Information about Cisco Smart PHY

The Cisco Smart PHY application is an integrated package for installing, configuring, monitoring and troubleshooting the Remote-PHY devices (RPD) serviced by the Cisco cBR-8 routers. It enables multiple use cases, including:

- Distributed Access Architecture (DAA) deployment simplification

- RPD deployment automation

- RPD software lifecycle management

- Traffic engineering

These are some general instructions and information for using the Cisco Smart PHY:

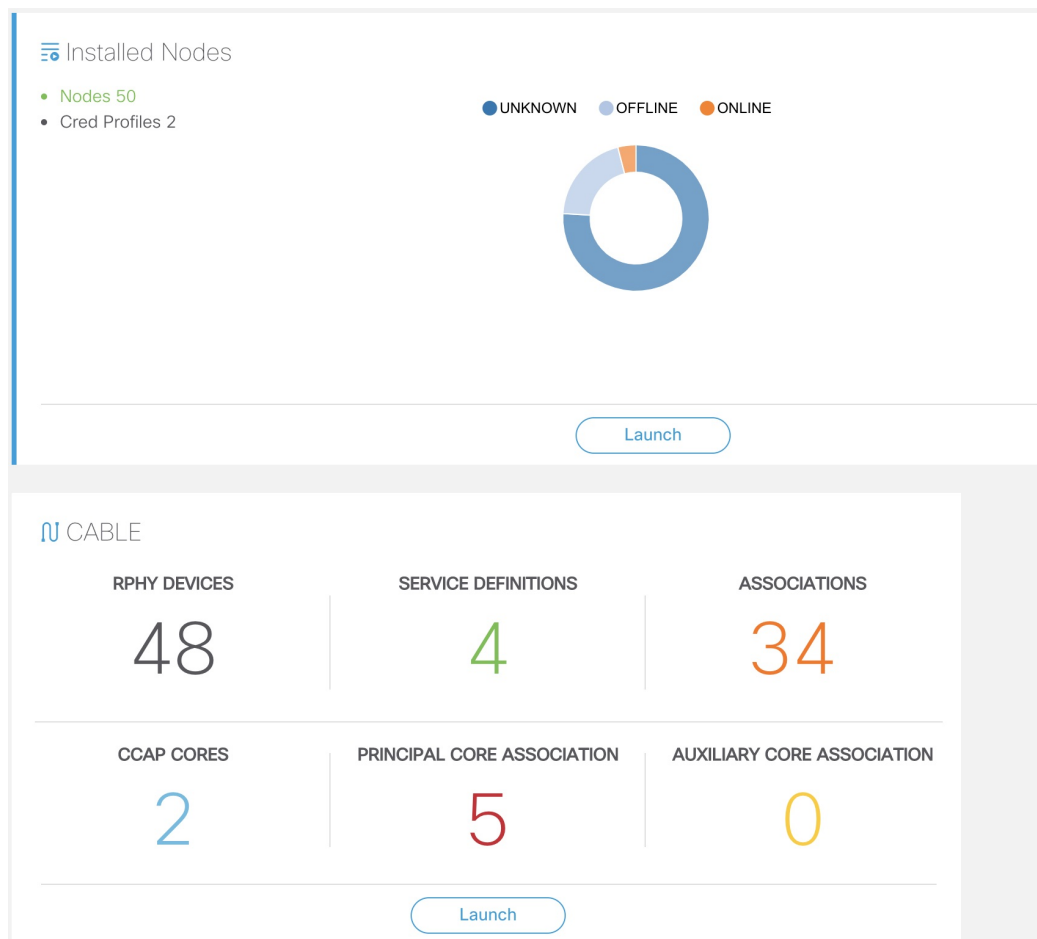| Icon	Description
ⓘ	**Information** button. Click this button to display more information.
☰	**Context Menu** button. Move the mouse over this button to display a context menu.

Benefits of Cisco Smart PHY

Typically, 200 to 500 RPDs might be connected to a single Cisco CMTS and manual configuration and monitoring could pose a problem.

