



## **Cisco DNA Service For Bonjour Configuration Guide, Cisco Nexus 9000 Series NX-OS, Release 10.2(3)F**

**First Published:** 2022-04-26

### **Americas Headquarters**

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
<http://www.cisco.com>  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 527-0883

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

All printed copies and duplicate soft copies of this document are considered uncontrolled. See the current online version for the latest version.

Cisco has more than 200 offices worldwide. Addresses and phone numbers are listed on the Cisco website at [www.cisco.com/go/offices](http://www.cisco.com/go/offices).

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: <https://www.cisco.com/c/en/us/about/legal/trademarks.html>. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1721R)

© 2022 Cisco Systems, Inc. All rights reserved.



## CONTENTS

---

### CHAPTER 1

#### **Cisco DNA Service for Bonjour Solution Overview 1**

About the Cisco DNA Service for Bonjour Solution 1

Solution Components 2

Supported Platforms 3

Supported Network Design 4

Traditional Wired and Wireless Networks 4

Wired Networks 5

Wireless Networks 7

Cisco SD-Access Wired and Wireless Networks 8

BGP EVPN Networks 10

---

### CHAPTER 2

#### **Configuring Local Area Bonjour in Multicast DNS Mode for LAN 13**

How to configure Multicast DNS Mode for LAN and Wired Networks 13

Enabling mDNS Gateway on the Device 13

Creating Custom Service Definition 14

Creating Service List 15

Creating Service Policy 16

Associating Service Policy to a VLAN 17

Verifying Local Area Bonjour in Multicast DNS Mode for LAN 18

Verifying SDG-Agent Status 18

Verifying Local Area Bonjour Configuration for LAN 20

---

### CHAPTER 3

#### **Configuring Wide Area Bonjour 23**

Restrictions for Wide Area Bonjour for LAN 23

Information About Wide Area Bonjour LAN 23

How to Configure Wide Area Bonjour for LAN 24

Configuring Cisco Wide Area Bonjour Service Policy 24

Configuring Cisco Wide Area Bonjour Controller on Nexus 9300 Series Switches 25

Verifying Wide Area Bonjour for LAN 26

Additional References for Wide Area Bonjour for LAN 28

---

**CHAPTER 4**      **Configuring VRF-Aware Local Area Bonjour Services 29**

Prerequisites for VRF-Aware Local Area Bonjour Services 29

Restrictions for VRF-Aware Local Area Bonjour Services 30

Information about VRF-Aware Local Area Bonjour Services 30

Understanding VRF-Aware Wide Area Bonjour Services 31

How to configure Intra-Virtual Network Proxy Service on Local Area Bonjour Domain 32

How to configure Inter-Virtual Network Proxy Service on Local Area Bonjour Domain 33

---

**CHAPTER 5**      **Guidelines and Limitations 35**

Guidelines and Limitations 35

---

**CHAPTER 6**      **New and Changed Information 37**

New and Changed Information 37



## CHAPTER 1

# Cisco DNA Service for Bonjour Solution Overview

---

- [About the Cisco DNA Service for Bonjour Solution, on page 1](#)
- [Solution Components, on page 2](#)
- [Supported Platforms, on page 3](#)
- [Supported Network Design, on page 4](#)

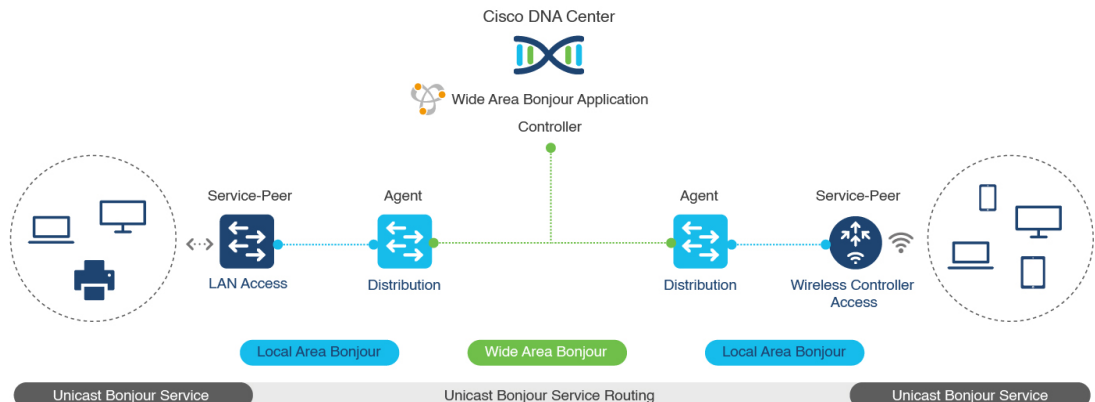
## About the Cisco DNA Service for Bonjour Solution

The Apple Bonjour protocol is a zero-configuration solution that simplifies rich services and enables intuitive experience between connected devices, services, and applications. Using Bonjour, you can discover and use IT-managed, peer-to-peer, audio and video, or Internet of Things (IoT) services with minimal intervention and technical knowledge. Bonjour is originally designed for single Layer 2 small to mid-size networks, such as home or branch networks. The Cisco DNA Service for Bonjour solution eliminates the single Layer 2 domain constraint and expands the matrix to enterprise-grade traditional wired and wireless networks, including overlay networks such as Cisco Software-Defined Access (SD-Access) and industry-standard BGP EVPN with VXLAN. The Cisco Catalyst 9000 Series LAN switches, Cisco Nexus 9300 Series Switches, and Cisco Catalyst 9800 Series Wireless Controller follow the industry standard, RFC 6762-based multicast DNS (mDNS) specification to support interoperability with various compatible wired and wireless consumer products in enterprise networks.

The Cisco Wide Area Bonjour application on Cisco DNA Center enables mDNS service routing to advertise and discover services across enterprise-grade wired and wireless networks. The new-distributed architecture is designed to eliminate mDNS flood boundaries and transition to unicast-based service routing, providing policy enforcement points and enabling the management of Bonjour services.

The following figure illustrates how the Cisco Wide Area Bonjour application operates across two integrated service-routing domains.

Figure 1: Cisco Wide Area Bonjour Solution Architecture



- Local Area Service Discovery Gateway Domain - Unicast Mode:** The new enhanced Layer 2 unicast policy-based deployment model. The new mDNS service discovery and distribution using the Layer 2 unicast address enables flood-free LAN and wireless networks. Cisco Catalyst 9000 Series Switches and Cisco Catalyst 9800 Series Wireless Controller in Layer 2 mode introduce a new service-peer role, replacing the classic flood-n-learn, for new unicast-based service routing support in the network. The service-peer switch and wireless controller also replace mDNS flood-n-learn with unicast-based communication with any RFC 6762 mDNS-compatible wired and wireless endpoints.
- Wide-Area Service Discovery Gateway Domain:** The Wide Area Bonjour domain is a controller-based solution. The Bonjour gateway role and responsibilities of Cisco Catalyst and Cisco Nexus 9300 Series Switches are extended from a single SDG switch to an SDG agent, enabling Wide Area Bonjour service routing beyond a single IP gateway. The network-wide distributed SDG agent devices establish a lightweight, stateful, and reliable communication channel with a centralized Cisco DNA Center controller running the Cisco Wide Area Bonjour application. The SDG agents route locally discovered services based on the export policy.



**Note** The classic Layer 2 multicast flood-n-learn continues to be supported on wired and wireless networks with certain restrictions to support enhanced security and location-based policy enforcement. The Cisco Catalyst and Cisco Nexus 9300 Series Switches at Layer 3 boundary function as an SDG to discover and distribute services between local wired or wireless VLANs based on applied policies.

## Solution Components

The Cisco DNA Service for Bonjour solution is an end-to-end solution that includes the following key components and system roles to enable unicast-based service routing across the local area and Wide Area Bonjour domain:

- Cisco Service Peer:** Cisco Catalyst Switches and Cisco Wireless Controllers in Layer 2 access function in service peer mode to support unicast-based communication with local attached endpoints and export service information to the upstream Cisco Catalyst SDG agent in the distribution layer.



**Note** Cisco Nexus 9300 Series Switches don't support unicast-based service routing with downstream Layer 2 access network devices.

- **Cisco SDG Agent:** Cisco Catalyst and Cisco Nexus 9300 Series Switches function as an SDG agent and communicate with the Bonjour service endpoints in Layer 3 access mode. At the distribution layer, the SDG agent aggregates information from the downstream Cisco service peer switch and wireless controller, or local Layer 2 networks, and exports information to the central Cisco DNA controller.



**Note** Cisco Nexus 9300 Series Switches don't support multilayer LAN-unicast deployment mode.

- **Cisco DNA controller:** The Cisco DNA controller builds the Wide Area Bonjour domain with network-wide and distributed trusted SDG agents using a secure communication channel for centralized services management and controlled service routing.
- **Endpoints:** A Bonjour endpoint is any device that advertises or queries Bonjour services conforming to RFC 6762. The Bonjour endpoints can be in either LANs or WLANs. The Cisco Wide Area Bonjour application is designed to integrate with RFC 6762-compliant Bonjour services, including AirPlay, Google Chrome cast, AirPrint, and so on.

## Supported Platforms

The following table lists the supported controllers, along with the supported hardware and software versions.

**Table 1: Supported Controllers with Supported Hardware and Software Versions**

Supported Controller	Hardware	Software Version
Cisco DNA Center appliance	DN2-HW-APL DN2-HW-APL-L DN2-HW-APL-XL	Cisco DNA Center, Release 2.3.2.3
Cisco Wide Area Bonjour application	—	2.4.264.12003

The following table lists the supported SDG agents along with their licenses and software requirements.

