



Multicast Domain Name System

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Introduction to mDNS Gateway

Multicast Domain Name System (mDNS) is an Apple service discovery protocol which locates devices and services on a local network with the use of mDNS service records.

The Bonjour protocol operates on service announcements and queries. Each query or advertisement is sent to the Bonjour multicast address ipv4 224.0.0.251 (ipv6 FF02::FB). This protocol uses mDNS on UDP port 5353.

The address used by the Bonjour protocol is link-local multicast address and therefore is only forwarded to the local L2 network. As, multicast DNS is limited to an L2 domain for a client to discover a service it has to be part of the same L2 domain, This is not always possible in any large scale deployment or enterprise.

In order to address this issue, the Cisco Catalyst 9800 Series Wireless Controller acts as a Bonjour Gateway. The controller then listens for Bonjour services, caches these Bonjour advertisements (AirPlay, AirPrint, and so on) from the source or host. For example, Apple TV responds back to Bonjour clients when asked or requested for a service. This way you can have sources and clients in different subnets.

By default, the mDNS gateway is disabled on the controller. To enable mDNS gateway functionality, you must explicitly configure mDNS gateway using CLI or Web UI.

Prerequisite

Since the Cisco Catalyst 9800 Series Wireless Controller will respond and advertise for services cached when acting as a Bonjour Gateway, it must have an SVI interface with a valid IP address on every VLAN where mDNS is allowed or used. This will be the source IP address of those mDNS packets that are coming out from the controller acting as mDNS Gateway.

Enabling mDNS Gateway (GUI)

Procedure

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- | | |
|---------------|--|
| Step 1 | Choose Configuration > Services > mDNS . |
| Step 2 | In the Global section, toggle the slider to enable or disable the mDNS Gateway . |
| Step 3 | From the Transport drop-down list, choose one of the following types: <ul style="list-style-type: none">• ipv4• ipv6• both |
| Step 4 | Enter an appropriate timer value in Active-Query Timer . The valid range is between 15 to 120 minutes. The default is 30 minutes. |
| Step 5 | From the mDNS-AP Service Policy drop-down list, choose an mDNS service policy. |
| Note | Service policy is optional only if mDNS-AP is configured. If mDNS-AP is not configured, the system uses default-service-policy. |

Step 6 Click **Apply**.

Enabling or Disabling mDNS Gateway (GUI)

Procedure

- Step 1** Choose **Configuration > Services > mDNS > Global**.
- Step 2** Enable or disable the **mDNS Gateway** toggle button.
- Step 3** Choose **ipv4** or **ipv6** or **both** from the **Transport** drop-down list.
- Step 4** Enter the **Active-Query Timer**.
- Step 5** Click **Apply**.

Enabling or Disabling mDNS Gateway (CLI)



- Note**
- mDNS gateway is disabled by default globally on the controller.
 - You need both global and WLAN configurations to enable mDNS gateway.

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 global configuration mode.
Step 3	mdns-sd gateway Example: Device(config)# mdns-sd gateway	Enables mDNS gateway.
Step 4	transport {ipv4 ipv6 both} Example: Device(config-mdns-sd)# transport ipv4	Processes mDNS message on a specific transport. Here,

	Command or Action	Purpose
		<p>ipv4 signifies that the IPv4 mDNS message processing is enabled. This is the default value.</p> <p>ipv6 signifies that the IPv6 mDNS message processing is enabled.</p> <p>both signifies that the IPv4 and IPv6 mDNS message is enabled for each network.</p>
Step 5	<p>active-query timer <i>active-query-periodicity</i></p> <p>Example:</p> <pre>Device(config-mdns-sd) # active-query timer 15</pre>	<p>Changes the periodicity of mDNS multicast active query.</p> <p>Note An active query is a periodic mDNS query to refresh dynamic cache.</p> <p>Here,</p> <p><i>active-query-periodicity</i> refers to the active query periodicity in Minutes. The valid range is from 15 to 120 minutes. Active query runs with a default periodicity of 30 minutes.</p>
Step 6	<p>exit</p> <p>Example:</p> <pre>Device(config-mdns-sd) # exit</pre>	Returns to global configuration mode.

Creating Default Service Policy

When the mdns gateway is enabled on any of the WLANs by default, mdns-default-service-policy is associated with it. Default service policy consists of default-service-list and their details are explained in this section. You can override the default service policy with a custom service policy.

Procedure

-
- Step 1** Create a service-definition if the service is not listed in the preconfigured services.
 - Step 2** Create a service list for IN and OUT by using the service-definitions.
 - Step 3** Use the existing service list to create a new service. For more information, refer to *Creating Service Policy* section.
 - Step 4** Attach the mdns-service-policy to the profile or VLAN that needs to be enforced.
 - Step 5** To check the default-mdns-service list, use the following command:
show mdns-sd default-service-list
-

Creating Custom Service Definition (GUI)

Procedure

-
- Step 1** Choose **Configuration > Services > mDNS**.
- Step 2** In the **Service Definition** section, click **Add**.
- Step 3** In the **Quick Setup: Service Definition** page that is displayed, enter a name and description for the service definition.
- Step 4** Enter a service type and click + to add the service type.
- Step 5** Click **Apply to Device**.
-

Creating Custom Service Definition

Service definition is a construct that provides an admin friendly name to one or more mDNS service types or A pointer (PTR) Resource Record Name.

By default, 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.

You can execute the following command to view the list of all the service definitions (built-in and custom):

```
Device# show mdns-sd master-service-list
```

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 global configuration mode.
Step 3	mdns-sd service-definition <i>service-definition-name</i> Example: Device(config)# mdns-sd service-definition CUSTOM1	Configures mDNS service definition. Note <ul style="list-style-type: none"> • 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.