Following are some of the benefits of using the Cisco Smart PHY application:

- Initial RPD Zero-Touch Automation: Initial RPD installation and provisioning with Zero-touch of the Cisco CMTS.

- RPD Inventory: RPD inventory operations. For example, running inventory reports or searching for RPDs based on specific criteria and so on.

- RPD SW Management: RPD SW version management.

- API Centric Design: Operators have direct programmatic access to Cisco Smart PHY services and functions using open interfaces and tools.

Dashboard

Following are the field descriptions:

Name	Description
Dashboard	Snapshot view of all devices managed and monitored by the Cisco Smart PHY application.
Installed Nodes	Shows the number of nodes installed using the Cisco Smart PHY application. This panel also shows the number of Credential Profiles available in the application. The pie chart shows the offline, online, and unknown (unmanaged cores) nodes.

Name	Description
Launch	Takes you to the specific page view.
Cable	Shows the following details in this pane: configured and managed using the **Cable RPD Automation** page. • RPHY Devices • Service Definitions • Associations • CCAP Cores • Prinicipal Core Association • Auxiliary Core Association Click the number to view more details. Click the **Launch** link to go to the **Cable RPD Automation** page.

Inventory

Inventory has two tabs; Inventory and Credential Profiles.

	Status	Host Name	Key Type	IP Address	MAC Address	UUID	Product Type	Credential Pr...
☐	✕	RPD25	MAC ADDRESS		0004.9F32.1149	_DEVICE_00049F32...	RPD-1-CHASS	
☐	⏻	RPD22	MAC ADDRESS		0004.9F32.1727	_DEVICE_00049F32...	RPD-1-CHASS	
☐	✕	RPD26	MAC ADDRESS		0004.9F32.1001	_DEVICE_00049F32...	RPD-1-CHASS	
☐	✓	RPD-R02	MAC ADDRESS	2002:0:0:0:0:6626...	BADB.AD14.32EA	_DEVICE_BADBAD1...	RPD-1X2-PKEY	
☐	⏻	RPD18	MAC ADDRESS		0004.9F32.1637	_DEVICE_00049F32...	RPD-1-CHASS	
☐	✓	RPD07	MAC ADDRESS	2002:0:0:0:0:6626...	0004.9F32.1739	_DEVICE_00049F32...	RPD-1X2-PKEY	
☑	✓	video-LWR-S-D8.cis...	IP ADDRESS	10.90.82.232		_DEVICE_10.90.82....	CBR-8-CCAP-CHASS cBR8	
☐	✓	RPDX2042	MAC ADDRESS	2002:0:0:0:0:6626...	BADB.AD14.32DE	_DEVICE_BADBAD1...	RPD-1X2-PKEY	

Inventory

The Inventory tab enables you to add, organize, and update information about the network devices. This includes non-Cable devices too and hence the information to be provided is more exhaustive than in the Cable RPD Automation view.

Note Add the RPDs through the Cable Pairing table in the Cisco Smart PHY application and not through the Inventory tab.

Following are the field descriptions for Inventory:

Name	Description
Status	Shows a graphical pie chart of all devices in the network, categorized by status: • ONLINE • OFFLINE • UNKNOWN • SSHKEYFETCH • MAINTENANCE • NORMALOPS_PROGRESS
Host Name	Host name of the device.
Key Type	Two types: • MAC ADDRESS • IP ADDRESS
IP Address	IP address of the device.
MAC Address	MAC address of the device.
UUID	Universally unique identifier of the device.
Product Type	Product type of the device.
Credential Profile	Credential profile name.
Latitude	Latitude of the device.
Longitude	Longitude of the device.
Location	Location of the device.
Description	Description of the device.
Software Version	Software version of the device.
Model Number	Model number of the device.