**Table 2: Supported SDG Agents with Supported License and Software Requirements**

Supported Platform	Supported Role	Local Area SDG	Wide Area SDG	Minimum Software
Cisco Catalyst 9200 Series Switches	SDG agent	Cisco DNA Advantage	Unsupported	Cisco IOS XE Bengaluru 17.6.2

Supported Platform	Supported Role	Local Area SDG	Wide Area SDG	Minimum Software
Cisco Catalyst 9200L Series Switches	—	Unsupported	Unsupported	—
Cisco Catalyst 9300 Series Switches	Service peer SDG agent	Cisco DNA Advantage	Cisco DNA Advantage	Cisco IOS XE Bengaluru 17.6.2
Cisco Catalyst 9400 Series Switches	Service peer SDG agent	Cisco DNA Advantage	Cisco DNA Advantage	Cisco IOS XE Bengaluru 17.6.2
Cisco Catalyst 9500 Series Switches	Service peer SDG agent	Cisco DNA Advantage	Cisco DNA Advantage	Cisco IOS XE Bengaluru 17.6.2
Cisco Catalyst 9500 High Performance Series Switches	Service peer SDG agent	Cisco DNA Advantage	Cisco DNA Advantage	Cisco IOS XE Bengaluru 17.6.2
Cisco Catalyst 9600 Series Switches	Service peer SDG agent	Cisco DNA Advantage	Cisco DNA Advantage	Cisco IOS XE Bengaluru 17.6.2
Cisco Catalyst 9800 Wireless Controller	Service peer	Cisco DNA Advantage	Unsupported	Cisco IOS XE Bengaluru 17.6.2
Cisco Catalyst 9800-L Wireless Controller	Service peer	Cisco DNA Advantage	Unsupported	Cisco IOS XE Bengaluru 17.6.2
Cisco Nexus 9300 Series Switches	SDG agent	Cisco DNA Advantage	Cisco DNA Advantage	Cisco NX-OS Release 10.2(3)F

## Supported Network Design

The Cisco DNA Service for Bonjour supports a broad range of enterprise-grade networks. The end-to-end unicast-based Bonjour service routing is supported on traditional, Cisco SD-Access, and BGP EVPN-enabled wired and wireless networks.

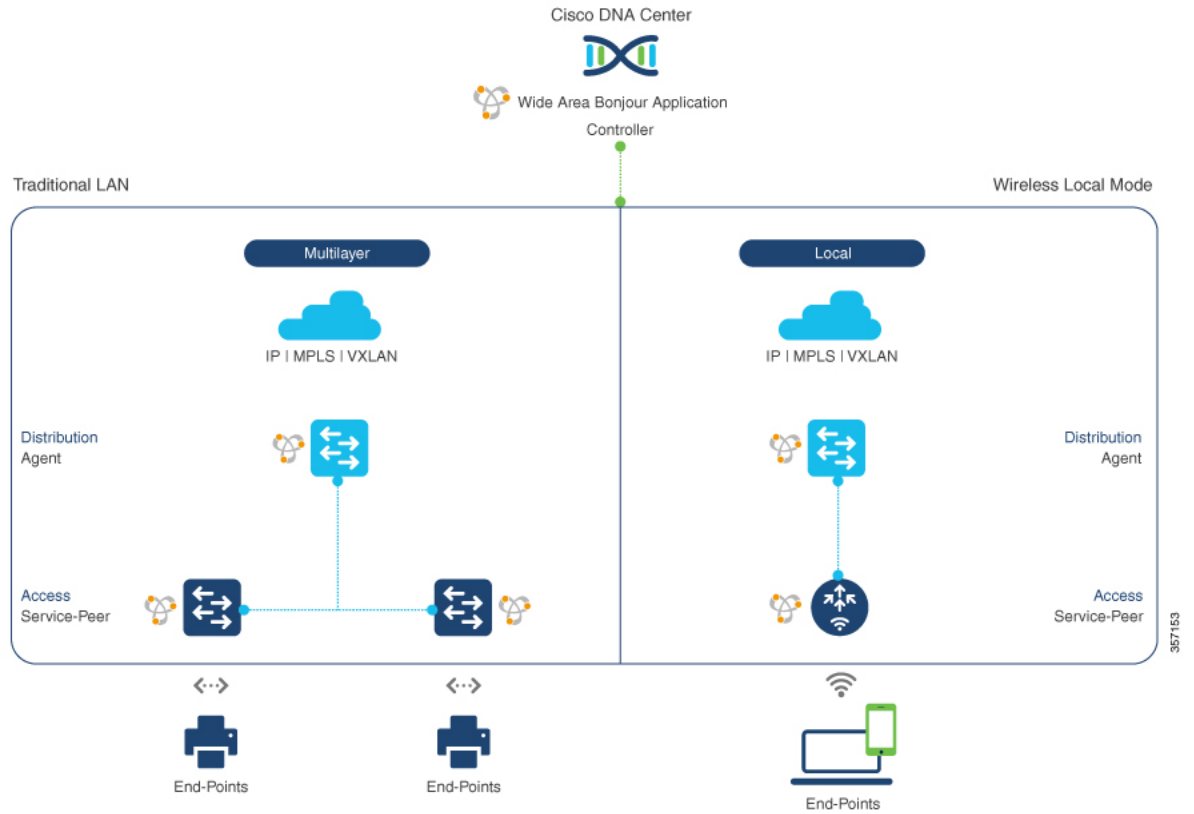
### Traditional Wired and Wireless Networks

Traditional networks are classic Layer 2 or Layer 3 networks for wired and wireless modes deployed in enterprise networks. Cisco DNA Service for Bonjour supports a broad range of network designs to enable end-to-end service routing and replace flood-n-learn-based deployment with a unicast mode-based solution.

The following figure illustrates traditional LAN and central-switching wireless local mode network designs that are commonly deployed in an enterprise.



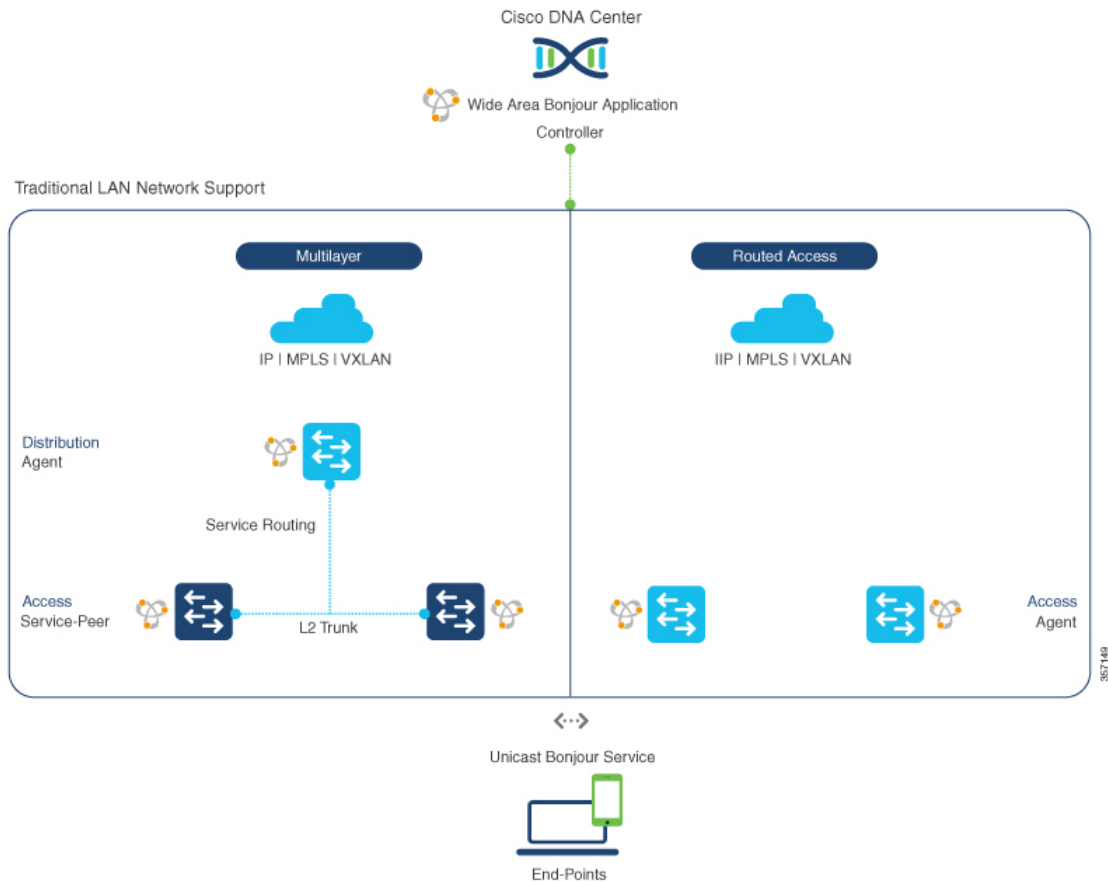
**Figure 2: Enterprise Traditional LAN and Wireless Local Mode Network Design**



## Wired Networks

The following figure shows the supported traditional LAN network designs that are commonly deployed in an enterprise.

