



CHAPTER 3

Independent VRF Management

This chapter describes independent VRF management, which provides a means to create, deploy and manage VRF objects independent of MPLS VPN links and service requests. Deployed VRF objects can also be used with MPLS VPN links. It contains the following sections:

- [Overview, page 3-1](#)
- [Working with VRF Objects, page 3-2](#)
- [Working with VRF Service Requests, page 3-12](#)
- [Using VRFs with MPLS VPN Service Requests and Policies, page 3-17](#)
- [Migrating Existing MPLS VPN Service Requests to the VRF Object Model, page 3-23](#)

Overview

In the traditional VRF (VPN routing and forwarding) model available in previous releases of ISC, the operator first creates a VPN object and then associates it to an MPLS VPN link. The necessary VRF information is generated and deployed at the time the MPLS VPN link is provisioned. The VRF information is removed only when the last link associated with the VRF is decommissioned. However, in certain cases, it might be desirable to have the VRF information provisioned independent of the physical link. ISC now supports this scenario through the independent VRF management feature described in this chapter. This lets you create, modify, and delete VRF objects independently of MPLS VPN links. This provides several advantages:

- VRF information and templates can be directly deployed on a PE device without being associated with an interface.
- VRF information can exist without links pointing to it.
- A VRF object can be modified, even if it is associated with links.
- Route targets (RTs) can be added and removed without causing outages.

Managing VRFs independently of physical links involves the following tasks, which are covered in detail in the rest of this chapter:

- Creating, modifying, and deleting VRF objects.
- Creating, modifying, deploying, decommissioning, and deleting a new type of service request, called a VRF service request.
- Using deployed VRF objects with MPLS VPN links via service policies and service requests.
- Migrating traditional MPLS VPN service requests to the independent VRF model.

**Note**

The traditional ISC VRF model is still supported for backward compatibility. The choice of which VRF model to use is available during MPLS VPN link creation. This is described in subsequent sections of this chapter.

**Note**

Independent VRF association is not supported for MVRFCE-based policies and service requests.

Working with VRF Objects

This section describes how to create, modify, and delete VRF objects. Subsequent sections in this chapter cover how the VRF objects are used in service requests. This section covers the following topics:

- [Creating a New VRF Object, page 3-2](#)
- [Copying a VRF Object, page 3-6](#)
- [Searching for VRF Objects in the ISC Repository, page 3-8](#)
- [Modifying Non-Deployed VRF Objects, page 3-8](#)
- [Modifying Deployed VRF Objects, page 3-10](#)
- [Deleting VRF Objects, page 3-11](#)

Creating a New VRF Object

Creating a VRF object is similar to creating a VPN. However, there are some extra attributes involved, such as Import RT List and Export RT List. After the VRF object is created, you will later provision it using a VRF service request, as covered in later sections of this chapter.

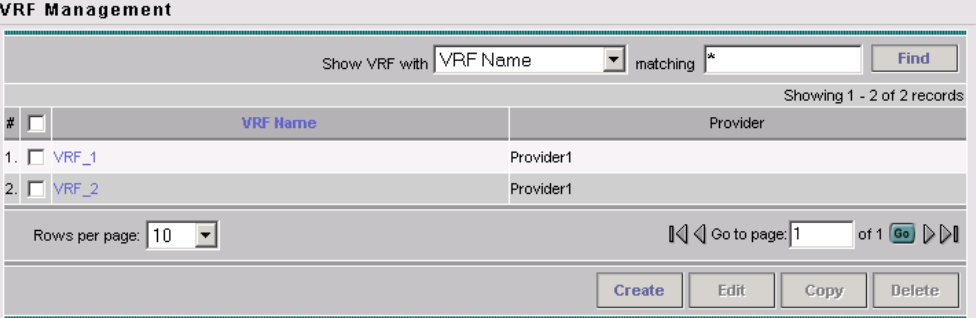
To create a VRF object, perform the following steps.

Step 1 Choose **Service Inventory > Inventory and Connection Manager**.

The Inventory and Connection Manager window appears.

Step 2 From the Inventory and Connection Manager, choose **VRFs**.

The VRF Management window appears, as shown in [Figure 3-1](#).

Figure 3-1 VRF Management Window

VRF Management

Show VRF with matching

Showing 1 - 2 of 2 records

#	<input type="checkbox"/>	VRF Name	Provider
1.	<input type="checkbox"/>	VRF_1	Provider1
2.	<input type="checkbox"/>	VRF_2	Provider1

Rows per page:

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- Step 3** From the VRF Management window, click **Create**.
The Create VRF window appears, as shown in [Figure 3-2](#).

