



Manage the Cisco Wide Area Bonjour Application

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Cisco Wide Area Bonjour Application Overview

Cisco DNA Center supports rich network controller functions and automation and assurance capabilities for enterprise networks. The Cisco Wide Area Bonjour application is an add-on service that enables controller functions to support mDNS service routing across multiple network deployment models. Cisco DNA Center in controller mode builds stateful service routing peer sessions with network-wide distributed Service Discovery Gateway (SDG) agents to dynamically discover mDNS services and distribute other SDG agents. IT-defined global policies in the Cisco Wide Area Bonjour application define mDNS service routing.

The Cisco Wide Area Bonjour application provides an intuitive GUI to build, manage, and troubleshoot network-wide service routing peers, global policies, service instances, and more. As a service routing controller, the Cisco Wide Area Bonjour application supports policy management to enable service routing and rich service-assurance capabilities for management and troubleshooting.

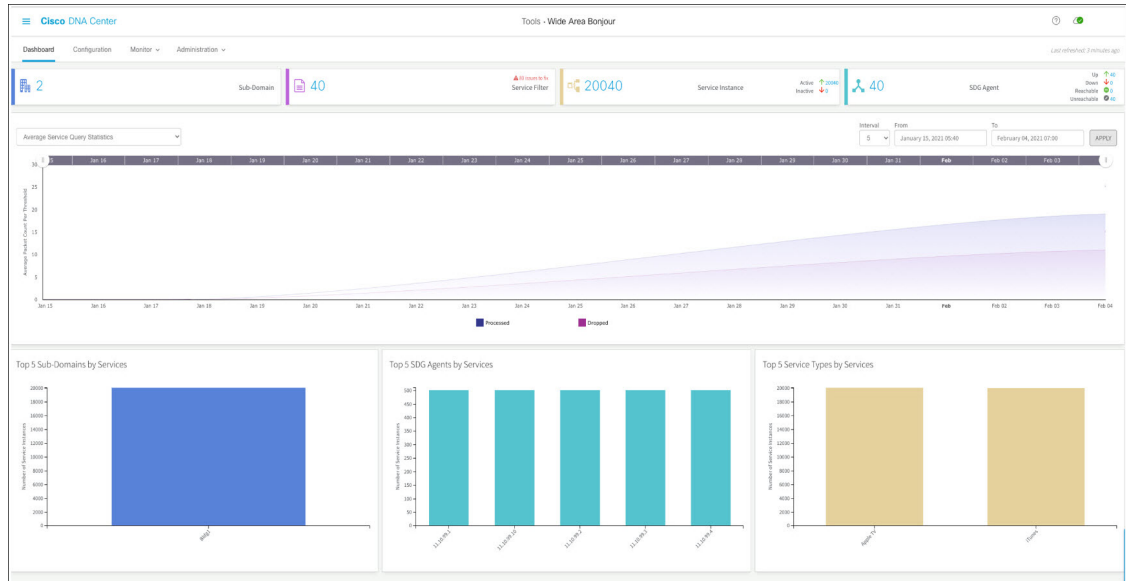


Note The Cisco Wide Area Bonjour application doesn't support network automation to implement service policies on network devices. You must manually configure service policies on your network.

This chapter provides an overview of the Cisco Wide Area Bonjour application and its supporting functions.

The following figure shows the Cisco Wide Area Bonjour application dashboard.

Figure 1: Cisco Wide Area Bonjour Application Dashboard



The following table explains the function of the four key areas of the Cisco Wide Area Bonjour application. For more information about implementing and managing global service routing, see [Monitor the Cisco Wide Area Bonjour Application](#).

Table 1: Cisco Wide Area Bonjour Application Functions

Manage	Function
Dashboard	<p>The Cisco Wide Area Bonjour application dashboard provides a statistical view of global service routing policies and processing information. The dashboard is divided into the following categories, each providing unique service assurance capabilities:</p> <ul style="list-style-type: none"> • Dashlets: Key indicators providing configured subdomains and service filter policy counts, dynamically discovered service instances, and real-time peering status for Wide Area Bonjour service routing. • Service Query Statistics: A two-tier historical chart view with granular intervals to monitor average and cumulative mDNS service query messages from SDG agents, and two-layer charts showing successful query responses and requests dropped due to mismatched service policies. • Top Talkers: Bar charts for top talkers in the network.

