Provisioning Devices Using Admin UI

This chapter describes how to configure devices using the Prime Cable Provisioning Admin UI. Use the Devices menu to provision and manage various devices. You can:

- Search for a specific device or for a group of devices that share criteria that you specify. See Searching for Devices, page 18-1.
- Add, modify, or delete devices in the RDU database. See:
  - Adding Device Records, page 18-9
  - Deleting Devices, page 18-10
  - Deleting Devices, page 18-10
- View device data, such as configuration, and properties. See Viewing Device Details, page 18-4.
- Regenerate device configurations. See Regenerating Device Configurations, page 18-10.
- Relate and unrelate any device to a specific group. See Relating and Unrelating Devices, page 18-11.
- Reset, or reboot, a device. See Resetting Devices, page 18-12.

Device Management

The Manage Devices page appears when you click the **Devices** tab on the primary navigation bar. You can also click the Devices link on the Main Menu to get to the Manage Devices page.

Searching for Devices

Using Prime Cable Provisioning, you can search for device information in a number of ways.

To select the search type, from the Manage Devices page, click the Search Type drop-down list. Subsequent search pages contain screen components that may be unique to the search type that you selected.

The Manage Devices page uses two separate but related areas to generate search results that allow you to manage the devices in your network. These areas are the:

- Search Type drop-down list, which defines which search to perform.
- An additional value field, which qualifies the search type that you selected. These fields include IP Address, MAC Address or MAC Address wildcard, Group Name (Group Type), and Owner ID.

Some searches that you can perform allow the use of a wildcard character (*) to enhance the search function. Prime Cable Provisioning provides specific wildcards for each search, as described in Table 18-1.

Note We do not recommend using the wildcard search (*) in systems that support hundreds of thousands, or more, devices. Such a search can return thousands of results, and use extensive system resources so as to impact performance.

Table 18-1 Searches Supported for Device Management

Menu Search	Search Type Option
DUID Search	Searches using the DHCP Unique Identifier (DUID) of a device in an IPv6 environment. The accepted format for a DUID is a two-octet type code represented in network byte order, followed by a variable number of octets that make up the identifier; for example, 00:03:00:01:02:03:04:05:07:a0. See Troubleshooting Devices by Device ID, page 26-2, for information on how you can effectively use this search criteria.
FQDN Search	Searches by using the fully qualified domain name (FQDN) associated with the device that is assigned by the DNS Server. This search is especially useful when the device MAC address is unknown. For example, **www.myhost.example.com** is a fully qualified domain name. Where **myhost** identifies the host, **example** identifies the second-level domain, and **.com** identifies the third-level domain. To search for a device with the FQDN IGW-1234.EXAMPLE.COM, you can try: • *.example.com • *.com • *
IP Address Search	Searches by returning all devices on the network that currently have the specified DHCP leased IP address. Wildcard searches are not supported. You must enter the complete IP address. For example, to search for a device with the IP address 10.10.10.10, you must enter 10.10.10.10.
MAC Address Search	Searches by using the precise MAC address for a specific modem or all devices with a specific vendor-prefix that unambiguously identifies the equipment vendor. The vendor-prefix is the first three octets of the MAC address. For example, for MAC address 1,6,aa:bb:cc:dd:ee:ff, the vendor-prefix is “aa:bb:cc”. Therefore, if you perform a MAC address search, you can identify the manufacturer and the type of device. See Troubleshooting Devices by Device ID, page 26-2, for information on how you can effectively use this search criteria.
Group Search	Searches devices that are part of a particular group or group type.

Table 18-1 Searches Supported for Device Management (continued)

Menu Search	Search Type Option
Owner ID Search	Searches by using the owner ID associated with the device. The owner ID may identify the service subscriber's account number, for example. This search function does not support wildcard searching. You must enter the complete owner ID. For example, to search for a device with the owner ID 100000000000xxxxx, you must enter 100000000000xxxxx.
Provisioning Group Search	Searches by using the provisioning group to which the device belongs.
Registered Class of Service Search	Searches by using the Class of Service that a device has been provisioned with.
Registered DHCP Criteria Search	Searches for devices that belong to certain DHCP Criteria.
Related Class of Service Search	Searches by using both the registered and selected Class of Service.
Related DHCP Criteria Search	Searches using both the registered and selected DHCP Criteria.
Selected Class of Service Search	Searches by using the Class of Service selected by the RDU for a device that, for one reason or another, cannot retain its registered Class of Service.
Selected DHCP Criteria Search	Searches using the DHCP Criteria selected by the RDU for a device that, for one reason or another, cannot retain its registered DHCP Criteria.