	Command or Action	Purpose
Step 4	service-type <i>string</i> Example: Device(config-mdns-ser-def) # service-type _custom1._tcp.local	Configures mDNS service type.
Step 5	exit Example: Device(config-mdns-ser-def) # exit	Returns to global configuration mode.

Creating Service List (GUI)

Procedure

-
- Step 1** Choose **Configuration > Services > mDNS**.
- Step 2** In the **Service List** section, click **Add**.
- Step 3** In the **Quick Setup: Service List** page that is displayed, enter a name for the service list.
- Step 4** From the **Direction** drop-down list, choose **IN** for inbound filtering or **OUT** for outbound filtering.
- Step 5** From the **Available Services** drop-down list, choose a service type to match the service list.
- Note** To allow all services, choose the **all** option.
- Step 6** Click **Add Services**.
- Step 7** From the **Message Type** drop-down list, choose the message type to match from the following options:
- **any**—To allow all messages.
 - **announcement**—To allow only service advertisements or announcements for the device.
 - **query**—To allow only a query from the client for a service in the network.
- Step 8** Click **Save** to add services.
- Step 9** Click **Apply to Device**.
-

Creating Service List

mDNS service list is a collection of service definitions.

Procedure

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.

	Command or Action	Purpose
	Example: Device> enable	Enter your password, if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	mdns-sd service-list <i>service-list-name</i> { IN OUT } Example: Device(config)# mdns-sd service-list Basic-In IN Device(config)# mdns-sd service-list Basic-Out OUT	Configures mDNS service list. <ul style="list-style-type: none"> • IN: Provides inbound filtering. • Out: Provides outbound filtering.
Step 4	match <i>service-definition-name</i> message-type { announcement any query } Example: Device(config-mdns-sl-in)# match CUSTOM1 message-type query	Matches the service to the message type. Here, <i>service-definition-name</i> refers to the names of services, such as, airplay, airserver, airtunes, and so on. Note To add a service, the service name must be part of the primary service list. If the mDNS service list is set to IN, you get to view the following command: match service-definition-name message-type {announcement any query} . If the mDNS service list is set to Out, you get to view the following command: match service-definition-name .
Step 5	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.
Step 6	exit Example: Device(config-mdns-sl-in)# exit	Returns to global configuration mode.

Creating Service Policy (GUI)

Procedure

-
- Step 1** Choose **Configuration > Services > mDNS**.
 - Step 2** In the **Service Policy** section, click **Add**.
 - Step 3** In the **Quick Setup: Service Policy** page that is displayed, enter a name for the service policy.
 - Step 4** From the **Service List Input** drop-down list, choose one of the types.
 - Step 5** From the **Service List Output** drop-down list, choose one of the types.
 - Step 6** From the **Location** drop-down list, choose the location you want to associate with the service list.
 - Step 7** Click **Apply to Device**.
-

Creating Service Policy

mDNS service policy is used for service filtering while learning services or responding to queries.

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 global configuration mode.
Step 3	mdns-sd service-policy service-policy-name Example: Device(config)# mdns-sd service-policy mdns-policy1	Enables mDNS service policy.
Step 4	location {lss site-tag} Example:	Filters mDNS service types based on LSS or site-tag.

	Command or Action	Purpose
	<pre>Device(config-mdns-ser-pol)# location lss</pre>	<p>Note</p> <p>In Location Specific Services (LSS) based filtering, the mDNS gateway responds with the service instances learnt from the neighboring APs of the querying client AP. Other service instances for the rest of APs are filtered.</p> <p>In Site tag based filtering, the mDNS gateway responds with the service instances that belong to the same site-tag as that of querying client.</p> <p>The mDNS gateway responds back with wired services even if the location based filtering is configured.</p>
Step 5	<p>service-list <i>service-list-name</i> {IN OUT}</p> <p>Example:</p> <pre>Device(config-mdns-ser-pol)# service-list VLAN100-list IN</pre>	<p>Configures various service-list names for IN and OUT directions.</p> <p>Note</p> <p>If an administrator decides to create or use a custom service policy, then the custom service policy must be configured with service-lists for both directions (IN and OUT); otherwise, the mDNS Gateway will not work (will not learn services if there is no IN service-list, or will not reply or announce services learned if there is no OUT service-list).</p>
Step 6	<p>exit</p> <p>Example:</p> <pre>Device(config-mdns-ser-pol)# exit</pre>	Returns to global configuration mode.

Configuring a Local or Native Profile for an mDNS Policy

When an administrator configures local authentication and authorization and does not expect to get any mDNS policy from the AAA server, the administrator can configure a local or native profile to select a mDNS policy based on user, role, or device type. When this local or native profile is mapped to the wireless profile policy, mDNS service policy is applied on the mDNS packets that are processed on that WLAN.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 2	service-template <i>template-name</i> Example: Device(config)# service-template mdns	Configures the service-template or identity policy.
Step 3	mdns-service-policy <i>mdns-policy-name</i> Example: Device(config-service-template)# mdns-service-policy mdnsTV	Configures the mDNS policy.
Step 4	exit Example: Device(config-service-template)# exit	Returns to global configuration mode.

