Configuring Local Area Bonjour for Embedded Wireless Controller Access Point Mode

- Overview of Local Area Bonjour for Embedded Wireless Controller - Access Point Mode, on page 1
- Restrictions for Local Area Bonjour for Embedded Wireless Controller - Access Point Mode, on page 2
- Prerequisites for Local Area Bonjour for Embedded Wireless Controller - Access Point Mode, on page 2
- Understanding EWC Mode mDNS Gateway Alternatives, on page 3
- Understanding Local Area Bonjour for Embedded Wireless Controller Access Point Mode, on page 4
- Configuring Local Area Bonjour for Embedded Wireless Controller Access Point Mode, on page 5
- Verifying Local Area Bonjour in Service-Peer Mode, on page 19
- Verifying Local Area Bonjour in SDG Agent Mode, on page 20
- Reference, on page 22

Overview of Local Area Bonjour for Embedded Wireless Controller - Access Point Mode

The Cisco Embedded Wireless Controller on Catalyst Access Points introduces unicast mode function in Local Area Bonjour network domain. The enhanced gateway function at the first hop of wired and wireless networks communicate directly with any industry standard RFC 6762 compliant multicast DNS (mDNS) end point in Layer 2 unicast mode.

The Cisco Catalyst 9100 series Access Points (AP) support distributed wireless forwarding with Embedded Wireless Controller (EWC) in Local-Switching mode. The Catalyst 9000 series LAN switch introduces new Service-Peer mode to support mDNS gateway for locally attached wired and wireless endpoints in Unicast mode. The mDNS service discovery and distribution boundary is expanded from 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 Embedded Wireless Controller - Access Point Mode

- The mDNS gateway on EWC Cisco Catalyst 9100 series Access Points does not support service-peer mode to enable service-routing and unicast mode mDNS communication.
- The mDNS gateway on EWC Catalyst 9100 series Access Points must be in disabled state.
- The mDNS bridging is required, allowing mDNS service discovery and distribution from locally attached mDNS gateway Layer 2 access switch in Service-Peer mode.
- The Catalyst 9000 series switches in Service-Peer mode supports per Layer 2 access switch level Location-Based service for wireless users connected to EWC mode Access Point and Wired endpoints.

Prerequisites for Local Area Bonjour for Embedded Wireless Controller - Access Point Mode

The EWC mode Cisco Catalyst 9100 series Access Points must be successfully configured and operational before implementing Cisco Local Area Bonjour for EWC AP mode wireless networks.

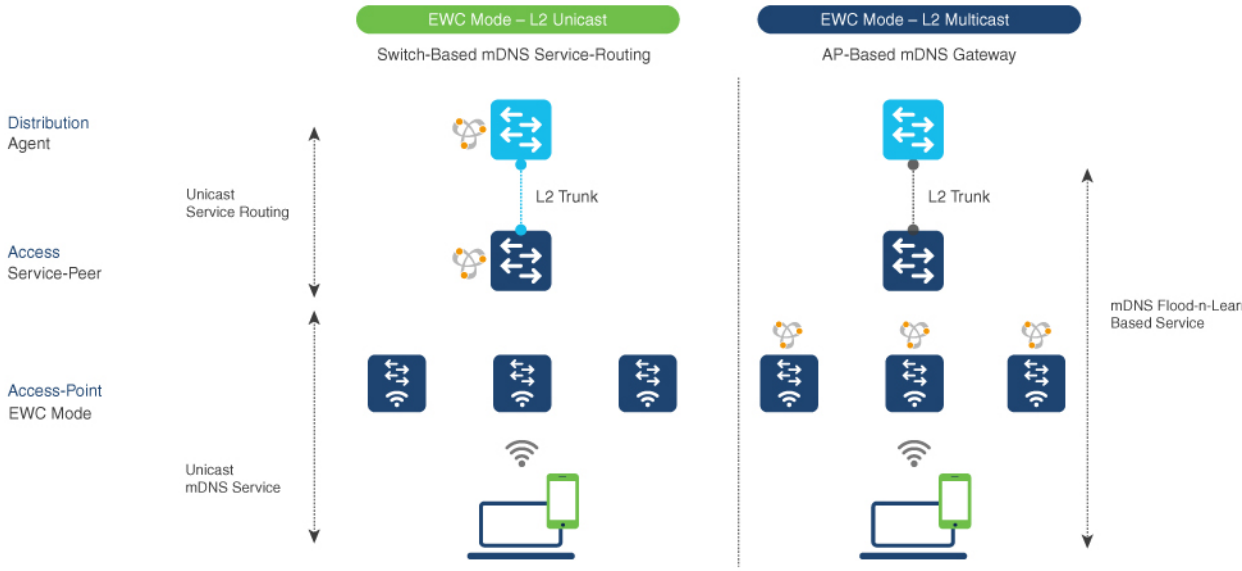
The following are the pre-requisites verified on EWC mode AP and the Layer 2 access Cisco Catalyst 9000 series switches deployed in Service-Peer mode supporting mDNS gateway for wired and wireless users:

- The EWC mode Cisco Catalyst 9100 series Access Point must be pre-configured to implement wireless network and other advanced parameters. For more information, see the Cisco Embedded Wireless Controller on Catalyst Access Points Configuration Guide .
- The EWC mode Cisco Catalyst 9100 series Access Point may run operate recommended IOS-XE software version. There are no mDNS requirements and software version dependency on EWC mode AP to enable Local Area Bonjour gateway.
- Ensure that the targeted controller for Service-Peer role has the required Cisco IOS XE software version.
- Ensure that the controller runs a valid Cisco DNA-Advantage license.
- Ensure that the upstream distribution-layer Cisco Catalyst switch in SDG-Agent mode runs a valid Cisco DNA-Advantage license.
- Ensure that the controller is interconnected as Layer 2 trunk in multi-layer network, when Layer 2 Unicast service-routing is running between SDG-Agent in distribution-layer and the controller service-peer.
- Ensure the Catalyst 9000 access layer switches have IP reachability to upstream Cisco Catalyst 9000 series switches in SDG Agent mode over IPv4 subnet. that is, switch management IP network

Understanding EWC Mode mDNS Gateway Alternatives

The Cisco Catalyst controllers continue to innovate mDNS gateway function to address evolving business and technical requirements in enterprise networks. The EWC mode Access Point based wireless networks can implement mDNS gateway using following two methods as displayed in figure below:

Figure 1: EWC Mode Access Point mDNS Gateway Alternatives



The mDNS gateway for EWC mode Access Point wireless network can be implemented using in either mode to address service discovery and distribution based on operating network environment:

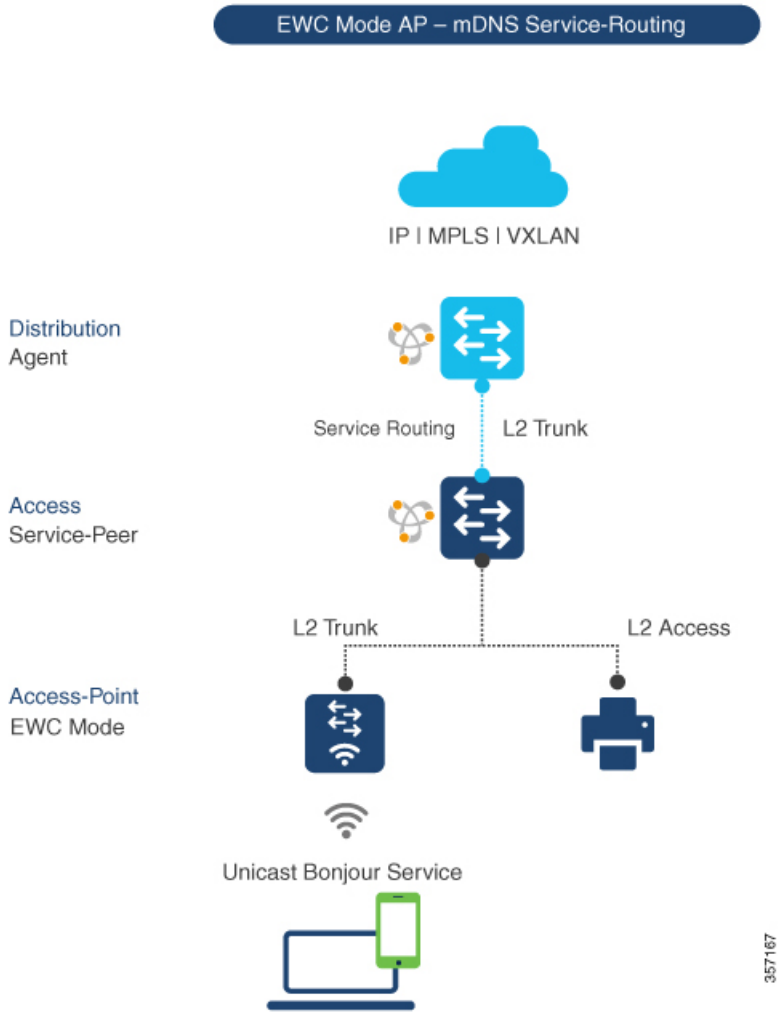
- **Switch Based mDNS Gateway**– Catalyst 9000 series switch in Layer 2 access can be implemented as mDNS gateway in Service-Peer role supporting following key benefits:
  - Replaces flood-n-learn with new enhanced Unicast-based mDNS communication with locally attached wired and EWC mode Access Point wireless users.
  - The Catalyst 9000 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 wired and wireless networks.
  - The switch-based mDNS gateway solution eliminates requirement to forward wired network traffic to wireless APs improving wireless scale, performance and network reliability.
- **AP Based mDNS Gateway** – The Cisco EWC mode Access Point can alternatively be implemented as mDNS gateway in case if connected to unsupported LAN access switch. In this classic method the mDNS service discovery and distribution follows flood-n-learn mechanic over the Layer 2 wired and wireless network. Refer to Multicast Domain Name System chapter module for Cisco Embedded Wireless Controller Configuration Guide, Release 17.3.1 to implement AP based mDNS gateway.

Understanding Local Area Bonjour for Embedded Wireless Controller Access Point Mode

The Cisco Catalyst LAN switches and WLC supported mDNS gateway function with various advancements for broad range of Wired and Wireless network types. 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 Catalyst 9000 series LAN switches and EWC mode Catalyst 9100 series Access Points enables distributed Bonjour gateway function at network edge and with end-to-end Wide Area Bonjour service-routing the new solution enables service-oriented enterprise networks with intuitive user-experience.