Name	Description
⊕	Adds a device to the existing inventory.
✎	Edits the device information.
🗑	Deletes a device from the inventory.
⬆	Exports device information to a CSV file.
⬇	Imports devices by using a CSV file.
✖	Enables maintenance mode on one or more Cisco cBR-8 routers. Applicable only to Cisco cBR-8 routers.
🏃	Resumes normal operations on one or more Cisco cBR-8 routers. Applicable only to Cisco cBR-8 routers.
🔑	Fetches the SSH key on one or more Cisco cBR-8 routers. Applicable only to Cisco cBR-8 routers.
🔑	Status showing SSH key failure.
⋯	Status shows one of the following states: • Fetching SSH Keys • Resuming Normal Operations from the maintenance mode
Details	Shows the details of the devices, such as Device Summary and Device State History
⚙	Sets the columns in the device table.
Search	Allows you to search for and filter the network devices.
Devices table	Shows detailed information about each device in the network.

Credential Profiles

Credential profiles are collections of device credentials for Telnet or SSH network devices. Using credential profiles lets you apply credential settings consistently across devices. When you add or import devices, you specify the credential profile the devices use. If you need to make a credential change, such as changing a device password, you can edit the profile to update the settings across all devices that use that profile.

Figure 1: Credential Profiles

Following are the field descriptions for Credential Profiles:

Name	Description
+ Create New	Allows you to add or edit a credential profile. **Note** Mandatory fields are marked with an asterisk.
New Profile	You can create a new profile by entering the required details and saving the profile.

Cable RPD Automation

The Cable RPD Automation page enables you to add, organize, and update information about CMTS and RPD devices in the network. The information available in the view is focused on CCAP Cores and Remote PHY Devices.

The Cable RPD Automation page has four tabs; Overview, RPD Assignment, Service Definitions, and Global Settings.

Overview

Provides a view of the number of RPDs, their status, and the number of Cores. Also, it provides a dashboard view of the Core and the RPDs in different states.
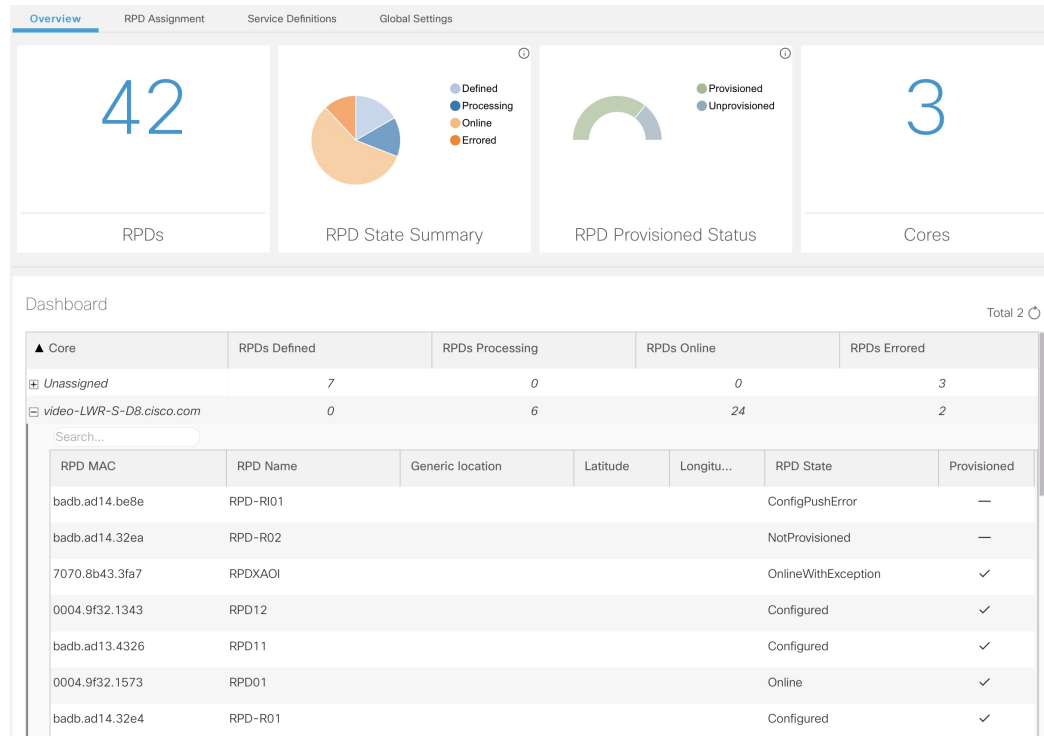
You can view the following RPD State Summary table by clicking the ⓘ icon in the RPD State Summary dashlet.