Configuring an mDNS Flex Profile (GUI)

Procedure

-
- Step 1** Choose **Configuration > Services > mDNS**.
- Step 2** In the **mDNS Flex Profile** section, click **Add**.
The **Add mDNS Flex Profile** window is displayed.
- Step 3** In the **Profile Name** field, enter the flex mDNS profile name.
- Step 4** In the **Service Cache Update Timer** field, specify the service cache update time. The default value is 1 minute. The valid range is from 1 to 100 minutes.
- Step 5** In the **Statistics Update Timer** field, specify the statistics update timer. The default value is 1 minute. The valid range is from 1 to 100 minutes.
- Step 6** In the **VLANs** field, specify the VLAN ID. You can enter multiple VLAN IDs separated by commas, or enter a range of VLAN IDs. Maximum number of VLANs allowed is 16.
- Step 7** Click **Apply to Device**.
-

Configuring an mDNS Flex Profile (CLI)

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 2	mdns-sd flex-profile <i>mdns-flex-profile-name</i> Example: Device(config)# mdns-sd flex-profile <i>mdns-flex-profile-name</i>	Enters the mDNS Flex Profile mode.
Step 3	update-timer service-cache <i>service-cache timer-value <1-100></i> Example: Device(config-mdns-flex-profile)# update-timer service-cache 60	Configures the mDNS update service cache timer for the flex profile. The default value is 1 minute. Value range is between 1 minute and 100 minutes.
Step 4	update-timer statistics <i>statistics timer-value <1-100></i> Example: Device(config-mdns-flex-profile)# update-timer statistics 65	Configures the mDNS update statistics timer for the flex profile. The default value is 1 minute. The valid range is from 1 to 100 minutes.
Step 5	wired-vlan-range <i>wired-vlan-range value</i> Example: Device(config-mdns-flex-profile)# wired-vlan-range 10 - 20	Configures the mDNS wired VLAN range for the flex profile. The default value is 1 minute. The valid range is from 1 minute to 100 minutes.

Applying an mDNS Flex Profile to a Wireless Flex Connect Profile (GUI)

Procedure

-
- Step 1** Choose **Configuration > Tags & Profiles > Flex**.
- Step 2** Click **Add**.
The **Add Flex Profile** window is displayed.
- Step 3** Under the **General** tab, from the **mDNS Flex Profile** drop-down list, choose a flex profile name from the list.

Step 4 Click **Apply to Device**.

Applying an mDNS Flex Profile to a Wireless Flex Connect Profile (CLI)

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 2	wireless profile flex <i>wireless-flex-profile-name</i> Example: Device# wireless profile flex <i>wireless-flex-profile-name</i>	Enters wireless flex profile configuration mode.
Step 3	mdns-sd <i>mdns-flex-profile</i> Example: Device(config-wireless-flex-profile)# mdns-sd <i>mdns-flex-profile-name</i>	Enables the mDNS features for all the APs in the profile

Enabling the mDNS Gateway on the VLAN Interface

This procedure configures the mDNS service policy for a specific VLAN. This allows the administrator to configure different settings to the mDNS packets on per VLAN interface basis and not on per WLAN basis.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 2	interface vlan <i>vlan-interface-number</i> Example: Device(config)# interface vlan 200	Configures a VLAN ID and enters interface configuration mode.
Step 3	ip address <i>ip-address subnet-mask</i> Example:	Configures the IP address for the interface.

	Command or Action	Purpose
	Device(config-if)# ip address 111.1.1.1 255.255.255.0	
Step 4	mdns-sd gateway Example: Device(config-if)# mdns-sd gateway	Enables mDNS configuration on a VLAN interface.
Step 5	service-policy service-policy-name Example: Device(config-if-mdns-sd)# service-policy test-mDNS-service-policy	Configures the service policy. Note If specific <i>service-policy-name</i> is not defined, the VLAN will use the default-mdns-service-policy by default. By default, default-mdns-service-policy gets created in the system and it will use default-mdns-service-list configuration for filtering mDNS service announcement and queries.
Step 6	end Example: Device(config-if-mdns-sd)# end	Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.

Location-Based Service Filtering

Prerequisite for Location-Based Service Filtering

You need to create the Service Definition and Service Policy. For more information, see [Creating Custom Service Definition](#) section and [Creating Service Policy](#) section.

Configuring mDNS Location-Based Filtering Using SSID

When a service policy is configured with the SSID as the location name, the response to the query will be the services that were learnt on that SSID.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: Device# configure terminal	Enters global configuration mode.

	Command or Action	Purpose
Step 2	mdns-sd service-policy <i>service-policy-name</i> Example: Device(config)# mdns-sd service-policy mdns-policy1	Configures the service policy.
Step 3	location ssid Example: Device(config-mdns-ser-pol)# location ssid	Configures location-based filtering using SSID.
Step 4	end Example: Device(config-mdns-ser-pol)# end	Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.

Configuring mDNS Location-Based Filtering Using AP Name

When a service policy is configured with the AP name as the location, the response to the query will be the services that were learnt on that AP.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 2	mdns-sd service-policy <i>service-policy-name</i> Example: Device(config)# mdns-sd service-policy mdns-policy1	Configures the service policy.
Step 3	location ap-name Example: Device(config-mdns-ser-pol)# location ap-name	Configures location-based filtering using an AP name.
Step 4	end Example: Device(config-mdns-ser-pol)# end	Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.

Configuring mDNS Location-Based Filtering Using AP Location

When a service policy is configured with location as the AP-location, the response to the query will be the services that were learnt on all the APs using the same AP "location" name (not to be confused with "site-tag").

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 2	mdns-sd service-policy <i>service-policy-name</i> Example: Device(config)# mdns-sd service-policy mdns-policy1	Configures the service policy.
Step 3	location ap-location Example: Device(config-mdns-ser-pol)# location ap-location	Configures location-based filtering using the AP location.
Step 4	end Example: Device(config-mdns-ser-pol)# end	Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.

Configuring mDNS Location-Based Filtering Using Regular Expression

- When a service policy is configured with the location as a regular expression that matches the corresponding AP name, the response to the query will be the services that were learnt on a group of APs based on the AP name.
- When a service policy is configured with the location as a regular expression that matches the corresponding AP location, the response to the query will be the services that were learnt on a group of APs based on the AP location.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 2	mdns-sd service-policy <i>service-policy-name</i> Example: Device(config)# mdns-sd service-policy mdns-policy1	Configures the service policy.
Step 3	location regex {<i>ap-location regular-expression</i> <i>ap-name regular-expression</i>} Example:	Configures location-based filtering using regular expression.

