



# Pulse Policy Secure: Steel Belted Radius Server

SBR to PPS Migration Guide

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*Steel Belted RADIUS (SBR) to Pulse Policy Secure Migration Guide*

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# Executive Overview

Pulse Secure is a leader in providing the industry's best Next-Gen Network Access Control solutions. Pulse Policy Secure (PPS) with inbuilt RADIUS server offers scalable 802.1X deployment with Role-based access control that reduces network threat exposure and mitigates risks to zero-trust security.

PPS migration tools enable seamless deployment of authentication mechanisms, allowing customers to easily migrate from Steel Belted Radius (SBR) to PPS. Migration tools also provide customers with the flexibility of migrating 802.1X/RADIUS, MAC Address Authentication configurations.

PPS migration helps customers to achieve contextual based endpoint visibility, a much stronger security posture with unified access policies that extend from BYOD systems to their perimeter defenses. Customers are also going to benefit from comprehensive NAC solutions, Visibility, Policy Management, Sponsored-based Guest Access, BYOD/Mobility, Endpoint Compliance, Ecosystem Integrations and Zero-Trust Internet of Things (IoT) Security.

## Introduction

This document provides detailed information about the migration steps from SBR to Pulse Policy Secure (PPS). The document captures the manual migration approach for the 802.1X/RADIUS, MAC Address, authentication and TACACS+ use cases. Export the configurations from SBR and then import them into PPS. The default configurations are created for smooth migration.

The migration procedure starts with comparing the configuration settings from SBR and then configuring on PPS. Ensure that you understand the configuration flow of Pulse Policy Secure and verify them against the access policies of SBR.

PPS supports role-based access control. The level of access to the network is determined based on the user roles and various other attributes. For example, an individual with the engineer role in an organization might be allowed access to the certain company's resources, but blocked access to employee records.

However, SBR is profile-based access control. The access is determined based on the profiles associated with Users or RADIUS clients or Location groups. The access is determined based on the check properties of the request against the configured checklist of attributes.



Note:

Ensure that you configure the PPS based on the configuration flow for easy migration. The equivalent SBR terminologies for configuration is documented in RADIUS Configuration Migration, MAC Address Authentication Migration sections. Plan your migration carefully to ensure smooth migration and to decrease any risk of migration failure.

## Supported Migration Use cases

You can migrate all the RADIUS configurations such as Location groups, RADIUS Clients and Profiles and MAC addresses configurations from SBR to PPS.

# RADIUS Configuration Migration

The configuration flow for RADIUS based authentication on PPS and the equivalent configuration on SBR is described in the below table. The examples documented in this guide is based on SBR latest Release version.

Table 1 describes the recommended configuration flow for PPS

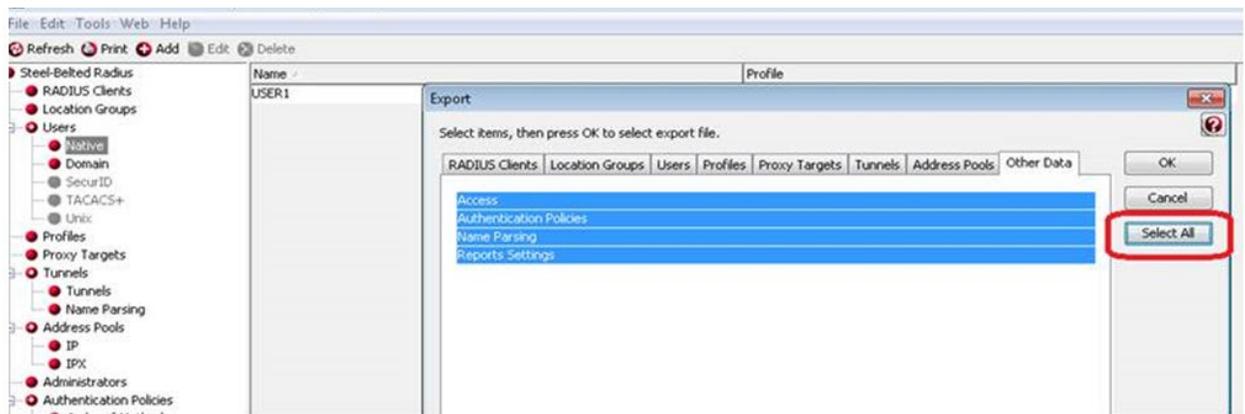
| <i>Table 1: Steps to Configure</i> |  |  |
|------------------------------------|--|--|
| Step                               | Configuration on SBR                         | Equivalent configuration on PPS  |
| Step 1                             | Configure Users > Native > Add Native Users. | Configure Authentication Server  |
| Step 2                             | SBR profile-based authentication.            | Configure the Authentication Realm, Role mapping rules and Sign-In Policy. |
| Step 3                             | Configure SBR > Location Groups.             | Configure the Location Group   |
| Step 4                             | Configure SBR > Radius Client                | Configure a RADIUS client  |
| Step 5                             | Configure SBR > Profiles.                    | Create RADIUS return attribute policy                                      |

## Exporting SBR XML Configuration

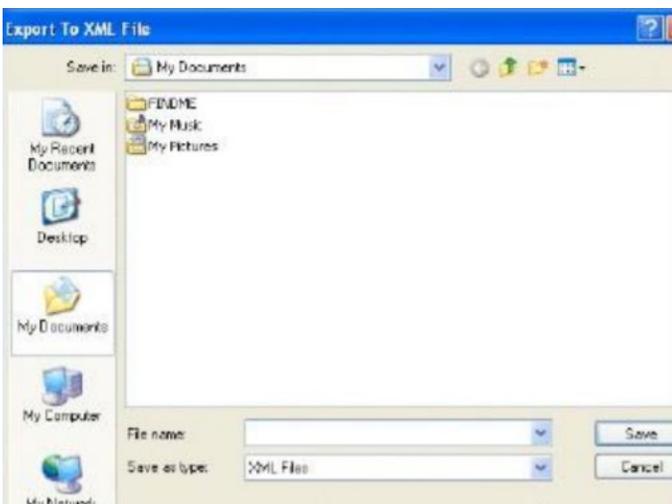
To export the SBR configurations:

1. Run the SBR Administrator.
2. Choose **File > Export**.
3. In the Export dialog, select the information to export. Each tab in the dialog lists exportable items of a particular category. For each category, select the appropriate tab and click each item you'd like to export. To select a contiguous range of items, select the first item in the range, hold down the Shift key, and click the last item in the range.
  - To select a non-contiguous set of items, hold down the Ctrl key as you click each item you want.
  - To select all items in a category, click **All**.
  - To select all items in all categories, click **Select All**.

Figure: Export



4. After you have selected the items to export, click **OK**.

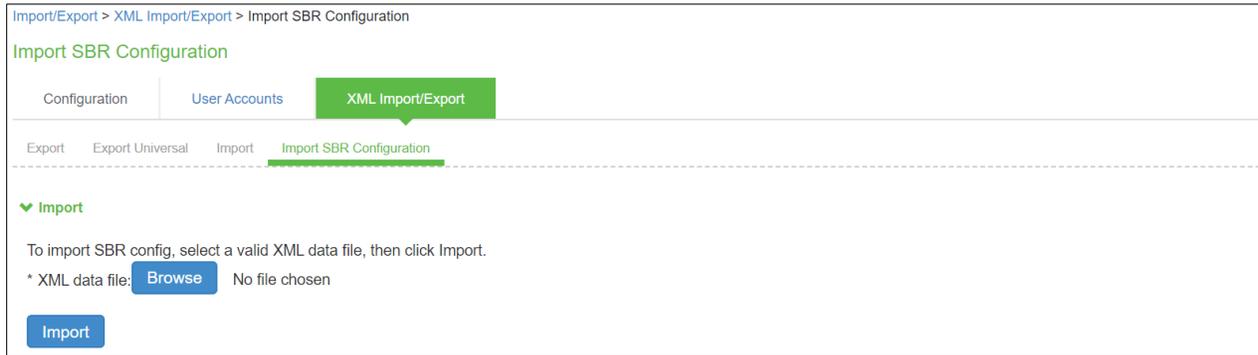


5. In the Export to XML file dialog, enter the file name and click **Save**.

## Importing SBR XML file to PPS

To import the SBR XML file to PPS from PPS Admin console:

1. Select **Maintenance > Import/Export > XML Import/Export > Import SBR Configuration**.
2. Click **Browse** and browse the SBR xml file which needs to be imported.
3. Click **Import**.