Table 1: RPD States Summary

RPD Summary	RPD State	Description
DEFINED	Defined	RPD pairing is defined. However, MAC address is not yet assigned.
DEFINED	Installed	Installed RPD. RPD name, MAC address, and the GPS location are available.
DEFINED	Inventory	Added RPD MAC address to the inventory without the GPS details.
ERRORED	ConfigNotFound	RPD assignment is incomplete or not specified in the Cisco Smart PHY application.
ERRORED	ConfigPushError	Unable to push the RPD configuration to the CCAP core.
ERRORED	ConfigReadError	Unable to get the existing CCAP core configuration.
ERRORED	ConfigurationError	Assigned incorrect RPD in the Cisco Smart PHY application.

RPD Summary	RPD State	Description
ERRORED	GcpRedirectError	Received an error from the RPD when redirecting to the CCAP core.
ERRORED	NotProvisioned	Cisco cBR-8 router is not provisioned with the RPD configuration. RPD configuration is not pushed to the Cisco cBR-8 router.
ERRORED	Offline	RPD is offline. However, RPD configuration is pushed to the CCAP core.
ERRORED	ResourceAllocationError	Unable to allocate resources to an RPD for the assigned CCAP core or interface.
ONLINE	Online	RPD is online on the CCAP core.
ONLINE	OnlineWithException	RPD is online, but NDF or NDR fails.
ONLINE	PartialOnline	Parttial services are available if the RPD is not online on all cores.
PROCESSING	Configured	CCAP core is configured. RPD configuration is pushed to the CCAP core.
PROCESSING	DeletePending	RPD pairing deletion is pending.
PROCESSING	GcpRedirected	Received an ACK from the RPD for the CCAP core redirect message.
PROCESSING	GcpRedirectStartedWithException	RPD configuration is pushed to the CCAP core and redirecting the RPD to that core has started. However, one of the following errors occurred: • RouterVersionIncompatible • StaticRouteNotConfigured
PROCESSING	GcpRedirectStarted	RPD configuration is pushed to the CCAP core and the RPD is redirected to that core.
PROCESSING	GcpRedirectedWithException	Received an ACK from the RPD for the CCAP core redirect message. However, one of the following errors occurred: • RouterVersionIncompatible • StaticRouteNotConfigured
PROCESSING	GcpUp	Received GCP message from the RPD.
WARNING	RouterVersionIncompatible	RPD software version is incompatible with the CCAP core version.

RPD Summary	RPD State	Description
WARNING	StaticRouteNotConfigured	Static route is not configured.

RPD Assignment

Allows you to add, edit, import, or export the details of RPD assignments. Search allows you to search for or filter the RPD information.

Following are the menu options available on the RPD Assignment window:

Options	Description
＋	To assign an RPD for a specific RPD name or to add an RPD MAC address to the RPD Inventory. You can assign additional RPD information only after specifying a name for the RPD MAC address.
✎	To edit an existing RPD assignment. You can edit the name, the MAC address information, and so on.

Options	Description
🗑	To delete an RPD name and its RPD assignment information.
	When you delete the RPD Assignment details, the RPD MAC address that is assigned to the RPD name is moved back to the Inventory and is retained in the system.
	To delete the RPD MAC address, delete it from the main Inventory page.
	Similarly, deleting an RPD MAC address from the Inventory does not delete the RPD name and its assignment information in the RPD Assignment table. This deletion removes only the RPD MAC address from the RPD Assignment table.
⬆	Exports the details of RPD assignments to a CSV file.
⬇	Imports the details of RPD assignments using a CSV file.
	Sample of the CSV file is available when you click this icon.
Assign	To assign the chosen Service Definition to all the selected RPDs.
Clear	To clear the core and the service template assignment for a specific RPD name. This option does not clear the mapping between an RPD name and the MAC address.
Details	To get the details of the RPD, such as RPD Summary, RPD State History, and RPD CLI.
Search	Use any filtering option.
⚙	Sets the required columns in the device table.