Figure 3-2 Create VRF Window

Create VRF

Name *	<input type="text"/>								
Provider *	<input type="text"/> <input type="button" value="Select"/>								
Description:	<input type="text"/>								
VRF Attributes									
CE Routing Communities *	<input type="text"/> <input type="button" value="Select"/>								
Import RT List:	<input type="text"/>								
Export RT List:	<input type="text"/>								
Import Route Map:	<input type="text"/>								
Export Route Map:	<input type="text"/>								
Maximum Routes: ⓘ	<input type="text"/> (1 - 4294967295)								
Threshold: ⓘ	<input type="text"/> (1 - 100)								
RD *	<input type="text"/> <input type="checkbox"/> Autopick RD								
Enable Multicast: ⓘ	<input type="checkbox"/>								
Enable Auto Pick MDT Addresses:	<input checked="" type="checkbox"/>								
Default MDT Address *	<input type="text"/> (a.b.c.d)								
Data MDT Subnet *	<input type="text"/> (a.b.c.d)								
Data MDT Size:	<input type="text" value="1"/>								
Data MDT Threshold:	<input type="text"/> (1 - 4294967 kilobits/sec)								
Default PIM Mode:	<input type="text" value="SPARSE_DENSE_MODE"/>								
MDT MTU: ⓘ	<input type="text"/> (576 - 65535)								
Enable PIM SSM:	<input type="checkbox"/> <input type="text" value="DEFAULT"/>								
SSM List Name *	<input type="text"/>								
Multicast Route Limit:	<input type="text"/> (1 - 2147483647)								
Enable Auto RP Listener:	<input type="checkbox"/>								
Configure Static-RP:	<input type="checkbox"/>								
My PIM Static-RPs *	<div style="text-align: right;">Showing 0 of 0 records <input type="button" value="Edit"/></div> <table border="1"> <thead> <tr> <th>#</th> <th>Static-RP Unicast Address</th> <th>Multicast-Group List Name</th> <th>Override</th> </tr> </thead> <tbody> <tr> <td colspan="4">Rows per page: <input type="text" value="10"/> <input type="button" value="Go"/> of 1</td> </tr> </tbody> </table>	#	Static-RP Unicast Address	Multicast-Group List Name	Override	Rows per page: <input type="text" value="10"/> <input type="button" value="Go"/> of 1			
#	Static-RP Unicast Address	Multicast-Group List Name	Override						
Rows per page: <input type="text" value="10"/> <input type="button" value="Go"/> of 1									

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Step 4 Name: Enter the name of the VRF object.

This is a simple text field. Enter any name of your choice. It is recommended not to use special characters (' ` " < > () [] { } / \ & ^ ! ? ~ * % = , . + |), as this may cause misconfiguration of the VRF name for certain devices.

This name will be directly deployed on the PE device. All the validations applicable for a VPN name while creating a VPN object in ISC are applicable for a VRF name. This attribute is required.

- Step 5 Provider:** To choose the provider associated with this VRF:
- Click **Select**.
The Select Provider dialog box appears.
 - From the list of providers, choose the appropriate provider, then click **Select**.
The Create VRF window reappears.
- This attribute is required.
- Step 6 Description:** Enter a description of the VRF, if desired.
No validation is done on the description entered.
- Step 7 CE Routing Communities:** To select a CE routing community (CERC) for this VRF:
- Click **Select**.
The Select CE Routing Communities dialog box appears.
 - From the list of CERCs, choose the appropriate CERC, then click **Select**.
Only one CERC is allowed per VRF. The Create VRF window reappears.
- This attribute is required.
- Step 8 Import RT List:** Enter one or more Route Targets (RTs) to be imported in the VRF.
For multiple RTs, use a comma (,) separated list. An example RT list is 100:120,100:130,100:140.
- Step 9 Export RT List:** Enter one or more Route Targets (RTs) to be exported from the VRF.
For multiple RTs, use a comma (,) separated list.
- Step 10 Import Route Map:** Enter the name of a route map defined on the device.
ISC will validate this name while provisioning the VRF. If the route map is not defined, ISC will generate an error.
- Step 11 Export Route Map:** Enter the name of a route map defined on the device.
ISC will validate this name while provisioning the VRF. If the route map is not defined, ISC will generate an error.
- Step 12 Maximum Routes:** Specify the maximum number of routes that can be imported into the VRF.
This is an integer value from 1 to 4294967295 for IOS devices and from 32 to 2000000 for IOS XR devices.
- Step 13 Threshold:** Specify the threshold value, which defines a percentage, which, if exceeded, generates a warning message.
This is an integer value from 1 to 100. This attribute is mandatory for IOS devices and optional for IOS XR devices. Validations for specific device type will be done during service request creation.
- Step 14 RD:** Specify a RD (route distinguisher) manually, or check the **Autopick RD** check box to have ISC automatically choose an RD from the Route Distinguisher pool (if one has been set up).
This attribute is required.
- Step 15 Enable Multicast:** Check this check box to enable multicast VRF.
The multicast attributes below this check box are enabled for use. For details on how to set the multicast attributes, see [Creating an IP Multicast VPN, page 2-26](#), starting with Step 2 in the procedure.



Note Multicast VRF deployments are supported only for IPv4 deployments. CERC is mandatory if multicast is enabled.



Note For the MDT MTU attribute: The range for IOS devices is from 576 to 18010. The range for IOS XR devices is from 1401 to 65535. Validations for specific device type will be done during service request creation.

Step 16 When you are satisfied with the settings for this VRF object, click **Save**.

ISC creates a new VRF object based the attributes selected. The VRF Management window appears. The new VRF is listed in the VRF Name column of the window.

Copying a VRF Object

You can use an existing VRF object as the basis for a new one. You do this by copying a VRF object, renaming the copy, and (optionally) modifying its attributes.

To copy an existing VRF object, perform the following steps.