Manage	Function
Configuration	<p>The Configuration tab of the Cisco Wide Area Bonjour application enables you to construct and manage global service routing policies. The Configuration tab is divided into the following sections:</p> <ul style="list-style-type: none"> • Domains and subdomains: The logical structure of enterprise geolocations associated with SDG agents to enable service routing and policies in the Wide Area Bonjour domain. • Service filters: Intuitive two-sided policy constructs enabling global service discovery and distribution. The mDNS services are accepted from one or more source SDG agents. The mDNS services are distributed to one or more query SDG agents. • 360 degree view: Brief SDG agents, policies, instance count statistics and status information at multiple subdomain levels for ease of operation and management.
Monitor	<p>From the Monitor tab of the Cisco Wide Area Bonjour application you can view the detailed status of service routing, service instances, and troubleshooting information. The Monitor page is divided into the following categories:</p> <ul style="list-style-type: none"> • SDG agent: The center point to manage, synchronize, and troubleshoot service routing with network-wide distributed SDG agent switches. Detailed view of the service filter, device reachability, and device serviceability for each SDG agent. • Service instance: A comprehensive view of service instance details in real-time providing complete reachability source of service, addressing plan, and service-route state in the Wide Area Bonjour domain. • Troubleshooting: The built-in toolkit to troubleshoot the service routing issues in the Wide Area Bonjour domain. The troubleshooting logs can be downloaded with selected message-type with brief information hinting possible challenges for self-resolution.
Administration	<p>From the Administration tab of the Wide Area Bonjour application, you can manage advanced service routing parameters. From this tab of the application, you can manage the following:</p> <ul style="list-style-type: none"> • Service type: The key tuple in building global service policies for Wide Area Bonjour service routing. Cisco DNA Center supports built-in or user-defined custom service type repository mapping of one or more mDNS poinTeR (PTR) records to user-friendly names. • Global parameters: Central service routing parameters to build and manage secure and reliable routing peer connections, such as MD5 authentication, keepalive timers, and inactive service instance management.

Create Wide Area Bonjour Domain and Policy Structure

Before building global service policies in the Wide Area Bonjour, you must first configure foundational settings. This section focuses on creating the multi-tier logical construct of domains and briefly explains service policy structures associated with each tier, to implement Wide Area Bonjour service routing policies.

The Wide Area Bonjour application supports the following user-defined domain hierarchy that may align with the hierarchy of the company's geolocation and building planning:

- **Root domain:** The Wide Area Bonjour application must have a root domain as the base configuration. The root domain can be defined as the company's name or major site location, for example. The Wide Area Bonjour application supports a single root domain.
- **Subdomain:** The subdomain is a logical construct which you can create, aligning with site location attributes (such as the building name, for example). The Wide Area Bonjour application supports multiple subdomains, and you can have further subdomains under a subdomain.

Create Wide Area Bonjour Domains

The root domain configuration is the initial step to configure the Cisco Wide Area Bonjour application.



Note You can't edit the name of the root domain after it has been configured. To rename a root domain, you must first delete the domain and then reconfigure it with the new name.

The following figure shows the **Configuration** tab of the Cisco Wide Area Bonjour application before you configure a root domain.

Figure 2: Configure a Root Domain in the Cisco Wide Area Bonjour Application

It looks like there are no domains.

Once available, you can create domains/subdomains and associate policies & agents.

Step 1 Navigate to the **Configuration** tab in the Cisco Wide Area Bonjour application.

Step 2 In the **Domain Name** section, enter the name of the root domain.

Step 3 (Optional) Enter a description for the root domain.

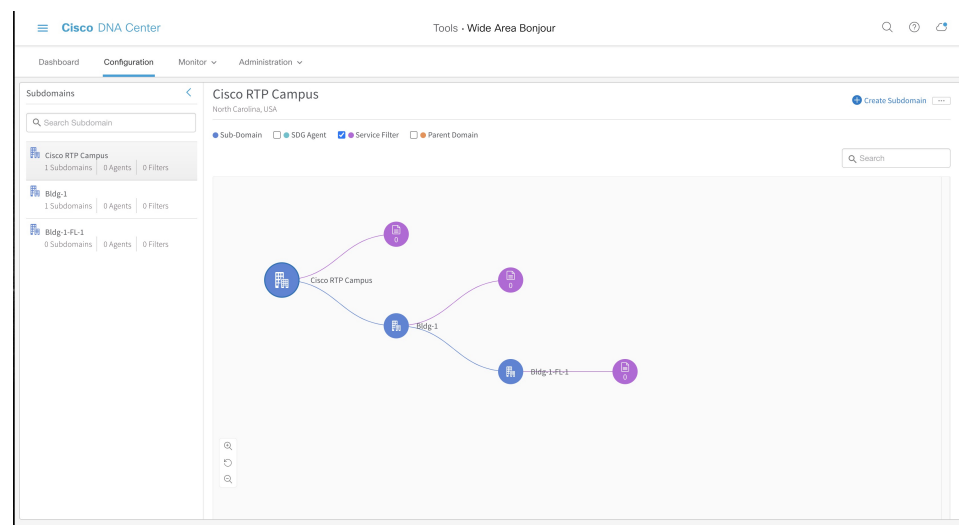
Step 4 Click **CREATE**.