## Authentication Server on PPS

PPS provides a seamless migration from SBR server to PPS server. Once it is migrated it can be easily paired with an organization's other identity databases, such as LDAP, RADIUS server and Active Directory (AD) to leverage existing credentials.

Import the SBR xml file to PPS. After importing the file:

1. Select **Authentication > Authentication Server**. You can see the imported file on PPS authentication server. Local Auth Server named as **SBRMigrationAuthServer** is created for SBR migration.
2. Auth Server will be created with default values.
3. Password storage type will be set to clear text by default.
4. Password must be different from user name and New Passwords must be different from previous password options will be disabled.

Figure – Authentication Server

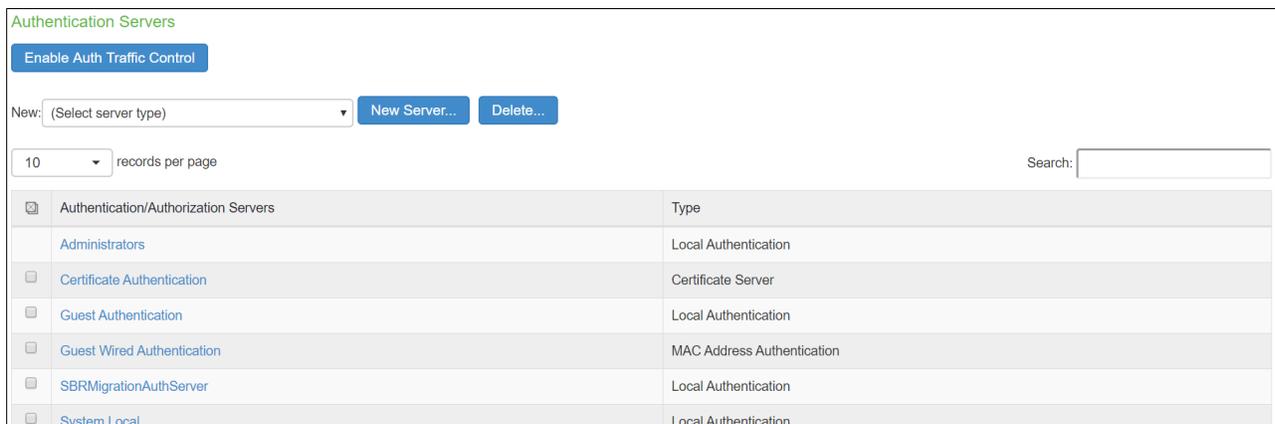


Figure – Authentication Server Settings

Auth Servers > SBRMigrationAuthServer > Settings

### Settings

Settings | Users | Admin Users

\*Name:  Label to reference this server.

#### ▼ Password Options

Minimum length:  characters

Maximum length:  characters

Password must have at least  digits

Password must have at least  letters

Password must have mix of UPPERCASE and lowercase letters

Password must be different from username

New passwords must be different from previous password

#### Password Storage Type

Strong Hash  
Note: Highly secure, but not compatible with some of the authentication protocols i.e. CHAP, EAP-MD5 and MS-CHAP (V1/V2)

Legacy Hash This option can only be set during create  
Note: Compatible with MSCHAP(v1/v2) although less secure

Clear Text This option can only be set during create  
Note: Compatible with all authentication protocols i.e. CHAP, EAP-MD5, MSCHAP(v1/v2) although not secure

#### ▼ Password Management

Allow users to change their passwords

Force password change after  days

Prompt users to change their password  days before current password expires

Note: Use options on the Administrators/Users > Authentication > [Realm] > Authentication Policy > Password page to specify which realms should inherit the server's password management capabilities

#### ▼ Account Lockout

Enable Account Lockout for users

Maximum wrong password attempts:  (3 and above)

Account Lockout period (minutes):  (10 and above)

#### ▼ Guest Access

##### Guest User Account Managers

Enable Guest User Account Managers to administer Guest Accounts. [Configure system GUAM settings](#)

Instructions for Guest User Account Manager:

Instructions displayed for guest users creation and updation. You can use <b>, <br>, <font>, <noscript>, and <a hrefP> tags to format the text.

Maximum Account Validity Period:  Set the Guest Account length limit (end time minus start time) in hours. This is valid for guests created by Guest Admin. Does not impact existing user expirations.

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##### Guest Self-Registration

Send guest user credentials via:  SMS

Email [Configure SMS/Email settings](#)

Show credentials on screen after guest completes registration

Enable Sponsored Guest Access

Maximum Account Validity Period for Self Registered Guests:  Set the Guest Account length limit in hours. This is valid for self registered guests. Does not impact existing user expirations.

Note: To enable Guest Self-Registration navigate to Signing In > Sign-in Policies > User URLs > [url] > Configure Guest Settings

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##### Common configuration for Guest User Account Managers and Guest Self-Registration

Guest User Name Prefix:  Prefix applied to auto-generated user names.

Guest User Info Fields:

Enter additional fields for guest user information, one field per line. For example:  
Title  
Company name  
Sponsor

#### ▼ Server Catalog

\* indicates required field

## User Creation on PPS

The Users are created on **SBRMigrationAuthServer**.

- Password will be stored in plain text.
- The native user (Encrypted Passwords) stored in the SBR xml file will be decrypted and stored into PPS.
- The native user (with Hashed Passwords) in SBR will be imported with password "pulsesecure". Change password at next sign-in flag will be enabled for this user.
- If user in SBR contains attributes, it will added into attribute table of that user in PPS.
- If user in SBR has a profile associated with it, then attributes in the associated profile will be added into attribute table of that user in PPS.

Figure - Users

Auth Servers > SBRMigrationAuthServer > Users

Users

Settings **Users** Admin Users

Import Users from CSV file:  No file chosen  Overwrite Users:  Note: Enabling the checkbox will overwrite the user having the same user name.

Show users named:  Show  users

Page 1 of 1

|                          | ! | Username ▲   | Name             | Usertype   | Last Sign-In Statistic |           |       |        |
|--------------------------|---|--------------|------------------|------------|------------------------|-----------|-------|--------|
|                          |   |              |                  |            | Date&Time              | IPAddress | Agent | Status |
| <input type="checkbox"/> |   | 0021ccc236a1 | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> |   | 0021ccc236a2 | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> |   | 0021ccc236b1 | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> |   | 0021ccc236b2 | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> |   | 0021ccc236c1 | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> |   | 005056836480 | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> |   | after        | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> |   | check        | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> |   | hdarshan     | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> |   | kaialkr      | Unspecified Name | Guest user |                        |           |       |        |

## Sign-In Page on PPS

Select **Authentication > Signing In > Sign-In Pages**. You can see the SBR Sign-In Page created by default.

