



# Configuring Local Area Bonjour for Wireless FlexConnect Mode

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## Overview of Local Area Bonjour for Wireless FlexConnect Mode

The Cisco Catalyst 9800 series controller introduces unicast mode function in Local Area Bonjour network domain. The enhanced gateway function at the first hop of Wired and Wireless networks communicates directly with any industry standard RFC 6762 compliant Multicast DNS (mDNS) end point in Layer 2 Unicast mode. The controller also introduces new service-peer mode expanding single-gateway to end-to-end service-routing with upstream SDG-Agent switch to enable unicast-mode, increased scale, performance and resiliency in the network.

## Restrictions for Local Area Bonjour for Wireless FlexConnect Mode

- In FlexConnect mode network deployments, the mDNS gateway and service-peer mode on the controller must not be configured and must be in disabled state.

# Prerequisites for Local Area Bonjour for Wireless FlexConnect Mode

The Cisco Catalyst 9800 series controller must be successfully configured and operational before implementing Cisco Local Area Bonjour for FlexConnect mode wireless networks.

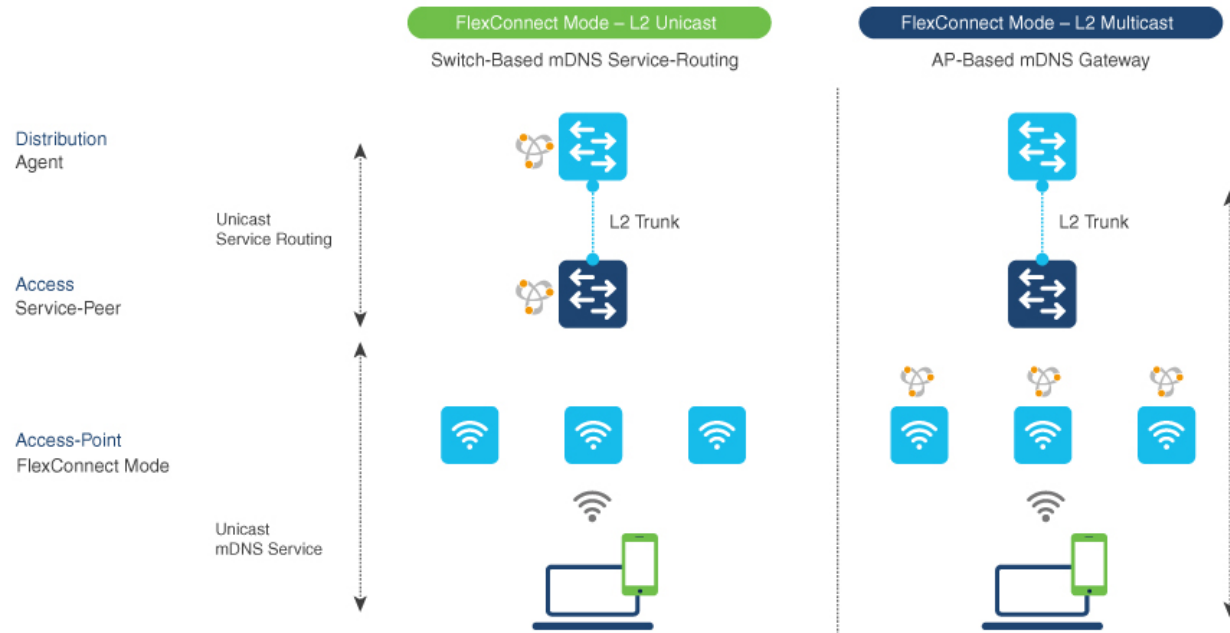
The following list provides the prerequisites for the controller that is to be deployed to enable successful mDNS gateway solution for Wireless FlexConnect:

- Ensure that the targeted Layer 2 Catalyst 9000 Series Ethernet switch is configured in service-peer role and running the required Cisco IOS-XE software version.
- Ensure that the Catalyst 9000 Series Ethernet switch runs a valid Cisco DNA-Advantage license.
- Ensure that the upstream distribution-layer Cisco Catalyst switch for Wired and FlexConnect Local Switching Wireless networks is configured in SDG-Agent mode and runs a valid Cisco DNA-Advantage license.

## Understanding mDNS Gateway Alternatives for Wireless FlexConnect Mode

The controller continues to innovate mDNS gateway function to address evolving business and technical requirements in the Enterprise networks. The FlexConnect Local Switching based wireless networks implement mDNS gateway using the following two methods depicted in the figure:

Figure 1: mDNS Gateway Alternatives for FlexConnect Mode



Based on the operating network environment, the mDNS gateway for FlexConnect mode wireless network can be implemented in one of the following modes to address service discovery and distribution:

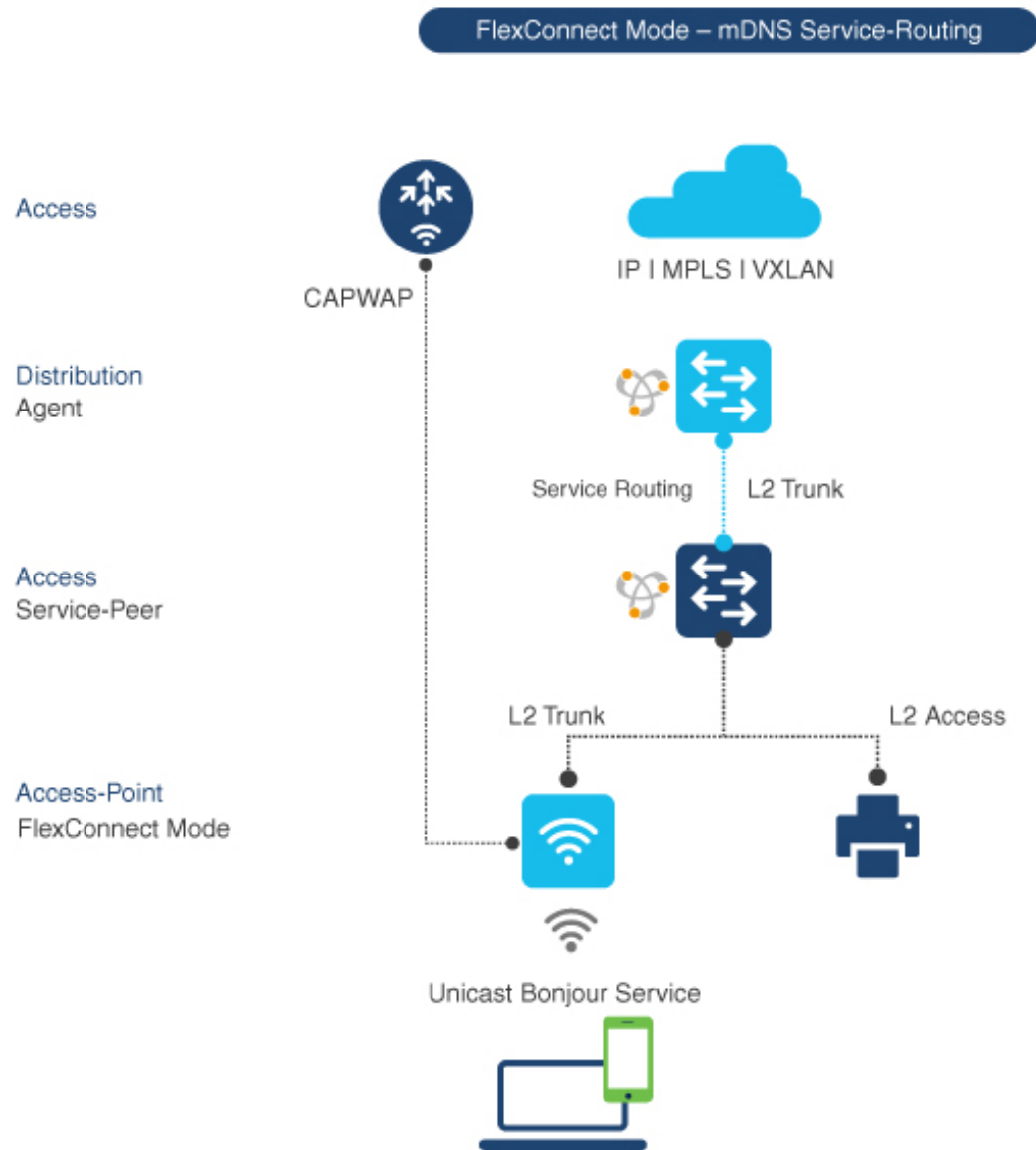
- **Switch Based mDNS Gateway**—In Layer 2 access, the Cisco Catalyst 9000 series Ethernet switch must be implemented as mDNS gateway in Service-Peer role. The following are the key benefits:
  - Replaces flood-n-learn with the new enhanced Unicast-based mDNS communication with FlexConnect mode wireless users.
  - Eliminates mDNS flood with Unicast service-routing to LAN distribution. The Unicast service-routing between LAN distribution and Layer 2 access layer switches forms Local Area Bonjour domain to enable policy and location-based service discovery and distribution. The Unicast based service-routing over Layer 2 trunk eliminates mDNS flood-free and enables service-oriented wireless networks.
  - Eliminates the requirement to forward wired network traffic to wireless Access Points improving wireless scale, performance, and network reliability.
- **AP Based mDNS Gateway**—The Cisco FlexConnect mode wireless access points can alternatively be implemented as mDNS gateway when connected to unsupported LAN access switch. In this method, the mDNS service discovery and distribution follows flood-n-learn mechanism over the Layer 2 wireless network. To implement AP based mDNS gateway, see the [Multicast Domain Name System](#) chapter.

# Understanding Local Area Bonjour for Wireless FlexConnect Mode

The controller supports mDNS gateway function with various advancements for broad range of wireless networks. As the enterprise requirements expands it drives IT organization to introduce new network deployment models, supporting mobile devices and distributed zero-configuration services following increased scale, granular security control and resiliency for mission critical networks. The common unified Cisco IOS-XE operating system across Cisco Catalyst 9000 series LAN switches and Cisco Catalyst 9800 series controller enables distributed Bonjour gateway function at network edge. With end-to-end Wide Area Bonjour service-routing, the new solution enables service-oriented enterprise networks with intuitive user-experience.

The following figure illustrates how the controller connected to wireless access points support mDNS gateway function to wireless users in FlexConnect Local Switching mode.

Figure 2: Cisco Catalyst 9800 Series Controller Local Area Bonjour for Wireless - FlexConnect Mode



The Cisco Catalyst 9000 series switches in the Layer 2 access layer and Layer 3 distribution layer must be configured in the following mDNS gateway mode to enable Unicast-based mDNS service-routing between wired and FlexConnect Local Switching mode wireless users within the same Layer 2 network block:

- **Service-Peer** - The Layer 2 access switch connecting wireless access point in FlexConnect Local Switching mode must be configured with mDNS gateway in Service-Peer mode. Each Layer 2 access switch provides mDNS gateway function between locally attached wired and FlexConnect mode wireless users. The Unicast-based mDNS service discovery and distribution within same or different VLANs is supported with bi-directional mDNS policies on single Layer 2 access switch.
- **SDG Agent** - The mDNS flood-n-learn based method in Layer 2 network is replaced with simple Unicast based service-routing between Layer 2 access switch in Service-Peer mode and upstream distribution-layer

in mDNS gateway SDG Agent mode. The Unicast based mDNS service-routing eliminates mDNS flood over Layer 2 trunk ports providing increased bandwidth, enhanced security, location-based services, and flood control management in wired and FlexConnect wireless network.

## Configuring Local Area Bonjour for Wireless FlexConnect Mode

This section provides configuration guidelines to implement Cisco Catalyst 9000 series Ethernet switch as mDNS gateway and enable service-peer and SDG Agent mode to enable service-routing with upstream distribution-layer Cisco Catalyst 9000 series switch in SDG Agent mode to build Local Area Bonjour.

### Configuring mDNS Gateway Mode (CLI)

To enable mDNS gateway and Service-Peer mode on Layer 2 access switch and SDG Agent mode on Layer 3 distribution layer switch, perform the following:

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device# <b>enable</b>	Enables privileged EXEC mode. Enter your password, if prompted.
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 3</b>	<b>mdns-sd gateway</b> <b>Example:</b> Device(config)# <b>mdns-sd gateway</b>	Enables mDNS on the Layer 2 Catalyst switch and enters the mDNS gateway configuration mode. (Optional) You can configure the following additional parameters: <ul style="list-style-type: none"> <li>• <b>air-print-helper</b>: Enables communication between Apple iOS devices like iPhone or iPad to discover and use older printers that does not support driverless AirPrint function.</li> <li>• <b>cache-memory-max</b>: Configures the percentage memory for cache.</li> <li>• <b>ingress-client</b>: Configures Ingress client packet tuners.</li> <li>• <b>rate-limit</b>: Enables rate limiting of incoming mDNS packets.</li> <li>• <b>service-announcement-count</b>: Configures maximum advertisements.</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• <b>service-announcement-timer</b>: Configures advertisements announcement timer periodicity.</li> <li>• <b>service-query-count</b>: Configures maximum queries.</li> <li>• <b>service-query-timer</b>: Configures query forward timer periodicity.</li> <li>• <b>service-type-enumeration</b>: Configures service enumeration.</li> </ul> <p><b>Note</b> For <b>cache-memory-max</b>, <b>ingress-client</b>, <b>rate-limit</b>, <b>service-announcement-count</b>, <b>service-announcement-timer</b>, <b>service-query-count</b>, <b>service-query-timer</b>, and <b>service-type-enumeration</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 4</b>	<p><b>mode</b> {<b>service-peer</b>   <b>sdg-agent</b>}</p> <p><b>Example:</b></p> <pre>Device(config-mdns-sd)# mode service-peer Device(config-mdns-sd)# mode sdg-agent</pre>	<p>Configure mDNS gateway in one of the following modes based on the system settings:</p> <ul style="list-style-type: none"> <li>• <b>service-peer</b>– Enables Layer 2 Catalyst access switch in mDNS Service-Peer mode.</li> <li>• <b>sdg-agent</b>– Default. Enables Layer 3 distribution layer Catalyst switch in SDG Agent mode to peer with central Cisco Catalyst Center controller for Wide Area Bonjour service routing.</li> </ul>
<b>Step 5</b>	<p><b>exit</b></p> <p><b>Example:</b></p> <pre>Device(config-mdns-sd)# exit</pre>	<p>Exits mDNS gateway configuration mode.</p>

## Configuring mDNS Service Policy (CLI)

You need to perform the following to configure an mDNS service policy:

1. Create service-list to permit built-in or user-defined custom service types.

2. Associate service-list to a service-policy to enforce ingress or egress direction.
3. Apply the service policy to the new VLAN configuration mode.



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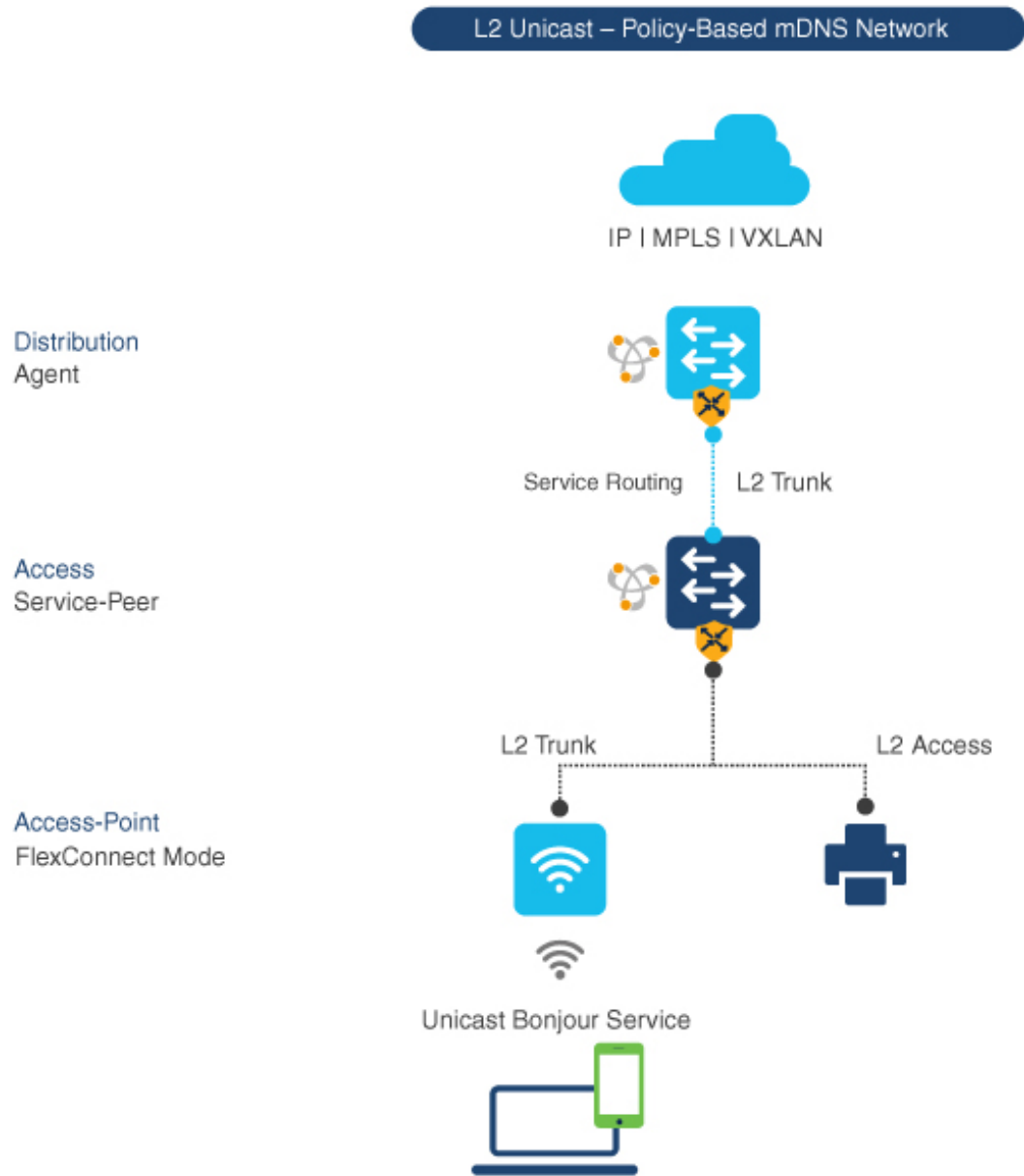
**Note** You will need this configuration in Service-Peer mode for Layer 2 Catalyst switch and SDG agent mode for Layer 3 Catalyst switch.

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The following figure shows how to configure mDNS policies on Catalyst switch in Service-Peer and SDG agent modes.



Figure 3: mDNS Service Policy Configuration on Catalyst Switch in Service-Peer and SDG Agent Modes



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This procedure builds and applies service-policies on target VLAN in service-peer and SDG agent modes.