Create Wide Area Bonjour Subdomain Hierarchies

Configuring a subdomain is a secondary step to configure the Cisco Wide Area Bonjour application based on your hierarchy configuration requirements. You can extend the subdomain hierarchy to as many levels as necessary. The Cisco Wide Area Bonjour application provides the flexibility to build the Wide Area Bonjour service routing global policies at any subdomain level.

The following figure shows the **Configuration** tab of the Cisco Wide Area Bonjour application.

Figure 3: Cisco Wide Area Bonjour Application - Configuration



The **Configuration** tab is divided into the following subdomain logical panels, supporting ease of configuration and managing large-scale global policies:

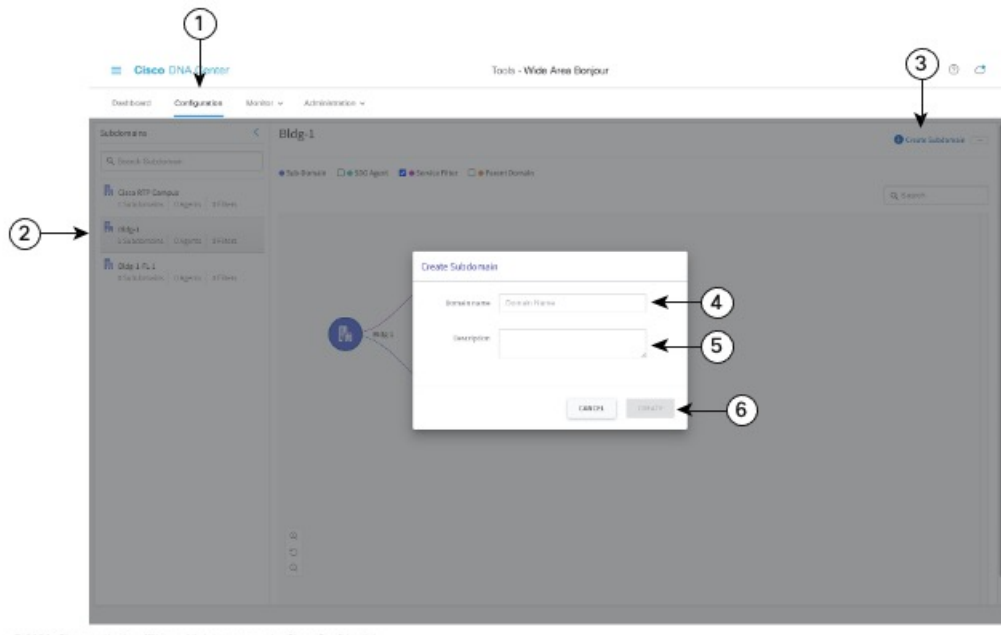
- **Subdomain panel:** A single-column table which lists configured root domain and subdomains. The network administrator can briefly collect aggregated counts of downstream subdomains, SDG agents, and configured service filters for global service-routing in the Wide Area Bonjour domain.
- **Subdomain Canvas:** A wide canvas which provides the complete domain hierarchical view in a graphical format. Service filter can be created on a subdomain at any level. The flexible tree structure can be collapsed to support a condensed view or expanded to enable a 360-degree view of SDG agents, and service filter counts on a per subdomain level.



Note You can't edit the name of a subdomain after it has been created. To modify the name of a subdomain, you must first delete the subdomain and then reconfigure it with the new name.

The following figure shows the steps to be followed to create a subdomain in the Cisco Wide Area Bonjour application.

Figure 4: Steps to Create a Subdomain Using the Cisco Wide Area Bonjour Application



- Step 1** Navigate to the **Configuration** tab.
- Step 2** From the left pane, select the domain or subdomain under which to create the new subdomain.
- Step 3** Click **Create Subdomain** in the upper-right portion of the GUI.
- Step 4** Enter a unique name for the subdomain in the **Domain Name** field.
- Step 5** (Optional) Enter a description for the subdomain.
- Step 6** Click **CREATE**.