Figure -Sign-In Pages

Signing In > Sign-In Pages

Sign-In Pages

Sign-In Policies **Sign-In Pages** Sign-In Notifications Authentication Protocol Sets

10 records per page Search:

| Sign-In Page                                       | Type          |
|--|---------------|
| <input type="checkbox"/> SBRMigration Sign-In Page | Standard page |
| <input type="checkbox"/> Default Sign-In Page      | Standard page |

## Sign-In Policy

Select **Authentication > Sign-In Policies**.

The Sign-In policy user url `*/SBR/` with sign-in page as SBR Sign-In Page and Authentication Realm(s) as SBRMigRelam (802.1X) is created by default.

Figure -Sign-In Policies

Signing In > Sign-in Policies

Sign-in Policies

Sign-in Policies | Sign-in Pages | Sign-in Notifications | Authentication Protocol Sets

Restrict access to administrators only  
Only administrator URLs will be accessible. Note that Administrators can attempt to sign in even if all rules on this page are disabled.  
**Warning:** Enabling this option will immediately terminate all user sessions.

New URL... Delete... Enable Disable ↑ ↓ Save Changes

| Administrator URLs                | Sign-In Page         | Authentication Realm(s) | Enabled |
|-----------------------------------|----------------------|-------------------------|---------|
| <input type="checkbox"/> */admin/ | Default Sign-In Page | Admin Users             | ✓       |

| User URLs                                | Sign-In Page              | Authentication Realm(s)                | Enabled |
|--|---------------------------|--|---------|
| <input type="checkbox"/> */SBR/          | SBRMigration Sign-In Page | SBRMigrationRealm (SBRMigration802.1X) | ✓       |
| <input type="checkbox"/> */guest/        | Default Sign-In Page      | Guest (Guest)                          | ✓       |
| <input type="checkbox"/> */guestadmin/   | Default Sign-In Page      | Guest Admin (N/A)                      | ✓       |
| <input type="checkbox"/> */certauth/     | Default Sign-In Page      | Cert Auth (Cert Auth)                  | ✓       |
| <input type="checkbox"/> */              | Default Sign-In Page      | Users (802.1X)                         | ✓       |
| <input type="checkbox"/> */guestsponsor/ | Default Sign-In Page      | Guest Sponsor (N/A)                    | ✓       |

## Authentication Protocol Sets

Select **Signing In > Authentication Protocol Sets**. SBRmigration802.1X is created by default.

Figure – Authentication Protocol Set

Signing In > Authentication Protocol Sets

Authentication Protocol Sets

Sign-in Policies | Sign-in Pages | Sign-in Notifications | Authentication Protocol Sets

New Authentication Protocol... Duplicate... Delete... Restore Factory Default

10 records per page Search:

| Name  | Authentication Protocol                                  | PEAP                       | TTLS  |
|---|--|----------------------------|---|
| 1 <b>802.1X</b><br>System created default authentication protocol required for UAC agents   | EAP-TTLS<br>EAP-PEAP                                     | EAP-JUAC<br>EAP-MS-CHAP-V2 | EAP-JUAC<br>PAP<br>MS-CHAP-V2<br>EAP-MS-CHAP-V2<br>EAP-GenericTokenCard |
| 2 <b>802.1X-Phones</b><br>System created default authentication protocol for phones         | EAP-MD5-Challenge<br>EAP-TLS                             |                            |   |
| 3 <b>Guest</b><br>System created authentication protocol for guest users                    | PAP<br>CHAP  |                            |   |
| 4 <b>Cert Auth</b><br>System created authentication protocol for Certificate Authentication | EAP-TLS<br>EAP-TTLS<br>EAP-PEAP                          | EAP-JUAC<br>EAP-TLS        | EAP-JUAC<br>EAP-GenericTokenCard  |
| 5 <b>SBRMigration802.1X</b>   | EAP-PEAP<br>EAP-TTLS<br>PAP<br>CHAP<br>EAP-MD5-Challenge | EAP-JUAC<br>EAP-MS-CHAP-V2 | EAP-JUAC<br>PAP<br>MS-CHAP-V2<br>EAP-MS-CHAP-V2<br>EAP-GenericTokenCard |

## Roles

Select **Users > User Role > User Authentication Role**. You can see the **SBRMigRole** user role created by default.

Figure – SBR Migration Role

User Roles > Roles

Roles

New Role... Duplicate... Delete... Default Options...

10 records per page Search:

| Role   | Enabled settings                    |                                     |                                     |                          |                                     |
|--|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|-------------------------------------|
|  | Session Options                     | UI Options                          | UAC Agent                           | Host Enforcer            | Agentless Access                    |
| <input type="checkbox"/> Guest<br>System created Guest Users role.                             | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Guest Admin<br>System created Guest Admin role.                       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Guest Sponsor<br>System created Guest Sponsor role.                   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Guest Wired Restricted<br>System created Guest Wired Restricted role. | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> SBRMigrationRole<br>System created Users role.                        | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| <input type="checkbox"/> Users<br>System created Users role.                                   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |

← Previous 1 Next →

New Role... Duplicate... Delete... Default Options...

User Roles > SBRMigrationRole > General > Overview

Overview

General Agent Agentless

Overview Restrictions Session Options UI Options

\* Name:

Description:

Save Changes

Options

If these settings are not specified by any roles assigned to the user, the settings specified in [Default Options](#) will be used.

Session Options (Edit)

UI Options (Edit)

Enable Guest User Account Management Rights

Enable Sponsored Guest User Account Management Rights

Save Changes

\* indicates required field

## User Realms

Select Users > User Realms > User Authentication Realms. You can see the SBRMigrationRealm realm.

Figure - Realm

| Authentication Realm                       | Servers  | Dynamic Policy Evaluation |
|--|--|---------------------------|
| <input type="checkbox"/> Cert Auth         | Primary: Certificate Authentication                                  | Disabled                  |
| <input type="checkbox"/> Guest             | Primary: Guest Authentication  | Disabled                  |
| <input type="checkbox"/> Guest Admin       | Primary: Guest Authentication  | Disabled                  |
| <input type="checkbox"/> Guest Sponsor     | Primary: Guest Authentication  | Disabled                  |
| <input type="checkbox"/> SBRMigrationRealm | Primary: SBRMigrationAuthServer<br>Directory: SBRMigrationAuthServer | Disabled                  |
| <input type="checkbox"/> Users             | Primary: System Local  | Disabled                  |

SBRMigrationRole is added in the role mapping rules.

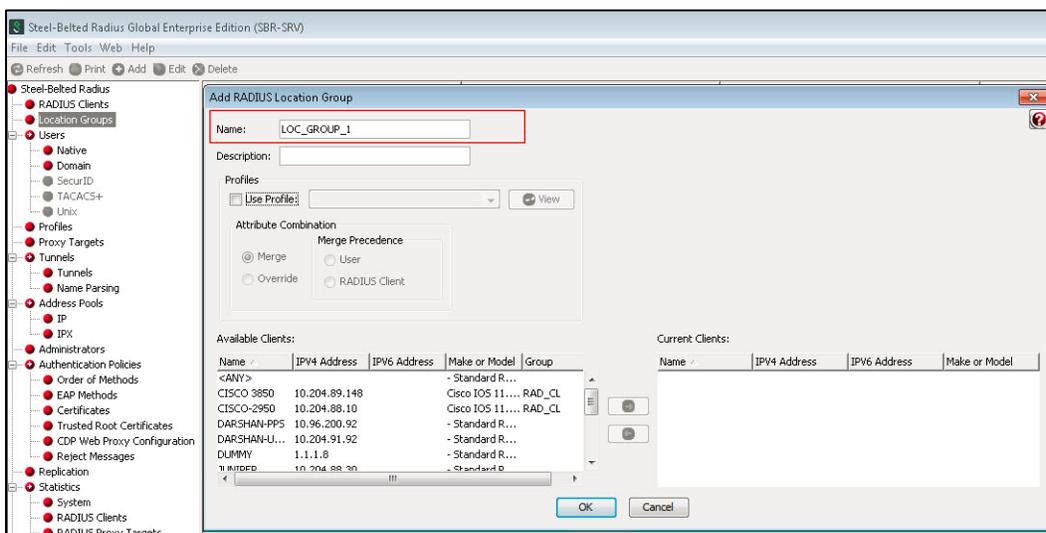
Figure – Role Mapping Rules

| When users meet these conditions | assign these roles | Rule Name               | Stop |
|----------------------------------|--------------------|-------------------------|------|
| 1. username is ***               | → SBRMigrationRole | SBRMigrationRoleMapping |      |

## Network Location Group Configured on SBR

Select Steel-Belted Radius > Location Groups to view the location groups.