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	<p><b>enable</b></p> <p><b>Example:</b></p> <p>Device# <b>enable</b></p>	<p>Enables privileged EXEC mode.</p> <p>Enter your password, if prompted.</p>

	Command or Action	Purpose
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 3</b>	<b>mdns-sd service-list service-list-name {in   out}</b> <b>Example:</b> Device (config)# <b>mdns-sd service-list VLAN100-LIST-IN in</b> Device (config)# <b>mdns-sd service-list VLAN100-LIST-OUT out</b>	Configure mDNS service-list to classify one or more service types. Unique service-list is required to process incoming mDNS message and outbound response to request locally connected wired or FlexConnect wireless end points.
<b>Step 4</b>	<b>match service-definition-name [message-type {any   announcement   query}]</b> <b>Example:</b> Device (config)# <b>mdns-sd service-list VLAN100-LIST-IN in</b> Device (config-mdns-sl-in)# <b>match APPLE-TV</b> Device (config-mdns-sl-in)# <b>match PRINTER-IPPS message-type announcement</b>	Matches inbound service-list. The Catalyst switch validates to accept or drop incoming mDNS service-type (such as, Apple TV) advertisement or query matching message type from locally connected wired or FlexConnect wireless end points. The service-list contains implicit deny at the end. The default message-type used is <b>any</b> .
<b>Step 5</b>	<b>match service-definition-name [message-type {any   announcement   query}]</b> <b>Example:</b> Device (config)# <b>mdns-sd service-list VLAN100-LIST-OUT out</b> Device (config-mdns-sl-in)# <b>match APPLE-TV</b> Device (config-mdns-sl-in)# <b>match PRINTER-IPPS</b>	Matches outbound service-list. The Catalyst switch provides local service proxy function by responding matching service-type to the requesting end point(s). For example, the Apple-TV and Printer learnt from VLAN 100 will be distributed to FlexConnect wireless receiver in same VLAN 100. The service-list contains implicit deny at the end. The message-type for outbound service-list is not required.
<b>Step 6</b>	<b>mdns-sd service-policy service-policy-name</b> <b>Example:</b> Device (config)# <b>mdns-sd service-policy VLAN100-POLICY</b>	Creates unique mDNS service-policy in global configuration mode.
<b>Step 7</b>	<b>service-list service-list-name {in   out}</b> <b>Example:</b> Device (config)# <b>mdns-sd service-policy VLAN100-POLICY</b> Device (config-mdns-ser-policy)# <b>service-list VLAN100-LIST-IN in</b> Device (config-mdns-ser-policy)# <b>service-list VLAN100-LIST-OUT out</b>	Configures mDNS service-policy to associate service-list for each direction.

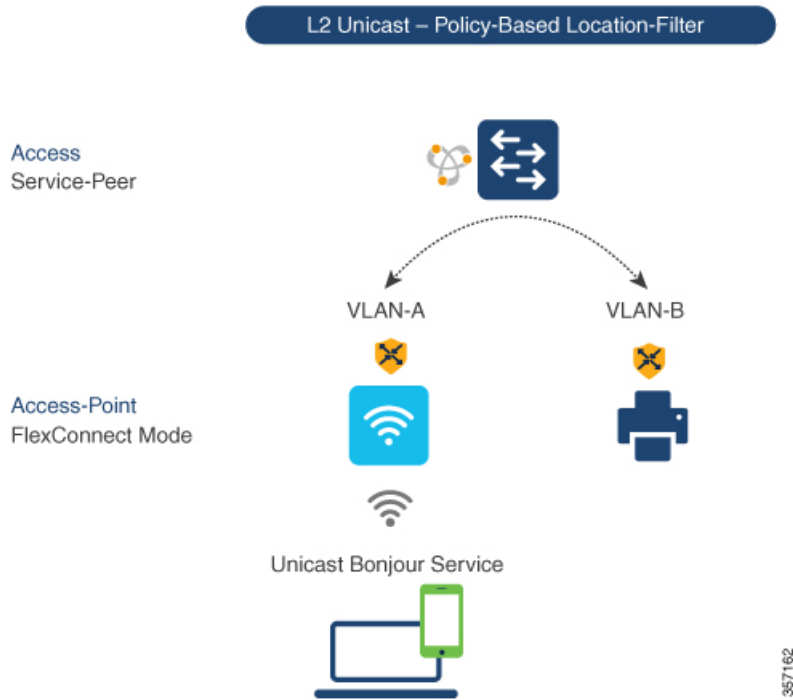
	Command or Action	Purpose
<b>Step 8</b>	<b>vlan configuration <i>ID</i></b> <b>Example:</b> Device (config) # <b>vlan configuration 100</b>	Enables wired or wireless FlexConnect user VLAN configuration for advanced service parameters. One or more VLANs can be created for the same settings.  Here, <i>ID</i> refers to the VLAN configuration ID. The range is from 101 to 110 and 200. This range allows to configure consecutive and non-consecutive VLAN ID(s).
<b>Step 9</b>	<b>mdns-sd gateway</b> <b>Example:</b> Device (config-vlan) # <b>mdns-sd gateway</b>	Enables mDNS gateway on configured wired or FlexConnect wireless user VLAN ID(s).
<b>Step 10</b>	<b>service-policy <i>service-policy-name</i></b> <b>Example:</b> Device (config-vlan-mdns) # <b>service-policy VLAN100-POLICY</b>	Associates mDNS service-policy to the configured wired or FlexConnect wireless user VLAN ID(s).
<b>Step 11</b>	<b>exit</b> <b>Example:</b> Device (config-vlan-mdns) # <b>exit</b>	Exits mDNS gateway configuration mode.

## Configuring mDNS Location-Filter (CLI)

Optionally, you can configure mDNS location-filter to allow service discovery and distribution between locally configured VLAN IDs associated to FlexConnect wireless user networks.

The following figure illustrates and references location-filter policy on Catalyst switch in Service-Peer mode permitting to discover and distribute mDNS services between wired and FlexConnect wireless user VLANs.

Figure 4: Catalyst Service-Peer mDNS Location-Filter Configuration



To enable local service proxy on Cisco Catalyst switch in Service-Peer mode and discover mDNS services between local wired and wireless FlexConnect user VLANs, perform the following:

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device# <b>enable</b>	Enables privileged EXEC mode. Enter your password, if prompted.
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 3</b>	<b>mdns-sd location-filter</b> <i>location-filter-name</i> <b>Example:</b> Device (config)# <b>mdns-sd location-filter</b> <b>LOCAL-PROXY</b>	Configures a unique location-filter in global configuration mode.
<b>Step 4</b>	<b>match location-group</b> {all   default   ID} <b>vlan</b> [ID] <b>Example:</b>	Configures the match criteria to mutually distribute the permitted services between grouped VLANs. For example, mDNS services can be discovered and distributed using the