**Figure 3: Enterprise Wired Multilayer and Routed Access Network Design**



The Cisco Catalyst or Cisco Nexus 9300 Series Switches in SDG agent role that provide Bonjour gateway functions are typically IP gateways for wired endpoints that could reside in the distribution layer in multilayer network designs, or in the access layer in Layer 3 routed access network designs:

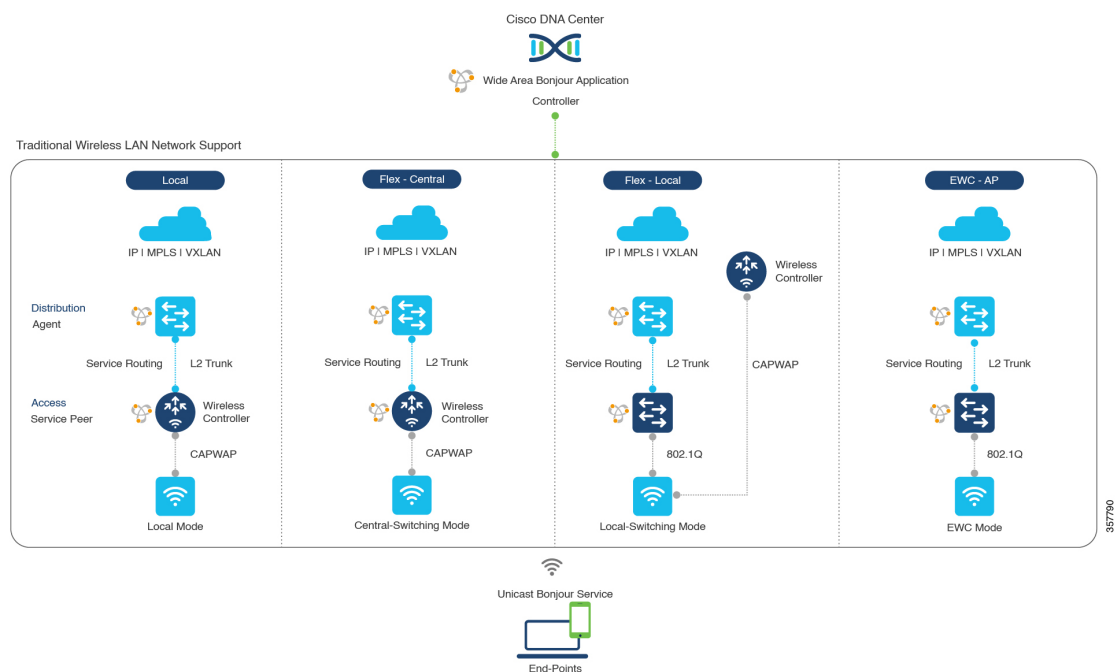
- **Multilayer LAN—Unicast Mode:** In this deployment mode, the Layer 2 access switch provides the first-hop mDNS gateway function to locally attached wired endpoints. In unicast mode, the mDNS services are routed to the distribution layer systems providing IP gateway and SDG agent mode. The policy-based service routing between the SDG agents is performed by the Cisco DNA Center controller.
- **Multilayer LAN—Flood-n-Learn Mode:** In this deployment mode, the Layer 2 access switch or wireless controller are in mDNS passthrough modes with the Cisco Catalyst or Cisco Nexus 9300 Series Switches operating in the SDG agent mode. The mDNS gateway function at distribution layer in a network enables inter-VLAN mDNS local proxy. It also builds stateful Wide Area Bonjour unicast service routing with the Cisco DNA Center to discover or distribute mDNS services beyond a single IP gateway.
- **Routed Access:** In this deployment mode, the first-hop Cisco Catalyst or Cisco Nexus 9300 Series Switch is an IP gateway boundary and, therefore, it must also perform the SDG agent role. The policy-based service routing between the SDG agents is performed by the Cisco DNA Center controller.

## Wireless Networks

The Cisco DNA Service for Bonjour extends the single wireless controller mDNS gateway function into the Wide Area Bonjour solution. The mDNS gateway on Cisco Catalyst 9800 Series Wireless Controller can be deployed in an enhanced mode as a service peer. In this mode, the wireless controller builds unicast service routing with an upstream Cisco Catalyst gateway switch for end-to-end mDNS service discovery. It replaces the classic flood-n-learn mDNS services from wired network using mDNS AP or other methods.

The following figure shows the supported traditional wireless LAN network designs that are commonly deployed in an enterprise. Based on the wireless network design, the mDNS gateway function may be on the wireless controller, or first-hop Layer 2 or Layer 3 Ethernet switch of an Access Point in local-switching mode.

**Figure 4: Enterprise Traditional Wireless LAN Network Design**



The Cisco DNA Service for Bonjour supports the following modes for wireless LAN networks:

- Local Mode:** In the central switching wireless deployment mode, the m-DNS traffic from local mode Cisco access points is terminated on the Cisco Catalyst 9800 Series Wireless Controller. The Cisco Catalyst 9800 Series Wireless Controller extends the mDNS gateway function to the new service peer mode. The wireless controller can discover and distribute services to local wireless users and perform unicast service routing over a wireless management interface to the upstream Cisco Catalyst Switch in the distribution layer, which acts as the IP gateway and the SDG agent.
- FlexConnect—Central:** The mDNS gateway function for Cisco access point in FlexConnect central switch SSID functions consistently as described in **Local Mode**. The new extended mDNS gateway mode on the Cisco Wireless Controller and upstream service routing with SDG agent operate consistently to discover services across network based on policies and locations.
- FlexConnect—Local:** In FlexConnect local switching mode, the Layer 2 access switch in mDNS gateway service peer mode provides the policy-based mDNS gateway function to locally attached wired and wireless users. The Cisco Catalyst Switches in the distribution layer function as SDG agents and enable

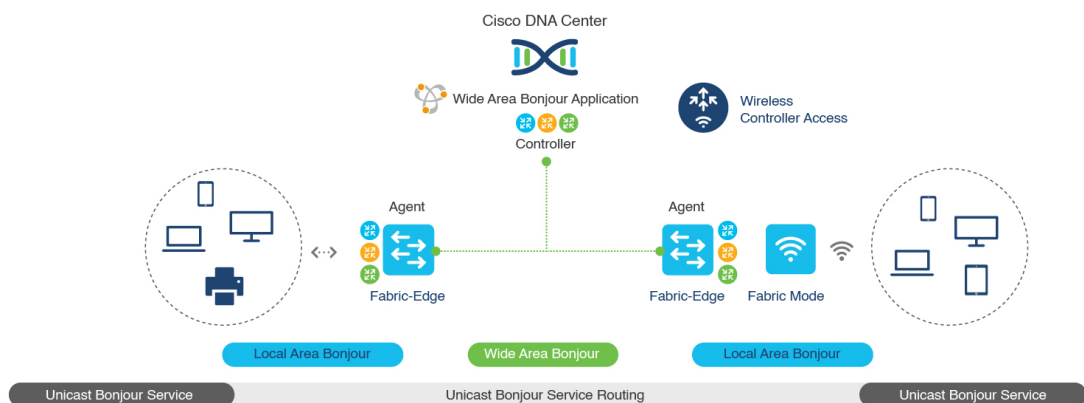
mDNS service-routing across all Layer 2 ethernet switches to support unicast-based service routing to LAN and wireless LAN user groups.

- **Embedded Wireless Controller—Access Point:** The Layer 2 access switch in service peer mode provides unified mDNS gateway function to wired and wireless endpoints associated with Cisco Embedded Wireless Controller on Cisco Catalyst 9100 Series Access Points. The SDG agent in the distribution layer provides unicast service routing across all Layer 2 service peer switches in the Layer 2 network block without any mDNS flooding.

## Cisco SD-Access Wired and Wireless Networks

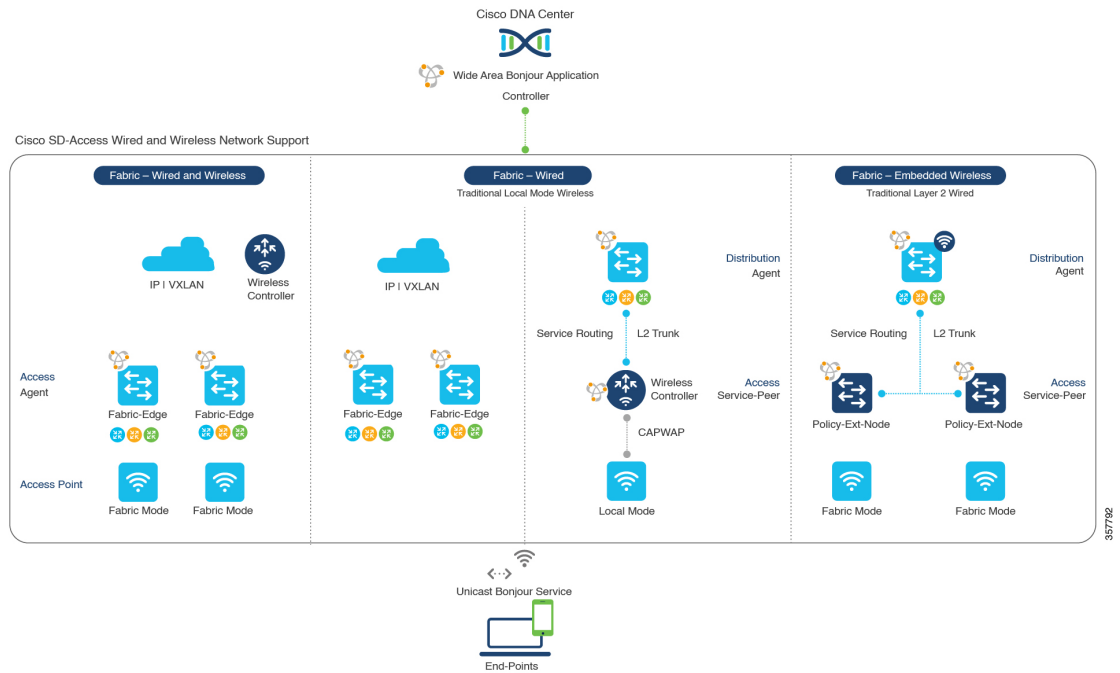
Cisco SD-Access-enabled wired and wireless networks support Cisco DNA Service for Bonjour across fabric networks. The Cisco Catalyst 9000 Series Switches support VRF-aware Wide Area Bonjour service routing to provide secure and segmented mDNS service discovery and distribution management for virtual networks. The VRF-aware unicast service routing eliminates the need to extend Layer 2 flooding, and improves the scale and performance of the fabric core network and endpoints.