Step 1 Choose **Service Inventory > Inventory and Connection Manager > VRF management**.

The VRF Management window appears, as shown in [Figure 3-3](#).

Figure 3-3 VRF Management Window

The screenshot shows the VRF Management window with the following details:

- Search bar: Show VRF with matching
- Table:

#	VRF Name	Provider
1. <input type="checkbox"/>	VRF_1	Provider1
2. <input type="checkbox"/>	VRF_2	Provider1
- Footer: Rows per page: Go to page: of 1
- Buttons:



Note The example assumes that a VRF object has already been created. See [Creating a New VRF Object, page 3-2](#) for information on how to create a VRF object.

Step 2 Select an existing VRF object (for example, VRF_1) by checking the check box for the VRF object.

When you select a VRF object, the Edit, Copy, and Delete buttons become active, as shown in [Figure 3-4](#).

Figure 3-4 VRF Object Selected in the VRF Management Window

VRF Management

Show VRF with VRF Name matching * Find

Showing 1 - 2 of 2 records

#	<input type="checkbox"/>	VRF Name	Provider
1.	<input checked="" type="checkbox"/>	VRF_1	Provider1
2.	<input type="checkbox"/>	VRF_2	Provider1

Rows per page: 10 Go to page: 1 of 1 Go

Create Edit Copy Delete

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Step 3 To copy the VRF object, click the **Copy** button.

The Create VRF window appears. The attribute fields are populated with values from the VRF object being copied.

Step 4 Provide a name for the new VRF object by changing the name in the **Name** field.

Step 5 Edit other attributes in the Create VRF window as desired.



Note The copy VRF function copies all attributes of the parent except the route distinguisher (RD), Default MDT Address, and Data MDT Subnet. The RD is always set to auto pick (the Autopick RD check box is checked by default). If auto pick is set for the parent VRF, it will be carried to the VRF object created by the copy function.

Step 6 When you are finished with the edits, click the **Save** button.

The VRF Management window appears, with the new VRF object (VRF_3) displayed, as shown in Figure 3-5.

Figure 3-5 New VRF Object Displayed in the VRF Management Window

VRF Management

Show VRF with VRF Name matching * Find

Showing 1 - 3 of 3 records

#	<input type="checkbox"/>	VRF Name	Provider
1.	<input type="checkbox"/>	VRF_1	Provider1
2.	<input type="checkbox"/>	VRF_2	Provider1
3.	<input type="checkbox"/>	VRF_3	Provider1

Rows per page: 10 Go to page: 1 of 1 Go

Create Edit Copy Delete

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Step 7 The VRF object copy operation is complete.

Searching for VRF Objects in the ISC Repository

All VRF objects are stored in the ISC repository. You can display these by accessing the VRF Management window at **Service Inventory > Inventory and Connection Manager > VRFs** in the ISC GUI. You can search for VRF objects using the **Show VRF with** drop-down list together with the **matching** field. The **Show VRF with** drop-down list enables you to display VRF objects by searching for these attributes:

- VRF Name
- Provider
- Route Distinguisher
- Route Target
- CERC



Note

The search is case insensitive, and wildcard (*) searches are supported.

Modifying Non-Deployed VRF Objects

VRF objects can be modified individually (single VRF edit) or in batch mode (multi-VRF edit). This section covers the basic steps for modifying VRF objects which have not yet been deployed via a VRF service request or associated with MPLS VPN links. There are some special considerations when modifying VRFs which have been deployed, as described in [Modifying Deployed VRF Objects, page 3-10](#).

Single-VRF Edit Mode

To edit one VRF object, perform the following steps.

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- Step 1** Choose **Service Inventory > Inventory and Connection Manager > VRF management** to list the VRF objects in the ISC repository.
The VRF Management window appears.
 - Step 2** Select the VRF you want to edit and click the **Edit** button.
The VRF Edit window appears. This window is similar to the Create VRF window shown in [Figure 3-2](#).
 - Step 3** Update any attributes you want to edit.
 - Step 4** Click **Save** to save the edits.
-

Multi-VRF Edit Mode

The multi-VRF edit feature allows you to modify common attributes on more than one VRF. For example, multi-VRF edit is useful for adding and/or removing route targets on multiple VRFs.

To edit multiple VRF objects simultaneously, perform the following steps.

Step 1 Choose **Service Inventory > Inventory and Connection Manager > VRF management** to list the VRF objects in the ISC repository.

The VRF Management window appears.

Step 2 Select the VRFs you want to edit and click the **Edit** button.

The Edit VRFs window appears, as shown in [Figure 3-6](#).

Figure 3-6 Edit VRFs

The screenshot shows the 'Edit VRFs' configuration window. It is divided into several sections:

- VRF'S Affecting:** A row for 'VRF Details' containing 'VRF_1 ,VRF_2' and a blue 'Attributes' link.
- Route Attributes:**
 - Two columns: 'Import Targets' and 'Export Targets'.
 - 'Add' and 'Remove' buttons for each column.
 - 'Provider:' field with 'Provider1' entered.
 - 'CE Routing Communities:' field with a 'Select' button.
 - 'Import Route Map:' and 'Export Route Map:' fields.
- Multicast Attributes:**
 - 'Enable Multicast:' checkbox (unchecked).
 - 'Data MDT Size:' dropdown menu (set to 0).
 - 'Data MDT Threshold:' input field with '(1 - 4294967 kilobits/sec)' range.
 - 'Default PIM Mode:' dropdown menu (set to SPARSE_DENSE_MODE).
 - 'MDT MTU:' input field with '(576 - 65535)' range.
 - 'Enable PIM SSM:' checkbox (unchecked) with a 'DEFAULT' dropdown.
 - 'SSM List Name:' input field.
 - 'Multicast Route Limit:' input field with '(1 - 2147483647)' range.
 - 'Enable Auto RP Listener:' checkbox (unchecked).