Note Normally, the Related and Selected Class of Service and the Related and Selected DHCP Criteria are identical. If they are not, you should investigate and modify the Selected Class of Service/DHCP Criteria to match the Related Class of Service/DHCP Criteria.

A Page Size drop-down list on the Manage Devices page lets you limit the number of search results that display per page. You can select 25, 50, or 75 results for display. If the number of results returned for a search exceeds the number selected, a screen prompt appears at the lower left corner of the page. These controls let you scroll backward or forward one page at a time, or to select a specific page.

A maximum of 1,000 results are returned for any query, with a maximum of 75 results appearing per page. To change the default maximum:

1. Change the */adminui/maxReturned* property in the *BPR_HOME/rdu/conf/adminui.properties* file.
2. Restart the Prime Cable Provisioning Tomcat process for the administrator user interface:

```
# /etc/init.d/bprAgent restart tomcat
```

Searching for devices returns results under the following headings or links that appear on the page:

- Identifier—Identifies all devices matching the search criteria. Each of the identifiers that appear links to another page from which you can modify the device.
- Device Type—Displays the available device types. Available selections include:
  - CableHome MAN-Data

  - CableHome MAN-WAN
  - DOCSIS Modem
  - Computer
  - PacketCable Multimedia Terminal Adapter (MTA)
  - Set-top box (STB)
- Status—Identifies whether or not the device is provisioned. A provisioned device is one that has been registered using the application programming interface (API), or the administrator user interface, and has booted on the network.
- Details—Displays all available details for the selected device. For additional information, see Viewing Device Details, page 18-4.

Viewing Device Details

You can view the details of any device identified in the search results. To view any device details, select the device and click **Details**.

Note The information that appears in the View Device Details page largely depends on the type of device you choose. The sample fields listed in Table 18-2 identify the details that typically appear for most devices.

Table 18-2 View Device Details Page

Field or Button	Description
Device Details	
Device Type	Identifies the device type; for example, a DOCSIS modem.
MAC Address	Identifies the MAC address of the device.
DUID	Identifies the DUID of the device.
FQDN	Identifies the fully qualified domain name (FQDN) for the device; for example, IGW-1234.EXAMPLE.COM.
Host Name	Identifies the host. For example, in the FQDN description above, IGW-1234 is the hostname.
Domain Name	Identifies the domain within which the host resides. For example, in the FQDN description above, EXAMPLE.COM is the domain name.
OID	Specifies the Object Identifier, which is the value that identifies a specific SNMP Object in the MIB database.
Revision Number	Identifies the OID revision numbers that are validated before processing.
Behind Device	Identifies the device that is behind this device.
Provisioning Group	Identifies the provisioning group to which the device has been pre-assigned or assigned automatically. This is an active link that, if clicked, displays the Provisioning Group Details page.

Table 18-2 View Device Details Page (continued)

Field or Button	Description
Registered DHCP Criteria	Identifies the DHCP Criteria used. Except in the case of the default DHCP Criteria, this is an active link that, if clicked, displays the appropriate Modify DHCP Criteria page. If you select the default DHCP Criteria, the DHCP Criteria that is configured as the default on the Systems Defaults page is applied.
Security Domain	Identifies the RBAC domain assigned to an entity (such as Device, CoS, DHCP Criteria), in case Instance Level Access control is enabled.
Device Properties	Identifies any properties, other than those that appear on this page, that can be set for this device. This field includes the display of custom properties.
Device Provisioned State	Specifies if the device is provisioned. A device is provisioned only when it is registered and has booted on the network.
Device Registered State	Identifies if the device is registered.
Client Identifier	Identifies the client identification used by the device in its DHCP messages.
Client Request Host Name	Identifies the hostname that the client requests in its DHCP messages.
Registered Class of Service	Identifies the Class of Service assigned to the device. This is an active link that, if clicked, displays the appropriate Modify Class of Service page. If a different Class of Service has been selected for the device by extension, an additional field with Selected Class of Service appears.
Owner Identifier	Identifies the device. This may be a user ID or an account number; the field may also be blank.
Detected Properties	Identifies properties returned by the RDU device-detection extensions when configuration for the device is generated.
Selected Properties	Identifies properties returned by the RDU service-level selection extensions for the detected device type when the configuration for the device is generated.
Is Behind Required Device	Specifies “false” if the *DeviceDetailsKeys.IS_BEHIND_REQUIRED_DEVICE* property has been used to establish a required relay agent device and the service-level selection extension determines that this device did not boot behind the required relay agent.
Is In Required Provisioning Group	Specifies “false” if the *IPDeviceKeys.MUST_BE_IN_PROV_GROUP* property has been used to establish a required provisioning group and the service-level selection extensions determine that this device did not boot in the required provisioning group.