**Figure 5: Cisco SD-Access Wired and Wireless Network Design**



Cisco SD-Access supports flexible wired and wireless network design alternatives to manage fully distributed, integrated, and backward-compatible traditional network infrastructure. Wide Area Bonjour service routing is supported in all network designs providing intuitive user experience. The following figure illustrates the various SD-Access enabled wired and wireless network design alternatives.

Figure 6: Cisco SD-Access Wired and Wireless Network Design Alternatives



The Cisco DNA Service for Bonjour for SD-Access enabled wired and fabric, or traditional mode-wireless networks use two-tier service routing providing end-to-end unicast-based mDNS solution. Based on the network design, each solution component is enabled in a unique role to support the Wide Area Bonjour domain:

- Fabric Edge SDG Agent:** The Layer 3 Cisco Catalyst Fabric Edge switch in the access layer configured as SDG agent provides unicast-based mDNS gateway function to the locally attached wired and wireless endpoints. The VRF-aware mDNS service policy provides network service security and segmentation in a virtual network environment. The mDNS services can be locally distributed and routed through centralized Cisco DNA Center.
- Policy Extended Node:** The Layer 2 Cisco Catalyst access layer switch enables first-hop mDNS gateway function without flooding across the Layer 2 broadcast domain. The unicast-based service routing with upstream Fabric Edge switch in the distribution layer enables mDNS service routing within the same Layer 2 network block. It can also perform remote service discovery and distribution from centralized Cisco DNA Center.
- Cisco Wireless Controller:** Based on the following wireless deployment modes, Cisco Wireless Controller supports unique function to enable mDNS service routing in Cisco SD-Access enabled network:
  - Fabric-Enabled Wireless:** Cisco Wireless Controller doesn't require any mDNS gateway capability to be enabled in distributed fabric-enabled wireless deployments.
  - Local Mode Wireless:** As Cisco Wireless Controller provides central control and data plane termination, it provides mDNS gateway in service peer mode for wireless endpoints. The wireless controller provides mDNS gateway between locally associated wireless clients. The wireless controller builds service routing with upstream SDG agent Catalyst switch providing IP gateway and service routing function for wireless endpoints.
  - Embedded Wireless Controller—Switch:** The Cisco Embedded Wireless Controller solution enables the lightweight integrated wireless controller function within the Cisco Catalyst 9300 Series

Switch. The Cisco Catalyst switches in the distribution layer function as SDG agents to the wired and wireless endpoints. The SDG agent in the distribution layer provides unicast service routing across all wireless access points and Layer 2 service peer switches without mDNS flooding.

- **Cisco DNA Center Controller:** The Cisco Wide Area Bonjour application on Cisco DNA Center supports policy and location-based service discovery, and distribution between network-wide distributed Fabric Edge switches in SDG agent mode.

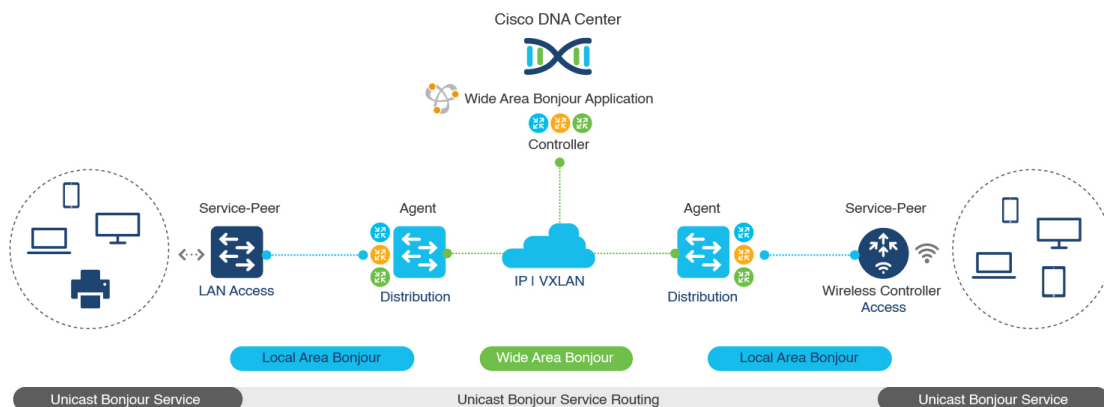
The Wide Area Bonjour communication between the SDG agent and controller takes place through the network underlay. Based on policies, the SDG agent forwards the endpoint announcements or queries to the Cisco DNA Center. After discovering a service, the endpoints can establish direct unicast communication through the fabric overlay in the same virtual network. The inter-virtual network unicast communication takes place through the Fusion router or external Firewall system. This communication is subject to the configured overlay IP routing and Security Group Tag (SGT) policies.

## BGP EVPN Networks

The BGP EVPN-based technology provides a flexible Layer 3 segmentation and Layer 2 extension overlay network. The VRF and EVPN VXLAN-aware Wide Area Bonjour service routing provides secure and segmented mDNS service solution. The overlay networks eliminate mDNS flooding over EVPN-enabled Layer 2 extended networks and solve the service reachability challenges for Layer 3 segmented routed networks in the fabric.

The following figure shows the BGP EVPN leaf switch in the distribution layer, supporting overlay Bonjour service routing for a BGP EVPN-enabled traditional Layer 2 wired access switch and traditional wireless local mode enterprise network interconnected through various types of Layer 2 networks and Layer 3 segmented VRF-enabled networks.

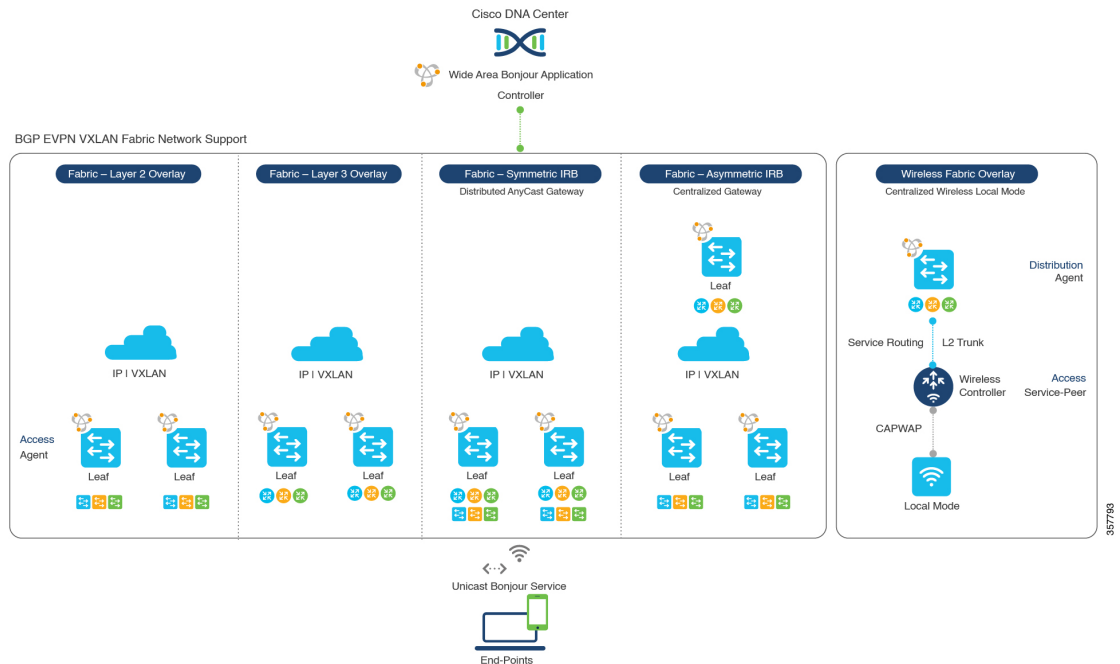
**Figure 7: Overlay Bonjour Service for a BGP EVPN-Enabled Enterprise Network**



Cisco DNA Service for Bonjour supports all the industry-standard overlay network designs enabling end-to-end unicast-based mDNS service routing, and preventing flooding and service boundary limitation across wired and wireless networks.

The following figure illustrates the various BGP EVPN VXLAN reference overlay network design alternatives. This network design enables end-to-end mDNS service discovery and distribution based on overlay network policies.

Figure 8: BGP EVPN VXLAN Wired and Wireless Design Alternatives



The Cisco Catalyst and Cisco Nexus 9000 Series Switches can be deployed in Layer 2 or Layer 3 leaf roles supporting mDNS service routing for a broad range of overlay networks. In any role, the mDNS communication is limited locally and supports end-to-end unicast-based service routing across Wide Area Bonjour domain:

- **Layer 2 Leaf SDG Agent:** The Cisco Catalyst or Cisco Nexus switches can be deployed as Layer 2 leaf supporting end-to-end bridged network with IP gateway within or beyond BGP EVPN VXLAN fabric network. By default, the mDNS is flooded as Broadcast, Unknown Unicast, Multicast (BUM) over the fabric-enabled core network. This mDNS flooding may impact network performance and security. The Layer 2 leaf, enabled as SDG agent, prevents mDNS flooding over VXLAN and supports unicast-based service routing.
- **Layer 3 Leaf SDG Agent:** The Cisco Catalyst or Cisco Nexus switches can be deployed as SDG agent supporting Layer 3 overlay network in BGP EVPN VXLAN fabric. The IP gateway and mDNS service boundary is terminated at the SDG agent switches and remote services can be discovered or distributed through centralized Cisco DNA Center.
- **Local Mode Wireless:** The centralized wireless local mode network can be terminated within or outside the EVPN VXLAN fabric domain to retain network segmentation and service discovery for wireless endpoints. The Cisco Catalyst 9800 Series Wireless Controller in service peer mode can build unicast service routing with distribution layer IP and SDG agent Cisco Catalyst switch to discover services from BGP EVPN VXLAN fabric overlay network.
- **Cisco DNA Center:** Cisco DNA Center supports Wide Area Bonjour capability to dynamically discover and distribute mDNS services based on Layer 2 or Layer 3 Virtual Network ID (VNID) policies to route the mDNS services between SDG agent switches in the network.

