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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Contents

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 de fault 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.

ℹ 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 and TACACS+ 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

Table 1: Steps to Configure

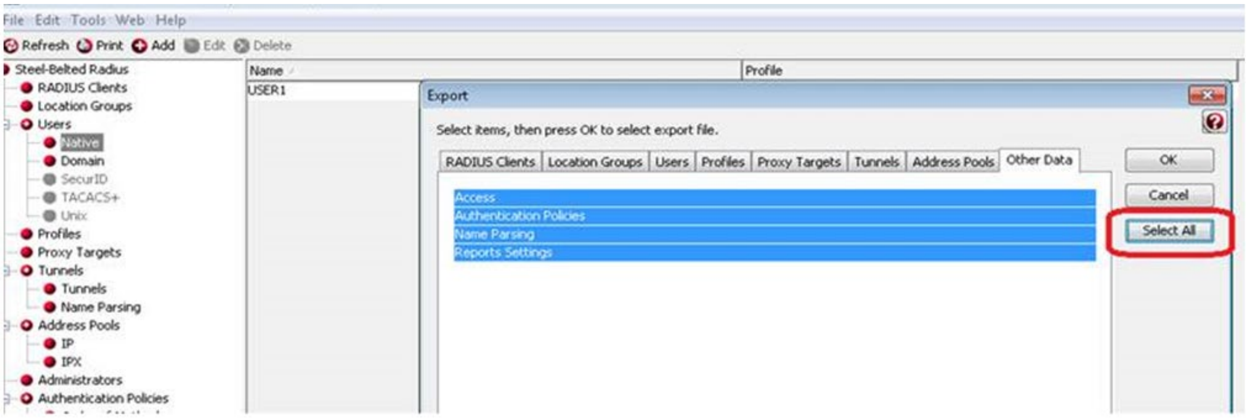
Step	Configuration on SBR	Equivalent configuration on PPS
Step 1	Configure Users > Native > Add Native Users.	Configure Authentication Server
Step 2	SBR profile-based authentication.	Configure the Authentication Realm, Role mapping rules and Sign-In Policy.
Step 3	Configure SBR > Location Groups.	Configure 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:

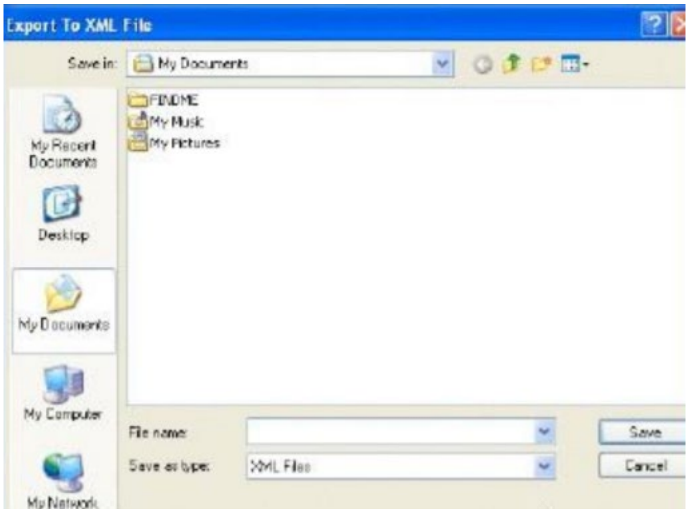
1. Run the SBR Administrator.
2. Choose **File > Export**.
3. In the Export dialog, select the information to export. Each tab in the dialog lists exportable items of a particular category. For each category, select the appropriate tab and click each item you'd like to export. To select a contiguous 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



Select items, then press OK to select export file.

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

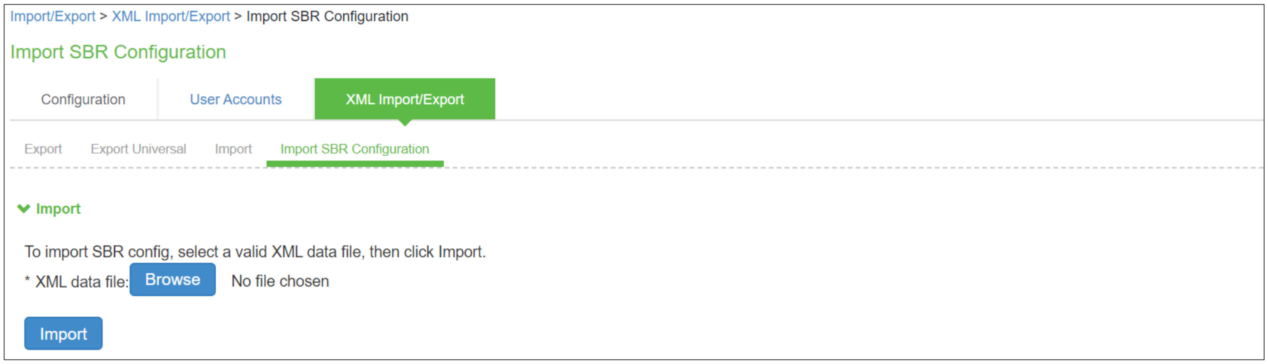


5. In the Export to XML file dialog, enter the file name and click **Save**.

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**.



To import SBR config, select a valid XML data file, then click Import.