The figure below displays the Cisco Catalyst 9000 series switches connected to EWC mode Access Points that supports the mDNS gateway function to the locally attached EWC mode wireless users and wired users.

Figure 2: Cisco Catalyst Switch and EWC Mode Access Point



The Cisco Catalyst 9000 series switches in Layer 2 access layer and at Layer 3 distribution layer must be configured in following mDNS gateway mode to enable Unicast-based mDNS service-routing between wired and EWC mode Access Points mode wireless users within same Layer 2 network block.

- **Service-Peer**- The Layer 2 access switch connecting Wireless Access-Point in EWC 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 EWC mode Access Point 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 increase bandwidth, enhanced security, location-based services and flood control management in wired and EWC mode Access Point wireless network.

Configuring Local Area Bonjour for Embedded Wireless Controller Access Point Mode

This topic describes the configuration steps to implement Layer 2 access layer Cisco Catalyst 9000 series switch as mDNS gateway and enable Service-Peer on Layer 2 access layer switch and the SDG Agent mode. To enable mDNS service discovery and distribution between multiple Layer 2 access switches, service-routing must be enabled with upstream distribution-layer Cisco Catalyst 9000 series switch in SDG Agent mode to build Local Area Bonjour service-routing domain.

Note mDNS gateway must be globally disabled on Catalyst 9100 series Access Point in EWC mode.

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, follow the procedure given below:

Procedure

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

	Command or Action	Purpose
Step 3	**mdns-sd gateway** **Example:** `Device(config)# mdns-sd gateway`	Enables mDNS on the Layer 2 Catalyst switch and enters the mDNS gateway configuration mode. (Optional) You can configure the following additional parameters: • **air-print-helper**: Enables communication between Apple iOS devices like iPhone or iPad to discover and use older printers that does not support driverless AirPrint function. • **cache-memory-max**: Configures the percentage memory for cache. • **ingress-client**: Configures Ingress client packet tuners. • **rate-limit**: Enables rate limiting of incoming mDNS packets. • **service-announcement-count**: Configures maximum advertisements. • **service-announcement-timer**: Configures advertisements announcement timer periodicity. • **service-query-count**: Configures maximum queries. • **service-query-timer**: Configures query forward timer periodicity. • **service-type-enumeration**: Configures service enumeration. **Note** For **cache-memory-max**, **ingress-client**, **rate-limit**, **service-announcement-count**, **service-announcement-timer**, **service-query-count**, **service-query-timer**, and **service-type-enumeration** commands, you can retain the default value of the respective parameter for general deployments. Configure a different value, if required, for a specific deployment.
Step 4	**mode** {**service-peer** | **sdg-agent**} **Example:**	Configures mDNS gateway in one of the following modes based on the system settings:

	Command or Action	Purpose
	`Device(config-mdns-sd)# mode service-peer`	• **Service-Peer**– Enables Layer 2 Catalyst access switch in mDNS Service-Peer mode. • **SDG Agent**– Default. Enables Layer 3 distribution layer Catalyst switch in SDG Agent mode to peer with central Cisco DNA Center controller for Wide Area Bonjour service routing.
Step 5	**exit** **Example:** `Device(config-mdns-sd)# exit`	Exits mDNS gateway configuration mode.

Configuring mDNS Service Policy (CLI)

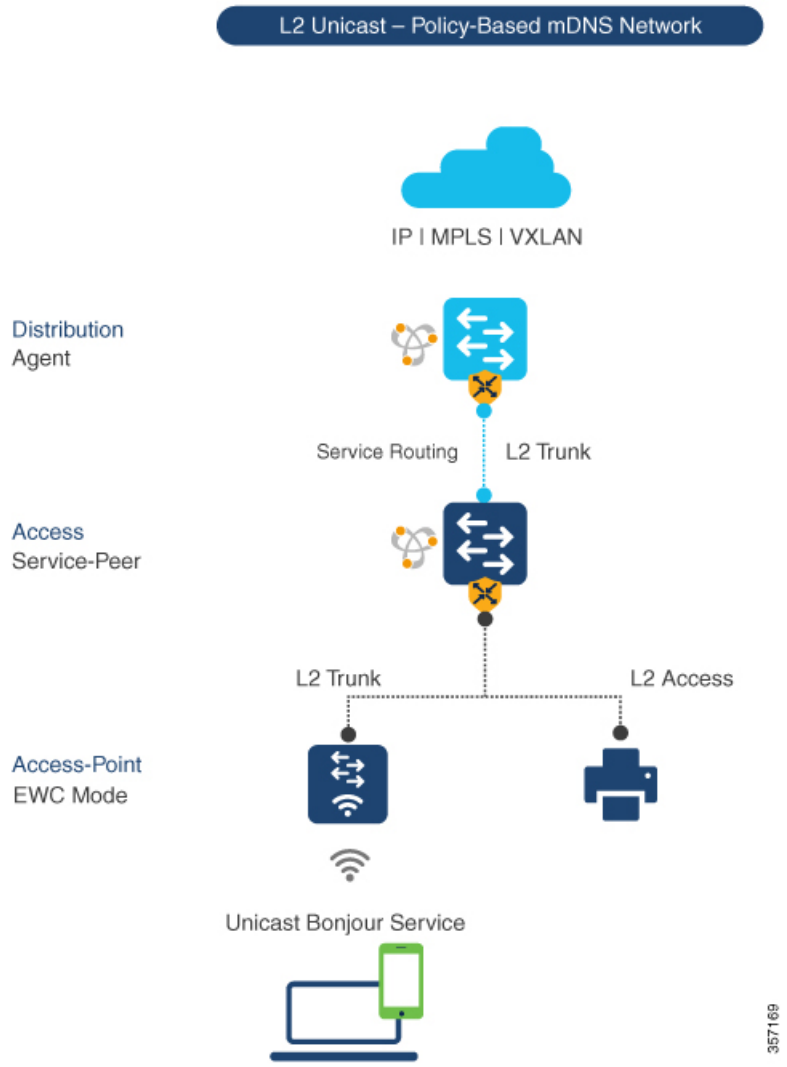
To configure an mDNS service policy, follow the steps given below:

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.

Note You will need this configuration in service-peer mode for Layer 2 Catalyst switch and SDG agent mode for Layer 3 Catalyst switch.

The figure given below displays how to configure mDNS policies on the Catalyst switch in service-peer and SDG agent modes:

Figure 3: Catalyst Service-Peer and SDG Agent mDNS Service Policy Configuration



To build and apply service-policies on target VLAN in service-peer and SDG agent modes, follow the procedure given below:

Procedure

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

	Command or Action	Purpose

Step 3	**mdns-sd service-list** *service-list-name* {**in** | **out**}
	Example:
	`Device(config)# mdns-sd service-list VLAN100-LIST-IN in`
	`Device(config)# mdns-sd service-list VLAN100-LIST-OUT out`
		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 locally connected wired or EWC mode Access Point wireless end points.

Step 4	**match** *service-definition-name* [**message-type** {**any** | **announcement** | **query**}]
	Example:
	`Device(config)# mdns-sd service-list VLAN100-LIST-IN in`
	`Device(config-mdns-sl-in)# match APPLE-TV`
	`Device(config-mdns-sl-in)# match PRINTER-IPPS message-type announcement`
		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 EWC mode Access Point wireless end points. The service-list contains implicit deny at the end.
		The default message-type used is **any**.

Step 5	**match** *service-definition-name* [**message-type** {**any** | **announcement** | **query**}]
	Example:
	`Device(config)# mdns-sd service-list VLAN100-LIST-OUT out`
	`Device(config-mdns-sl-in)# match APPLE-TV`
	`Device(config-mdns-sl-in)# match PRINTER-IPPS`
		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 EWC mode Access Point wireless in same VLAN 100. The service-list contains implicit deny at the end.
		The message-type for outbound service-list is not required.

Step 6	**mdns-sd service-policy** *service-policy-name* **Example:** `Device(config)# mdns-sd service-policy VLAN100-POLICY`	Creates a unique mDNS service-policy in the global configuration mode.

Step 7	**service-list** *service-list-name* {**in** | **out**}
	Example:
	`Device(config)# mdns-sd service-policy VLAN100-POLICY`
	`Device(config-mdns-ser-policy)# service-list VLAN100-LIST-IN in`
	`Device(config-mdns-ser-policy)# service-list VLAN100-LIST-OUT out`
		Configures an mDNS service-policy to associate service-list for each direction.

Step 8	**vlan configuration** *ID* **Example:** `Device(config)# vlan configuration 100`	Enables wired or wireless EWC mode Access Point user VLAN configuration for advanced service parameters. One or more VLANs can be created for the same settings.

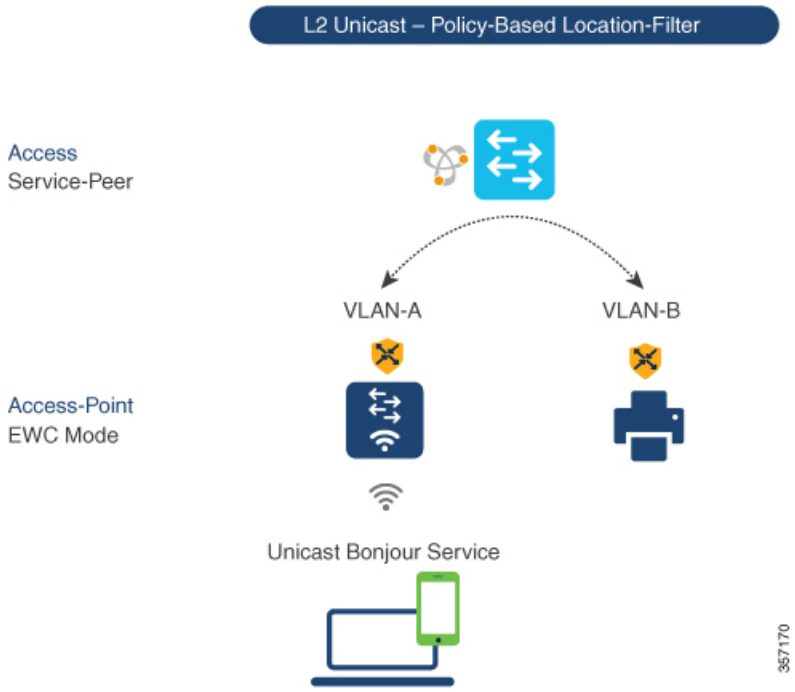
	Command or Action	Purpose
		Here, *ID* refers to the VLAN configuration ID. For example, *vlan configuration 101-110,200* range allows you to configure consecutive and non-consecutive VLAN ID(s) range.
Step 9	**mdns-sd gateway** **Example:** `Device(config-vlan)# mdns-sd gateway`	Enables mDNS gateway on configured wired or EWC mode Access Point wireless user VLAN ID(s).
Step 10	**service-policy** *service-policy-name* **Example:** `Device(config-vlan-mdns)# service-policy VLAN100-POLICY`	Associates mDNS service-policy to the configured wired or EWC mode Access Point wireless user VLAN ID(s).
Step 11	**exit** **Example:** `Device(config-vlan-mdns)# exit`	Exits the mDNS gateway configuration mode.