'Save' and 'Cancel' buttons are located at the bottom right of the window.

The Edit VRFs window is similar to the Create VRF and Edit VRF windows. However, there is an additional field, **VRF Details**, and the format of the RT import/export fields are laid out differently. Also, some attributes are not available for editing in multi-VRF edit mode.

Step 3 To see details of the VRFs being edited, click the **Attributes** link in the VRF Details row.

The VRF Details window appears. This lists the VRFs being edited and displays the following attributes for each VRF:

- Name
- Provider
- CERC
- Import Route Map

- Export Route Map
- Import Route Target
- Export Route Target
- MultiCast

Step 4 To add or remove import or export route maps, enter the desired values in the provided fields. You can enter more than one RT in each field. For multiple RTs, use a comma (,) separated list.

Step 5 Update the **CE Routing Communities**, **Import Route Map**, **Export Route Map**, and **Multicast Attributes** settings as desired.



Note The **Provider** attribute cannot be edited in multi-VRF editing mode.

Step 6 To save the edits, click **Save**.

Modifying Deployed VRF Objects

After a VRF object is deployed on a PE device through a VRF service request (see [Deploying VRF Service Requests, page 3-14](#)), there are some special considerations to be aware of when modifying the VRF object.

- The VRF object might have been associated with multiple links and/or VRF service requests.
- Unlike traditional VPN objects, you can modify a VRF object even if it is referenced by multiple VRF service requests.
- The **VRF Name**, **Provider**, and **RD** attributes cannot be changed after the VRF object is deployed.



Note The **RD** attribute can be modified if the VRF service request is deployed on a PE device running IOS 12.0 (32) SY or greater.

To modify a deployed VRF object, perform the following steps.

Step 1 When you attempt to modify a deployed VRF object, the Affected Jobs window appears, as shown in [Figure 3-7](#).

Figure 3-7 Affected Jobs Window

Job ID	SR ID	Link ID	VRF	Description
15	17	11	VRF_1	

Showing 1 - 1 of 2 records

Rows per page: 10

Go to page: 1 of 1

Save Save and Deploy Cancel

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The window displays the affected VRF service requests associated with the VRF object being modified. The Job ID, SR ID, Link ID, VRF Name, and Description information for each VRF service request are listed.

- Step 2** To display more details about a VRF service request, click the **Job ID** link.
The Service Request Details window appears.
- Step 3** Verify the service request details, if desired.
- Step 4** Perform one of the following actions:
- Click **Save** to save the VRF object and move all of the affected VRF service requests to the REQUESTED state.
 - Click **Save and Deploy** to save the VRF object, move all of the affected VRF service requests to the REQUESTED state, and schedule an immediate deployment for all of the VRF service requests.
 - Click **Cancel** to cancel the operation and return to the Edit VRFs window.
-

Deleting VRF Objects

To delete VRF objects from the ISC repository, perform the following steps.



Note There are some prerequisite steps you must perform if the VRF object or objects are still in use by a VRF service request, as mentioned in the notes following the procedure.

- Step 1** Click the **Service Inventory** tab.
- Step 2** Choose **Inventory and Connection Manager**.
The Inventory and Connection Manager window appears.
- Step 3** From the Inventory and Connection Manager, choose **VRF management**.
The VRF Management window appears.
- Step 4** Select the VRFs you want to delete and click the **Delete** button.
The Delete VRF confirmation window appears.
- Step 5** Click **Delete** to confirm.
If the VRF objects are not in use, the selected VRF objects are deleted.
-

Deleting VRF Objects Associated with VRF Service Requests

A VRF object cannot be deleted if it is still associated with any VRF service request. If you attempt to do so, you receive a Delete VRF Failed message in the Status window. In this case you must first decommission, deploy, and purge all of the related VRF service requests before you can delete the VRFs object. Use the information provided in the error message to identify the VRF services requests and links related to the VRF object you are attempting to delete.

Working with VRF Service Requests

Saved VRF objects are deployed on a Provider Edge (PE) device through a special type of service request called a VRF service request. This section covers the following topics:

- [Overview of VRF Service Requests, page 3-12](#)
- [Defining VRF Service Requests, page 3-12](#)
- [Deploying VRF Service Requests, page 3-14](#)
- [Modifying VRF Service Requests, page 3-15](#)
- [Decommissioning and Deleting VRF Service Requests, page 3-15](#)
- [Searching for VRF Service Requests by VRF Object Name, page 3-16](#)
- [Viewing the Configlet Generated by a Deployed VRF Service Request, page 3-16](#)

Overview of VRF Service Requests

The VRF service request allows the VRF object to be configured on a router without having to select a physical interface. Each VRF service request consists of one or more links. Each link consists of the following elements:

- One VRF object
- One PE object
- One template (optional)

In addition, VRF service requests are associated to a customer.

