1			

<u>Note</u>

Any printer services that advertise Service String _ipp._tcp.local are cached by the WLC under Service Name AirPrint. Likewise, if the printer also advertises the string _printer._tcp.local, it appears under the Printer service name

Below, the Bonjour printer advertises the AirPrint Service and is part of default-mdns-profile.

cisco			WIRELESS	SECURITY	MANAGEMENT	COMMANDS	нер в	TEDBACK	Saya Configuration	Eng Logout Befresh
Controller	mDNS Service >	> Detail								< Back
General Inventory Interfaces Interface Groups Hulticast Network Routes F Redundancy	Service Name Service String Service Id Service Query Sta Profile Count Service Provider O	itus Ceunt		-	AirPrint _Jop_tcp. 1 Enabled 1	local.				
Internal DHCP Server Mobility Management	Profile Informatio	in								
Ports NTP CDP	Profile Name default-mdns-profile									
PMIPv6	Service Provider	Information								
IPv6 mDNS General Profiles Domain Names	MAC Address 00:9c:02:o4:3c:de	1	Service Provid	er Name]ipptcp.loc	Vlan Id al. 105		vpe ired		TTL (seconds) 4500	Time Left (seconds) 3577

- **3.** Once the services are visible on the WLC, check if wired Bonjour Printer services are routed across the VLANs and if the printer is detected by your iOS device. Make sure your Apple iPhone/iPad Client is connected the client SSID.
- 4. Use your iOS device to test the AirPrint services.
- a. As shown below, click the Print icon in iOS6 or click the Print tab in iOS5.
- **b.** Under Printer Options, click Select Printer to see the Bonjour printer that was discovered by the device.

- Visit Visit
- c. Select that printer, and click Print to test the AirPrint Services.

Bonjour and Guest Anchoring

For guest anchoring, the guest WLAN is able to see Bonjour services advertised to the anchor controller. The Bonjour queries and advertisements are sent inside the Control and Provisioning of Wireless Access Points (CAPWAP) tunnel.



Bonjour Layer 3 Roaming

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The Layer 3 roaming works across the Ethernet over IP (EoIP) tunnel to ensure users moving among access points (APs) on different controllers continue to see the devices they saw on the original controller.



The Bonjour services on the anchor controller are displayed to the client, including both wired and wireless devices.

Bonjour Services Summary

- The 7.4 release supports up to 64 services and 100 service providers per service type.
- Each service provider is registered in the WLC as its domain name.
- A client that meets the profile requirements receives unicast service directly from the service provider.
- Each Bonjour service has an advertised TTL. The controller asks the device for an update at 85% of this TTL.

Bonjour Services Support in FlexConnect Mode

- For centrally switched WLANs, the behavior for Bonjour is the same as if the AP was in local mode.
- Bonjour queries from the client are sent to the controller and Bonjour responses from the controller are sent back to the AP in the unicast CAPWAP tunnel.
- FlexConnect APs do not require the Multicast?Unicast mode to support Bonjour.
- For locally switched WLANs, Bonjour continues to work in a single subnet only.

Bonjour Configuration on the WLC Through the CLI

This is a list of command line interface (CLI) commands that can be used to configure Bonjour on the WLC.

Configure Commands

To enable or disable global mDNS snooping

WLC>config mdns snooping { enable | disable }

To create a new mDNS profile name

WLC>config mdns profile create profile-name

To delete an existing mDNS profile name

WLC>config mdns profile delete profile-name

To attach a mDNS profile name to an interface

WLC>config interface mdns-profile { management | all interface-name } {profile-name | none}



If a WLAN is attached to interface, the WLC issues a dependency error.

To attach a mDNS profile name to an interface-group

WLC>config interface group mdns-profile { all | interface-group-name } {profile-name |
none }



If a WLAN is attached to Interface, the WLC issues a dependency error.

To enable or disable mDNS support for a WLAN

```
WLC>config wlan mdns { enable | disable } { wlan id | all }
```



The default value is enabled.

To attach a mDNS profile to a WLAN

```
WLC>config wlan mdns { profile-name | none } { wlan id | all }
```

To create a new mDNS service

WLC>config mdns service create service-name service string query { enable | disable }

To enable/disable query for a service

WLC>config mdns service query { enable | disable } service-name

To delete a mDNS service

WLC>config mdns service delete service-name

To attach a service to a given profile name

WLC>config mdns profile service add service-name profile-name

To remove the service from a profile name

WLC>config mdns profile service delete service-name profile-name

To configure query interval

WLC>config mdns query interval interval-value



The default value is 15 minutes; the range is 10 minutes to 2 hours

Show Commands

WLC>show mdns profile summary WLC>show mdns profile detailed profile-name WLC>show mdns service summary WLC>show mdns service detailed service-name WLC>show interface detailed interface-name WLC>show interface group detailed interface-group-name WLC>show wlan wlan-id WLC>show client detail mac-address WLC>show network summary

Clear Commands

To clear the mDNS database learned dynamically per service WLC>clear mdns service-database { all | service-name }

Debug Commands

To display events related to mDNS WLC>debug mdns message { enable | disable }

To display mDNS details of the events WLC>debug mdns detail { enable | disable }

To display errors related to mDNS processing WLC>debug mdns error { enable | disable }

To enable all debugs WLC>debug mdns all { enable | disable } All the debugs can be filtered based on the MAC address.