Configuring mDNS Location-Filter (CLI)

The Layer 2 Cisco Catalyst access-layer switch in the service-peer mode, by default provides local service proxy between mDNS service provider and receiver connected in the same Layer 2 VLAN associated to wired or EWC mode Access Point wireless user networks. Optionally, you can configure mDNS location-filter to allow service discovery and distribution between locally configured VLAN IDs associated to wired or EWC mode Access Point wireless user networks.

The following figure displays and references location-filter policy on Catalyst switch in service-peer mode permitting discovery and distribution of mDNS services between wired and EWC mode Access Point 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 to discover mDNS services between local wired and wireless EWC mode Access Point user VLANs, follow the procedure given below:

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device# enable`	Enables Privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters the global configuration mode.
Step 3	**mdns-sd location-filter** *location-filter-name* **Example:** `Device(config)# mdns-sd location-filter LOCAL-PROXY`	Configures a unique location-filter in the global configuration mode.
Step 4	**match location-group** {**all** | **default** | **ID**} **vlan** [*ID*] **Example:**	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
	`Device(config-mdns-loc-filter)# match location-group default vlan 100` `Device(config-mdns-loc-filter)# match location-group default vlan 101`	unicast-mode between Wireless EWC mode Access Point user VLAN ID 100 and wired user VLAN ID 101.
Step 5	**mdns-sd service-list** *service-list-name* {**in** | **out**} **Example:** `Device(config)# mdns-sd service-list VLAN100-LIST-OUT out`	Configures the mDNS service-list to classify one or more service types. Unique service-list is required to process incoming mDNS message and response outbound requesting wired or EWC mode Access Point user end points.

Step 6	**match** *service-definition-name* [**message-type** {**any** | **announcement** | **query**}]
	Example:
	`Device(config)# mdns-sd service-list VLAN100-LIST-OUT out`
	`Device(config-mdns-sl-out)# match APPLE-TV location-filter LOCAL-PROXY`
		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.
		Note
		The service-list contains implicit deny at the end.
		You do not require a **message-type** for the outbound service-list.

Step 7	**mdns-sd service-policy** *service-policy-name* **Example:** `Device(config)# mdns-sd service-policy VLAN100-POLICY`	Creates a unique mDNS service-policy in the global configuration mode.

Step 8	**service-list** *service-list-name* {**in** | **out**}
	Example:
	`Device(config)# mdns-sd service-policy VLAN100-POLICY`
	`Device(config-mdns-ser-policy)# service-list VLAN100-LIST-OUT out`
		Configures an mDNS service-policy to associate the service-list for each direction.

Step 9	**vlan configuration** *ID* **Example:** `Device(config)# vlan configuration 100`	Enables VLAN configuration for advanced service parameters. You can create one or more VLANs with the same settings. Here, *ID* refers to the VLAN configuration ID. For example, *vlan configuration 101-110,200* range allows you to configure consecutive and non-consecutive VLAN ID range.
Step 10	**mdns-sd gateway** **Example:** `Device(config-vlan-config)# mdns-sd gateway`	Enables the mDNS gateway on the configured VLAN ID(s).

	Command or Action	Purpose
Step 11	**service-policy** *service-policy-name* **Example:** `Device(config-vlan-mdns-sd)# service-policy VLAN100-POLICY`	Associates mDNS service-policy to the configured VLAN ID(s).
Step 12	**exit** **Example:** `Device(config-vlan-mdns-sd)# exit`	Exits the mDNS gateway configuration mode.

Configuring Custom Service Definition (CLI)

The Cisco IOS-XE supports various built-in mDNS service-definition types that map 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.

To associate the custom service-definition to the service-list, follow the procedure given below:

Procedure

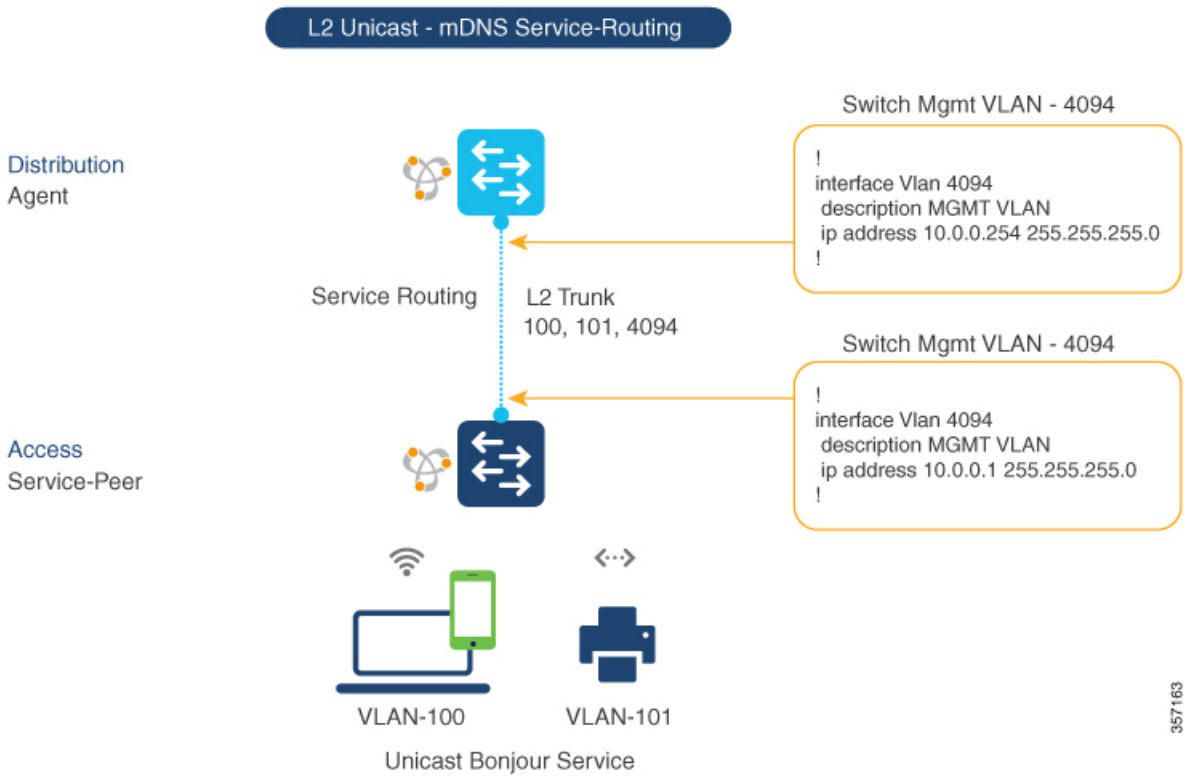
	Command or Action	Purpose
Step 1	**enable** **Example:** `Device# enable`	Enables Privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters the global configuration mode.
Step 3	**mdns-sd service-definition** *service-definition-name*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

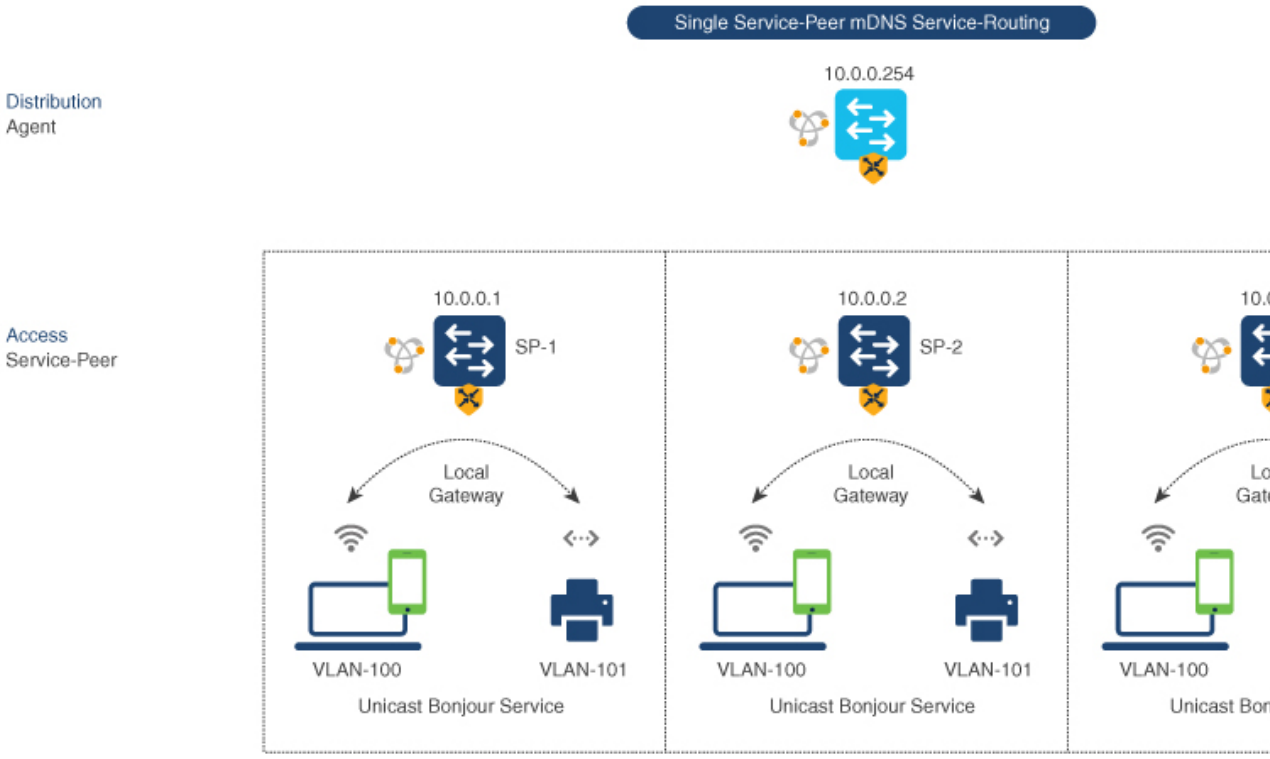
	Command or Action	Purpose
Step 1	**enable** **Example:** `Device# enable`	Enables Privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:**	Enters global configuration mode.