Table 18-2 View Device Details Page (continued)

Field or Button	Description
Selected Access	Identifies the access granted to the device by the service-level selection extensions: • REGISTERED—Indicates that the device was registered and met requirements for access. • PROMISCUOUS—Indicates that the device's provisioning will be based on policies assigned to its relay agent. • DEFAULT—Indicates that the device will be provisioned with default access for its device type. • OTHER—Not used by the default extensions built into Prime Cable Provisioning and is provided for use by custom extensions.
Selected Class of Service	Identifies the name of the Class of Service used to generate the configuration for the device. This is an active link that, if clicked, displays the appropriate Modify Class of Service page.
Selected DHCP Criteria	Identifies the name of the DHCP Criteria used to generate the configuration for the device. This is an active link that, if clicked, displays the appropriate Modify DHCP Criteria page.
Selected Explanation	Provides a textual description of why the service-level selection extensions selected the access they granted the device. For example, the device may have been granted default access because it did not boot in its required provisioning group.
Selected Reason	Identifies why the service-level selection extensions selected the access they granted the device as an enumeration code. The possible values are: • NOT_BEHIND_REQUIRED_DEVICE • NOT_IN_REQUIRED_PROV_GROUP • NOT_REGISTERED • OTHER • PROMISCUOUS_ACCESS_ENABLED • REGISTERED • RELAY_NOT_IN_REQUIRED_PROV_GROUP • RELAY_NOT_REGISTERED Most of these indicate violations of requirements for granting registered or promiscuous access, resulting in default access being granted.
Related Group Name (Group Type)	Identifies the groups to which this device is related. This is an active link that, if clicked, displays the appropriate Modify Group page. See Managing Groups, page 12-2.
DHCPv4 Information	
Note This section does not appear unless the device has discovered DHCPv4 data.	
DHCP Inform Dictionary	Identifies additional information that the Cisco Prime Network Registrar extensions send to the RDU when requesting the generation of a configuration. This is for internal Prime Cable Provisioning use only.

Table 18-2 View Device Details Page (continued)

Field or Button	Description
DHCP Request Dictionary	Identifies the DHCP Discover or DHCP Request packet details sent from the Network Registrar extensions to the RDU when requesting the generation of a configuration.
DHCP Response Dictionary	This field is for internal Prime Cable Provisioning use only; it should always be empty.
DHCP Environment Dictionary	This field is for internal Prime Cable Provisioning use only; it should always be empty.
Lease v4 Information	
Note This section does not appear unless the device has discovered Lease v4 data.	
IP Address	Identifies the IPv4 address of the device.
DHCP Lease Properties	Identifies the lease properties, along with an IPv4 update, that Network Registrar sends to the RDU.