**Note**

An important difference between regular MPLS service requests and VRF service requests is that there is no service policy required for a VRF service request. As a result, the VRF service request is not associated with a service policy.

The VRF service request states follow the normal ISC service request state transitions, as described in the [Service Request Transition States, page 6-1](#).

Defining VRF Service Requests

To define a VRF service request, perform the following steps.

Step 1 Choose **Service Inventory > Inventory and Connection Manager > Service Requests** to access the Service Requests window.

Step 2 Click the **Create** button and choose **VRF** from the drop-down list.

The Service Request Editor window appears, like the one shown in [Figure 3-8](#).

Figure 3-8 Service Request Editor Window



Note If necessary, click the **Add Link** button to create a row for setting the link information.

This window allows you to define the VRF service request by setting up one or more links, each consisting of a VRF object, PE device, and an optional template. You also specify the address scheme for each link (only if the PE is running IOS XR). You can deploy any number of links with any combination of PE devices and VRF objects. An important point to note is that no physical interface on the router needs to be selected.

To set up a link, continue with the steps in the procedure, as follows:

- Step 3** Set the customer for the VRF service request by clicking on the link beside the Customer attribute. The Select Customer window appears. Choose the desired customer and click the **Select** button. This attribute is optional.
- Step 4** Click the **Select VRF** link to choose a VRF object from the ISC repository. This brings up the Select Independent VRF window, like the one shown in [Figure 3-9](#).

Figure 3-9 Select Independent VRF Window

#	VRF Name	RD Value	Provider	CERC
1.	<input type="radio"/> VRF_1	100:3557	Provider1	Cerc1
2.	<input type="radio"/> VRF_2	100:3000	Provider1	Cerc2
3.	<input type="radio"/> VRF_3	100:3002	Provider1	Cerc1

- Step 5** Choose a VRF object by clicking on a radio button and clicking the **Select** button.

If desired, you can limit the VRF objects displayed by searching by VRF Name, Provider, Route Distinguisher, Route Target, or CERC using the **Show VRFs with** and **matching** fields.



Note For steps on how to add VRF objects to the ISC repository, see [Creating a New VRF Object, page 3-2](#).

Step 6 Click the **Select PE** link to choose a PE device for the link.

The Select PE Device window appears.

Step 7 Choose a PE by clicking on a radio button and clicking the **Select** button.

If desired, you can limit the PE devices displayed by using the **Show PEs with** and **matching** fields.

This step specifies the PE device on which to deploy the VRF object selected in Steps 4 and 5.



Note Because the VRF object and the PE device must belong to the same provider, ISC limits the list of PEs displayed to those with the same provider specified in the VRF object chosen for the link.

Step 8 Click the **Add Template** link to choose a template data file to be associated with the link.

The Add/Remove Templates window appears. This is a standard ISC window for selecting a data file and specifying operations such as append and prepend. For information on working with templates in ISC, see [Appendix B, “Working with Templates and Data Files.”](#) For specific information about using the Add/Remove Templates window, see [Using Templates and Data Files with Service Requests, page B-12](#).

Step 9 If the PE device you selected for the link is an IOS XR device, you must specify the address scheme by choosing the appropriate selection from the **Address Family** drop-down list for the link.

The choices are:

- IPv4
- IPv6
- IPv4 and IPv6

The IPv4 and IPv6 option causes the VRF object to be deployed with both IPv4 and IPv6 configurations.



Note For IOS devices, the Address Family attribute defaults to IPv4. No other choice is available.

Step 10 If you want to set up additional links for the VRF service request, click the **Add Link** button and repeat Steps 4 through 9 for each link.

Step 11 When you have completed setting up the link(s) for the VRF service request, click **Save** to save the VRF service request.

The Service Requests window appears and you see the VRF service request displayed with Job ID, State, Type and other attributes. The VRF service request is initially in the Requested state.

Step 12 To deploy a VRF service request, see [Deploying VRF Service Requests, page 3-14](#).

Deploying VRF Service Requests

To deploy a VRF service request, perform the following steps.

Step 1 In the Service Requests window, choose the VRF service request you want to deploy.

- Step 2** Click the **Deploy** button and choose **Deploy** from the drop-down list.
The Deploy Service Request task window appears.
- Step 3** Set the task parameters as desired and click the **Save** button.
To immediately start the deploy task, keep the defaults and click **Save**. The Service Request window reappears and the VRF service request moves to the Deployed state.

For steps on how to check the status of the deployed VRF service request, refer to the information in [Deploying Service Requests, page 6-25](#) and [Monitoring Service Requests, page 6-27](#).

Modifying VRF Service Requests

To add links or modify existing link attributes for a VRF service request, perform the following steps.

- Step 1** Choose **Service Inventory > Inventory and Connection Manager > Service Requests** to access the Service Requests window.
- Step 2** Choose the VRF service request in the Service Requests window and click **Edit**.
The VRF Service Request Editor window appears.
- Step 3** Modify the VRF service request attributes as desired.



Note You can only modify VRF service request links that are not associated with any MPLS VPN links. When you attempt to modify any VRF service request link that is associated with an MPLS VPN link, ISC generates an error while saving the VRF service request.