	Command or Action	Purpose
	<pre>Device(config-mdns-ser-pol)# location regex ap-location dns_location Device(config-mdns-ser-pol)# location regex ap-name dns_name</pre>	
Step 4	<p>end</p> <p>Example:</p> <pre>Device(config-mdns-ser-pol)# end</pre> <p>Note To filter the services for which AP names have the specific keyword such as <i>AP-2FLR-SJC-123</i>, you can use the regex AP name as <i>AP-2FLR-</i> to match the services that are learnt from the set of access points.</p>	<p>Returns to privileged EXEC mode.</p> <p>Alternatively, you can also press Ctrl-Z to exit global configuration mode.</p>

Configuring mDNS AP

In most of the deployments, the services may be available in VLANs that the APs can hear in the wired side (allowed in the switchport where the AP is directly connected: its own VLAN, or even more VLANs if switchport is a trunk).

The following procedure shows how to configure mDNS AP:

Procedure

	Command or Action	Purpose
Step 1	<p>configure terminal</p> <p>Example:</p> <pre>Device# configure terminal</pre>	Enters global configuration mode.
Step 2	<p>mdns-sd gateway</p> <p>Example:</p> <pre>Device(config)# mdns-sd gateway</pre>	Configures the mDNS gateway.
Step 3	<p>ap name <i>ap-name</i> mdns-ap enable vlan <i>vlan-id</i></p> <p>Example:</p> <pre>Device# ap name ap1 mdns-ap enable vlan 22</pre>	Enables mDNS on the AP, and configures a VLAN for the mDNS AP.
Step 4	<p>ap name <i>ap-name</i> mdns-ap vlan add <i>vlan-id</i></p> <p>Example:</p> <pre>Device# ap name ap1 mdns-ap vlan add 200</pre>	Adds a VLAN to the mDNS AP. <i>vlan-id</i> ranges from 1 to 4096.

	Command or Action	Purpose
Step 5	ap name <i>ap-name</i> mdns-ap vlan del <i>vlan-id</i> Example: Device# ap name ap1 mdns-ap vlan del 2	Deletes a VLAN from the mDNS AP.
Step 6	ap name <i>ap-name</i> mdns-ap disable Example: Device# ap name ap1 mdns-ap disable	(Optional) Disables the mDNS AP.
Step 7	end Example: Device# end	Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode. Note You can configure a maximum of 10 VLANs per AP.

Enabling mDNS Gateway on the RLAN Interface

By configuring the mDNS gateway mode on the RLAN interface, you can configure the mDNS service policy for a specific RLAN.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 2	ap remote-lan profile-name <i>remote-lan-profile-name rlan-id</i> Example: Device(config)# ap remote-lan profile-name rlan_test_1 1	Configures a remote LAN profile. <ul style="list-style-type: none"> • <i>remote-lan-profile</i>: Remote LAN profile name. Range is from 1 to 32 alphanumeric characters. • <i>rlan-id</i>: Remote LAN identifier. Range is from 1 to 128. Note You can create a maximum of 128 RLANs. Also, you cannot use the <i>rlan-id</i> of an existing RLAN while creating another RLAN.
Step 3	mdns-sd-interface {gateway drop} Example: mdns-sd-interface	Enables mDNS configuration on an RLAN interface.

	Command or Action	Purpose
	Device(config-remote-lan)# mdns-sd-interface gateway	
Step 4	no shutdown Example: Device(config-remote-lan)# no shutdown	Restarts the RLAN profile.
Step 5	exit Example: Device(config-remote-lan)# exit	Exits remote LAN configuration mode.
Step 6	ap remote-lan-policy policy-name profile name Example: Device(config)# ap remote-lan-policy policy-name rlan_named_ppl	Configures the RLAN policy profile and enters wireless policy configuration mode.
Step 7	mdns-sd service-policy service-policy-name Example: Device(config-remote-lan-policy)# mdns-sd service-policy mdnsTV6	Enables an mDNS service policy.
Step 8	central switching Example: Device(config-remote-lan-policy)# central switching	Configures the RLAN for central switching.
Step 9	central dhcp Example: Device(config-remote-lan-policy)# central dhcp	Configures the central DHCP for centrally switched clients.
Step 10	vlan vlan-name Example: Device(config-remote-lan-policy)# vlan 141	Assigns the profile policy to a VLAN.
Step 11	no shutdown Example: Device(config-remote-lan-policy)# no shutdown	Restarts the RLAN profile.
Step 12	wireless tag policy policy-tag-name Example: Device(config)# wireless tag policy rlan_pt_1	Configures a policy tag.

	Command or Action	Purpose
Step 13	remote-lan <i>remote-lan-profile-name</i> policy <i>rlan-policy-profile-name</i> port-id <i>port-id</i> Example: <pre>Device(config-policy-tag)# remote-lan rlan_test_1 policy rlan_named_pp1 port-id 1 Device(config-policy-tag)# remote-lan rlan_test_1 policy rlan_named_pp1 port-id 2 Device(config-policy-tag)# remote-lan rlan_test_1 policy rlan_named_pp1 port-id 3 Device(config-policy-tag)# remote-lan rlan_test_1 policy rlan_named_pp1 port-id 4</pre>	Maps the RLAN policy profile to the RLAN profile. <ul style="list-style-type: none"> • <i>remote-lan-profile-name</i>: Name of the RLAN profile. • <i>rlan-policy-profile-name</i>: Name of the policy profile. • <i>port-id</i>: LAN port number on the access point. Range is from 1 to 4.
Step 14	exit Example: <pre>Device(config-policy-tag)# exit</pre>	Returns to global configuration mode.
Step 15	ap <i>mac-address</i> Example: <pre>Device (config)# ap 0042.5AB6.0EF0</pre>	Configures the AP and enters the AP tag configuration mode. Note Use the Ethernet MAC address.
Step 16	policy-tag <i>policy-tag-name</i> Example: <pre>Device (config-ap-tag)# policy-tag rlan_pt_1</pre>	Maps a policy tag to the AP.
Step 17	end Example: <pre>Device(config-guest-lan)# end</pre>	Returns to privileged EXEC mode.