Table 18-2 View Device Details Page (continued)

Field or Button	Description
DHCPv6 Information	
Note This section does not appear unless the device has discovered DHCPv6 data.	
DHCPv6 Inform Dictionary	Identifies additional information that the Cisco Prime Network Registrar extensions send to the RDU when requesting the generation of a configuration. This is for internal Prime Cable Provisioning use only.
DHCPv6 Request Dictionary	Identifies the DHCP Discover or DHCP Request packet details sent from the Network Registrar extensions to the RDU when requesting the generation of a configuration.
DHCPv6 Relay Request Dictionary	Identifies DHCP packet details sent from the Network Registrar extensions to the RDU when requesting the generation of a configuration. This data, however, is derived from the CMTS, and includes information on the CMTS, and the DOCSIS version that the CMTS uses.
DHCPv6 Response Dictionary	This field is for internal Prime Cable Provisioning use only; it should always be empty.
DHCPv6 Environment Dictionary	This field is for internal Prime Cable Provisioning use only; it should always be empty. But if you set a value for the Attributes from Environment Dictionary on the Network Registrar default (**Configuration > Defaults > NR Defaults**) page, that value appears here.
Lease v6 Information	
Note This section does not appear unless the device has discovered Lease v6 data.	
IP Address	Identifies the IPv6 address of the device.
DHCPv6 Lease Properties	Identifies the lease properties, along with an IPv6 update, that Network Registrar sends to the RDU.
Technology-Specific Information	
Note The technology-specific information identifies only data that is relevant for the technologies you are licensed to use.	
XGCP Ports	Identifies the ports on which the Gateway Control Protocol is active.
DOCSIS Version	Identifies the DOCSIS version currently in use.

Managing Devices

The Devices menu lets you add devices to the RDU database and update preprovisioned data. Device management includes:

- Adding, deleting, and modifying RDU devices records
- Regenerating configurations
- Relating devices to management objects, such as Provisioning Group, Class of Service, and Group.

This section describes how to perform various device management functions on new or existing devices. Several information fields appear consistently in all device management pages. These fields include:

- Device Type—When adding a device, this is a drop-down list that identifies the available device types you can create within Prime Cable Provisioning. Available selections, as they appear on screen, include:

  - CableHomeWanData
  - CableHomeWanMan
  - Computer
  - DOCSISModem
  - PacketCableMTA
  - STB

  When modifying a device, the device type cannot be edited or changed.

- MAC Address—Identifies the MAC address of the device.

  Enter the MAC address of the device being added in this field. When doing this, ensure that you enter the commas (,) and colons (:) appropriately. For example, 1,6,00:00:00:00:00:AE.

- DUID—Identifies the DUID of the device.

  Enter the DUID of the device being added in this field. When doing this, ensure that you enter the colons (:) appropriately. For example, 00:03:00:01:02:03:04:05:06:a0.

- Host Name—Identifies the device host. For example, from an FQDN of node.example.com, node is the hostname.
- Domain Name—Identifies the domain within which the host resides. For example, from an FQDN of node.example.com, example.com is the domain name.
- Owner Identifier—Identifies the device by using something other than the hostname. This may be a user ID, or an account number; for example, 1000000000000000000. You can also leave this field blank.
- Registered Class of Service—Specifies the Class of Service that the device is provisioned with; for example, the default option or a Class of Service that you defined.
- Registered DHCP Criteria—Specifies the DHCP Criteria that the device is provisioned with; for example, the default option or a DHCP Criteria that you defined.

Adding Device Records

To add a device record:

Step 1 From the Manage Devices page, click **Add.**

Step 2 Choose the device type from the options available in the drop-down list.

Step 3 Enter details for the other fields on the page, such as MAC address, DUID, and hostname.

Step 4 Choose the Class of Service, and the DHCP Criteria registered for the device.

Step 5 In addition to the values that you provided for the device earlier, you can optionally add new values for existing property name/value pairs.

- Property Name—Identifies the name of the custom or built-in device property.
- Property Value—Identifies the value of the property.

Step 6 Click **Submit**.

Deleting Devices

Deleting device records is a simple process, but one that you should use carefully. To undo the delete, you must restore a previously backed-up database or re-add the device. If restoration of a backed-up database becomes necessary, see Database Restore, page 5-6.

To delete a device record, locate the device that you want to delete and click **Delete**.

Regenerating Device Configurations

The **Regenerate** button or API operation forces immediate regeneration of configurations for a device that are sent to the DPEs in the device's provisioning group.

Normally, the process of regenerating the configuration is automatically triggered following changes to the device, Class of Service, or other such impacting changes. However, after a change to a Class of Service, the system takes time to regenerate configurations for all devices. You can use the Regenerate button to expedite regeneration of configurations for a given device; this option is especially useful during proactive troubleshooting.