	Command or Action	Purpose
	<pre>Device(config-mdns-loc-filter)# match location-group default vlan 100  Device(config-mdns-loc-filter)# match location-group default vlan 101</pre>	Unicast mode between wireless FlexConnect user VLAN ID 100 and wired user VLAN ID 101.
<b>Step 5</b>	<p><b>mdns-sd service-list</b> <i>service-list-name</i> {in   out}</p> <p><b>Example:</b></p> <pre>Device(config)# mdns-sd service-list VLAN100-LIST-OUT out</pre>	<p>Configures the mDNS service-list to classify one or more service types.</p> <p>The <b>service-list</b> configuration is required to process any incoming or outgoing mDNS messages.</p>
<b>Step 6</b>	<p><b>match</b> <i>service-definition-name</i> [message-type {any   announcement   query}]</p> <p><b>Example:</b></p> <pre>Device(config)# mdns-sd service-list VLAN100-LIST-OUT out  Device(config-mdns-sl-out)# match APPLE-TV location-filter LOCAL-PROXY</pre>	<p>Associates location-filter to one or more service types to enable local proxy between local VLANs. For example, the Apple-TV learnt from VLAN 100 and VLAN 101 will be distributed to receiver in VLAN 100.</p> <p><b>Note</b> You do not require a <b>message-type</b> for the outbound service-list.</p>
<b>Step 7</b>	<p><b>mdns-sd service-policy</b> <i>service-policy-name</i></p> <p><b>Example:</b></p> <pre>Device(config)# mdns-sd service-policy VLAN100-POLICY</pre>	Creates unique mDNS service-policy in global configuration mode.
<b>Step 8</b>	<p><b>service-list</b> <i>service-list-name</i> {in   out}</p> <p><b>Example:</b></p> <pre>Device(config)# mdns-sd service-policy VLAN100-POLICY  Device(config-mdns-ser-policy)# service-list VLAN100-LIST-OUT out</pre>	Configures mDNS service-policy to associate service-list for each direction.
<b>Step 9</b>	<p><b>vlan configuration</b> <i>ID</i></p> <p><b>Example:</b></p> <pre>Device(config)# vlan configuration 100</pre>	<p>Enables VLAN configuration for advanced service parameters. You can create one or more VLANs with the same settings.</p> <p>Here, <i>ID</i> refers to the VLAN configuration ID. The range is from 101 to 110 and 200. This range allows to configure consecutive and non-consecutive VLAN ID(s).</p>
<b>Step 10</b>	<p><b>mdns-sd gateway</b></p> <p><b>Example:</b></p> <pre>Device(config-vlan-config)# mdns-sd gateway</pre>	Enables mDNS gateway on configured VLAN ID(s).
<b>Step 11</b>	<p><b>service-policy</b> <i>service-policy-name</i></p> <p><b>Example:</b></p>	Associates mDNS service-policy to the configured VLAN ID(s).

	Command or Action	Purpose
	Device (config-vlan-mdns-sd) # <b>service-policy VLAN100-POLICY</b>	
<b>Step 12</b>	<b>exit</b>  <b>Example:</b> Device (config-vlan-mdns-sd) # <b>exit</b>	Exits mDNS gateway configuration mode.

## Configuring Custom Service Definition (CLI)

The Cisco IOS-XE supports mapping of various built-in well-known mDNS service-definition types to key mDNS PTR records and user-friendly names. For example, built-in Apple-TV service-type is associated with `_airplay._tcp.local` and `_raop._tcp.local` PTR records to successfully enable service in the network. Network administrators create custom service-definition with matching mDNS PTR records to enable end mDNS service-routing in the network.

The custom service-definition can be associated to the service-list as described in the following steps:

### Procedure

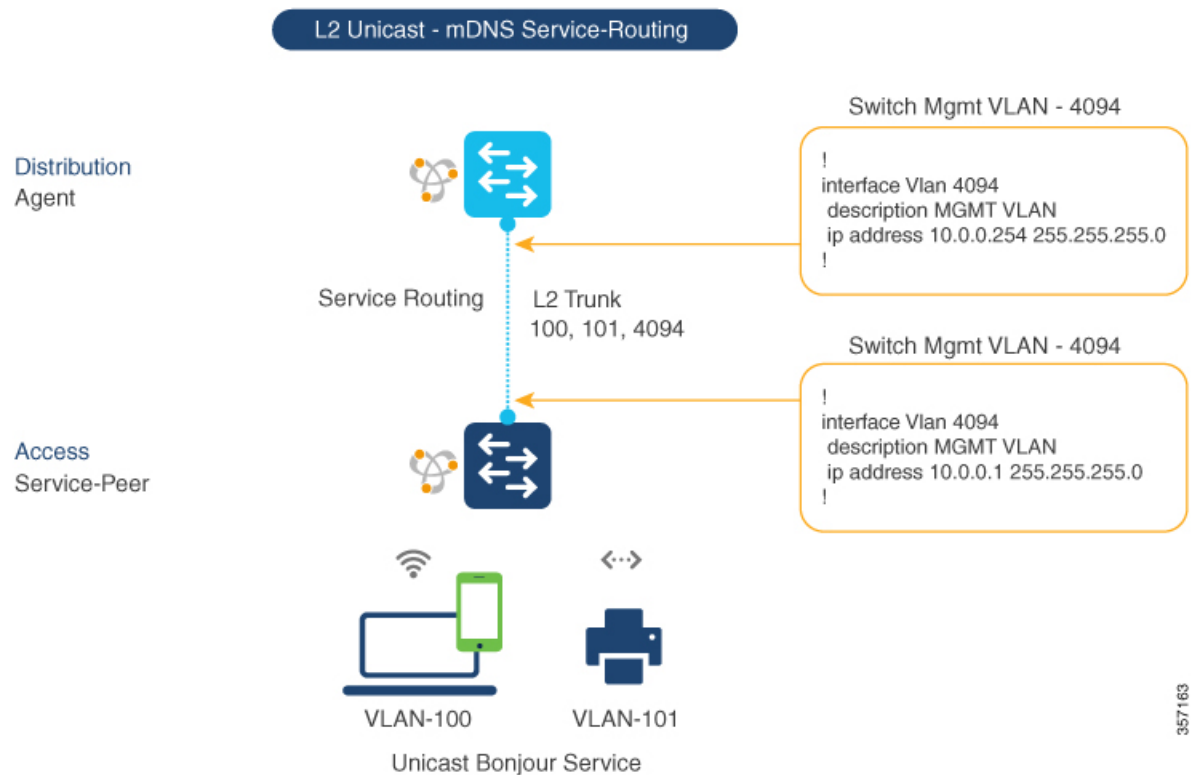
	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device# <b>enable</b>	Enables privileged EXEC mode.  Enter your password, if prompted.
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 3</b>	<b>mdns-sd service-definition</b> <i>service-definition-name</i>  <b>Example:</b> Device (config) # <b>mdns-sd</b> <b>service-definition APPLE-CLASSROOM</b>	Creates a unique service-definition name for custom service-types.
<b>Step 4</b>	<b>service-type</b> <i>custom-mDNS-PTR</i>  <b>Example:</b> Device (config-mdns-ser-def) # <b>service-type</b> <b>_classroom._tcp.local</b>	Configures a regular-expression string for custom mDNS PoinTeR(PTR) record.
<b>Step 5</b>	<b>exit</b>  <b>Example:</b> Device (config-mdns-ser-def) # <b>exit</b>	Exits mDNS gateway configuration mode.