For more information about BGP EVPN networks, see [Cisco DNA Service for Bonjour Configuration Guide, Cisco IOS XE Bengaluru 17.6.x \(Catalyst 9600 Switches\)](#).







## CHAPTER 2

# Configuring Local Area Bonjour in Multicast DNS Mode for LAN

- [How to configure Multicast DNS Mode for LAN and Wired Networks, on page 13](#)
- [Verifying Local Area Bonjour in Multicast DNS Mode for LAN, on page 18](#)

## How to configure Multicast DNS Mode for LAN and Wired Networks

This section provides information about how to configure Local Area Bonjour in multicast DNS mode.

### Enabling mDNS Gateway on the Device

To configure mDNS on the device, follow these steps:

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b> <b>Example:</b> Device# <code>configure terminal</code>	Enters global configuration mode.
<b>Step 2</b>	<b>mdns-sd gateway</b> <b>Example:</b> Device(config)# <code>mdns-sd gateway</code>	Enables mDNS on the device and enters mDNS gateway configuration mode.  Enter the following commands in mDNS gateway configuration mode to enable the respective functionalities: <ul style="list-style-type: none"><li>• <b>air-print helper</b>: Enables IOS devices like iPADS to discover and use older printers that support Bonjour</li><li>• <b>ingress-client</b>: Configures Ingress Client Packet Tuners</li></ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• <b>service announcement-count</b>: Configures maximum service advertisement count for controller</li> <li>• <b>service announcement-timer</b>: Configures advertisements announce timer periodicity for controller</li> <li>• <b>service query-count</b>: Configures maximum query count for controller</li> <li>• <b>service query-timer</b>: Configures query forward timer periodicity for controller</li> </ul> <p><b>Note</b> For <b>ingress-client</b>, <b>service-announcement-count</b>, <b>service-announcement-timer</b>, <b>service-query-count</b>, and <b>service-query-timer</b> commands, you can retain the default value of the respective parameter for general deployments. Configure a different value, if required, for a specific deployment.</p>
<b>Step 3</b>	<b>exit</b>  <b>Example:</b> Device(config-mdns-sd)# exit	Exits mDNS gateway configuration mode.

## Creating Custom Service Definition

Service definition is a construct that provides an admin friendly name to one or more mDNS service types or PTR Resource Record Name. By default, a few built-in service definitions are already predefined and available for admin to use. In addition to built-in service definitions, admin can also define custom service definitions.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b>  <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 2</b>	<b>mdns-sd service-definition</b> <i>service-definition-name</i>	Configures mDNS service definition.

	Command or Action	Purpose
	<b>Example:</b> Device(config)# <b>mdns-sd service-definition CUSTOM1</b>	<b>Note</b> All the created custom service definitions are added to the primary service list. Primary service list comprises of a list of custom and built-in service definitions.
<b>Step 3</b>	<b>service-type</b> <i>string</i> <b>Example:</b> Device(config-mdns-ser-def)# <b>service-type _custom1._tcp.local</b>	Configures mDNS service type.
<b>Step 4</b>	Repeat step 4 to configure more than one service type in the custom service definition.	
<b>Step 5</b>	<b>exit</b> <b>Example:</b> Device(config-mdns-ser-def)# <b>exit</b>	Exit mDNS service definition configuration mode.

## Creating Service List

mDNS service list is a collection of service definitions. To create a service list, follow these steps:

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b> <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 2</b>	<b>mdns-sd service-list</b> <i>service-list-name</i> { <b>in</b>   <b>out</b> } <b>Example:</b> Device(config)# <b>mdns-sd service-list VLAN100-list in</b>	Configures mDNS service list.
<b>Step 3</b>	<b>match</b> { <i>ser-def-name</i>   <i>all</i> } <b>message-type</b> { <b>any</b>   <b>announcement</b>   <b>query</b> } <b>Example:</b> Device(config-mdns-sl-in)# <b>match PRINTER-IPPS message-type announcement</b>	Matches the service and message type. Here, <i>service-definition-name</i> refers to the names of services, such as, airplay, airserver, airtunes, and so on.

	Command or Action	Purpose
		<p><b>Note</b> To add a service, the service name must be part of the primary service list.</p> <p>If the mDNS service list is set to IN, the applicable command syntax is:  <b>match</b> {<i>ser-def-name</i>   <i>all</i>}  <b>message-type</b> {<i>any</i>   <b>announcement</b>   <b>query</b>}.</p> <p>If the mDNS service list is set to OUT, the applicable command syntax is: <b>match</b> {<i>ser-def-name</i>   <i>all</i>} [<b>source-interface</b> <i>valns</i>].</p>
<b>Step 4</b>	<b>exit</b>  <b>Example:</b> Device(config-mdns-sl-in)# exit	Exits mDNS service list configuration mode.

## Creating Service Policy

A Service Policy that is applied to a VLAN specifies the allowed Bonjour service announcements or the queries of specific service types that should be processed, in ingress direction or egress direction or both. For this, the service policy specifies two service-lists, one each for ingress and egress directions. In the Local Area Bonjour domain, the same service policy can be attached to one or more Bonjour client VLANs; however, different VLANs may have different service policies.

To configure service policy with service lists, follow these steps:

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b>  <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 2</b>	<b>mdns-sd service-policy</b> <i>service-policy-name</i>  <b>Example:</b> Device(config)# <b>mdns-sd service-policy</b> <b>mdns-policy1</b>	Configures mDNS service policy.
<b>Step 3</b>	<b>service-list</b> <i>service-list-name</i> { <b>in</b>   <b>out</b> }  <b>Example:</b> Device(config-mdns-ser-pol)# <b>service-list</b> <b>VLAN100-list in</b>  Device(config-mdns-ser-pol)# <b>service-list</b> <b>VLAN300-list out</b>	Configures service lists for IN and OUT directions.

	Command or Action	Purpose
Step 4	<b>exit</b> <b>Example:</b> Device(config-mdns-ser-pol)# exit	Exits mDNS service policy configuration mode.

## Associating Service Policy to a VLAN

To configure mDNS on the device, follow these steps:

### Procedure

	Command or Action	Purpose
Step 1	<b>configure terminal</b> <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.
Step 2	<b>vlan configuration <i>vlan-id</i></b> <b>Example:</b> (config-vlan-config)# <b>vlan configuration</b> 601	Enters VLAN configuration mode and enables VLAN configuration.
Step 3	<b>mdns-sd gateway</b> <b>Example:</b> (config-vlan-mdns-sd)# <b>mdns-sd gateway</b>	<p>Configures mDNS gateway on the VLAN.</p> <p>Enter the following commands in the interface mDNS gateway configuration mode to enable the respective functionalities:</p> <ul style="list-style-type: none"> <li>• <b>active-query</b>: Sets the time interval for SDG agent to refresh the active status of connected Bonjour client services. The timer value ranges from 60 to 3600 seconds.</li> </ul> <p><b>Note</b> The default active-query timer is for 1800 seconds and it will run for all VLANs where <b>mdns-sd gateway</b> is enabled. There is no way to disable it.</p> <ul style="list-style-type: none"> <li>• <b>service-policy <i>policy-name</i></b>: Attaches the specified service policy to the VLAN. Bonjour announcements, and queries received by and sent from the VLAN are governed by the policies configured in the service policy. This configuration is not mandatory. If the user has not specified the service policy for a VLAN, then a default service policy <b>default-mdns-service-policy</b> will be used.</li> </ul>

	Command or Action	Purpose
		<b>Note</b> Service policies can only be attached at VLAN level.
<b>Step 4</b>	<b>exit</b> <b>Example:</b> Device(config-if-mdns-sd)# exit	Exits mDNS gateway configuration mode.

## Verifying Local Area Bonjour in Multicast DNS Mode for LAN

This section shows how to verify Local Area Bonjour in Multicast DNS mode for LAN.

### Verifying SDG-Agent Status

The following is a sample output of the **show mdns-sd summary** command.

```
Global mDNS Gateway
=====
mDNS Gateway           : Enabled
Rate Limit             : 200 PPS
Cache Memory Max      : 10 Percentage
AirPrint Helper       : Disabled

Ing-qry supp          : Enabled
Ing-qry supp Packet Gap : 15 PPS
Ing-qry reply service count : 100
Service Announcement Count : 100
Service Query Count   : 100
Announcement Timer    : 5 Seconds
Query Timer           : 15 Seconds
```

The following is a sample output of the **show mdns-sd service-policy [name ser-pol-name]** command.

```
Service Policy Name      Service List IN Name      Service List Out
Name
-----
sp-one                   cus-sl-in
cus-sl-out
default-mdns-service-policy default-mdns-in-service-list
default-mdns-out-service-list
Device#
```

The following is a sample output of the **show mdns-sd service-list [{direction {in | out}} | {name sl-name}]** command.

```
Name          Type      Service
Msg-Type      Source
```

macbook-list-out		OUT	macbook_custom
none	all		
appletv-list-out		OUT	appletv_custom
none	all		
default-mdns-in-service-list		IN	apple-airprint
any	none		apple-remote-login
any	none		apple-screen-share
any	none		apple-tv
any	none		apple-windows-fileshare
any	none		google-chromecast
any	none		google-expeditions
any	none		homesharing
any	none		multifunction-printer
any	none		printer-ipps
13vni-list-in		IN	13vni_custom
any	none		
default-mdns-out-service-list		OUT	apple-airprint
none	all		apple-remote-login
none	all		apple-screen-share
none	all		apple-tv
none	all		apple-windows-fileshare
none	all		google-chromecast
none	all		google-expeditions
none	all		homesharing
none	all		multifunction-printer
none	all		printer-ipps
13vni-list-out		OUT	13vni_custom
none	all		
macbook-list-in		IN	macbook_custom
any	none		

```

appletv-list-in          IN          appletv_custom
any                     none
list1                   IN          custom1
any                     none
list2                   OUT         custom1
none                    all
List2                   OUT         custom1
none                    all

```

The following is a sample output of the **show mdns-sd service-definition** [{name *ser-def-name*} | {type {**built-in** | **custom**}}] command.

