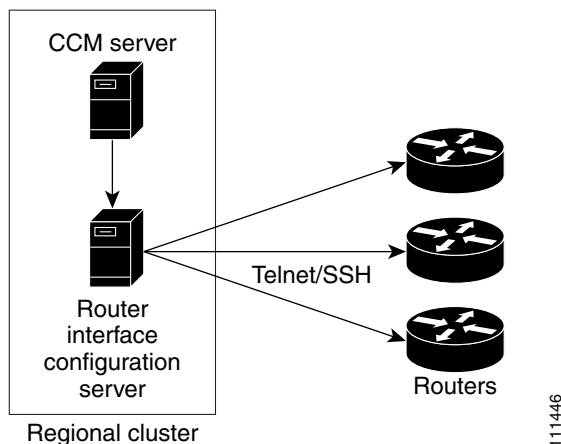




Managing Router Interface Configurations

The regional Router Interface Configuration (RIC) server is used to manage router interfaces on Cisco Systems Universal Broadband Routers (uBRs) that manage cable modem termination systems (CMTSs). This module interacts with the CMTS servers to push the required cable modem configuration to edge devices, such as routers and switches (see [Figure 10-1](#)). The RIC server module is accessible only if you entered the router license, and by administrators assigned the `ric-management` subrole of the `cfg-admin` or `central-cfg-admin` role.

Figure 10-1 Router Interface Configuration (RIC) Server Module



Tip

Add routers before you add any other subnets. This prevents the subnets that the router creates from possibly overlapping with those explicitly added, and prevents router synchronization errors later on.

The view of the routers is available on the View Tree of Routers page. The tree levels are the routers, their router interfaces, and any child interfaces. Parent/child relationships can be either physical/virtual (as in `Cable2/0` and `Cable2/0.1`) or primary/secondary (as in router interface bundling, where the bundle is identified by one of the interfaces; see the [“Bundling Interfaces”](#) section on page 10-4). This listing of router interfaces is available only once you create routers in the system and synchronize with them.

Adding Routers

The routers that the RIC server manages can be Cisco Universal Broadband Routers in the family uBR72xx and uBR10xxx.

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- Step 1** In the Web UI, to add a router, click **Routers**, then **Router List**. This opens the List Routers page.
- Step 2** Click **Add Router**. This opens the Add Router page (see [Figure 4-17 on page 4-27](#)).
- Step 3** You can set a router to managed or virtual (see the [“Managed Versus Virtual Routers” section on page 10-2](#)). If the router is managed, you must enter its type and IP address. The selections for the Type field are **Ubr72xx** or **Ubr10k**. If managed, you also need to check with the router administrator about the username, password, and enable password, and enter these values.
- Step 4** Click **Add Router**.

In the CLI, add a router using **router name create**. For example:

```
nrcmd> router router-1 create 192.168.121.121
```

Managed Versus Virtual Routers

Managed routers are updated in the database as well as being physically updated and synchronized. When you edit a managed router in the Web UI or CLI, the router is also automatically updated and synchronized with the newest data.

Virtual routers are updated in the Network Registrar database only. However, you can create, push, and reclaim subnets for a virtual router. You might define a virtual router when the RIC server cannot directly manage the router, but the virtual router should still be considered part of the topology.

You define a virtual router by omitting the router type or connection credentials on the Add Router page (see [Figure 4-17 on page 4-27](#)) or Edit Router page.

Secure Mode Connections with Routers

To enable secure communication between the RIC server and the routers, you must have the Cisco CNS Network Registrar Communications Security Option Release 1.1 installed. By default, secure connectivity is disabled and accessible over Telnet. However, you can specify whether you require or desire a Secure Shell (SSH) connection. Use the *use-ssh* attribute in the (expandable) Reserved attributes section of the Edit Router page in the Web UI. This attribute has the following values:

- disabled (default)—Uses simple Telnet for the connection.
- required—The router communicates with the edge device using SSH only, and not Telnet.
- desired—The router tries to communicate using SSH, but if it cannot, it uses Telnet.