- Step 4** Click **Save** to save your edits.

Decommissioning and Deleting VRF Service Requests

VRF service requests are decommissioned and deleted like other ISC service requests.



Note Decommissioning a VRF service request is not allowed if any of the links in the VRF service request with a VRF object referred in MPLS service request exists.

To decommission a VRF service request, perform the following steps.

- Step 1** Choose **Service Inventory > Inventory and Connection Manager > Service Requests** to access the Service Requests window.
- Step 2** Choose the VRF service request in the Service Requests window and click the **Decommission** button.
The Confirm Request window appears.

- Step 3** Click **OK** to confirm.
- The Service Request window appears, showing the VRF service request with a DELETE operation type.
- Step 4** Deploy the service request with the DELETE operation type, to ensure the successful decommission of the service request.
-

Searching for VRF Service Requests by VRF Object Name

To search for and display VRF service requests in the ISC repository by VRF object name, perform the following steps.

- Step 1** Choose **Service Inventory > Inventory and Connection Manager > Service Requests** to access the Service Requests window.
- Step 2** Choose **VRF Object Name** in the **Show Services with** drop-down list.
- Step 3** Set the **matching** and **of Type** fields as desired.
- To search only VRF service requests, choose **VRF** in the **of Type** field.
- Step 4** Click **Find** to search for service requests with the associated VRF object name you specified.
-

Viewing the Configlet Generated by a Deployed VRF Service Request

To view the configlet generated by a deployed VRF service request, perform the following steps.

- Step 1** Choose **Service Inventory > Inventory and Connection Manager > Service Requests** to view the available service requests.
- Step 2** Check the appropriate check box to select the VRF service request for which you want to view the associated configlets.
- Step 3** Click the **Details** button.
- The Service Request Details window appears.
- Step 4** Click the **Configlets** button.
- The Service Request Configlets window appears. This window displays a list of devices for which configlets have been generated.
- Step 5** To view configlets that were generated for a device, select a device and click the **View Configlet** button.
- By default, the latest generated configlet is displayed.



Note If the configlet is deployed on an IOS XR device, you have the option of displaying the configlet in XML or CLI formats or both. For more details on this behavior, see [Viewing Configlets on IOS XR Devices, page 6-32](#).

- Step 6** If applicable, you can display configlets for a device based on the time of creation. Choose the desired time of creation in the Create Time list to display a specific configlet based on the time the configlet was generated for the service request.

Step 7 Click **OK** when you are finished viewing the VRF configlet data.

Using VRFs with MPLS VPN Service Requests and Policies

VRF objects which have been deployed can be used within MPLS VPN service requests and service policies. This section covers the following topics:

- [Relationship of VRF Object and Service Requests and PE Device](#), page 3-17
- [Specifying VRF Objects within MPLS VPN Service Requests](#), page 3-17
- [Searching for MPLS VPN Service Requests by VRF Object Name](#), page 3-22
- [Searching for MPLS VPN Service Requests by VRF Object Name](#), page 3-22
- [Specifying VRF Objects within MPLS VPN Service Policies](#), page 3-22



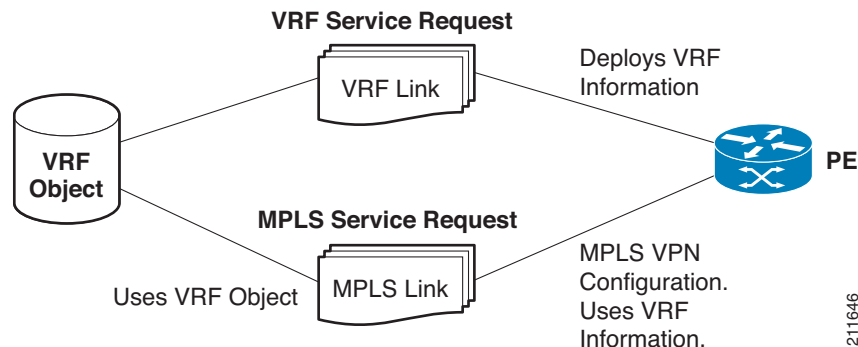
Note

Independent VRF association is not supported for MVRFCE-based policies and service requests.

Relationship of VRF Object and Service Requests and PE Device

Figure 3-10 shows the relationships between the VRF object, MPLS service request, VRF service request, and the PE device. Refer to this figure to understand concepts discussed in the procedures that follow.

Figure 3-10 VRF Object, VRF Service Request, MPLS VPN Service Request, and PE



Specifying VRF Objects within MPLS VPN Service Requests

VRF objects can be selected during the creation of the MPLS VPN service request at the time when the VRF and VPN attributes are set. At that stage, you can either set the VPN attributes individually (as in previous releases of ISC) or else use an existing VRF object. In the latter case, the MPLS VPN link “inherits” the VPN and VRF data from the VRF object. The VRF object might be either undeployed or

deployed. If the VRF object is not deployed, ISC will deploy it automatically. For additional information about the function of VRF objects with MPLS VPN service requests, see [Notes On Using a VRF Object in an MPLS Service Request, page 3-22](#).

To create an MPLS VPN service request using a VRF object, perform the following steps.