Service	Type	PTR
airplay	built-in	_airplay._tcp.local
apple-screen-share	built-in	_rfb._tcp.local
spotify _spotify-connect._tcp.local	built-in	
apple-remote-login	built-in	_sftp-ssh._tcp.local _ssh._tcp.local
apple-itunes-music	built-in	_daap._tcp.local
apple-tv	built-in	_raop._tcp.local _airplay._tcp.local
apple-homekit	built-in	_hap._tcp.local _homekit._tcp.local
appletv_custom	custom	_airplay._tcp.local
_companion-link._tcp.local		_homekit._tcp.local
_mediaremotetv._tcp.local		_raop._tcp.local
_sleep-proxy._udp.local		
apple-itunes-library Switch(config)#	built-in	_atc._tcp.local

## Verifying Local Area Bonjour Configuration for LAN

The following is a sample output of the **show running-config mdns** [all] command.



```
!Command: show running-config mdns
!No configuration change since last restart
!Time: Fri Apr 15 06:58:29 2022

version 10.2(3) Bios:version 07.69
feature mdns

mdns-sd gateway
  air-print helper
  ingress-client query-suppression
vlan configuration 10
mdns-sd gateway
  active-query timer 60
vlan configuration 2000
mdns-sd gateway
  active-query timer 60
mdns-sd controller bhag
  address 100.100.100.1
  source-interface Lo0
mdns-sd service-list cus-sl-in IN
  match all message-type any
mdns-sd service-list cus-sl-out OUT
  match all
mdns-sd service-policy sp-one
  service-list cus-sl-in IN
  service-list cus-sl-out OUT
```





## CHAPTER 3

# Configuring Wide Area Bonjour

Cisco Wide Area Bonjour domain enables global service-routing beyond a single IP gateway for traditional and overlay LAN networks. In Cisco Wide Area Bonjour domain, Cisco Nexus 9300 LAN switches are deployed in Layer 3 routed mode to act as distributed SDG Agents throughout the network. These SDG agents build a TCP-based, stateful, reliable, and light-weight communication channel with a Cisco DNA Center. The Cisco DNA Center must also be configured with Cisco Wide Area Bonjour application for policy-based global service discovery and distribution.

- [Restrictions for Wide Area Bonjour for LAN, on page 23](#)
- [Information About Wide Area Bonjour LAN, on page 23](#)
- [How to Configure Wide Area Bonjour for LAN, on page 24](#)
- [Configuring Cisco Wide Area Bonjour Controller on Nexus 9300 Series Switches, on page 25](#)
- [Verifying Wide Area Bonjour for LAN, on page 26](#)
- [Additional References for Wide Area Bonjour for LAN, on page 28](#)

## Restrictions for Wide Area Bonjour for LAN

Wide Area Bonjour service-routing between Cisco DNA Center and a Nexus 9300 SDG Agent Switch over management port is not supported. We recommend that you use a switch Loopback interface instead.

## Information About Wide Area Bonjour LAN

Wide Area Bonjour, by definition, allows service-routing over an IP network without network boundaries. Hence, the core objective of Cisco Wide Area Bonjour is to advertise and browse Bonjour services in a global IP network that is limited to local or remote sites, as required. Typically, the LAN and Wireless LAN IP gateway deployed in SDG Agent mode build the stateful TCP-based unicast connection to the Cisco DNA Center for Wide Area Bonjour service-routing.

The fundamentals of service-routing are based on the policies defined in Local Area and Wide Area Bonjour domains. The policy defines implicit guidelines to accept, process and respond to mDNS services on the SDG Agent and the Cisco DNA-Center. The service policy carries multiple tuples to distinctly classify and distribute the service provider information along with granular network.

# How to Configure Wide Area Bonjour for LAN

This section provides information about how to configure Wide Area Bonjour for LAN. Configuration of Cisco Wide Area Bonjour requires you to configure the Cisco Nexus Series switch in SDG Agent mode and build the service policies in Wide Area Bonjour application of Cisco DNA Center.

## Configuring Cisco Wide Area Bonjour Service Policy

To build and apply the Wide Area Bonjour export service policy and enable service-routing, perform the following steps.



**Note** The controller-bound service policy does not require an ingress service policy.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b>  <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 2</b>	<b>mdns-sd controller service-list</b> <i>service-list-name</i>  <b>Example:</b> Device(config)# <b>mdns-sd controller</b> <b>service-list WIDE-AREA-SERVICES-LIST-OUT</b>	Configures the outgoing mDNS controller service list to classify one or more service types.
<b>Step 3</b>	<b>match {ser-def-name   all} message-type {any   announcement   query}</b> <b>[source-interface vlans]</b>  <b>Example:</b> Device(config-mdns-sl-out)# <b>match</b> <b>APPLE-TV</b>  Device(config-mdns-sl-out)# <b>match</b> <b>PRINTER-APPS</b>	Checks and matches the outbound service list. The switch exports locally discovered services and requests remote service information from Wide Area Bonjour domain. The service announcement and query request are processed based on permitted, built-in, or custom service types.  The service list contains an implicit deny at the end.  The <b>message-type</b> is used and either announcement or query filter can be added.
<b>Step 4</b>	<b>mdns-sd controller service-policy</b> <i>service-policy-name</i>  <b>Example:</b> Device(config)# <b>mdns-sd controller</b> <b>service-policy DNAC-CONTROLLER-POLICY</b>	Creates a unique mDNS service policy.

	Command or Action	Purpose
<b>Step 5</b>	<b>end</b> <b>Example:</b> Device(config-mdns-sd) # <b>end</b>	Returns to privileged EXEC mode.

## Configuring Cisco Wide Area Bonjour Controller on Nexus 9300 Series Switches

To configure Cisco Wide Area Bonjour controller on Nexus 9300 series of switches, perform the following steps:

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b> <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 2</b>	<b>mdns-sd controller</b> <i>controller-name</i> <b>Example:</b> Device(config) # <b>mdns-sd controller</b> <b>DNAC-BONJOUR-CONTROLLER</b>	Configures the controller to enable Wide Area Bonjour service-routing with Cisco DNA Center.  Only one controller can be configured.
<b>Step 3</b>	<b>address</b> <i>ipv4-address</i> <b>Example:</b> Device(config-mdns-sd-se) # <b>address</b> <b>100.0.0.1</b>	Assigns the Cisco DNA Center IPv4 address to pair service-routing.  <b>Note</b> Only one controller address can be configured. IPv6 address is not supported.
<b>Step 4</b>	<b>source-interface</b> <i>interface-name</i> <b>Example:</b> Device(config-mdns-sd-se) # <b>source-interface Loopback0</b>	Configures the source interface to build service-routing from the SDG-Agent and the Cisco DNA Center.  Nexus 9300 Series of switches support only loopback interface as a source interface.
<b>Step 5</b>	<b>service-policy</b> <i>service-policy-name</i> <b>Example:</b> Device(config-mdns-sd-se) # <b>service-policy</b> <b>DNAC-CONTROLLER-POLICY</b>	Associates the controller-bound egress mDNS policy for Wide Area Bonjour service-routing.  Specifies the service policy to be used by the controller. If no policy is configured, a default controller policy <b>default-mdns-ctrl-srv-policy</b> is used.

	Command or Action	Purpose
<b>Step 6</b>	<b>end</b>  <b>Example:</b> Device(config-mdns-sd) # <b>end</b>	Returns to privileged EXEC mode.