Enabling mDNS Gateway on Guest LAN Interface

By configuring the mDNS gateway mode on a Guest LAN interface, you can configure the mDNS service policy for a specific Guest LAN interface.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: <pre>Device# configure terminal</pre>	Enters global configuration mode.

	Command or Action	Purpose
Step 2	guest-lan profile-name <i>guest_lan_profile_name num wired-vlan</i> <i>wired_vlan_num</i> Example: <pre>Device(config)# guest-lan profile-name open 1 wired-vlan 666</pre>	Configures guest LAN profile with a wired VLAN. Note Configures the wired VLAN only for the Guest Foreign controller. <ul style="list-style-type: none"> • <i>num</i>: Guest LAN identifier. The valid range is from 1 to 5. • <i>wired_vlan_num</i>: Wired VLAN number. The valid range is from 1 to 4094.
Step 3	guest-lan profile-name <i>guest_lan_profile_name num</i> Example: <pre>Device(config)# guest-lan profile-name open 1</pre>	Configures the guest LAN profile without a VLAN for the Guest Anchor controller.
Step 4	mdns-sd-interface {gateway drop} Example: <pre>Device(config-guest-lan)# mdns-sd gateway</pre>	Configures the mDNS gateway for a Guest LAN. Note You need to enable mDNS gateway globally for the Guest LAN to work.
Step 5	end Example: <pre>Device(config-guest-lan)# end</pre>	Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.

Associating mDNS Service Policy with Wireless Profile Policy (GUI)

Procedure

-
- Step 1** Choose **Configuration > Tags & Profiles > Policy**.
- Step 2** Click the **policy profile** name.
- Step 3** In the **Advanced** tab, choose the mDNS service policy from the **mDNS Service Policy** drop-down list.
- Step 4** Click **Update & Apply to Device**.
-

Associating mDNS Service Policy with Wireless Profile Policy



Note You must globally configure the mDNS service policy before associating it with the wireless profile policy.

A default mDNS service policy is already attached once the wireless profile policy is created. You can use the following commands to override the default mDNS service policy with any of your service policy:

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 2	wireless profile policy <i>profile-policy</i> Example: Device(config)# wireless profile policy default-policy-profile	Configures wireless profile policy. Here, <i>profile-policy</i> refers to the name of the WLAN policy profile.
Step 3	mdns-sd service-policy <i>custom-mdns-service-policy</i> Example: Device(config-wireless-policy)# mdns-sd service-policy custom-mdns-service-policy	Associates an mDNS service policy with the wireless profile policy. The default mDNS service policy name is default-mdns-service-policy .

Command or Action		Purpose								
		<p>Note</p> <p>The default-mdns-profile-policy uses default-mdns-service-list configuration for filtering mDNS service announcement and queries.</p> <p>In wireless network, the mDNS packets are consumed by the mDNS gateway and clients or device is deprived of learning this service. To share the service with the device and provide ease of configuration to the administrator, a list of few standard service types are shared by default on the wireless network. The list of such standard service types is termed as default service policy that comprises a set of service types.</p> <p>The table covers a sample service list in the default service policy.</p> <p>Table 1: Default Name and mDNS Service Type</p> <table><tr><th>Default Name</th><th>mDNS Service Type</th></tr><tr><td>Apple HomeSharing</td><td>_homeshaing_tcp.local</td></tr><tr><td>Printer-IPPS</td><td>_ipps._tcp.local</td></tr><tr><td>Google-chromecast</td><td>_googlecast_tcp.local</td></tr></table>	Default Name	mDNS Service Type	Apple HomeSharing	_homeshaing_tcp.local	Printer-IPPS	_ipps._tcp.local	Google-chromecast	_googlecast_tcp.local
Default Name	mDNS Service Type									
Apple HomeSharing	_homeshaing_tcp.local									
Printer-IPPS	_ipps._tcp.local									
Google-chromecast	_googlecast_tcp.local									
		<p>Note</p> <ul style="list-style-type: none">• Location would be disabled on mDNS default service policy.• You cannot change the contents of the mDNS default service policy. However, you can create separate mDNS service policies and associate them under the wireless policy profile.								

	Command or Action	Purpose
Step 4	exit Example: Device(config-wireless-policy)# exit	Returns to global configuration mode.

Enabling or Disabling mDNS Gateway for WLAN (GUI)

Procedure

- Step 1** Choose **Configuration > Tags & Profiles > WLANs**.
- Step 2** Click on the WLAN.
- Step 3** In the **Advanced** tab, choose the mode in **mDNS Mode** drop-down list.
- Step 4** Click **Update & Apply to Device**.