Delete Wide Area Bonjour Domain Hierarchies

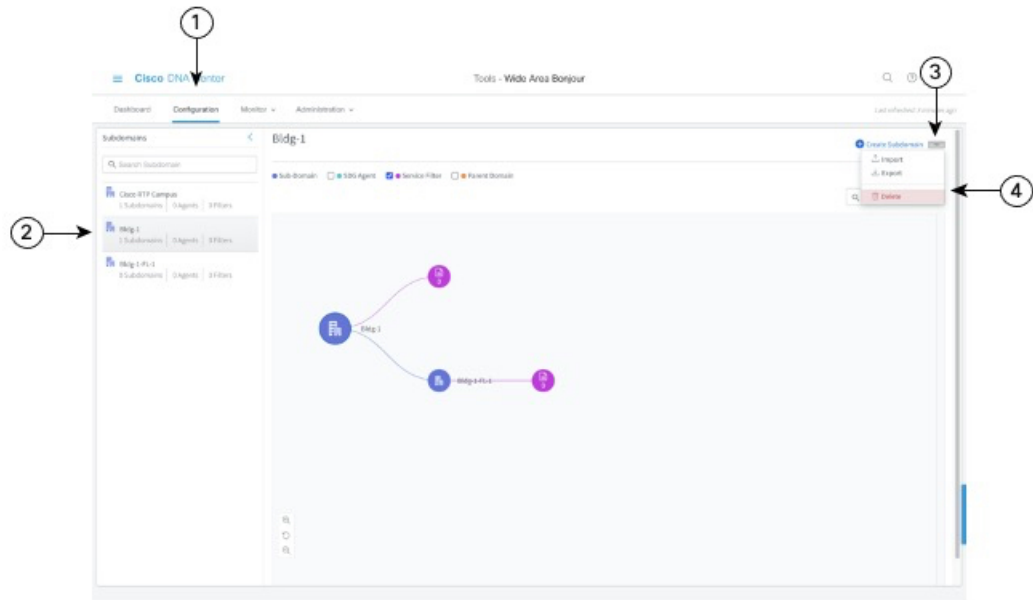
You can delete the root domain or a subdomain at any point in time. When you delete a domain, the stateful service-routing adjacencies with SDG agent switches in an associated domain or subdomain are immediately disconnected. Further, all dynamically discovered mDNS services are flushed away to enforce change immediately.



Note You can't undo the deletion of a domain or subdomain. To restore a domain or subdomain, you must manually reconfigure it or upload a backed up configuration file.

The following figure illustrates the steps required to delete a subdomain.

Figure 5: Steps to Delete a Subdomain in the Cisco Wide Area Bonjour Application



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- Step 1** Navigate to the **Configuration** tab.
 - Step 2** From the left pane, select the domain or subdomain to be deleted.
 - Step 3** From the options menu in the upper right portion of the screen, click **Delete**.
 - Step 4** Confirm that you want to delete the selected domain or subdomain.
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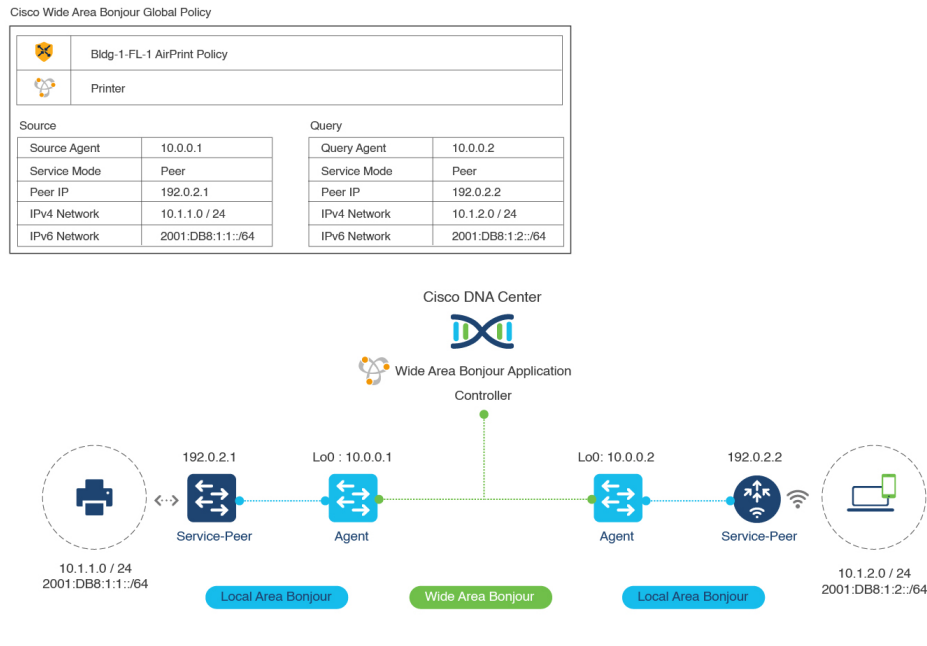
Understanding Global Policy Structure

