Network Authentication

This document describes the Remote PHY device network authentication on the Cisco cBR Series Converged Broadband Router.

Finding Feature Information

Your software release may not support all the features that are documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. The Feature Information Table at the end of this document provides information about the documented features and lists the releases in which each feature is supported.

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Hardware Compatibility Matrix for Cisco Remote PHY Device

Note Unless otherwise specified, the hardware components introduced in a given Cisco Remote PHY Device Software Release are supported in all subsequent releases.

Table 1: Hardware Compatibility Matrix for the Cisco Remote PHY Device

Cisco HFC Platform	Remote PHY Device
Cisco GS7000 Super High Output Node	**Cisco 1x2 / Compact Shelf RPD Software 2.1 and Later Releases** Cisco Remote PHY Device 1x2 • PID—RPD-1X2= **Cisco 1x2 / Compact Shelf RPD Software 2.1a and Later Releases** Cisco Remote PHY Device 1x2 • PID—RPD-1X2-PKEY=

Cisco HFC Platform	Remote PHY Device
Cisco GS7000 Super High Output Intelligent Node (iNode)	**Cisco 1x2 / Compact Shelf RPD Software 4.1 and Later Releases** Cisco Intelligent Remote PHY Device 1x2 • PID—iRPD-1X2= • PID—iRPD-1X2-PKEY=

Note The -PKEY suffix in the PID indicates units that enable the SCTE-55-2 Out-of-Band protocol support.

Information about Network Authentication

RPD must be able to operate in both authenticated and unauthenticated networks. Whether authentication is required for an RPD is determined by the network that it is connected to. In some cases, RPD is located in an untrusted network, and it must connect to devices inside the trusted network, which presents a potential security vulnerability. 802.1x is introduced to provide authentication services to eliminate the potential security issues.

802.1x is a Layer 2 protocol that uses EAP (Extensible Authentication Protocol) to provide authentication services. Following certificates are needed to use the network authentication:

- Cablelabs Root CA certificate: caRoot.pem
- CableLabs Device CA Certificate: deviceCA.pem
- RPD Certificate: rpdCert.pem, private key: rpd.key
- Cablelabs Service Provider CA Certificate: spCA.pem
- AAA Server Certificate: aaaCert.pem, private key: aaa.key

How to Enable Network Authentication

This section describes how to enable network authentication for RPD.

Installing Certificates in Radius Server

To install the certificate in Radius server, follow the steps below:

Step 1 Combine CA certificate for AAA server.

Example:

```
cat spCA.pem caRoot.pem > ca_root_srv.pem
```

Step 2 In freeRadius Server, copy "ca_root_srv.pem", "spCA.pem", "aaaCert.pem" and "aaa.key" to "/etc/freeradius/certs".

Configuring Radius Server

To install the certificate in RPD, follow the steps below:

Step 1 Define a new client in /etc/freeradius/clients.conf.

Example:

```
client rphytest_ng13 {
        ipaddr = 20.5.0.36
        secret = rphytest
        shortname = ng13_switch
        require_message_authenticator = yes
}
```

The "ipaddr" is the switch's management ip address.

Step 2 In "/etc/freeradius/eap.conf", change the following lines in "tls" to specify the server's private key file and certificate files.

Example:

```
tls {
      …
        private_key_file = ${certdir}/aaa.key
        certificate_file = ${certdir}/aaaCert.pem
        CA_file = ${cadir}/ca_root_srv.pem
}
```

Step 3 Start radius in radius sever.

Example:

```
sudo freeradius
```

Make sure only one freeradius instance is running.

Configuring Switch

To configure the switch, follow the steps below:

Note This procedure is for Catalyst 3750 switch, other switch may use different commands.

Step 1 Add the following configuration in global configuration mode.

Example:

```
dot1x system-auth-control   /* enable 802.1x */
aaa new-model
```

```
aaa authentication dot1x default group radius
radius-server host 10.79.41.103 auth-port 1812 key rphytest
```

Step 2 Add the following configuration under interface which connects to RPD.

Example:

```
authentication port-control auto
dot1x pae authenticator
```

Verifying Authentication Status

To displays dot1x authentication information for RPD, use the **show dot1x** command as shown in the following example:

```
Router# show dot1x summary
 Interface        Core-id                 EAP_Received     Status
 vbh0             CORE-3415960568         True             UP

Router# show dot1x detail
Interface        Core-id                 EAP_Received        Status
vbh0             CORE-3415960568         True                UP
bssid=01:80:c2:00:00:03
freq=0
ssid=
id=0
mode=station
pairwise_cipher=NONE
group_cipher=NONE
key_mgmt=IEEE 802.1X (no WPA)
wpa_state=COMPLETED
ip_address=30.85.40.47
address=00:04:9f:00:03:73
Supplicant PAE state=AUTHENTICATED
suppPortStatus=Authorized
EAP state=SUCCESSselected
Method=13 (EAP-TLS)EAP TLS
cipher=ECDHE-RSA-AES256-SHA
tls_session_reused=0
eap_session_id=0d53798f5b46014cc92a4ac1151521bae6a14c98f919ab5e8c81a701b7272be7f812e7e5a75881768d74d311795a3b1f0e37bfa7fff7dcc4685d36f216bec59850
uuid=ab722cfb-84dc-5835-a905-edfec20f78c3
```