Figure – SBR Location Group



## Location Group on PPS

Select **Endpoint Policy > Network Access > Location Group**.

Location group contains \*/SBR/ in sign-in policies. Default **SBRMigLocGroup** is created for those Radius Client which is not using any profile and location group.

Figure: Location Group

Network Access > Location Group

Location Group

RADIUS Dictionary   RADIUS Vendor   **Location Group**   RADIUS Client   RADIUS Attributes   Network Infrastructure Device   SNMP Enforcement Policies

A location group policy logically groups network access devices by associating the devices with specific sign-in policies.

[New Location Group...](#)   [Duplicate...](#)   [Delete...](#)

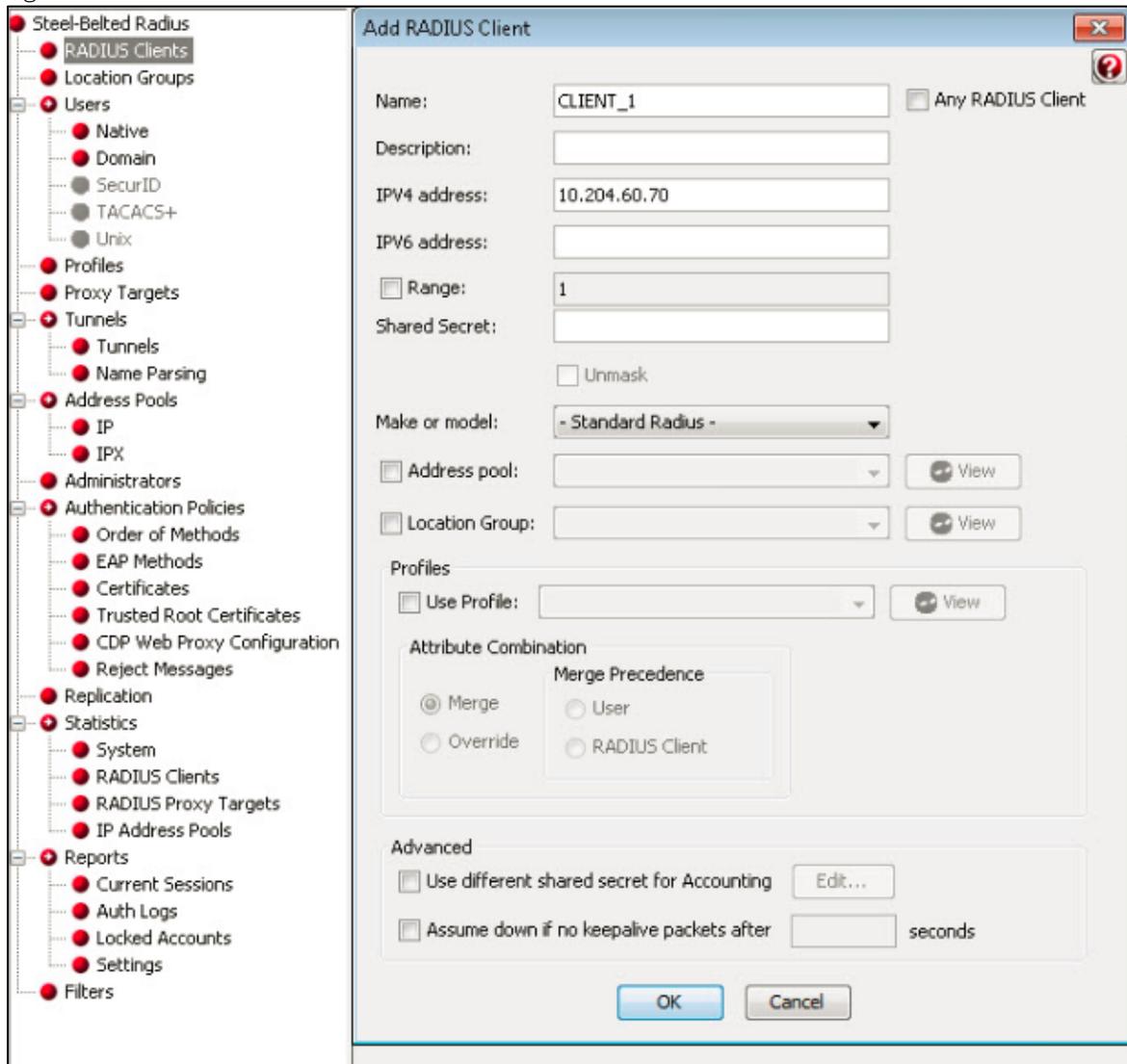
10 records per page   Search:

|   | Name   | Sign-in Policy | MAC Auth Realm | RADIUS Clients   |
|---|--|----------------|----------------|--|
| 1 | <b>Default</b><br>System created default location group.                         | */             |                |  |
| 2 | <b>Guest</b><br>System created location group for guest users                    | */guest/       |                |  |
| 3 | <b>Guest Wired</b><br>System created location group for wired guest users        | */guest/       | Guest Wired    |  |
| 4 | <b>Cert Auth</b><br>System created location group for Certificate Authentication | */certauth/    |                |  |
| 5 | <b>SBRMigrationLGDefault</b>   | */SBR/         |                | SBRMigrationRadiusClientPCS-70,<br>SBRMigrationRadiusClientP<br>SBRMigrationRadiusClientP<br>SBRMigrationRadiusClientP<br>SBRMigrationRadiusClientP<br>SBRMigrationRadiusClientP<br>SBRMigrationRadiusClientY<br>SBRMigrationRadiusClientC<br>SBRMigrationRadiusClientD<br>SBRMigrationRadiusClientD<br>SBRMigrationRadiusClientD<br>SBRMigrationRadiusClientJ<br>SBRMigrationRadiusClientK<br>SBRMigrationRadiusClientK |
| 6 | <b>SBRMigrationLGBNG</b>   | */SBR/         |                |  |
| 7 | <b>SBRMigrationLGBNG_OVERRIDE</b>  | */SBR/         |                | SBRMigrationRadiusClientDUMMY  |
| 8 | <b>SBRMigrationLGBNG_PROFILE</b>   | */SBR/         |                |  |

## RADIUS Client Configured on SBR

Select Steel-Belted Radius > RADIUS Clients to view the configured RADIUS client.

Figure SBR RADIUS client



## Creating a new RADIUS Client on PPS

Select **Endpoint Policy > Network Access > RADIUS Client**.

For example, SBRMigrationRadiusClientPPS is configured as a RADIUS client.