Following are the field descriptions in the Associate RPDs table:

Field Name	Description
Status	Shows the status of the RPDs.
Provisioned	Shows whether the RPD is provisioned or not.
RPD Name	Name for the RPD.
	This RPD name is also used in the `cable rpd` CLI command.
RPD MAC Address	MAC address of the RPD.
Node Segmentation	Node segmentation of the RPD: 1x1, 1x2, or 2x2.
Service Definition	Service Definition as created in the **Service Definitions** tab. If Cisco Smart PHY does not manage the principal CCAP core and if the **Principal Core** field is empty, then this **Service Definition** field is optional.

Field Name	Description
Principal Core	Name of the Cisco cBR-8 router which is the principal Converged Cable Access Platform (CCAP) Core for the RPD.
	This core must provide the RPD with data and narrowband digital forward (NDF)/narrowband digital return (NDR) services. This core may also provide the following services:
	• Out-of-band (OOB) SCTE 55–1
	• Video services: If there is no separate auxiliary Video Core
	Leave this field empty if the RPD has a principal CCAP Core that is not managed by Cisco Smart PHY.
	An `unmanaged` principal core is a non-cBR-8 principal core such as Cisco cnBR, which is not present in the Cisco SmartPHY inventory and to which it does not push the configuration. In this case, include the `unmanaged` principal core as the first item in the **Additional Cores** list.
SSD Profile	Secure Software Download (SSD) profile details for image storage.
Disable Network Delay	The default is value is **No**.
	• No: Apply the network-delay from service definition to RPD.
	• Yes: Do not apply the network-delay from service definition to RPD.
	Changing this value to `yes` is service impacting, if the RPD's assigned Service Definition/Template has network-delay configured.
Principal Core Interface	Complete name of the TenGigabitEthernet DPIC interface to be used for Data Service.
	Leave this field empty if there is no Principal Core.
Video Core	Name of the Cisco cBR-8 router, which is the auxiliary CCAP core for the RPD that provides video services.
	Leave this field empty if principal core provides the video services.
Video Core Interfaces	List of complete names of the TenGigabitEthernet DPIC interfaces to be used for Video Services.
OOB Core	Name of the Cisco cBR-8 router which is the CCAP core for the RPD that provides out-of-band (OOB) SCTE 55–1 service and NDF/NDR services.
	This field must match either the **Principal Core** or the auxiliary **Video Core**. Leave this field empty if the OOB 55-1 and NDF/NDR services are not used.
OOB Core Interface	Complete name of the TenGigabitEthernet DPIC interface to be used for out-of-band 55-1 and NDF/NDR service.
	Leave this field empty if the OOB 55-1 and NDF/NDR services are not used.
Downstream VOM ID	OOB 55-1 Downstream Virtual out-of-band Modulator (VOM) Identification (ID). If present, this value overrides the value from the Service Definition.

Field Name	Description
Downstream VOM Profile	OOB 55-1 Downstream VOM profile. If present, this value overrides the value from the Service Definition.
Upstream VARPD ID	OOB 55-1 Upstream Virtual Advanced Return Path Demodulator (VARPD) ID. If present, this value overrides the value from the Service Definition.
Upstream VARPD Profile	OOB 55-1 Upstream VARPD profile for first logical Downstream/Upstream (DS/US) pairing. If present, this value overrides the value from the Service Definition. The Upstream VARPD Profile (upstreamVarpdProfile) and the Second Upstream VARPD Profile (secondUpstreamVarpdProfile) can have the same value. For more details, see Common OOB 55-1 US Profile for Cisco RPD 1x2/2x2.
Second Upstream VARPD Profile	OOB 55-1 Upstream VARPD profile for second logical Downstream/Upstream (DS/US) pairing. If present, this value overrides the value from the Service Definition. The upstream VARPD profile (upstreamVarpdProfile) and the second upstream VARPD profile (secondUpstreamVarpdProfile) can have the same value. For more details, see Common OOB 55-1 US Profile for Cisco RPD 1x2/2x2.
Cable DSG TGs	Semicolon separated list of DOCSIS Set-Top Gateway (DSG) Tunnel Group (TG) identifications. If present, this list overrides the list from the Service Definition.
Additional Cores	Semicolon separated list of additional cores to which the RPD must connect. For example, when an SCTE 55-2 OOB auxiliary core is required, additional cores list it here. **Important** If Cisco Smart PHY does not manage the principal CCAP core and if the Principal Core field is empty, you must include the unmanaged principal core as the first item in this list.
Latitude	Latitude of the RPD (GPS coordinates)
Longitude	Longitude of the RPD (GPS coordinates)
RPD Description	Description for the RPD