## Configuring Service-Routing on Service-Peer (CLI)

The Layer 2 Cisco Catalyst switch in Service-Peer mode builds a service-routing with an upstream distribution-layer switch in the SDG Agent mode. To build service-routing, the Layer 2 Cisco Catalyst switch requires at least one interface with valid IP address to reach the upstream SDG Agent Catalyst switch. The switch management port is unsupported.

The following figure illustrates the topology to enable unicast-based service-routing over Layer 2 trunk between access-layer Catalyst switch in the Service-Peer mode and distribution-layer Catalyst switch in SDG Agent mode.

Figure 5: Catalyst Service-Peer Service-Routing Configuration



To enable service-routing on Cisco Catalyst switch in Service-Peer mode and setup mDNS trust interface settings, follow the procedure given below:

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device# <b>enable</b>	Enables Privileged EXEC mode. Enter your password, if prompted.
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b>	Enters the global configuration mode.

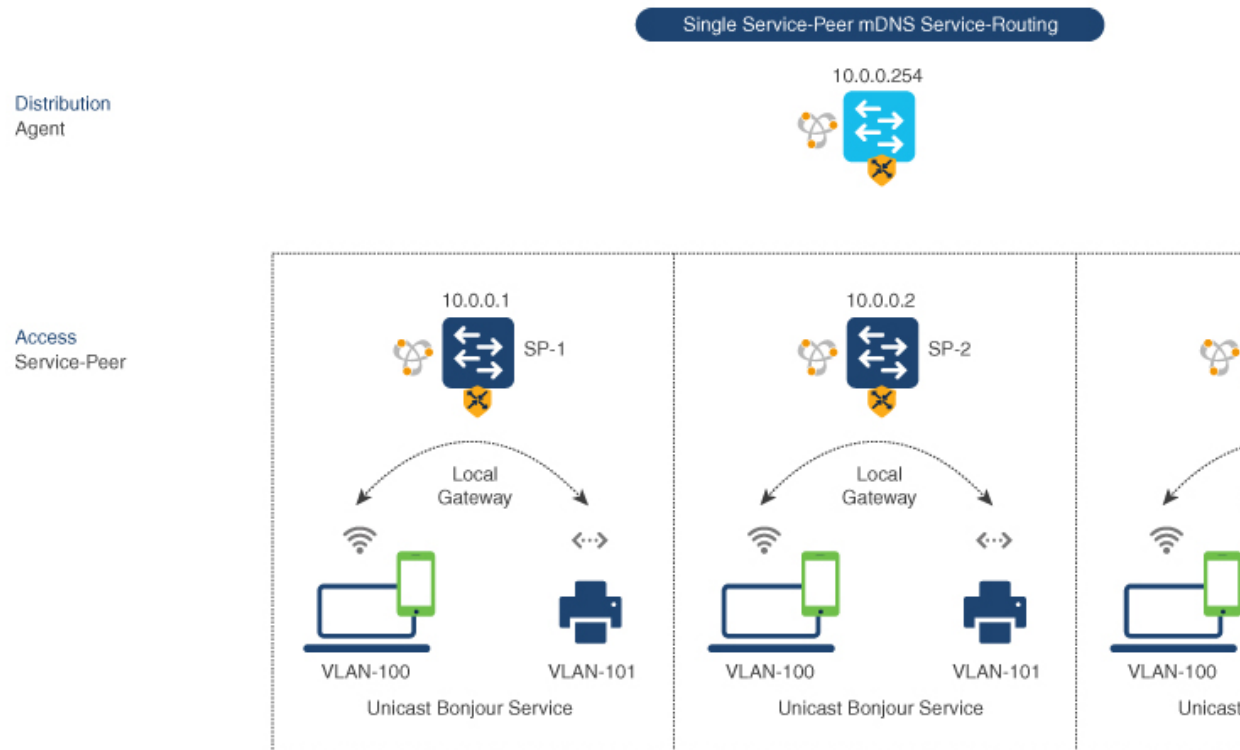
	Command or Action	Purpose
	Device# <code>configure terminal</code>	
<b>Step 3</b>	<p><b>vlan configuration <i>ID</i></b></p> <p><b>Example:</b></p> <pre>Device(config)# vlan configuration 100</pre>	<p>Enables Wired and FlexConnect user VLAN configuration for advanced service parameters. One or more VLANs can be created for the same settings.</p> <p>Here, <i>ID</i> refers to the VLAN configuration ID. For example, <i>vlan configuration 101-110, 200</i> range, allows to configure consecutive and non-consecutive VLAN ID(s).</p>
<b>Step 4</b>	<p><b>mdns-sd gateway</b></p> <p><b>Example:</b></p> <pre>Device(config-vlan-config)# mdns-sd gateway</pre>	<p>Enables mDNS gateway on configured VLAN ID(s).</p> <p>To enable the respective functionalities, enter the following commands in the mDNS gateway configuration mode:</p> <ul style="list-style-type: none"> <li>• <b>active-query timer [sec]:</b> Configure to enable refresh discovered services and their records with periodic mDNS Query message for permitted service types. The valid range is from 60 to 3600 seconds. The recommended value is 3600 seconds.</li> <li>• <b>service-mdns-query {ptr   srv   txt}:</b> Permits processing specific Query type. The default query type is PTR.</li> <li>• <b>transport {ipv4   ipv6   both}:</b> Permits processing for IPv4, IPv6, or both. It is recommended to use one network type to reduce redundant processing and respond with the same information over two network types. The default network type is IPv4.</li> </ul>
<b>Step 5</b>	<p><b>source-interface <i>ID</i></b></p> <p><b>Example:</b></p> <pre>Device(config-vlan-mdns-sd)# source-interface vlan 4094</pre>	<p>Selects the interface with a valid IP address to source service-routing session with the upstream Cisco Catalyst SDG Agent switch. Typically, the management VLAN interface can be used.</p>
<b>Step 6</b>	<p><b>sdg-agent [<i>IPv4_address</i>]</b></p> <p><b>Example:</b></p> <pre>Device(config-vlan-mdns-sd)# sdg-agent 10.0.0.254</pre>	<p>Configures the SDG Agent IPv4 address, typically, the management VLAN gateway address. If FHRP mode, then use the FHRP virtual IP address of the management VLAN.</p>
<b>Step 7</b>	<p><b>exit</b></p> <p><b>Example:</b></p> <pre>Device(config-vlan-mdns-sd)# exit</pre>	<p>Exits the mDNS gateway configuration mode.</p>



## Configuring Location-Based mDNS

By default, the Layer 2 Catalyst switch in the Service-Peer mode enables per-switch mDNS discovery and distribution in FlexConnect wireless users attached locally to the switch. This default per-switch location-based mDNS is supported even when the FlexConnect user VLANs may be extended between multiple Layer 2 Catalyst switches for user mobility purpose. The mDNS service-policy configuration SDG Agent is required to accept policy-based mDNS service provider and receiver information from downstream Service-Peer access-layer switch.