Note

The SSH server should be set up so that the key length (modulus) is at least 1024 bits, using, for example, the command **crypto key generate rsa general-keys modulus 1024**.

Alternative Login Method to Routers

There are two types of login mechanisms provided in the RIC server that you can affect using the *login-template* attribute on the Add Router page:

- **Discovery mode**—The default mechanism, designed to understand login prompts on edge devices and respond to those dynamically. It does not force a particular login sequence, but supports the various login sequences and login prompts most customers use with these default prompts:

```
Username prompt - Username:
Password prompt - Password:
Login-prompt - >
Enable password prompt - Password:
Enable prompt - #
```

- **Template mode**—Use this in case the RIC server cannot log in using the discovery mechanism for some reason, such as nonstandard prompts or a login sequence that the discovery mechanism does not understand. The *login-template* is the name of an optional login template to use to further customize the RIC server's login and enable interactive sessions. To create this template you must:
 1. In the API, create an ScpObj of class CCMRouterLoginTemplate.
 2. Add the object to the database using the RICAdminSession.addRouterLoginTemplate method.
 3. Enter the name of the added template (CCMRouterLoginTemplate.name) as the value of the *login-template*.


Editing Routers

To edit a router, click its name on the View Tree of Routers page or List Routers page. The Edit Router page is essentially the same as the Add Router page, except for an additional attribute unset function. Make your changes, then click **Modify Router**.

In the CLI, edit a router attribute using **router name set attribute**. For example:

```
nrcmd> router router-1 set owner=owner-1
```


Resynchronizing Routers

As soon as you add the router to the regional cluster, it is synchronized over the network. You can also explicitly resynchronize the router if you know that changes occurred. On the List Routers page, click the Resynchronize icon () next to the router name. If the synchronization could not occur or timed out, you get an error message to that effect.

Pushing and Reclaiming Subnets for Routers

You can push subnets to, and reclaim subnets from, a router interface (see the [“Reclaiming Subnets” section on page 8-9](#)). When you push or reclaim a subnet with a managed or virtual router, all primary and secondary relationships that are set for the router are also set for the related subnets and scopes.

Viewing and Editing the Router Interfaces

If you click the Interface icon () associated with the router on the List Routers page, the list of related cable or Ethernet interfaces appears on the List Router Interfaces page. Both from this page and the View Tree of Routers page, you can click the interface name to edit it. The List Router Interfaces page includes an additional attribute unset function and the ability to delete the interface. You can add, edit, or delete interfaces for virtual routers without restrictions. There are restricted attributes for managed routers, described in the “[Changeable Router Interface Attributes](#)” section on page 10-4.

In the CLI, edit a router interface attribute using **router-interface** *name* **set** *attribute*. For example:

```
nrcmd> router-interface Ethernet1/0 set ip-helper=192.168.121.122
```

Changeable Router Interface Attributes

Editing the router interface opens the Edit Router Interface page. You cannot change the name, state, or MAC address of the interface on this page. However, you can change the following attributes:

- Description
- Address of the primary subnet address on the interface
- Addresses of the secondary subnets on the interface
- Address of any IP helper (DHCP relay agent) for the interface
- Address of any cable helper of the DHCP server to accept unicast packets for the interface

Bundling Interfaces

An interface bundle provides load balancing among the router interfaces. When you define a bundle, all the participating interfaces in the bundle must have the same bundle identifier (ID), which is the name of the interface specified as the master.

If you want to use bundling, the following attributes are in the Interface Bundling Settings section of the Edit Router Interface page, or set them using the **router-interface** command in the CLI:

- *bundle-id*—Interface bundle identifier, the name of the master interface. All participating interfaces in the bundle must have the same bundle ID.
- *is-master*—This interface is the master interface in the bundle.
- *is-virtual*—This interface is a virtual interface in the bundle.