## Verifying Wide Area Bonjour for LAN

The following is a sample output of the **show mdns controller service-policy** command.

```
switch(config)# show mdns-sd controller service-policy name default-mdns-ctrl-srv-policy
```

```
Service Policy Name           Service List Name
=====
default-mdns-ctrl-srv-policy   default-mdns-ctrl-srv-list
```

The following is a sample output of the **show mdns controller service-list** command.

```
switch(config)# show mdns-sd controller service-list name default-mdns-ctrl-srv-list
```

```
Name                               Service                               Msg-Type
Source
=====
default-mdns-ctrl-srv-list         apple-airprint                       any
  all
  all                               apple-remote-login                   any
  all                               apple-screen-share                    any
  all                               apple-tv                              any
  all                               apple-windows-fileshare              any
  all                               google-chromecast                     any
  all                               google-expeditions                    any
  all                               homesharing                           any
  all                               multifunction-printer                 any
  all                               printer-ipps                           any
  all
```

The following is a sample output of the **show mdns controller summary** command.

```
switch(config)# show mdns-sd controller summary
```

```
Controller Summary
=====
Controller Name   : DNAC_BONJOUR_CONTROLLER
```

```

Controller IP      : 100.100.100.1
State             : UP
Port              : 9991
Interface         : Lo0
Filter List       : default-mdns-ctrl-srv-policy
Dead Time         : 120 sec
Service Buffer     : Disabled

```

The following is a sample output of the **show mdns controller detail** command.

```

switch(config)# show mdns-sd controller detail

Controller : DNAC_BONJOUR_CONTROLLER
IP 100.100.100.1, Dest Port : 9991, Src Port: 52482, State UP
Source Interface : Lo0, MD5 Disabled
Hello Timer 30 sec, Dead Timer 120 sec, Next Hello 00:00:06
Uptime 00:00:23
Service Buffer : Disabled
Service Announcement :
Filter : default-mdns-ctrl-srv-policy
Count 50, Delay timer 30 sec, Pending Announcement 0, Pending Withdraw 0
Total Export Count 0, Next Export in 00:00:06
Service Query :
Query Suppression Disabled
Query Count 50, Query Delay Timer 15 sec, Pending 0
Total Query Count 0, Next Query in 00:00:06

```

The following is a sample output of the **show mdns controller statistics** command.

```

switch(config)# show mdns-sd controller statistics

Total messages sent           : 3130
Total messages received       : 3128
Keepalive message sent        : 3126
Keepalive messages received   : 3126
Interface WITHDRAW messages sent : 2
Vlan WITHDRAW messages sent   : 0
Clear cache messages sent     : 0
Total RESYNC state count      : 0
Last successful RESYNC        : Not-Applicable
Service Advertisements:
Advertisements sent           : 0
Withdraws sent                : 0
Advertisements Filtered      : 0
Total service resynced       : 0
Service Queries:
Queries sent                   : 0
Queries Filtered              : 0
Query responses received      : 0

```

The following is a sample output of the **show mdns controller export-summary** command.

```

switch(config)# mdns-sd controller export-summary
Controller Export Summary
=====

```

```
Controller IP      : 100.100.100.1
State             : UP
Filter List       : default-mdns-ctrl-srv-policy
Count            : 50
Delay Timer       : 30
Export           : 0
Drop             : 0
Next Export       : 00:00:07
```

## Additional References for Wide Area Bonjour for LAN

Related Topic	Document Title
Cisco Wide Area Bonjour Application on Cisco DNA Center User Guide	<a href="#">Cisco Wide Area Bonjour Application on Cisco DNA Center User Guide, Release 2.1.2</a>





## CHAPTER 4

# Configuring VRF-Aware Local Area Bonjour Services

---

Beginning from Cisco NX-OS Release 10.2(3)F, Cisco Nexus 9300 Series switches supports Virtual Routing and Forwarding-Aware (VRF-Aware) services in Local Area Bonjour domain. VRF-Aware Local Area Bonjour services provide boundary-based service discovery for Layer 3 segmented IPv4 and IPv6 network and support policy-based (secure) routing services. VRF-Aware Local Area Bonjour service is supported on enterprise-grade, traditional, and next-generation fabric-based deployment models as described in [Cisco DNA Service for Bonjour Solution Overview](#).

- [Prerequisites for VRF-Aware Local Area Bonjour Services, on page 29](#)
- [Restrictions for VRF-Aware Local Area Bonjour Services, on page 30](#)
- [Information about VRF-Aware Local Area Bonjour Services, on page 30](#)
- [Understanding VRF-Aware Wide Area Bonjour Services, on page 31](#)
- [How to configure Intra-Virtual Network Proxy Service on Local Area Bonjour Domain, on page 32](#)
- [How to configure Inter-Virtual Network Proxy Service on Local Area Bonjour Domain, on page 33](#)

## Prerequisites for VRF-Aware Local Area Bonjour Services

- You must understand the mDNS service segmentation capabilities to implement, manage, and troubleshoot the proxy service in Local Area Bonjour domain.
- Ensure that the Cisco Nexus 9300 Series switch is configured in SDG-Agent mode. VRF-Aware Local Area Bonjour service is supported on first-hop IP gateway of switches configured in SDG-Agent mode in Wired networks.
- Ensure that the software version installed on the Cisco Nexus 9300 Series switch is 10.2(3)F or higher.
- Ensure that all required IP VRF with IPv4 or IPv6 address-family configurations is completed. These configurations are required to activate VRF on the switch configured in SDG-Agent mode.
- Ensure that the IP VRF configured to a local SVI interface supports IP gateway so that the mDNS Wired and Wireless endpoint can be attached directly or remotely.
- To activate mDNS gateway in Multicast mode for a VLAN, ensure that the mDNS gateway and service policy is configured after enabling the VLAN using the **vlan configuration id** command.

- Ensure that all configurations for IPv4 or IPv6-based data routing and forwarding both within the same VRF or different VRFs are complete including network requirements such as stateful firewall configuration, route-leaking configuration and so on.

## Restrictions for VRF-Aware Local Area Bonjour Services

- VRF-Aware Local Area Bonjour services are configured to provide mDNS service discovery information between Layer 3 segments within the same or different IP VRF, or share services from non-VRF enabled networks only. Any additional IP routing and data forwarding configurations are beyond the scope of this implementation.

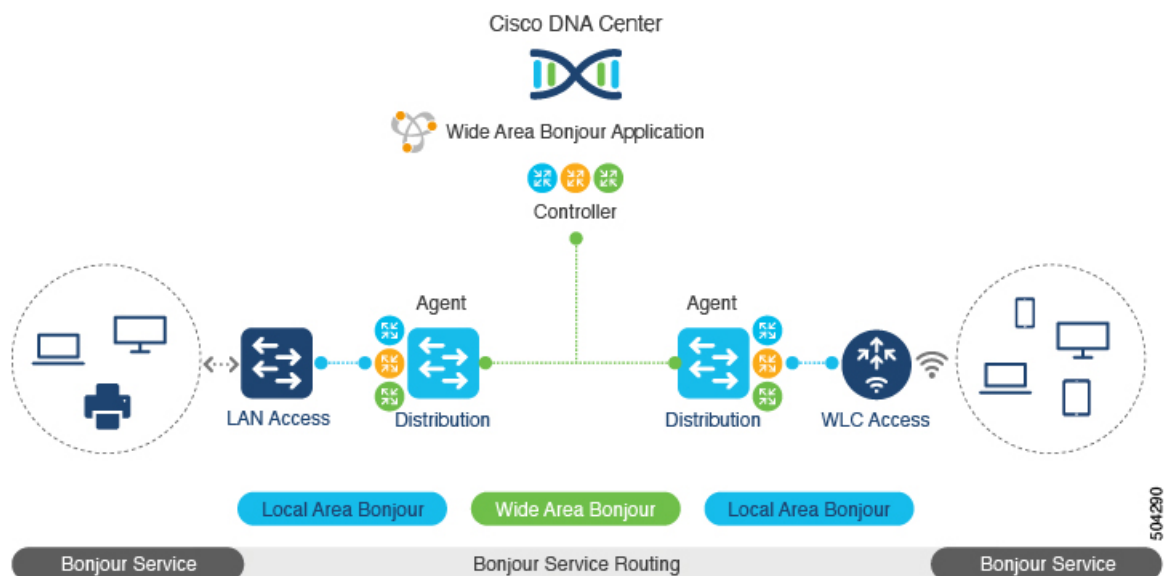
## Information about VRF-Aware Local Area Bonjour Services

The Cisco DNA Service for Bonjour solution provides end-to-end service-routing for enterprise and data center networks. The enterprise and data center networks build secure and segmented networks that protect IT-managed infrastructure and shares services and resources among trusted and untrusted user group. The physical infrastructure can be logically virtualized into a private networking space that supports secure communication services within closed user groups and conditionally extends boundary services based on business and technical demands.

VRF-Aware Local Area Bonjour gateway services allow to dynamically discover and distribute mDNS services on the same VRF segmented Layer 3 overlay networks based on policy. The Layer 3 VRF segmented networks can also be configured to route in overlay using Cisco BGP EVPN VXLAN overlay networks.

[Figure 9: Cisco DNA Service for Bonjour with VRF-Aware Services](#) illustrates the Cisco DNA Service for Bonjour solution configured with VRF-Aware services for enterprise and data center networks.