- Step 1** You must create or use an existing MPLS VPN service request and follow the workflow up to the point where you define the VRF and VPN attributes. This is done in the MPLS Link Editor – VRF and VPN window, as shown in [Figure 3-11](#).

Figure 3-11 MPLS Link Attribute Editor – VRF and VPN Window

MPLS Link Attribute Editor - VRF and VPN

Attribute	Value
VRF Information	
Use VRF Object:	<input type="checkbox"/>
Export Map:	<input type="text"/>
Import Map:	<input type="text"/>
Maximum Routes:	<input type="text"/> (1-4294967295)
Maximum Route Threshold *:	80 (1-100)
VRF Description:	<input type="text"/>
BGP Multipath Load Sharing:	<input type="checkbox"/>
Allocate New Route Distinguisher:	<input type="checkbox"/>
VRF And RD Overwrite:	<input type="checkbox"/>
VPN Selection	
PE VPN Membership *:	<input type="text"/>
Select	Customer VPN Provider CERC Is Hub
<input type="button" value="Add"/> <input type="button" value="Delete"/>	

Note: * - Required Field

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Note If necessary, see the relevant sections of this guide for how to arrive at this window in the MPLS VPN service request workflow.

- Step 2** If you do not want to use a VRF object with this MPLS VPN link, leave **Use VRF Object** unchecked. In this case, set the attributes for the VPN, as normally done with MPLS service requests. These steps are covered in other sections of this guide.
- Step 3** To use a VRF object with the MPLS VPN link, check the **Use VRF Object** check box. All of the standard VPN and VRF attributes, except BGP Multipath Load Sharing, are hidden, and the VRF Object attribute appears, as shown in [Figure 3-12](#).

Figure 3-12 MPLS Link Attribute Editor – VRF and VPN Window (Use VRF Object Selected)

Attribute	Value
VRF Information	
Use VRF Object:	<input checked="" type="checkbox"/>
VRF Object *:	VRF_1 <input type="button" value="Select"/>
BGP Multipath Load Sharing:	<input type="checkbox"/>

Note: * - Required Field

- Step 4** To select a VRF object, click the **Select** button to the right of the VRF Object attribute. The Select Independent VRF window appears, as shown in [Figure 3-13](#).

Figure 3-13 Select Independent VRF Window

Show VRF Objects with matching

Showing 1 - 3 of 3 records

#	VRF Name	RD Value	Provider	CERC
1.	<input type="radio"/> VRF_1	100:3557	Provider1	Cerc1
2.	<input type="radio"/> VRF_2	100:3000	Provider1	Cerc2
3.	<input type="radio"/> VRF_3	100:3002	Provider1	Cerc1

Rows per page: Go to page: of 1

Unique RD

This Select Independent VRF window lists all of the VRF objects deployed on the PE, along with their RD value, provider and CERC information.

- Step 5** To enable the unique route distinguisher feature, check the **Unique RD** check box.



Note The Unique RD feature is restricted to one MPLS VPN link per MPLS service request. If you select the Unique RD option, it is advised that only one MPLS VPN link is present in that service request.

Be aware of the following use case scenarios when enabling the Unique RD feature:

- If the selected VRF is not deployed on any device, a VRF service request is created for the selected VRF and PE device.
- If the selected VRF is not deployed on the PE device but is deployed on a different PE device, a new VRF object is created (which is a copy of the selected VRF) and a VRF service request is created for the newly created VRF and the PE device.
- If the selected VRF is deployed only on the PE device, then nothing is done. In this case, uniqueness is automatic.
- If the selected VRF is deployed on the PE device and also on some other devices, then a new copy of the VRF object is created with an updated name and a VRF service request is created for the newly created VRF and the PE device.
- It is possible to have two VRFs with the same name but different RDs.

Step 6 Choose the desired VRF Object and click the **Select** button.



Note For information about how the selection of the VRF object is subsequently managed in ISC, see [Notes On Using a VRF Object in an MPLS Service Request, page 3-22](#), following this procedure.

Step 7 Click the **Select** button to confirm the selection of the VRF object and return to the MPLS Link Editor – VRF and VPN window.

Step 8 To set up BGP multipath load sharing, check the **BGP Multipath Load Sharing** check box. This activates additional attributes as shown in [Figure 3-14](#).

Figure 3-14 MPLS Link Attribute Editor – VRF and VPN Window (Multipath Attribute Selected)

Attribute	Value
VRF Information	
Use VRF Object:	<input checked="" type="checkbox"/>
VRF Object *:	VRF_1 <input type="button" value="Select"/>
BGP Multipath Load Sharing:	<input checked="" type="checkbox"/>
BGP Multipath Action	eBGP
Force Modify Shared Multipath Attributes	<input type="checkbox"/>
Maximum Paths ::	(1-32)
Import Paths:	(1-32)

Note: * - Required Field

For information on setting these attributes, see [BGP Multipath Load Sharing and Maximum Path Configuration, page 5-32](#).



Note Use the **Force Modify Shared Multipath Attributes** attribute to enable forced modification of the shared VRF attributes used by other links. This field is not persisted.

Step 9 Click the **Next** button, if you want to associate templates or data files to the service request.