Figure – RADIUS client

|   | Name  | IP Address | Range | Make                | Group                 | Enabled |
|---|---|------------|-------|---------------------|-----------------------|---------|
| 1 | SBRMigrationRadiusClientCISCO 2960<br><small>This is Cisco rad client 88.10</small> |            | 1     | - Standard Radius - | SBRMigrationLGDefault | ✓       |
| 2 | SBRMigrationRadiusClientCISCO 3850  |            | 1     | - Standard Radius - | SBRMigrationLGRAD_CL  | ✓       |
| 3 | SBRMigrationRadiusClientDA...   |            | 1     | - Standard Radius - | SBRMigrationLGDefault | ✓       |
| 4 | SBRMigrationRadiusClient[...]<br><small>DARSHAN-LACQA</small>                       |            | 1     | - Standard Radius - | SBRMigrationLGDefault | ✓       |

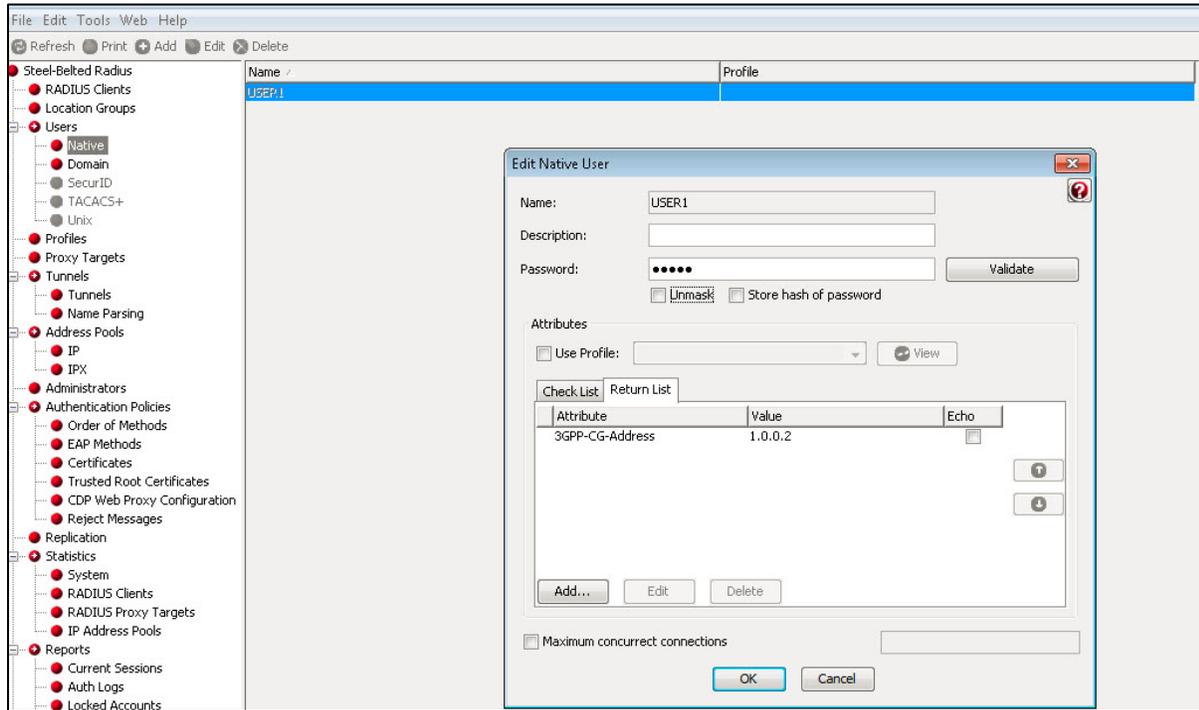
Note: If RADIUS client is not using profile and location group then the default Location group is used.

If a RADIUS Client is using Profiles then:

- If the profile is used by any of Location group then RADIUS client will be associated with that location group
- If profile is not used by any location group, then a location group with name "SBRMigProfile<ProfileID/Name>" is created on PPS, which will be associated to RADIUS Client.
- The Radius client Shared secrets stored in SBR xml file will be decrypted and imported to the PPS Radius clients.

## RADIUS Return Attribute on SBR

Select Return List and note down the attribute and value.



The screenshot shows a web-based configuration interface for a RADIUS server. The left sidebar contains a tree view of configuration categories, including Steel-Belted Radius, Users, Profiles, and Reports. The main area displays a table with columns for Name and Profile, with 'USER1' selected. An 'Edit Native User' dialog box is open, showing the user's details and a 'Return List' tab. The 'Return List' tab contains a table with the following data:

| Attribute       | Value   | Echo                     |
|-----------------|---------|--------------------------|
| 3GPP-CG-Address | 1.0.0.2 | <input type="checkbox"/> |

Below the table are buttons for 'Add...', 'Edit', and 'Delete'. At the bottom of the dialog box, there is a checkbox for 'Maximum concurrent connections' and 'OK' and 'Cancel' buttons.

## Configuring RADIUS Return Attribute Policies on PPS

1. Select Endpoint Policy > Network Access > RADIUS Attributes > RADIUS Return Attributes.
2. Click Return Attributes tab to see the configured policies.

For example, SBRMigrationRadRetAttrdef

Figure – Return Attributes

Network Access > Radius Attributes > RADIUS Return Attributes

### RADIUS Return Attributes

RADIUS Dictionary | RADIUS Vendor | Location Group | RADIUS Client | **RADIUS Attributes** | Network Infrastructure Device | SNMP Enforcement Policies

Return Attributes | Request Attributes | Attribute Logging

Show policies that apply to: All roles

A RADIUS return attributes policy specifies the return list attributes to send to an 802.1X network access device, such as which VLAN endpoints must use to access the network. If no policy applies, Open Port is the default action.

| Policy                               | ACL Settings | Attributes   | Location Group                                     | Interface | Applies to role |
|--------------------------------------|--------------|--|--|-----------|-----------------|
| 1. SBRMigrationRadRetAttrTEST        | N/A          | Cisco-AVPair=url-redirect=https://10.96.69.26<br>Cisco-AVPair=ip:inac1#161=deny ip any any | SBRMigrationLGRAD_CL<br>SBRMigrationLGBNG_OVERRIDE | N/A       | All roles       |
| 2. SBRMigrationRadRetAttr...         | N/A          | Cisco-AVPair=ip:inac1#141=permit ip any any<br>Reply-Message=123456789                     | SBRMigrationLGBNG_PROFILE                          | N/A       | All roles       |
| 3. SBRMigrationRadRetAttrS...        | N/A          | Tunnel-Medium-Type=6<br>Tunnel-Private-Group-ID="65"<br>Tunnel-Type=13                     | SBRMigrationLGProfSACHIN                           | N/A       | All roles       |
| 4. SBRMigrationRadRetAttrRC1_PROFILE | N/A          | Filter-Id=limited  | SBRMigrationLGProRC1_PROFILE                       | N/A       | All roles       |
| 5. SBRMigrationRadRetAttrLG1_PROFILE | N/A          | Filter-Id=compliant.in   | SBRMigrationLGLG1PROFILE                           | N/A       | All roles       |
| 6. SBRMigrationRadRetAttrOpenPort    | N/A          | OpenPort   | SBRMigrationLGBNG<br>SBRMigrationLGDefault         | N/A       | All roles       |

### Note:

- If Location group is using profile then will use those location group into profile.
- If RADIUS Client is using profile and no location group is using that profile, then the Location Group used during the creation of RADIUS client will be attached to that profile.
- If profile is not used by any location group or RADIUS Client it will not be imported.
- Only PPS supported attributes will be imported. For example, if SBR supports attribute\_a, attribute\_b and attribute\_c and PPS supports attribute\_a and attribute\_b then profile will contain only attribute\_a and attribute\_b.