	Command or Action	Purpose
	`Device# configure terminal`	
Step 3	**vlan configuration** *ID* **Example:** `Device(config)# vlan configuration 100`	Enables wired and EWC mode AP wireless user VLAN configuration for advanced service parameters. One or more VLANs can be created for the same settings. Here, *ID* refers to the VLAN configuration ID. For example, *vlan configuration 101-110, 200* range, allows to configure consecutive and non-consecutive VLAN ID(s).
Step 4	**mdns-sd gateway** **Example:** `Device(config-vlan-config)# mdns-sd gateway`	Enables mDNS gateway on configured VLAN ID(s). To enable the respective functionalities, enter the following commands in the mDNS gateway configuration mode: • **active-query timer [sec]**: 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. • **service-mdns-query {ptr | srv | txt}**: Permits processing specific Query type. The default query type is PTR. • **transport {ipv4 | ipv6 | both}**: 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.
Step 5	**source-interface** *ID* **Example:** `Device(config-vlan-mdns-sd)# source-interface vlan 4094`	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.
Step 6	**sdg-agent** [*IPv4_address*] **Example:** `Device(config-vlan-mdns-sd)# sdg-agent 10.0.0.254`	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.
Step 7	**exit** **Example:** `Device(config-vlan-mdns-sd)# exit`	Exits the mDNS gateway configuration mode.

Configuring Location-Based mDNS

By default, the Layer 2 Catalyst switch in the service-peer mode enables per-switch mDNS discovery and distribution between wired and EWC mode Access Point wireless users attached locally to the switch. This default per-switch location-based mDNS is supported even when wired and EWC mode Access Point wireless users 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 Wired and EWC Mode Access Point 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 (CLI), on page 7 section.

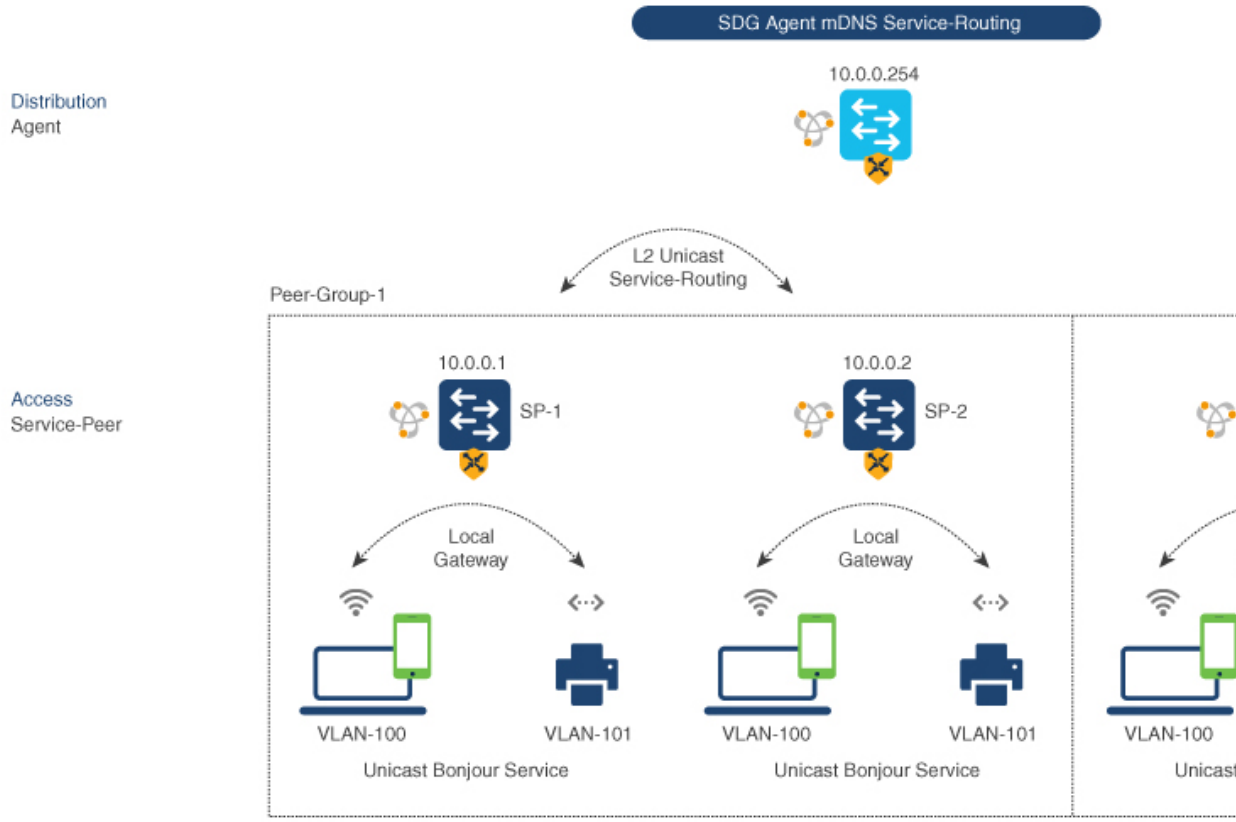
Configuring Service-Routing on SDG Agent (CLI)

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 wired and EWC mode Access Point wireless users. The SDG Agent must be configured with mDNS service-policy on wired or EWC mode Access Point wireless user VLAN to accept mDNS service cache from downstream service-peer switches.