The global service-policy construct of the Cisco Wide Area Bonjour application uses fundamental concepts to enable policy-based mDNS service discovery and distribution with stateful and trusted Cisco Catalyst SDG agent switches. The global service-policy in Wide Area Bonjour is divided into two major categories: source and query.

You can build service filters in the Cisco Wide Area Bonjour application comprising a set of parameters, activating one or more mDNS service types to accept services from specific source SDG agent switches and route services to other SDG agents on-demand from remote receiver end points.

The following figure illustrates a reference global service filter in the Cisco Wide Area Bonjour application.

Figure 6: Reference Global Service Filter in the Cisco Wide Area Bonjour Application



In the illustration, Cisco Wide Area Bonjour accepts mDNS service-type Printer when all configured network service-routing parameters for the source SDG agent switch match those in the policy. The mDNS service-type Printer will be routed on-demand to the query SDG agent when all the configured network service-routing parameters match those from the wireless network location requesting the services.

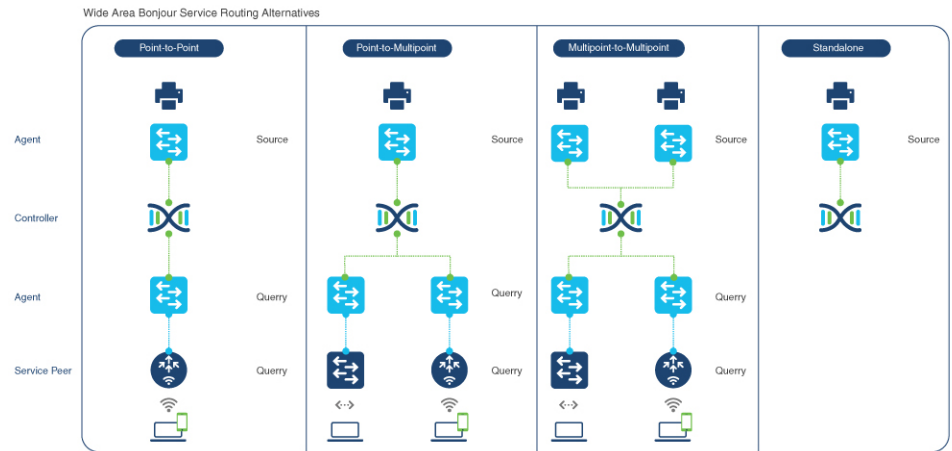
The Cisco Wide Area Bonjour application supports service-routing over multiple types of enterprise networks.

Flexible Wide Area Bonjour Service Routing Design

Enterprise networks need flexibility to discover and dynamically route services across IP networks in various use cases. The Cisco Wide Area Bonjour application supports an intuitive GUI to build service routing policies for multiple types of routing topologies.

The following figure shows a reference global policy example in the Cisco Wide Area Bonjour application to enable service routing. You can build unique policies to support one or more mDNS service types to enable flexible routing across the network.

Figure 7: Flexible Wide Area Bonjour Service Routing Design



Each service routing policy can be planned and configured in Cisco DNA Center to dynamically discover and distribute services in the network. The global policy configuration can be easily adjusted to append more service types, add more SDG agent switches, or include more service peers and networks, as required. To implement intent-based service routing, you can configure the policy in any deployment model:

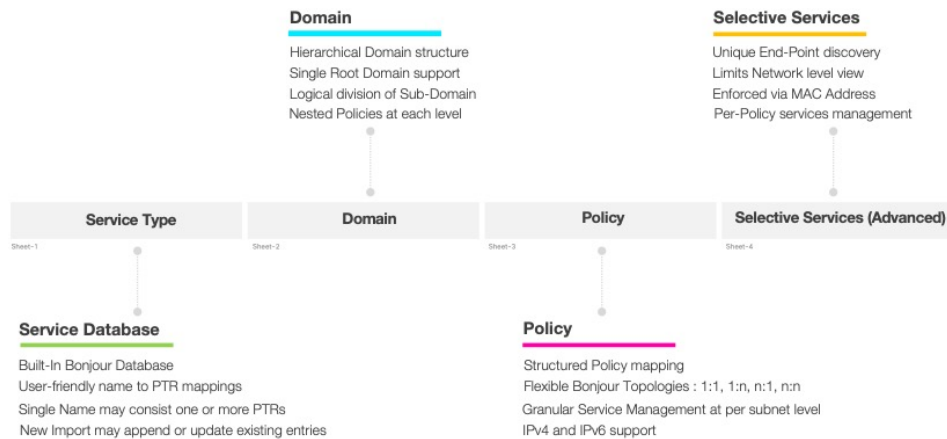
- **Point-to-point:** In this service routing topology, the single source SDG agent switch can be configured to discover service instances (such as *Printer*). Cisco DNA Center routes the printer information to a single remote query SDG agent upon receiving a query request. The global policy may contain advanced parameters from a selected SDG agent with extended network devices in a service peer role (such as a Cisco Catalyst 9800 Series Wireless Controller or Catalyst 9000 Switch). This policy configuration type limits printer from a single source SDG agent to a single query SDG agent, building a point-to-point routing topology.
- **Point-to-multipoint:** An expanded version of point-to-point routing topology with more than one query SDG agent device. This global policy setting provides the ability to route the service from a single source SDG agent to multiple remote SDG agent network devices upon receiving a query request.
- **Multipoint-to-multipoint:** An expanded version of point-to-point routing topology with more than one source SDG agent and query SDG agent. This global policy setting provides the ability to route a service from multiple source SDG agents to multiple remote SDG agent network devices upon receiving a query request.
- **Standalone:** This service routing topology enables Cisco DNA Center to discover the mDNS service instances from one or more source SDG agent switches. In this topology, the network administrator does not have to configure a query SDG agent. This type of configuration allows Cisco DNA Center to discover and manage SDG agent switches and services, but does not route the service to any SDG agent switches in the Wide Area Bonjour domain.

Cisco Wide Area Bonjour Bulk Configuration

The Cisco Wide Area Bonjour application gives you the flexibility to build and manage service filter policies either individually through the GUI or in bulk during any stage of deployment. This section focuses on bulk provisioning and managing configuration files for backup.

The service filter policy configuration template is in Microsoft Excel XLS format. You can download a prebuilt structured and formatted blank XLS template file from the Cisco Wide Area Bonjour application either during the initial provisioning stage or during runtime from any level of the domain hierarchy, with an up-to-date configuration. The XLS template file is divided in four sheets, each cross-linked with required details to automate large-scale service filter policies.

Figure 8: Cisco Wide Area Bonjour Policy Template



The Cisco Wide Area Bonjour XLS template file contains predefined columns and column names that must remain intact. Changes in the predefined columns and names could result in a failure when importing the modified file. You must fill in the required data in the respective columns for each sheet based on the following reference configuration model.

The Selective Services sheet is optional and can be used in advanced service routing scenarios where service distribution from Cisco DNA Center must be limited to user-defined static MAC addresses. For example, if Cisco DNA Center discovers up to ten AirPrint-capable printers with Selective Services support, you can statically assign the MAC addresses of two printers to be shared if a source SDG agent receives a query from a query SDG agent.

This section provides reference template configuration values to build bulk service filter policy configuration parameters distributed across multiple worksheets.

The following table lists the parameters to be configured on the Service Type worksheet.

Table 2: Cisco Wide Area Bonjour Policy - Service Type Sheet

Parameter	Value	Description
Service Type Name	<User-defined service name>	Enter a user-defined service name to create a custom service type.
Bonjour Type	<Multicast DNS pointer records>	Enter one or more mDNS PTRs. Each PTR must end with a period (.) and each must be decoupled with a comma (,).

You must populate the Domain sheet to build the domain and subdomain hierarchy of the Cisco Wide Area Bonjour application. As initial configuration, the first entry must be configured with a root domain, followed by one or more subdomains, listed with the parent domain name as configured for root domain row. The

hierarchy can be expanded with additional subdomains as necessary, with appropriate parent subdomain names.

The following table lists the parameters to be configured on the Domain worksheet.