**Figure 9: Cisco DNA Service for Bonjour with VRF-Aware Services**



504290

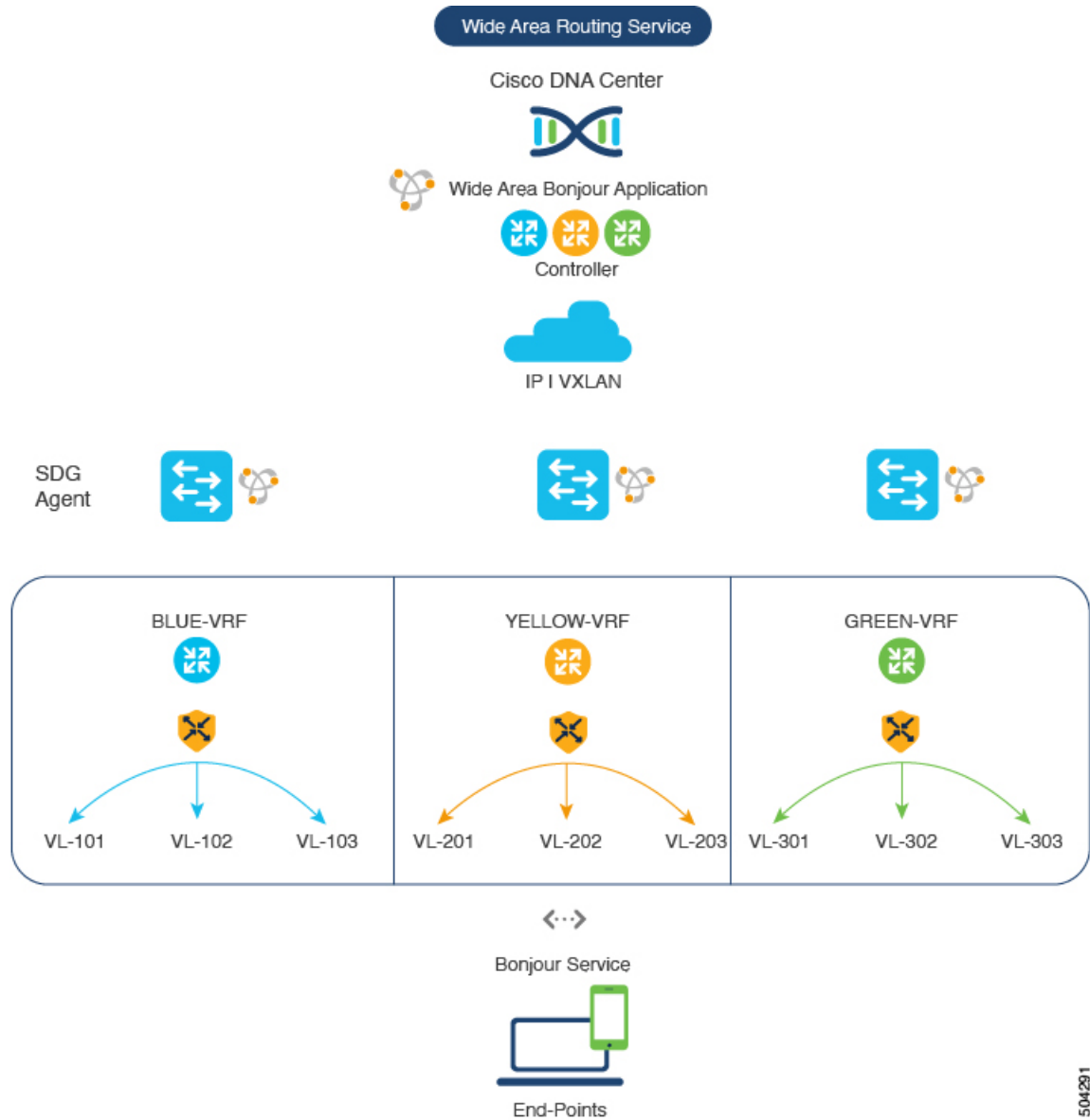
## Understanding VRF-Aware Wide Area Bonjour Services

The VRF-Aware service discovery and distribution can be implemented across multiple switches in SDG-Agent mode on an IP, or VXLAN-enabled network with Wide Area Bonjour. The Cisco DNA-Center Wide Area Bonjour application supports granular and policy-based routing services that allow discovery and distribution of mDNS services dynamically over overlay networks. You can build a global policy combining one or more source and receiver SDG-Agents that allow distributing or advertising services from a specific IPv4 or even an IPv6 network mapped to the VRF.

The network wide and distributed switches in SDG-Agent mode transport locally discovered or requested mDNS service information over lightweight unicast routing services to a centralized Cisco DNA-Center controller in an underlay IPv4 network. These switches must be configured with a unified service-export policy for local networks mapped to one or more VRFs.

[Figure 10: VRF-Aware Wide Area Bonjour Services](#) illustrates VRF-Aware Wide Area Bonjour services for IP, or VXLAN enabled overlay networks.

Figure 10: VRF-Aware Wide Area Bonjour Services



504201

## How to configure Intra-Virtual Network Proxy Service on Local Area Bonjour Domain

Intra-Virtual Network (Intra-VN) Proxy Service is a policy-based VRF-Aware service discovery and distribution implemented on the IP VRF of a switch in SDG-Agent mode connected to multiple IP networks.

Beginning from Cisco NX-OS Release 10.2(3)F, the Cisco Nexus 9300 Series switches support mDNS gateway service as the default on each VRF. You must build a mDNS service policy that implicitly allows required

mDNS service types and mapping services to endpoint facing VLANs. The Cisco Nexus 9300 Series switch can automatically discover VRF associations to a VLAN interface without additional configurations.

The Cisco Nexus 9300 Series switch in SDG-Agent mode dynamically discovers mDNS services from a local network and automatically builds VRF-aware service information. To enable Layer 3 segmented proxy service by default, the SDG-Agent provides limited mDNS service proxy response to endpoints in other VLANs mapped with the same VRF.

**Figure 11: Intra-VN Service Proxy** illustrates VRF-Aware enabled on an Intra-VN proxy service.

**Figure 11: Intra-VN Service Proxy**



50-4292

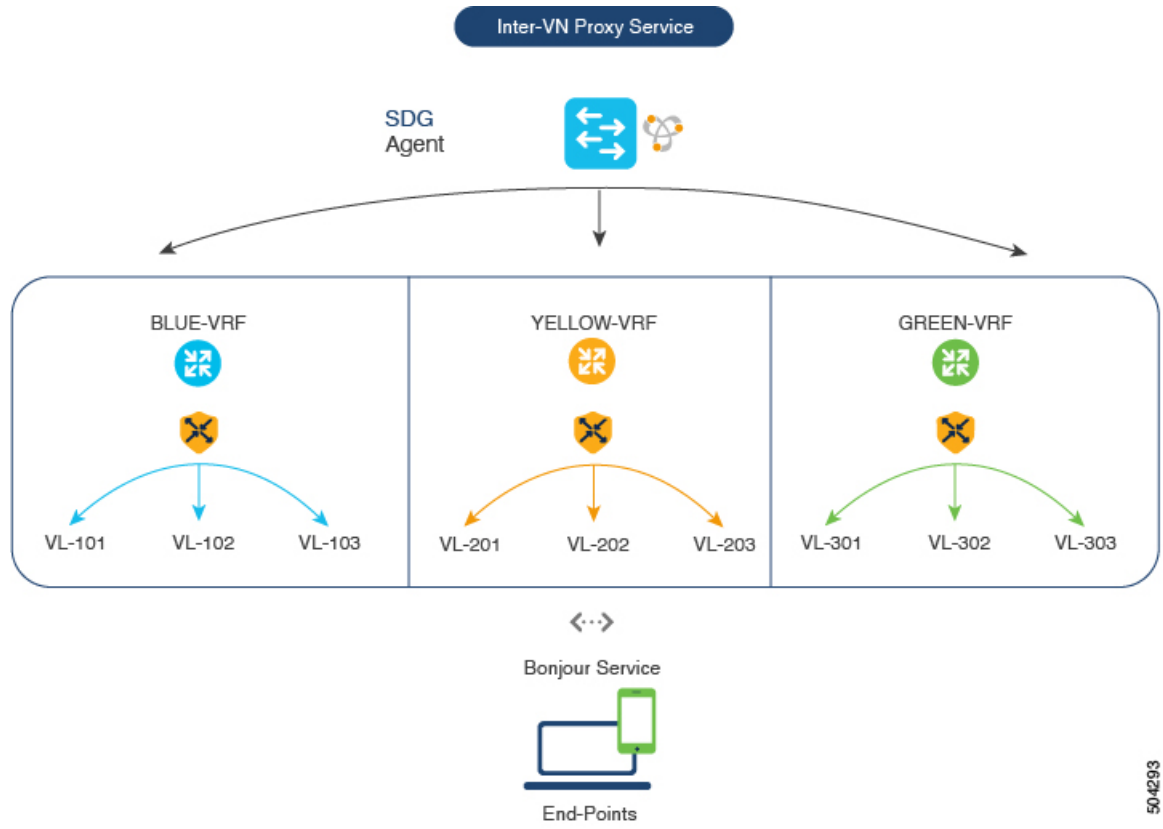
## How to configure Inter-Virtual Network Proxy Service on Local Area Bonjour Domain

Inter-VN Proxy Service is a policy-based VRF-Aware service discovery and distribution implemented on multiple IP VRFs or on a global IP routing domain of a switch in SDG-Agent mode connected to multiple IP networks.

Beginning from Cisco NX-OS Release 10.2(3)F, the Cisco Nexus 9300 Series switches support mDNS service discovery and distribution between IP VRFs or on a global routing domain. Although configuring inter-VN provides Extranet mDNS proxy services between Wired and Wireless networks, additional methods such as stateful firewall, route-leaking and so on must also be configured to handle the data transfer between Inter-VN or VRF to global IP routing.

Figure 12: Inter-VN Proxy Service shows Inter-VN proxy service for Extranet network.

Figure 12: Inter-VN Proxy Service



504293



## CHAPTER 5

# Guidelines and Limitations

---

- [Guidelines and Limitations, on page 35](#)

## Guidelines and Limitations

The following are the guidelines and limitations for Nexus 9300 Series of Switches for Bonjour Gateway:

- IPv6 mDNS packets are not supported.
- IPv6 connection towards Controller is not supported.
- Nexus 9300 supports only one Controller connection.
- No records are cached if corresponding PTR record is missing from the mDNS payload.
- mDNS traffic is not copied to SUP if port is configured with SPAN.
- For the mDNS gateway to work in Nexus 9000 Series of switches, the below TCAM carving followed by switch reload is required:  
**hardware access-list tcam region ing-sup 768**
- Beginning from Cisco NX-OS Release 10.2(3)F, N9K-C93180YC-EX, N9K-C93180YC-FX, N9K-C9336C-FX2, N9K-C9332C, and N9K-C93108TC-EX platforms are supported and discoverable by DNA center for Bonjour service.







## CHAPTER 6

# New and Changed Information

---

- [New and Changed Information](#), on page 37

## New and Changed Information

This table summarizes the new and changed features for the *Cisco DNA Service For Bonjour Configuration Guide, Cisco Nexus 9000 Series NX-OS, Release 10.2(3)F* and where they are documented.

**Table 3: New and Changed Features**

Feature	Description	Changed in Release	Where Documented
Bonjour Gateway	First 10.2(x) release	10.2(3)F	Not applicable