# MAC Address Authentication Migration

## Importing MAC Address from SBR into PPS

The following are the important things to consider while importing the MAC address:

1. The username should be in MAC address format (':', '-' or no separator).  
For example, 00-11-85-bb-8c-67, 00:11:85:bb:8c:66 or 001185bb8c69
2. The default password will be **username** (Mac address).
3. Password is stored in plain text by default.
4. User must change password in next sign-in option will be disabled by default.

Figure –MAC Address Users

The screenshot shows the 'Users' management page in PPS. At the top, there are tabs for 'Settings', 'Users', and 'Admin Users'. Below the tabs, there is an 'Import Users from CSV file' section with a 'Browse' button, 'No file chosen', an 'Import' button, and an 'Overwrite Users' checkbox. A note states: 'Note: Enabling the checkbox will overwrite the user having the same user name.' Below this, there is a search field 'Show users named:' with an asterisk, a 'Show' dropdown set to '200', and an 'Update' button. At the bottom of the search area, there are buttons for 'New...', 'Delete...', and 'Unlock...', along with pagination controls showing 'Page 1 of 1' and navigation arrows.

|                          | Username     | Name             | User type  | Last Sign-in Statistic |           |       |        |
|--------------------------|--------------|------------------|------------|------------------------|-----------|-------|--------|
|                          |              |                  |            | Date&Time              | IPAddress | Agent | Status |
| <input type="checkbox"/> | 0021ccc236a1 | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> | 0021ccc236a2 | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> | 0021ccc236b1 | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> | 0021ccc236b2 | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> | 0021ccc236c1 | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> | 005056836480 | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> | after        | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> | check        | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> | hdarshan     | Unspecified Name | Guest user |                        |           |       |        |
| <input type="checkbox"/> | kaiakr       | Unspecified Name | Guest user |                        |           |       |        |

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# TACACS+ Migration

Terminal Access Controller Access Control System (TACACS) is a security protocol that provides centralized validation of users who are attempting to gain access to a router or Network Access Device (NAS). TACACS+, a more recent version of the original TACACS protocol, provides separate authentication, authorization, and accounting (AAA) services.

The TACACS+ protocol provides detailed accounting information and flexible administrative control over the authentication, authorization, and accounting process. The protocol allows a TACACS+ client to request detailed access control and allows the TACACS+ process to respond to each component of that request. TACACS+ uses Transmission Control Protocol (TCP) for its transport.

TACACS+ provides security by encrypting all traffic between the NAD and the process. Encryption relies on a secret key that is known to both the client and the TACACS+ process.

This feature is to import SBR TACACS+ configuration data to PPS so that Network Access Devices (routers and switches) with TACACS+ client can connect (migrate) to PPS for TACACS+ AAA services. The procedure is to get the SBR TACACS+ configuration file and then import it into PPS. The default configurations are created in PPS to make it compatible with TACACS+ server.

The sample text configuration file used for import is captured below.

```

#!/opt/PSsbr/radius/tac_plus

id = spawn {
    listen = { port = 49 }
    spawn = {
        instances min = 2
        instances max = 10
    }
    background = yes
}

id = tac_plus {
    debug = PARSE PACKET AUTHEN AUTHOR ACCT CONFIG HEX REGEX LOCK ACL CMD BUFFER PROC NET PATH CONTROL INDEX AV MAVIS LWRES

    access log = /opt/PSsbr/radius/tacplus_access.log
    accounting log = /opt/PSsbr/radius/tacplus_acct.log

    syslog facility = local6
    syslog level = debug

    retire limit = 1000
    mavis module = external {
        setenv SHADOWFILE = /etc/shadow
        exec = /opt/PSsbr/radius/mavis/mavis_tacplus_shadow.pl
        # see the MAVIS configuration manual for more options
    }
    login backend = mavis chpass

    mavis module = external {
        setenv LDAP_SERVER_TYPE = "microsoft"
        setenv LDAP_HOSTS = "1.1.1.1:389"
        setenv LDAP_SCOPE = sub
        setenv LDAP_BASE = "dc=64windows2008,dc=pulse,dc=com"
        setenv LDAP_FILTER = "(&(objectclass=user)(sAMAccountName=%s))"
        setenv LDAP_USER = test@64windows2008.pulse.com
        setenv LDAP_PASSWORD = $ENC$53616c7465645f5f4c105b186f4d2f271b3e33ce6d65672c
        setenv FLAG_USE_MEMBEROF = 1
        setenv AD_GROUP_PREFIX = tes

        exec = /opt/PSsbr/radius/mavis/mavis_tacplus_ldap.pl
        # see the MAVIS configuration manual for more options
    }
    login backend = mavis
    pap backend = mavis
    user backend = mavis

    host = world {
        welcome banner = "\nHitherto shalt thou come, but no further. (Job 38.11)\n\n"
        key = QawsEdRfTgY
        address = 192.168.1.0/24
    }

    host = 10.204.88.14 {
        prompt = "Welcome to cisco switch \n"
        key = psecure
    }

    group = readwrite {
        default service = permit
        service = shell {
            default command = permit
            set priv-lvl = 15
        }
    }

    group = getconfig{
        enable 15 = clear secret
        service = shell {
            set priv-lvl = 1
            cmd = show { permit running-config }
            cmd = configure { deny terminal }
            cmd = telnet {
                deny ^131\.100\.13\.[0-9]+
                permit .*
            }
            cmd = show {
                deny version
                permit privilege
            }
            cmd = enable { permit .* }
        }
    }

    group = junipersuperadmin {
        service = junos-exec {
            set local-user-name = "remote-super-users"
            set user-permissions = "all"
        }
    }

    user = marc {
        password = crypt $1$xxxxxxx$hDZPHghXe8XvoHeFdqUwm/
        member = readwrite@world
    }

    user = john {
        password = clear john123
        member = junipersuperadmin@10.204.88.14
    }

    user = fred {
        password = clear kunkure
        member = getconfig@world
    }
}

```

## SBR TACACS+ config file

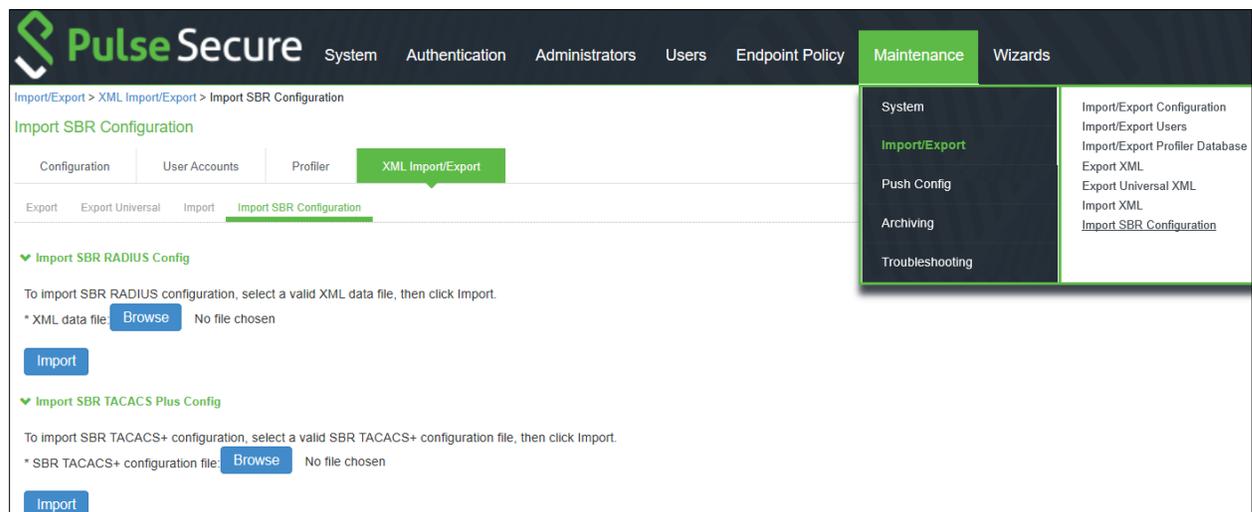
TACACS+ configurations are stored in a text configuration file available at:

/opt/PSsbr/radius/tac\_plusd.cfg

## Importing SBR TACACS+ config file to PPS

1. Select **Maintenance > Import/Export > XML Import/Export > Import SBR Configuration**.
2. Under Import SBR TACACS plus config, click **Browse** and browse the SBR TACACS+ configuration file which needs to be imported.
3. Click **Import**.