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

The following figure displays the 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 (CLI), on page 7 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, follow the steps given below:

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device# enable`	Enables Privileged EXEC mode. Enter your password, if prompted.

	Command or Action	Purpose
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters the global configuration mode.
Step 3	**mdns-sd service-peer group** *service-peer-group-name* **Example:** `Device(config)# mdns-sd service-peer group service-peer-group-name`	Configures a unique service-peer group in the global configuration mode.
Step 4	**peer-group** [*ID*] **Example:** `Device(config-mdns-svc-peer)# peer-group 1`	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.
Step 5	**service-policy** *service-policy-name* **Example:** `Device(config-mdns-svc-peer-grp)# service-policy VLAN100-POLICY`	Associates an mDNS service policy to accept service advertisements and query from the paired service-peers.

Step 6	**service-peer** [*IPv4_address*] **location-group** {**all** | **default** | **id**}
	Example:
	`Device(config-mdns-svc-peer-grp)# service-peer 10.0.0.1 location-group default`
	`Device(config-mdns-svc-peer-grp)# service-peer 10.0.0.2 location-group default`
		Configures atleast 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).

Step 7	**exit** **Example:** `Device(config-mdns-svc-peer-grp)# exit`	Exits the 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
show mdns-sd cache {all | interface | mac | name | service-peer | static | type | vlan}	Displays available mDNS cache records supporting multiple variables providing granular source details received from wired or EWC mode AP wireless user VLANs. The variables are as follows: • all – Displays all available cache records discovered from multiple source connections of a system. • interface – Displays available cache records discovered from the specified Layer 3 interface. • mac - Displays available cache records discovered from the specified MAC address. • name - Displays available cache records based on the service provider announced name. • service-peer - Displays available cache records discovered from the specified Layer 2 Service-Peer. • static – Displays locally configured static mDNS cache entry. • type – Displays available cache records based on the specific mDNS record type, such as, PTR, SRV, TXT, A or AAAA. • vlan - Displays available cache records discovered from the specified Layer 2 VLAN ID in the Unicast mode.
show mdns-sd service-definition {name | type}	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.
show mdns-sd service-list {direction | name}	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.

Command or Action	Purpose
show mdns-sd service-policy {interface | name}	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.
show mdns-sd statistics {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.
show mdns-sd summary {interface | vlan}	Displays brief information about mDNS gateway and key configuration status on all wired and EWC mode AP wireless user VLANs, and interfaces of the system.

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
show mdns-sd cache {all | interface | mac | name | service-peer | static | type | vlan | vrf}	Displays available mDNS cache records supporting multiple variables providing granular source details. The variables are as follows: • all – Displays all available cache records discovered from multiple source connections of a system. • interface – Displays available cache records discovered from the specified Layer 3 interface. • mac - Displays available cache records discovered from the specified MAC address. • name - Displays available cache records based on the service provider announced name. • service-peer - Displays available cache records discovered from the specified Layer 2 Service-Peer. • static – Displays locally configured static mDNS cache entry. • type – Displays available cache records based on the specific mDNS record type, such as, PTR, SRV, TXT, A or AAAA. • vlan - Displays available cache records discovered from the specified Layer 2 VLAN ID in the Unicast mode. • vrf - Displays per-VRF available cache records based on specific mDNS record type, that is, PTR, SRV, TXT, A or AAAA.
show mdns-sd service-definition {name | type}	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.
show mdns-sd service-list {direction | name}	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.
show mdns-sd service-policy {interface | name}	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
show mdns-sd statistics {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.
show mdns-sd summary {interface | vlan}	Displays brief information about mDNS gateway and key configuration status on all VLANs and interfaces of the system.

Reference

Table 3: Reference

Related Topic	Document Title
Cisco Embedded Wireless Controller on Catalyst Access Points CCO Configuration Guide	Cisco Embedded Wireless Controller on Catalyst Access Points Configuration Guide, IOS XE Bengaluru 17.5.x
DNA Service for Bonjour Deployment on Cisco Catalyst 9600 Switch	Cisco Catalyst 9600 Series Switch Software Configuration Guide, Release 17.4.X
DNA Service for Bonjour Deployment on Cisco Catalyst 9500 Switch	Cisco Catalyst 9500 Series Switch Software Configuration Guide, Release 17.4.X
DNA Service for Bonjour Deployment on Cisco Catalyst 9400 Switch	Cisco Catalyst 9400 Series Switch Software Configuration Guide, Release 17.4.X
DNA Service for Bonjour Deployment on Cisco Catalyst 9300 Switch	Cisco Catalyst 9300 Series Switch Software Configuration Guide, Release 17.4.X
DNA Service for Bonjour Deployment on Cisco Catalyst 9800 Wireless LAN Controller	Cisco Catalyst 9800 Series Wireless Controller Software Configuration Guide, Cisco IOS XE Bengaluru 17.5.x
Cisco Wide Area Bonjour Application on Cisco DNA Center User Guide	Cisco Wide Area Bonjour Application on Cisco DNA Center User Guide, Release 2.2.x