It is sometimes necessary to change many Class of Service or DHCP Criteria parameters. When this happens, existing device configurations become stale and require regeneration of the configuration. To eliminate the need to manually regenerate each configuration, and reduce the potential for introducing errors, Prime Cable Provisioning provides a configuration regeneration service (CRS) that you can use to automatically regenerate all device configurations.

Device configurations are automatically regenerated whenever:

- A file related to a Class of Service, that is, a template or script, is updated.
- The default Class of Service or DHCP Criteria for a device type is changed.
- A DHCP Criteria property is changed.
- The provisioning group object is changed via the administrator user interface or the API.
- The Class of Service object properties are changed.
- The DPE sends a configuration regeneration request to the RDU.
- The device properties or relationship are updated.
- Extended Dynamic TFTP Filename scripts associated to devices are replaced.

Some configurations cannot be automatically regenerated because Prime Cable Provisioning cannot determine if the change impacts device configuration. In such cases, manually regenerate configurations using the *generationConfiguration()* method or from the administrator user interface. Configurations that you must manually regenerate are those that become necessary when:

- A technology default is changed, except for the default Class of Service and the default DHCP Criteria. Changing the technology default properties for the default Class of Service and DHCP Criteria does trigger regeneration of the devices that are given the default DHCP Criteria or default Class of Service.
- The system defaults are changed.
- A file that is included within another DOCSIS template is changed.

Note Regardless of how configurations are regenerated, they are not propagated to the devices until the device configuration is activated, that is, the device contacts the DPE either on schedule or as a result of a connection request initiated from the DPE.

To regenerate a configuration for a device:

Step 1 From the Manage Devices page, locate the device for which you want to regenerate a configuration. You can use one of the search types for this purpose.

Step 2 Check the check box to the left of the device.

Step 3 Click **Regenerate**.

The RDU regenerates a configuration for the specific device.

Relating and Unrelating Devices

The concept of relating devices is similar to that of Class of Service or DHCP Criteria inasmuch as a device is related to a specific Class of Service or to a specific DHCP Criteria. The significant difference is that the Class of Service and DHCP Criteria are considered to be predefined groups and that you use groups to group devices into arbitrary groups that you define.

In this context, the Relate function lets you associate a device, using its MAC address or DUID, to a specific group, which is in turn associated with a specific group type.

By relating a device to a specific group, information indicating that the device is related to a specific group is stored in the database. If you relate the device to the predefined **system-diagnostics (system)** group, you can use available information to troubleshoot potential problems.

Relating a Device to a Group

You can relate and unrelate only one device at a time from the administrator user interface.

To relate a device:

Step 1 From the Manage Devices page, locate the device that you want to relate to a group. You can use one of the search types for this purpose.

Step 2 Check the check box to the left of the device.

Step 3 Click **Relate**. The Relate Device to Group page appears.

Step 4 Select the group type from the drop-down list and the group from the list of defined groups.

Note To select multiple groups from the Groups list, press **Control** or **Shift**.

Step 5 Click **Submit**.

To verify if the device is related to the group you specified, click the View Details icon corresponding to the device. On the Device Details page that appears, check the status against Related Group Name (Group Type).

Unrelating a Device from a Group

To unrelate a device from a group:

Step 1 From the Manage Devices page, locate the device that you want to unrelate from a group.

Step 2 Check the check box corresponding to the device identifier, and click the **Unrelate** button.

Step 3 From the list of defined groups, select the group from which you want to unrelate the device.

Note To select multiple groups from the Groups list, press **Control** or **Shift**.

Step 4 Click **Submit**. The Manage Devices page appears.

Searching Devices in a Group

To search for devices belonging to a particular group:

Step 1 From the Manage Devices page, select the Group Search option from the drop-down list under Search Type.

Step 2 From the Group Name (Group Type) drop-down list, select the name of the group to which the devices are associated.

Step 3 Click **Search**.

The devices related to the group appear.

Resetting Devices

The Reset button lets you reboot any selected device.

To reset a device:

Step 1 From the Manage Devices page, locate the device that you want to reboot. You can use one of the search types for this purpose.

Step 2 Check the check box corresponding to the device.

Step 3 Click **Reset**.

The device reboots.