Figure –Import SBR TACACS + config



**Note:** You cannot import multiple TACACS+ cfg files simultaneously. The Admin must wait for the TACACS+.cfg file import to get completed to import another cfg file.

## Authentication Server

For ease of migration TacacsPlusMigrationAuthServer is created by default.

| <input type="checkbox"/> | Authentication/Authorization Servers | Type                       |
|--------------------------|--------------------------------------|----------------------------|
| <input type="checkbox"/> | Administrators                       | Local Authentication       |
| <input type="checkbox"/> | Certificate Authentication           | Certificate Server         |
| <input type="checkbox"/> | Guest Authentication                 | Local Authentication       |
| <input type="checkbox"/> | Guest Wired Authentication           | MAC Address Authentication |
| <input type="checkbox"/> | System Local                         | Local Authentication       |
| <input type="checkbox"/> | TacacsPlusMigrationAuthServer        | Local Authentication       |

**Note:** Any secondary LDAP/AD servers configured in SBR tac\_plusd.cfg file are not migrated and admin should configure them manually in PPS.

## Users

Navigate to **Auth Servers > TacacsPlusMigrationAuthServer > Users** to view the users successfully migrated from SBR to PPS.

**Note:** If the user has encrypted password in SBR. It will be migrated with the default password as **pulsesecure**.

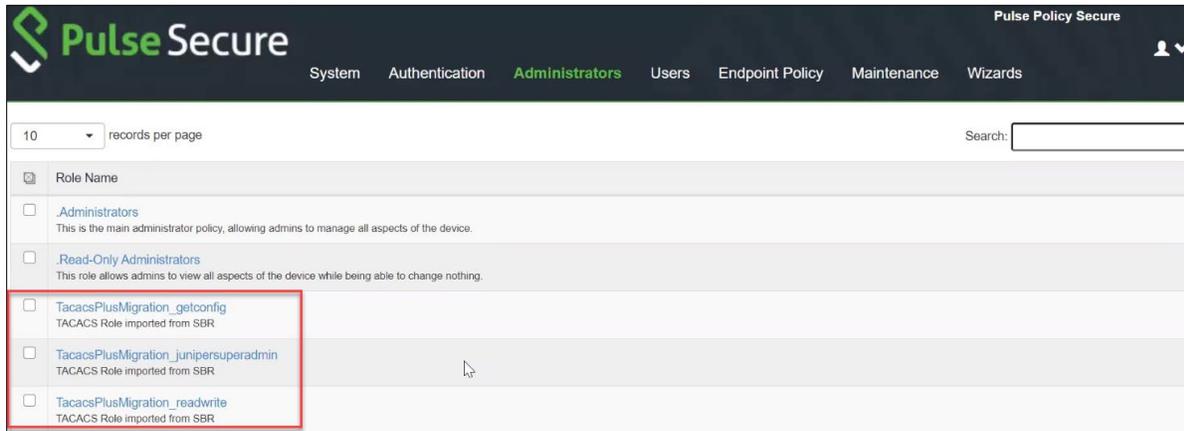
Figure -Users

| <input type="checkbox"/> | Username | Name             | User type | Last Sign-in Statistic |           |       |        |
|--------------------------|----------|------------------|-----------|------------------------|-----------|-------|--------|
|                          |          |                  |           | Date&Time              | IPAddress | Agent | Status |
| <input type="checkbox"/> | fred     | Unspecified Name | Normal    |                        |           |       |        |
| <input type="checkbox"/> | john     | Unspecified Name | Normal    |                        |           |       |        |
| <input type="checkbox"/> | marc     | Unspecified Name | Normal    |                        |           |       |        |

## Roles

TACACS roles are imported from SBR. The roles imported are prefixed with TacacsPlusMigration.

Figure –TacacsPlus Roles



The screenshot shows the Pulse Secure interface with the 'Administrators' menu item selected. A table lists roles, with three TacacsPlusMigration roles highlighted by a red box:

| Role Name  | Description   |
|--|---|
| <input type="checkbox"/> .Administrators                       | This is the main administrator policy, allowing admins to manage all aspects of the device.   |
| <input type="checkbox"/> .Read-Only Administrators             | This role allows admins to view all aspects of the device while being able to change nothing. |
| <input type="checkbox"/> TacacsPlusMigration_getonfig          | TACACS Role imported from SBR   |
| <input type="checkbox"/> TacacsPlusMigration_junipersuperadmin | TACACS Role imported from SBR   |
| <input type="checkbox"/> TacacsPlusMigration_readwrite         | TACACS Role imported from SBR   |

## Realm

For ease of migration **TacacsPlusMigrationRealm** is created by default. Navigate to **Admin Realms > Administrator Authentication Realms**. to view the realm.

Figure –Admin Realm



The screenshot shows the 'Administrator Authentication Realms' page in Pulse Secure. It features a table with the following data:

| Authentication Realm                              | Authentication Server         |
|---|-------------------------------|
| <input type="checkbox"/> Admin Users              | Administrators                |
| <input type="checkbox"/> TacacsPlusMigrationRealm | TacacsPlusMigrationAuthServer |

Navigation controls at the bottom include '← Previous', '1', and 'Next →'. A footer note states: 'Authentication realms specify what server to use for authentication, how policies are assigned to users, and restrictions on who can attempt to sign-in.'

## Role Mapping

Navigate to **Admin Realms > TacacsPlusMigrationRealm > Role Mapping** to view the users mapped to the TacacsPlusmigration roles.

Figure –Role Mapping

The screenshot shows the 'Role Mapping' configuration page for the 'TacacsPlusMigrationRealm'. The page has three tabs: 'General', 'Authentication Policy', and 'Role Mapping' (which is active). Below the tabs, there is a description: 'Specify how to assign delegated admin roles to users when they sign in. Users that are not assigned a role will not be able to sign in.' There are buttons for 'New Rule...', 'Duplicate', 'Delete', and 'Save Changes'. A table lists three rules:

|                          | When users meet these conditions | assign these roles                      | Rule Name                               | Stop |
|--------------------------|----------------------------------|---|---|------|
| <input type="checkbox"/> | 1. username is "fred"            | → TacacsPlusMigration_getconfig         | TacacsPlusMigrationRoleMapping for fred |      |
| <input type="checkbox"/> | 2. username is "john"            | → TacacsPlusMigration_junipersuperadmin | TacacsPlusMigrationRoleMapping for john |      |
| <input type="checkbox"/> | 3. username is "marc"            | → TacacsPlusMigration_readwrite         | TacacsPlusMigrationRoleMapping for marc |      |

Below the table, there are radio button options for handling multiple roles: 'Merge settings for all assigned roles' (selected), 'User must select from among assigned roles', and 'User must select the sets of merged roles assigned by each rule'. A note at the bottom states: 'Note: Users that do not meet any of the above rules will not be able to sign into this realm.'