**Figure 6: Per-Switch Location-Based FlexConnect Configuration**



**Note** Configure the mDNS service policy on the distribution layer SDG Agent switch before proceeding to the next configuration step. For more information, see the [Configuring mDNS Service Policy](#) section.

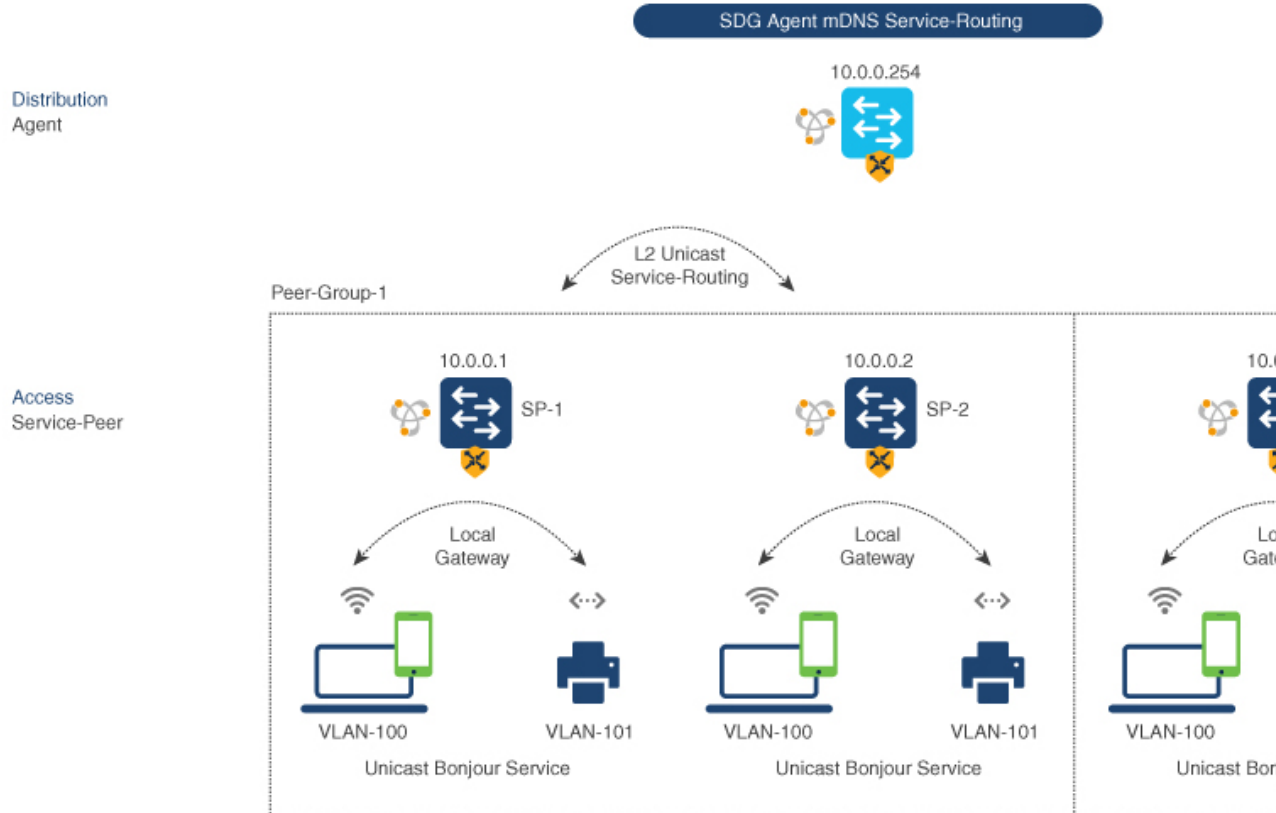
## Configuring Service-Routing on SDG Agent (CLI)

The Cisco Catalyst 9000 series switches support SDG Agent mode automatically at the distribution layer and enables Unicast mode Bonjour service-routing with the downstream Layer 2 access-layer Ethernet switches connected to the FlexConnect wireless users. The SDG Agent must be configured with mDNS service-policy on wireless FlexConnect user VLAN to accept mDNS service cache from downstream Service-Peer switches.

This section provides step-by-step configuration guidelines to enable policy-based service discovery and distribution between locally paired Layer 2 access network switches in the Service-Peer mode.

The following figure illustrates unicast service-routing on SDG Agent and downstream Layer 2 access network switches in the Service-Peer mode.

Figure 7: Catalyst SDG Agent Service-Routing Configuration



**Note** Configure the mDNS service policy on the distribution layer SDG Agent switch before proceeding to the next configuration step. For more information, see the [Configuring mDNS Service Policy](#) section.

To enable the mDNS service policy and peer-group on SDG Agent switch, and enable Unicast mode service-routing with Layer 2 access network switches in Service-Peer mode, perform the following:

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device# <b>enable</b>	Enables privileged EXEC mode.  Enter your password, if prompted.
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b>	Enters global configuration mode.

	Command or Action	Purpose
	Device# <code>configure terminal</code>	
<b>Step 3</b>	<b>mdns-sd service-peer group</b> <i>service-peer-group-name</i>  <b>Example:</b> Device(config)# <code>mdns-sd service-peer group group_1</code>	Configures a unique Service-Peer group.
<b>Step 4</b>	<b>peer-group [ID]</b>  <b>Example:</b> Device(config-mdns-svc-peer)# <code>peer-group 1</code>	Assigns a unique peer-group ID to the Service-Peers pair permitting mDNS service discovery and distribution within the assigned group list.  The valid peer-group range is from 1 to 1000 for each SDG Agent switch.
<b>Step 5</b>	<b>service-policy service-policy-name</b>  <b>Example:</b> Device(config-mdns-svc-peer-grp)# <code>service-policy VLAN100-POLICY</code>	Associates an mDNS service policy to accept service advertisements and query from the paired Service-Peers.
<b>Step 6</b>	<b>service-peer [IPv4_address] location-group {all   default   id}</b>  <b>Example:</b> Device(config-mdns-svc-peer-grp)# <code>service-peer 10.0.0.1 location-group default</code>  Device(config-mdns-svc-peer-grp)# <code>service-peer 10.0.0.2 location-group default</code>	Configures at least one Service-Peer to accept the mDNS service advertisement or query message. When a group has more than one Service-Peers, the SDG Agent provides Layer 2 Unicast mode routing between the configured peers.  For example, the SDG Agent provides Unicast based service gateway function between three (10.0.0.1 and 10.0.0.2) Layer 2 Service-Peer switches matching the associated service-policy.  The mDNS service information from the unpaired Layer 2 Service-Peer (10.0.0.3) cannot announce or receive mDNS services with the other grouped Service-Peers (10.0.0.1 and 10.0.0.2).
<b>Step 7</b>	<b>exit</b>  <b>Example:</b> Device(config-mdns-svc-peer-grp)# <code>exit</code>	Exits mDNS gateway configuration mode.