Table 3: Cisco Wide Area Bonjour Policy - Domain Sheet

Parameter	Value	Description
Domain-Name	<Root domain or subdomain name>	Enter the name of the root domain or subdomain.
Description	<Domain description>	(Optional) Enter a description for the domain.
Parent-Domain	<Root domain or subdomain name>	If the domain type in column A is root domain, leave this cell blank. If the domain type in column A is subdomain, enter the name of the root domain or the subdomain to build the hierarchy.

You must populate the Policy sheet to build global service filter policy in the Cisco Wide Area Bonjour application. As described in the previous sections, the service filter configuration and management in the Cisco Wide Area Bonjour application is applied at a subdomain level. Thus, the Policy sheet refers to information provided in the previous two sheets as a prerequisite and associates new policy configurations to each domain.

Table 4: Cisco Wide Area Bonjour Policy - Policy Sheet

Parameter	Value	Description
Domain	<Root domain or subdomain>	Enter the name of the domain where this policy needs to be configured.
Service Type	<mDNS Service Type>	Enter one or more mDNS service types allowed for this policy. Each service type must be decoupled with a comma (,) delimiter.
Policy Name	<Policy Name>	Enter a unique name for the service policy.
Description	<Policy Description>	(Optional) Enter a description for the service policy.
Enabled	<True False>	Enter True to enable the policy and False to disable the policy upon configuration.

Parameter	Value	Description
Deployment Type	<Traditional Overlay>	Enter Traditional or Overlay deployment type. The Overlay deployment model is supported with BGP EVPN VXLAN.
Source IP	<Source SDG Agent IPv4 Address>	Enter the source SDG agent IPv4 address for Cisco DNA Center to build service routing adjacency and dynamically learn services.
Source Service Layer	<Local Peer>	Enter Local or Peer depending on the service layer. Local: SDG agent switch discovers mDNS service from directly attached providers. Peer: SDG agent switch discovers mDNS services from downstream L2 switch or wireless controller device where providers are connected.
Source V4 Network	<Source IPv4 Network Address>	Enter the source IPv4 network address where the service provider is expected to announce services in the network.
Source V4 Mask	<Source IPv4 Network Mask>	Enter the source IPv4 network mask where the service provider is expected to announce the service in the network.
Source V6 Network	<Source IPv6 Network Address>	Enter the source IPv6 network address where the service provider is expected to announce the service in the network.
Source V6 Mask	<Source IPv6 Network Mask>	Enter the source IPv6 network mask, where the service provider is expected to announce the service in the network.
Source Peer ID	<Source Peer IPv4 Address>	If the source Service Layer is Peer, then enter the source IPv4 address of the L2 switch or wireless controller devices, where the providers are connected.
Source Location Group ID	<Source Location Group ID>	Enter the source location group ID. The valid range is from 0 to 4096.

Parameter	Value	Description
Source VNI ID	<Source EVPN Virtual Network ID>	If the Deployment Type is Overlay, then enter the source Layer 3 VNID or Layer 2 VNID where the service provider is expected to announce the service in the BGP EVPN overlay network.
Source IRB	<Symmetric IRB Asymmetric IRB>	If the Deployment Type is Overlay, then enter the source SDG agent in Symmetric IRB (L3 Leaf) or Asymmetric IRB (L2 Leaf) mode where the service provider is expected to announce the service in the BGP EVPN overlay network.
Query IP	<Query SDG Agent IPv4 Address>	Enter the query SDG agent IPv4 address for Cisco DNA Center to build service routing adjacency and dynamically distribute services on request.
Query Service Layer	<Local Peer>	Enter Local or Peer depending on the service layer. Local: The SDG agent switch expects mDNS receiver endpoints from directly attached providers. Peer: The SDG agent switch expects mDNS receiver endpoints connected to downstream L2 switch or wireless controller devices.
Query V4 Network	<Query IPv4 Network Address>	Enter the query IPv4 network address, where the endpoint receiver is expected to request the service in the network.
Query V4 Mask	<Query IPv4 Network Mask>	Enter the query IPv4 network mask, where the endpoint receiver is expected to request the service in the network.
Query V6 Network	<Query IPv6 Network Address>	Enter the query IPv6 network address where the endpoint receiver is expected to request the service in the network.
Query V6 Mask	<Query IPv6 Network Mask>	Enter the query IPv6 network mask where the endpoint receiver is expected to request the service in the network.