Enabling or Disabling mDNS Gateway for WLAN



Note Bridging is the default behaviour. This means that the mDNS packets are always bridged.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 2	wlan profile-name wlan-id ssid-name Example: Device(config)# wlan test 24 ssid1	Specifies the WLAN name and ID. <ul style="list-style-type: none"> • <i>profile-name</i> is the WLAN name which can contain 32 alphanumeric characters • <i>wlan-id</i> is the wireless LAN identifier. The valid range is from 1 to 512. • <i>ssid-name</i> is the SSID which can contain 32 alphanumeric characters. <p>Note Global configuration must be in place for mDNS gateway to work.</p>

	Command or Action	Purpose
Step 3	mdns-sd-interface {gateway drop} Example: Device(config-wlan)# mdns-sd gateway Device(config-wlan)# mdns-sd drop	Enables or disables mDNS gateway and bridge functions on WLAN.
Step 4	exit Example: Device(config-wlan)# exit	Returns to global configuration mode.
Step 5	show wlan name wlan-name show wlan all Example: Device# show wlan name test show wlan all	Verifies the status of mDNS on WLAN.
Step 6	show wireless profile policy Example: Device# show wireless profile policy	Verifies the service policy configured in WLAN.

mDNS Gateway with Guest Anchor Support and mDNS Bridging

When mDNS Gateway is enabled on both Anchor and Foreign controller, the mDNS gateway functionality is supported in guest anchor deployment where clients on guest LAN or WLAN with guest anchor enabled will be responded with any services or cache from export foreign controller itself. All advertisements received on Guest LAN or WLAN on export foreign are learnt on the export foreign itself. All queries received on guest LAN or WLAN are responded by the export foreign itself.

When mDNS Gateway is enabled on Anchor and Disabled on Foreign controller [Bridging Mode], the mDNS gateway functionality is supported in guest anchor deployment where clients on guest LAN or WLAN with guest anchor enabled will be responded with any services or cache from export Anchor even though the clients are connected on Foreign. All advertisements received on guest LAN or WLAN on export foreign is forwarded to Anchor and the cache is stored on the Anchor itself. All queries received on guest LAN or WLAN are responded by the export Anchor itself.



Note

- You must configure the guest-LAN to a wireless profile policy which is configured with the required mDNS service-policy.
- To configure non guest LAN mDNS gateway, see the [mDNS Gateway](#) chapter.

Configuring mDNS Gateway on Guest Anchor

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 2	guest-lan profile-name <i>guest-lan-profile-name</i> <i>guest-lan-id</i> Example: Device(config)# guest-lan profile-name g-lanpro 2	Configures the guest LAN profile with a wired VLAN.
Step 3	mdns-sd gateway Example: Device(config-guest-lan)# mdns-sd gateway	Enables mDNS gateway on the guest LAN.

Configuring mDNS Gateway on Guest Foreign (Guest LAN)

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 2	guest-lan profile-name <i>guest-lan-profile-name</i> <i>guest-lan-id</i> wired-vlan <i>vlan-id</i> Example: Device(config)# guest-lan profile-name g-lanpro 2 wired-vlan 230	Configures guest LAN profile with a wired VLAN. Note Configure the wired VLAN only for the Guest Foreign controller.
Step 3	mdns-sd gateway Example: Device(config-guest-lan)# mdns-sd gateway	Enables mDNS gateway on the guest LAN.
Step 4	exit Example: Device(config-wireless-policy)# exit	Returns to global configuration mode.

Configuring mDNS Gateway on Guest Anchor

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 2	guest-wlan profile-name <i>guest-lan-profile-name guest-wlan-id</i> Example: Device(config)# guest-wlan profile-name g-lanpro 2	Configures the guest WLAN profile with a wired VLAN.
Step 3	mdns-sd gateway Example: Device(config-guest-wlan)# mdns-sd gateway	Enables mDNS gateway on the guest WLAN.

Configuring mDNS Gateway on Guest Foreign (Guest WLAN)

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 2	guest-wlan profile-name <i>guest-lan-profile-name guest-wlan-id</i> wired-vlan <i>vlan-id</i> Example: Device(config)# guest-wlan profile-name g-lanpro 2 wired-vlan 230	Configures guest WLAN profile with a wired VLAN. Note Configure the wired VLAN only for the Guest Foreign controller.
Step 3	mdns-sd gateway Example: Device(config-guest-wlan)# mdns-sd gateway	Enables mDNS gateway on the guest WLAN.
Step 4	exit Example:	Returns to global configuration mode.

	Command or Action	Purpose
	Device(config-wireless-policy)# exit	

Verifying mDNS Gateway Configurations

To verify the mDNS summary, use the following command:

```
Device# show mdns-sd summary
mDNS Gateway: Enabled
Active Query: Enabled
  Periodicity (in minutes): 30
Transport Type: IPv4
```

To verify the mDNS cache, use the following command:

```
Device# show mdns-sd cache
----- PTR Records
-----
RECORD-NAME                TTL      WLAN  CLIENT-MAC      RR-RECORD-DATA
-----
_airplay._tcp.local        4500     30    07c5.a4f2.dc01  CUST1._airplay._tcp.local
_ipp._tcp.local            4500     30    04c5.a4f2.dc01  CUST3._ipp._tcp.local2
_ipp._tcp.local            4500     15    04c5.a4f2.dc01  CUST3._ipp._tcp.local4
_ipp._tcp.local            4500     10    04c5.a4f2.dc01  CUST3._ipp._tcp.local6
_veer_custom._tcp.local    4500     10    05c5.a4f2.dc01
CUST2._veer_custom._tcp.local18
```

To verify the mDNS cache from wired service provider, use the following command:

```
Device# show mdns-sd cache wired
----- PTR Records
-----
RECORD-NAME                TTL      VLAN  CLIENT-MAC      RR-RECORD-DATA
-----
_airplay._tcp.local        4500     16    0866.98ec.97af
wiredapple._airplay._tcp.local
_raop._tcp.local           4500     16    0866.98ec.97af
086698EC97AF@wiredapple._raop._tcp.local

----- SRV Records
-----
RECORD-NAME                TTL      VLAN  CLIENT-MAC      RR-RECORD-DATA
-----
wiredapple._airplay._tcp.local    4500     16    0866.98ec.97af  0 0 7000
wiredapple.local
086698EC97AF@wiredapple._raop._tcp.local  4500     16    0866.98ec.97af  0 0 7000
wiredapple.local

----- A/AAAA Records
-----
RECORD-NAME                TTL      VLAN  CLIENT-MAC      RR-RECORD-DATA
-----
```

```
wiredapple.local          4500      16      0866.98ec.97af
2001:8:16:16:e5:c446:3218:7437
```

```
----- TXT Records
```

```
RECORD-NAME          TTL      VLAN      CLIENT-MAC      RR-RECORD-DATA
```

```
-----
wiredapple._airplay._tcp.local      4500      16      0866.98ec.97af
[343]'acl=0''deviceId=08:66:98:EC:97:AF''features=
086698EC97AF@wiredapple._raop._tcp.local      4500      16      0866.98ec.97af
[193]'cn=0,1,2,3''da=true''et=0,3,5''ft=0x5A7FFF7
```