## Verifying Local Area Bonjour in Service-Peer Mode

This section provides guidelines to verify various Local Area Bonjour domain mDNS service configuration parameters, cache records, statistics and more on the controller in service-peer mode

Table 1:

Command or Action	Purpose
<b>show mdns-sd cache {all   interface   mac   name   service-peer   static   type   vlan}</b>	<p>Displays available mDNS cache records supporting multiple variables providing granular source details received from wired or wireless FlexConnect user VLANs. The variables are as follows:</p> <ul style="list-style-type: none"> <li>• all – Displays all available cache records discovered from multiple source connections of a system.</li> <li>• interface – Displays available cache records discovered from the specified Layer 3 interface.</li> <li>• mac - Displays available cache records discovered from the specified MAC address.</li> <li>• name - Displays available cache records based on the service provider announced name.</li> <li>• service-peer - Displays available cache records discovered from the specified Layer 2 Service-Peer.</li> <li>• static – Displays locally configured static mDNS cache entry.</li> <li>• type – Displays available cache records based on the specific mDNS record type, such as, PTR, SRV, TXT, A or AAAA.</li> <li>• vlan - Displays available cache records discovered from the specified Layer 2 VLAN ID in the Unicast mode.</li> </ul>
<b>show mdns-sd service-definition {name   type}</b>	<p>Displays built-in and user-defined custom service-definition that maps service name to the mDNS PTR records. The service-definition can be filtered by name or type.</p>
<b>show mdns-sd service-list {direction   name}</b>	<p>Displays inbound or outbound direction list of configured service-list to classify matching service-types for service-policy. The list can be filtered by name or specific direction.</p>
<b>show mdns-sd service-policy {interface   name}</b>	<p>Displays list of mDNS service-policy mapped with inbound or outbound service-list. The service-policy list can be filtered by an associated specified interface or name.</p>

Command or Action	Purpose
<b>show mdns-sd statistics</b> {all   cache   debug   interface   service-list   service-policy   services   vlan}	<p>Displays detailed mDNS statistics processed bi-directionally by the system on each mDNS gateway enabled VLAN configured mDNS in Unicast mode. The expanded keyword for mDNS statistics can provide detailed view on interface, policy, service-list, and services.</p> <p><b>Note</b> This command displays all mDNS packets received from directly connected (Local Mode) or Flex clients in WLAN.</p>
<b>show mdns-sd summary</b> {interface   vlan}	<p>Displays brief information about mDNS gateway and key configuration status on all wired and wireless FlexConnect user VLANs, and interfaces of the system.</p>

## Verifying Local Area Bonjour in SDG Agent Mode

This section provides guidelines to verify various Local Area Bonjour domain mDNS service configuration parameters, cache records, statistics and more on the controller in SDG Agent mode

Table 2:

Command or Action	Purpose
<b>show mdns-sd cache {all   interface   mac   name   service-peer   static   type   vlan   vrf}</b>	Displays available mDNS cache records supporting multiple variables providing granular source details. The variables are as follows: <ul style="list-style-type: none"> <li>• all – Displays all available cache records discovered from multiple source connections of a system.</li> <li>• interface – Displays available cache records discovered from the specified Layer 3 interface.</li> <li>• mac - Displays available cache records discovered from the specified MAC address.</li> <li>• name - Displays available cache records based on the service provider announced name.</li> <li>• service-peer - Displays available cache records discovered from the specified Layer 2 Service-Peer.</li> <li>• static – Displays locally configured static mDNS cache entry.</li> <li>• type – Displays available cache records based on the specific mDNS record type, such as, PTR, SRV, TXT, A or AAAA.</li> <li>• vlan - Displays available cache records discovered from the specified Layer 2 VLAN ID in the Unicast mode.</li> <li>• vrf - Displays per-VRF available cache records based on specific mDNS record type, i.e., PTR, SRV, TXT, A or AAAA.</li> </ul>
<b>show mdns-sd service-definition {name   type}</b>	Displays built-in and user-defined custom service-definition that maps service name to the mDNS PTR records. The service-definition can be filtered by name or type.
<b>show mdns-sd service-list {direction   name}</b>	Displays inbound or outbound direction list of the configured service-list to classify matching service-types for service-policy. The list can be filtered by name or specific direction.
<b>show mdns-sd service-policy {interface   name}</b>	Displays list of mDNS service-policy mapped with inbound or outbound service-list. The service-policy list can be filtered by an associated specified interface or name.

Command or Action	Purpose
<b>show mdns-sd statistics</b> {all   cache   debug   interface   service-list   service-policy   services   vlan}	Displays detailed mDNS statistics processed bi-directionally by the system on each mDNS gateway enabled VLAN configured mDNS in Unicast mode. The expanded keyword for mDNS statistics can provide detailed view on interface, policy, service-list, and services.
<b>show mdns-sd summary</b> {interface   vlan}	Displays brief information about mDNS gateway and key configuration status on all VLANs and interfaces of the system.

## Reference

*Table 3:*

Related Topic	Document Title
DNA Service for Bonjour Deployment on Cisco Catalyst 9600 Switch	<a href="#">Cisco Catalyst 9600 Series Switch Software Configuration Guide, Release 17.5.X</a>
DNA Service for Bonjour Deployment on Cisco Catalyst 9500 Switch	<a href="#">Cisco Catalyst 9500 Series Switch Software Configuration Guide, Release 17.5.X</a>
DNA Service for Bonjour Deployment on Cisco Catalyst 9400 Switch	<a href="#">Cisco Catalyst 9400 Series Switch Software Configuration Guide, Release 17.5.X</a>
DNA Service for Bonjour Deployment on Cisco Catalyst 9300 Switch	<a href="#">Cisco Catalyst 9300 Series Switch Software Configuration Guide, Release 17.5.X</a>
Cisco Wide Area Bonjour Application on Cisco Catalyst Center User Guide	<a href="#">Cisco Wide Area Bonjour Application on Cisco Catalyst Center User Guide, Release 2.2.2</a>