Service Definitions

Allows you to add, edit, delete, or assign service templates. Fields that are not marked as optional are mandatory.
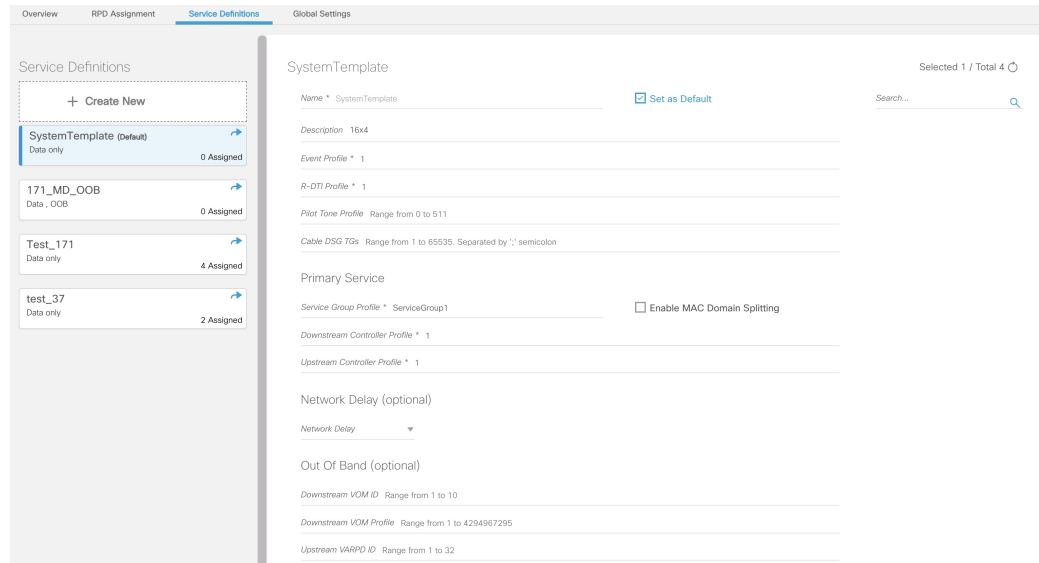
Following are the menu options descriptions:

Name	Description
+ Create New	Click this option to create a new service template.
Name of the existing service definition	Click the name of the existing service definition to edit the template.
New Service Definition	Enter the details in each filed and click the **Save** button to create a new service template.
Search	Use this Search text field in upper right-hand corner to filter service definition names.

Global Settings

You can perform the following configurations from the Global Settings window.

- Database Backup

- Global Configuration

- Software Compatibility

Database Backup

You can back up the database to a local server or a remote server.

Overview	RPD Assignment	Service Definitions	Global Settings

∨ Database Backup

Server * ⓘ   hostname.domain.com

Username *   admin

Password *   •••••••••••

Directory *   /users/name/folder/

Filename (Import Only *) ⓘ   smartphy_InstanceName_backup_timestamp.tar.gz

[Export]   [Import]   [Reset]

Database Backup Status

Operation	Start Time	End Time	Message

The database backup file is a `TAR.GZ` file with the following naming convention: `smartphy_backup_YYYYHHMM_022639.tar.gz`. Enter the following details in the **Database Backup** window to back up the database.

Field	Description
Server	The location where you want to save the DB. • Local backup—Enter **localhost**. Local backup files are saved to the `/var/smartphy/backup` directory on the local filesystem. • Remote backup—Enter the IP address or the `hostname.domain.com`. For remote backup, the Cisco Smart PHY application uses SFTP to transfer files from Cisco Smart PHY instances.
Username	• Local backup—Leave the field empty. • Remote backup—Enter the username for the remote server access.