## Device groups

Navigate to **Network Device Administration > Device Group** to view the device group policy, which logically groups network devices by associating the devices with specific admin realm TacacsPlusMigrationRealm. The device groups imported from SBR are prefixed with TacacsPlusMigration.

Figure –TacacsPlus Device Group

The screenshot shows the 'Device Group' configuration page in the 'Network Device Administration' section. The page has three tabs: 'Device Groups' (active), 'TACACS+ Clients', and 'Shell Policies'. Below the tabs, there is a description: 'A device group policy logically groups network devices by associating the devices with specific admin realm.' There are buttons for 'New Device Group...', 'Duplicate...', and 'Delete...'. Below the buttons, there is a 'records per page' dropdown set to '10' and a 'Search:' input field. A table lists two device groups:

|                          | Name                              | Admin Realm              | TACACS+ Clients                 |
|--------------------------|-----------------------------------|--------------------------|---------------------------------|
| <input type="checkbox"/> | 1 TacacsPlusMigration10.204.88.14 | TacacsPlusMigrationRealm | TacacsPlusMigration10.204.88.14 |
| <input type="checkbox"/> | 2 TacacsPlusMigrationworld        | TacacsPlusMigrationRealm | TacacsPlusMigration192.168.1.0  |

Network Device Administration > Device Group > TacacsPlusMigration10.204.88.14

### TacacsPlusMigration10.204.88.14

▼ Device Group

\* Name:  Label to reference this Device Group.

Description:

\* Admin Realm:  To manage realm, see the [Admin Realms](#)

\* indicates required field

### Clients

Host details configured in SBR is migrated to PPS. The clients migrated from SBR will have the prefix TacacsPlusMigration.

Figure –Clients

Network Device Administration > TACACS+ Client

### TACACS+ Client

Device Groups | **TACACS+ Clients** | Shell Policies

A TACACS+ client policy specifies the information required for this device to connect to Pulse Policy Secure for admin access control.

10 records per page Search:

|                          | Name ▲                            | IP Address   | Range | Device Group                    | Enabled |
|--------------------------|-----------------------------------|--------------|-------|---------------------------------|---------|
| <input type="checkbox"/> | 1 TacacsPlusMigration10.204.88.14 | 10.204.88.14 | 1     | TacacsPlusMigration10.204.88.14 | ✓       |
| <input type="checkbox"/> | 2 TacacsPlusMigration192.168.1.0  | 192.168.1.0  | 256   | TacacsPlusMigrationworld        | ✓       |

Network Device Administration > TACACS+ Client > TacacsPlusMigration10.204.88.14

**TacacsPlusMigration10.204.88.14**

▼ TACACS+ Client

\* Name:  Label to reference this TACACS+ Client.

Description:

\* IP Address:  IP Address of this TACACS+ Client.

\* IP Address Range:  Number of IP Addresses for this TACACS+ Client

\* Shared Secret:  TACACS+ shared secret

\* Device Group:  To manage groups, see the [Device Group](#)

▼ TACACS+ Advance Settings

Allow Authorization (w/o authentication)  Allow Authorization (w/o authentication)

[Save Changes](#)

\* indicates required field

## Shell policies

Navigate to **Endpoint Policy > Network Device Administration > Shell Policies** to view the migrated shell policies. The Shell Policies imported from SBR are prefixed with TacacsPlusMigration.

**Note:** The migration tool migrates only the first 13 custom attributes of the SBR shell policy to PPS and the remaining are not migrated.

Figure –Shell Policies

Network Device Management > Shell Policies

**Shell Policies**

Device Groups | TACACS+ Clients | **Shell Policies**

[New Policy](#) [Duplicate](#) [Delete](#) [↑](#) [↓](#) [Save Changes](#)

10 records per page

|                          | Name                                    | Device Group                    | Default Privilege | Maximum Privilege | Command Set                               | Custom Attributes      | Applies to                            |
|--------------------------|---|---------------------------------|-------------------|-------------------|---|------------------------|---------------------------------------|
| <input type="checkbox"/> | 1 TacacsPlusMigration_getconfig         | TacacsPlusMigrationworld        | 1                 | 15                | ▶ Permitted Commands<br>▶ Denied Commands |                        | TacacsPlusMigration_getconfig         |
| <input type="checkbox"/> | 2 TacacsPlusMigration_junipersuperadmin | TacacsPlusMigration10.204.88.14 | 1                 | 1                 |   | ▶ Mandatory Attributes | TacacsPlusMigration_junipersuperadmin |
| <input type="checkbox"/> | 3 TacacsPlusMigration_readwrite         | TacacsPlusMigrationworld        | 15                | 15                |   |                        | TacacsPlusMigration_readwrite         |

The example shell policy shows “TacacsPlusMigration\_getconfig” shell policy mapped to the device group “TacacsPlusMigrationworld” and to role “TacacsPlusMigration\_getconfig”.

**Note:** Service type can be configured in TACACS+ shell policy for TACACS+ authorisation. Service type value is different than the default value i.e shell sometimes. You must define correct value as desired by each vendor. For example, for Palo Alto Networks service type is "PaloAlto", for Juniper Networks service type is "junos-exec" and for Cisco Airspace WLC service type is "ciscowlc".

### TacacsPlusMigration\_getconfig

▼ New Shell Policy

\* Name:  Label to reference this policy.  
 Description:

▼ Device Group

- Policy applies to ALL groups  
 Policy applies to SELECTED groups

Available Device Groups:

Selected Device Groups:

▼ Shell Policy

\* Default Privilege:  Shell Privilege Levels supported  
 \* Maximum Privilege:   
 Service:

This is optional and default service is 'shell'

▼ Command Set

| <input type="checkbox"/> | Command              | Arguments            | Action                              |                                    |
|--------------------------|----------------------|----------------------|-------------------------------------|------------------------------------|
|                          | <input type="text"/> | <input type="text"/> | <input type="text" value="permit"/> | <input type="button" value="Add"/> |
| <input type="checkbox"/> | configure            | terminal             | deny                                |                                    |
| <input type="checkbox"/> | enable               | .*                   | permit                              |                                    |
| <input type="checkbox"/> | show                 | running-config       | permit                              |                                    |
| <input type="checkbox"/> | show                 | version              | deny                                |                                    |
| <input type="checkbox"/> | show                 | privilege            | permit                              |                                    |
| <input type="checkbox"/> | telnet               | ^131\108\13\[0-9]+   | deny                                |                                    |
| <input type="checkbox"/> | telnet               | .*                   | permit                              |                                    |

- Deny any command that does not hit any of the rule in the table above  
 Permit any command that does not hit any of the rule in the table above

▼ Custom Attributes

| <input type="checkbox"/> | Attribute            | Value                | Requirement                            |                                    |
|--------------------------|----------------------|----------------------|--|------------------------------------|
|                          | <input type="text"/> | <input type="text"/> | <input type="text" value="Mandatory"/> | <input type="button" value="Add"/> |

▼ Roles

- Policy applies to ALL roles  
 Policy applies to SELECTED roles  
 Policy applies to all roles OTHER THAN those selected below

Available roles:

Selected roles:

\* indicates required field

---

# References

For more information on 802.1X authentication and troubleshooting, see [802.1X Authentication with Cisco Switch](#).

For more information on TACACS+ authentication and troubleshooting, see:

[http://www.pro-bono-publico.de/projects/tac\\_plus.html](http://www.pro-bono-publico.de/projects/tac_plus.html) and <https://tools.ietf.org/id/draft-ietf-opsawg-tacacs-07.html>