To verify the mdns-sd type PTR, use the following command:

```
Device# show mdns-sd cache type {PTR | SRV | A-AAA | TXT}
```

```
RECORD-NAME          TTL      WLAN      CLIENT-MAC
RR-Record-Data
```

```
-----
_custom1._tcp.local      4500      2      c869.cda8.77d6
service_tl._custom1._tcp.local
_custom1._tcp.local      4500      2      c869.cda8.77d6
vk11._custom1._tcp.local
_ipp._tcp.local          4500      2      c869.cda8.77d6
service-4._ipp._tcp.local
```

To verify the mdns-sd cache for a client MAC, use the following command:

```
Device# show mdns-sd cache {ap-mac <ap-mac> | client-mac <client-mac> | glan-id <glan-id>
| mdns-ap <mac-address> | rlan-id <rlan-id> | wlan-id <wlan-id> | wired}
```

```
RECORD-NAME          TTL      WLAN      CLIENT-MAC
RR-Record-Data
```

```
-----
_custom1._tcp.local      4500      2      c869.cda8.77d6
service_tl._custom1._tcp.local
_custom1._tcp.local      4500      2      c869.cda8.77d6
vk11._custom1._tcp.local
_ipp._tcp.local          4500      2      c869.cda8.77d6
service-4._ipp._tcp.local
```

```
----- SRV Records
```

```
RECORD-NAME          TTL      WLAN      CLIENT-MAC
RR-Record-Data
```

```
-----
service-4._ipp._tcp.local      4500      2      c869.cda8.77d6      0 0 1212
mDNS-Client1s-275.local
vk11._custom1._tcp.local      4500      2      c869.cda8.77d6      0 0 987
mDNS-Client1s-275.local
service_tl._custom1._tcp.local      4500      2      c869.cda8.77d6      0 0 197
mDNS-Client1s-275.local
```

```
----- A/AAAA Records
```

```
RECORD-NAME          TTL      WLAN      CLIENT-MAC
RR-Record-Data
```

```
-----
mDNS-Client1s-275.local      4500      2      c869.cda8.77d6      120.1.1.33
```

```
----- TXT Records
```

```
RECORD-NAME          TTL      WLAN      CLIENT-MAC
RR-Record-Data
```

```

service-4._ipp._tcp.local          4500      2          c869.cda8.77d6  'Client1'
vk11._custom1._tcp.local          4500      2          c869.cda8.77d6
'txtvers=11'
service_t1._custom1._tcp.local    4500      2          c869.cda8.77d6
'txtvers=12'

```

To verify the mdns-sd cache with respect to the RLAN ID, use the following command:

```
Device# show mdns-sd cache rlan-id 1 detail
```

```

Name: _printer._tcp.local

Type: PTR
TTL: 4500
RLAN: 1
RLAN Name: rlan_test_1
VLAN: 141
Client MAC: 000e.c688.3942
AP Ethernet MAC: 0042.5ab6.0ef0
Remaining-Time: 4485
Site-Tag: default-site-tag
mDNS Service Policy: mdnsTV6
Overriding mDNS Service Policy: NO
UPN-Status: Disabled
Rdata: printer._printer._tcp.local

```

```

Name: lab-47-187.local
Type: A/AAAA
TTL: 4500
RLAN: 1
RLAN Name: rlan_test_1
VLAN: 141
Client MAC: 000e.c688.3942
AP Ethernet MAC: 0042.5ab6.0ef0
Remaining-Time: 4485
Site-Tag: default-site-tag
mDNS Service Policy: mdnsTV6
Overriding mDNS Service Policy: NO
UPN-Status: Disabled
Rdata: 10.15.141.124

```

To verify the mdns-sd cache with respect to mDNS-AP, use the following command:

```
Device# show mdns-sd cache mdns-ap 706b.b97d.b060 detail
```

```

Name: _printer._tcp.local

Type: PTR
TTL: 4500
VLAN: 145
Client MAC: 0050.b626.5bfa
mDNS AP Radio MAC: 706b.b97d.b060
mDNS AP Ethernet MAC: 706b.b97c.5208
Remaining-Time: 4480
mDNS Service Policy: mdnsTV
Rdata: printer._printer._tcp.local

```

```

Name: Client-46-153.local
Type: A/AAAA
TTL: 4500
VLAN: 145
Client MAC: 0050.b626.5bfa
mDNS AP Radio MAC: 706b.b97d.b060
mDNS AP Ethernet MAC: 706b.b97c.5208

```

```

Remaining-Time: 4480
mDNS Service Policy: mdnsTV
Rdata: 10.15.145.103

```

To verify the mdns-sd cache in detail, use the following command:

```
Device# show mdns-sd cache detail
```

```

Name: _custom1._tcp.local
Type: PTR
TTL: 4500
WLAN: 2
WLAN Name: mdns120
VLAN: 120
Client MAC: c869.cda8.77d6
AP Ethernet MAC: 7069.5ab8.33d0
Expiry-Time: 09/09/18 21:50:47
Site-Tag: default-site-tag
Rdata: service_t1._custom1._tcp.local