The Template Association window appears. In this window, you can associate templates and data files with a device by clicking the **Add** button in Template/Data File column for the device. When you click the **Add** button, the Add/Remove Templates window appears. For instructions about associating templates with service requests and how to use the features in this window, see [Appendix B, “Working with Templates and Data Files.”](#) When you have completed setting up templates and data files for the service request, click **Finish** in the Template Association window to close it and return to the Service Request Editor window.

Step 10 If you did not add templates, click **Finish** in the MPLS Link Editor – VRF and VPN window. The MPLS Service Request Editor window appears.

Step 11 Click the **Save** button to complete the creation of the MPLS VPN service request using the VRF object. The Service Requests window appears showing that the service request is in the Requested state and ready to deploy.

Notes On Using a VRF Object in an MPLS Service Request

Be aware of the following considerations when using VRF objects with MPLS VPN service requests:

- If the selected VRF object is not deployed on the PE device, ISC creates a new VRF service request with the selected VRF object and PE device and deploys it as part of the current MPLS VPN service request deployment process.
- If the VRF object selected in the MPLS VPN service request is not deployed on the PE device but a VRF service request exists in the Requested state or any failed states, ISC will attempt to deploy the VRF service request as part of the MPLS VPN service request.
- When decommissioning an MPLS VPN service request for which VRF service requests were created, ISC will not delete the VRF service requests automatically. The user must decommission and deploy such VRF service requests in order to delete the configuration from the device.
- When VRF configuration is selected, no VRF-related information will be provisioned on the device. The VRF name will be used in all the MPLS VPN configuration commands, such as `ip vrf forwarding` on interface, address family configuration in BGP, OSPF, EIGRP, and so on.

Searching for MPLS VPN Service Requests by VRF Object Name

To search for and display VRF service requests in the ISC repository by VRF object name, perform the following steps.

-
- Step 1** Choose **Service Inventory > Inventory and Connection Manager > Service Requests** to access the Service Requests window.
- Step 2** Choose **VRF Object Name** in the **Show Services with** drop-down list.
- Step 3** Set the **matching** and **of Type** fields as desired.
To search only MPLS VPN service requests, choose **MPLS VPN** in the **of Type** field.
- Step 4** Click the **Find** button to search for MPLS VPN service requests with the associated VRF object name you specified.
-

Specifying VRF Objects within MPLS VPN Service Policies

VRF object selection is supported while defining MPLS VPN policies. This is done during the MPLS VPN policy workflow in the MPLS Policy Editor – VRF and VPN Membership window, as shown in [Figure 3-15](#).

Figure 3-15 MPLS Policy Editor – VRF and VPN Window

MPLS Policy Editor - VRF and VPN Membership

Attribute	Value	Editable			
VRF Information					
Use VRF Object:	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Export Map:	<input type="text"/>	<input checked="" type="checkbox"/>			
Import Map:	<input type="text"/>	<input checked="" type="checkbox"/>			
Maximum Routes:	567 (1-4294967295)	<input checked="" type="checkbox"/>			
Maximum Route Threshold:	80 (1-100)	<input checked="" type="checkbox"/>			
VRF Description:	<input type="text"/>	<input checked="" type="checkbox"/>			
BGP Multipath Load Sharing:	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Allocate New Route Distinguisher:	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
VRF And RD Overwrite:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
VRF Name:	odVrf3	<input checked="" type="checkbox"/>			
RD Value:	100:45	<input checked="" type="checkbox"/>			
VPN Selection					
PE VPN Membership:		<input checked="" type="checkbox"/>			
Select	Customer	VPN	Provider	CERC	Is Hub
<input type="checkbox"/>	Customer1	Mpls-VPN-1	Provider1	Mpls-VPN-1	<input type="checkbox"/>
Add					Delete

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The procedure for using the VRF Object attribute is similar to what is covered in [Specifying VRF Objects within MPLS VPN Service Requests, page 3-17](#). See that section for details on using these attributes.

If you select a VRF object for the MPLS policy, it will subsequently be used by MPLS VPN service requests that use that policy. As per standard ISC policy usage, you can check the **Editable** check box next to the VRF Object attribute to ensure that service requests based on the policy use the same VRF object specified in the policy.



Note

If you are not using the independent VRF object feature for the policy, then you must set the VRF and VPN attributes available in the MPLS Policy Editor – VRF and VPN Membership window. See [Defining VRF and VPN Information, page 5-29](#), for more information.

Migrating Existing MPLS VPN Service Requests to the VRF Object Model

ISC provides a migration script to migrate traditional MPLS VPN service requests to the independent VRF model. The script takes as input one or more MPLS VPN service request ID numbers and creates appropriate VRF objects and VRF service requests for each service request. The script is located in the \$ISC_HOME/bin directory. The script and its syntax is as follows:

```
runMplsSRMigration srid1 [srid2] [srid3] ...
```

Where *srid1* is the first MPLS VPN service request ID, [*srid2*] is the second service request, and so on.

ISC performs the following tasks for each MPLS VPN service request passed to the script:

- Creates a VRF object based on the VPN and VRF attributes defined for the service request.
- Copies all the VPN properties to the VRF object.
- Creates a VRF service request, with the VRF object and PE selected in the MPLS VPN link.
- Modifies the MPLS VPN link to point to the VRF object.
- Runs a configuration audit on the VRF service request and the MPLS service request to ensure the correctness of the migration.