Field	Description
Password	• Local backup—Leave the field empty. • Remote backup—Enter the password for the remote server access.
Directory	• Local backup—Leave the field empty. • Remote backup—Enter the file path of the directory in the remote server.
Filename (Import Only)	Used exclusively for importing a database. Imported file must be in this format the following format: `smartphy_InstanceName_backup_timestamp.tar.gz` Leave the field empty for both local and remote backup.
Export	Click the **Export** button to perform local and remote backup.
Import	Click the **Import** button to import a DB.

Global Configuration

The **Global Configuration** section under the **Global Settings** menu provides the following options for you to configure on RPDs. Choose the following functions according to your requirement.

- Configure Static Routes—If you enable this option, for interfaces with /31 (IPv4 networks) or /127 (IPv6 networks) configured on the DPIC, the Cisco Smart PHY application adds a static route configuration on the Cisco cBR-8 router per RPD.

- Validate Software Compatibility—If you enable this option, the Cisco Smart PHY application checks the compatibility between the RPD version and the Cisco cBR-8 router version that is specified in the table.

- Persist Running Configuration—If you enable this option, when the Cisco Smart PHY makes a change to the Cisco cBR-8 configuration, the Cisco Smart PHY makes the configuration persistent. This option allows you to make the changes persistent on the Cisco cBR-8 router at a specific interval.

Static Route

To route traffic and for communication between an RPD and a Cisco cBR-8 router, static routes to the Cisco cBR-8 router are created when you configure the RPDs.

Smart PHY automatically creates a static route for the RPD if the DPIC interface is configured with a /31 (IPv4 networks) or /127 (IPv6 networks) subnet. The static route is determined by calculating the gateway IP address and routing traffic through the gateway for the RPD.

Note
- The DPIC must be a /31 or /127 subnet.
- Wait for the RPD to push the static route configuration.

Sample of a Cisco Smart PHY-Generated Configuration

```
cable rpd <the name assigned to the RPD>
 identifier a0f8.496f.6506
 type shelf
 rpd-ds 0 base-power 25
 rpd-ds 1 base-power 25
 core-interface Te9/1/6
  principal
  rpd-ds 0 downstream-cable 9/0/16 profile 100
  rpd-us 0 upstream-cable 9/0/1 profile 4
 r-dti 2
 rpd-event profile 0
rpd-55d1-us-event profile 0

cable fiber-node <next available fiber-node>
 downstream Downstream-Cable 9/0/16
 upstream Upstream-Cable 9/0/1
 downstream sg-channel 0 23 downstream-Cable 9/0/16 rf-channel 0 23
 upstream sg-channel 0 3 Upstream-Cable 9/0/1 us-channel 0 3
 service-group managed md 0 Cable 9/0/1
 service-group profile SG1
```

Software Compatibility

Allows you to add, edit, or delete the software compatibility matrix. Fields that are not marked as optional are mandatory.

Software Compatibility—This window displays a compatibility matrix for the RPD software versions and the Cisco cBR-8 software versions. The Smart PHY application detects the software incompatibility between an RPD and a Cisco cBR-8 router, and alerts you about the incompatibility. After the alert appears, either manually upgrade the RPD software or associate the RPD with an SSD profile through the Cisco Smart PHY application, which notifies the Cisco cBR-8 for the software upgrade.

Table 2: Field Description for Software Compatibility Matrix

Name	Description
RPD Vendor	Name of the RPD vendor.
RPD Software Version	Software version running on the RPD.
Router Product Type	Product type of the router from the Inventory. Example: CBR-8-CCAP-CHASS

Name	Description
Router Software Version	Software version of the router.

Admin

The **Admin** menu option displays the **User List** window which lists all existing users in the Cisco Smart PHY application.

In this window, you can reset the user passwords by clicking the . The admin user can reset the passwords of all users. All other users can reset only their own passwords when logged in.

Admin