```

To verify the mdns-sd cache statistics, use the following command:

```
Device# show mdns-sd cache statistics
```

```
mDNS Cache Stats
```

```
Total number of Services: 4191
```

To verify the mdns-sd statistics, use the following command:

```
Device# show mdns-sd statistics
```

```
-----
Consolidated mDNS Packet Statistics
-----
```

```
mDNS stats last reset time: 03/11/19 04:17:35
```

```
mDNS packets sent: 61045
```

```
IPv4 sent: 30790
```

```
IPv4 advertisements sent: 234
```

```
IPv4 queries sent: 30556
```

```
IPv6 sent: 30255
```

```
IPv6 advertisements sent: 17
```

```
IPv6 queries sent: 30238
```

```
Multicast sent: 57558
```

```
IPv4 sent: 28938
```

```
IPv6 sent: 28620
```

```
mDNS packets received: 72796
```

```
advertisements received: 13604
```

```
queries received: 59192
```

```
IPv4 received: 40600
```

```
IPv4 advertisements received: 6542
```

```
IPv4 queries received: 34058
```

```
IPv6 received: 32196
```

```
IPv6 advertisements received: 7062
```

```
IPv6 queries received: 25134
```

```
mDNS packets dropped: 87
```

```
-----
Wired mDNS Packet Statistics
-----
```

```
mDNS stats last reset time: 03/11/19 04:17:35
```

```
mDNS packets sent: 61033
```

```
IPv4 sent: 30778
```

```
IPv4 advertisements sent: 222
```

```
IPv4 queries sent: 30556
```

```

IPv6 sent: 30255
  IPv6 advertisements sent: 17
  IPv6 queries sent: 30238
Multicast sent: 57558
  IPv4 sent: 28938
  IPv6 sent: 28620
mDNS packets received: 52623
  advertisements received: 1247
  queries received: 51376
  IPv4 received: 32276
    IPv4 advertisements received: 727
    IPv4 queries received: 31549
  IPv6 received: 20347
    IPv6 advertisements received: 520
    IPv6 queries received: 19827
mDNS packets dropped: 63

```

```

-----
mDNS Packet Statistics, for WLAN: 2
-----

```

```

mDNS stats last reset time: 03/11/19 04:17:35
mDNS packets sent: 12
  IPv4 sent: 12
    IPv4 advertisements sent: 12
    IPv4 queries sent: 0
  IPv6 sent: 0
    IPv6 advertisements sent: 0
    IPv6 queries sent: 0
  Multicast sent: 0
    IPv4 sent: 0
    IPv6 sent: 0
mDNS packets received: 20173
  advertisements received: 12357
  queries received: 7816
  IPv4 received: 8324
    IPv4 advertisements received: 5815
    IPv4 queries received: 2509
  IPv6 received: 11849
    IPv6 advertisements received: 6542
    IPv6 queries received: 5307
mDNS packets dropped: 24

```

To verify the default service list details, use the following command:

```
Device# show mdns-sd default-service-list
```

```

-----
mDNS Default Service List
-----

Service Definition: airplay
Service Names: _airplay._tcp.local

Service Definition: airtunes
Service Names: _raop._tcp.local

Service Definition: homesharing
Service Names: _home-sharing._tcp.local

Service Definition: printer-ipp
Service Names: _ipp._tcp.local

Service Definition: printer-lpd
Service Names: _printer._tcp.local

```

```
Service Definition: printer-ipps
Service Names: _ipps._tcp.local
```

```
Service Definition: printer-socket
Service Names: _pdl-datastream._tcp.local
```

```
Service Definition: google-chromecast
Service Names: _googlecast._tcp.local
```

```
Service Definition: itune-wireless-devicesharing2
Service Names: _apple-mobdev2._tcp.local
```

To verify the primary service list details, use the following command:

```
Device# show mdns-sd master-service-list
```

```
-----
mDNS Master Service List
-----
```

```
Service Definition: fax
Service Names: _fax-ipp._tcp.local
```

```
Service Definition: roku
Service Names: _rsp._tcp.local
```

```
Service Definition: airplay
Service Names: _airplay._tcp.local
```

```
Service Definition: scanner
Service Names: _scanner._tcp.local
```

```
Service Definition: spotify
Service Names: _spotify-connect._tcp.local
```

```
Service Definition: airtunes
Service Names: _raop._tcp.local
```

```
Service Definition: airserver
Service Names: _airplay._tcp.local
               _airserver._tcp.local
```

```
.
.
.
```

```
Service Definition: itune-wireless-devicesharing2
Service Names: _apple-mobdev2._tcp.local
```

To verify the mdns-sd service statistics on the controller, use the following command:

```
Device# show mdns-sd service statistics
```

Service Name	Service Count
-----	-----
_atc._tcp.local	137
_hap._tcp.local	149
_ipp._tcp.local	149
_rfb._tcp.local	141
_smb._tcp.local	133
_ssh._tcp.local	142
_daap._tcp.local	149
_dpap._tcp.local	149
_eppc._tcp.local	138
_adisk._tcp.local	149

To verify the mDNS-AP configured on the controller and VLAN(s) associated with it, use the following command:

```
Device# show mdns-sd ap
```

```
Number of mDNS APs..... 1
```

AP Name	Ethernet MAC	Number of Vlans	Vlanidentifiers
AP3600-1	7069.5ab8.33d0	1	300

Further Debug

To debug mDNS further, use the following procedure:

1. Run this command at the controller:

```
set platform software trace wncd <0-7> chassis active R0 mdns debug
```

2. Reproduce the issue.

3. Run this command to gather the traces enabled:

```
show wireless loadbalance ap affinity wncd 0
```

AP MAC	Discovery Timestamp	Join Timestamp	Tag	Vlanidentifiers
0cd0.f894.0600	06/30/21 12:39:48	06/30/21 12:40:02	default-site-tag	300