Parameter	Value	Description
Query Peer ID	<Query Peer IPv4 Address>	If the query Service Layer is Peer, enter the query IPv4 address of L2 switches or wireless controller devices where the mDNS receiver endpoints are connected.
Query Location Group ID	<Query Location Group ID>	Enter the query location group ID. The valid range is from 0 to 4096.
Query VNI ID	<Query EVPN Virtual Network ID>	If the Deployment Type is Overlay, enter the query Layer 3 VNID or Layer 2 VNID where the mDNS receiver endpoint is expected to request the service in the BGP EVPN overlay network.
Query IRB	<Symmetric IRB Asymmetric IRB>	If the Deployment Type is Overlay, enter the query SDG agent in Symmetric IRB (L3 Leaf) or Asymmetric IRB (L2 Leaf) mode where the service provider is expected to request the service in the BGP EVPN overlay network.

The Advanced Services sheet is an optional sheet, used to configure advanced service distribution to querying SDG agents. As the network administrator, you can restrict the distribution of service instances based on matching policy names and the MAC addresses of service provider Bonjour endpoints.

The following table lists the parameters on the Selective Service sheet.

Table 5: Cisco Wide Area Bonjour Policy - Selective Service Sheet

Parameter	Value	Description
Policy Name	<Policy Name>	Enter the policy name as applied in the Policy worksheet to enable selective service instance distribution instead of all from the configured network.
Source MAC Address	<Service Provider MAC Address>	Enter a single MAC address in the format 00:00:00:00:00:00 associated with the policy. For another MAC address entry, use another row.

Manage the Cisco Wide Area Bonjour Configuration

The Cisco Wide Area Bonjour application provides flexibility in managing bulk configuration with Import and Export capabilities. The application domain and policies can be built and imported as initial Day-0

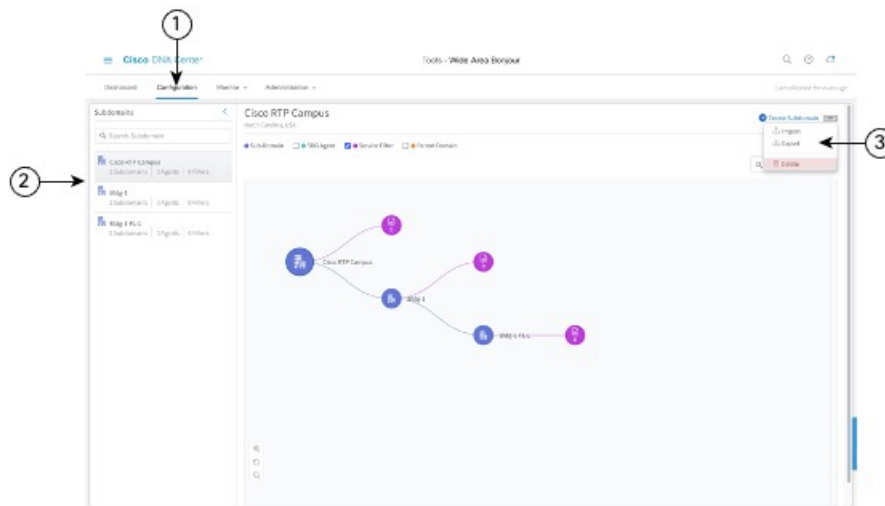
configuration for bulk provisioning instead of the manual process. The existing policy configuration can be downloaded to a local computer in an XLS format to either update existing policies or maintain a backup.

The policy configuration import is seamless in operation and can be appended to the Cisco Wide Area Bonjour application while it is operational. The new imported file may include new service-types in a database, additional services to existing policies, or new subdomains with new policies. During configuration import the application and service-peering with existing SDG agents remains intact providing non-disruptive bulk provisioning capabilities to scale up the network and services in the Wide Area Bonjour domain. You can import your configuration at any level of the domain hierarchy of the application.

The export function downloads a snapshot of the latest configuration from the Cisco Wide Area Bonjour application to a local computer. The file downloaded from the export function can be used as a configuration backup which you can later restore, if necessary.

The following figure is a screenshot illustrating the steps to be followed to either import or export the bulk configuration XLS file.

Figure 9: Steps to Import or Export the Bulk Configuration XLS File



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- Step 1** Navigate to the **Configuration** tab.
 - Step 2** From the left pane, select the domain or subdomain for which you want to import or export the bulk configuration XLS file.
 - Step 3** Click the menu button in the upper-right portion of the screen.
 - Step 4** Click **Import** to upload your configuration to the Cisco Wide Area Bonjour application from your local computer. Alternatively, click **Export** to download the configuration file from the Cisco Wide Area Bonjour application to your local computer.
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