* XML data file: Browse No file chosen

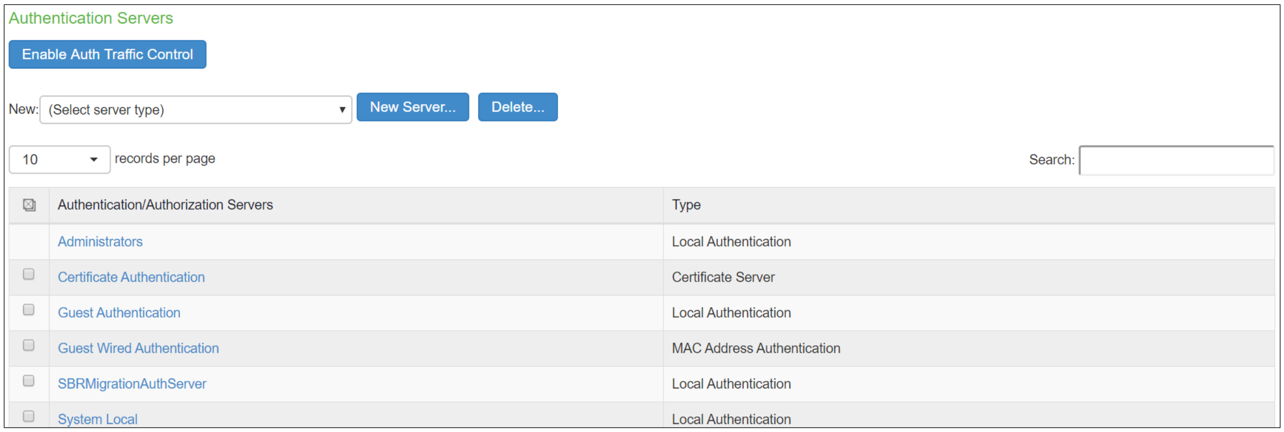
Authentication Server on PPS

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:

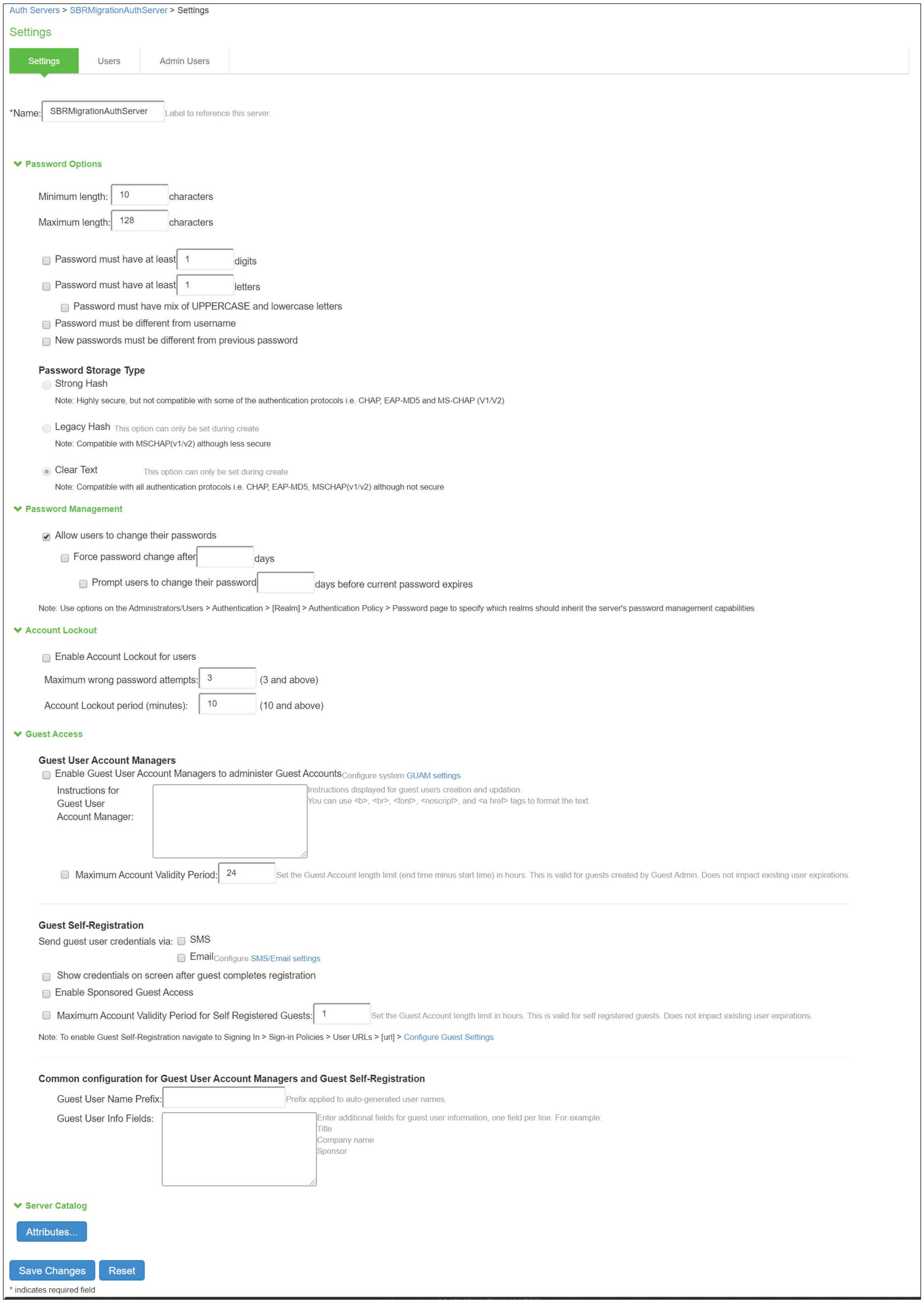
1. Select **Authentication** > **Authentication Server**. You can see the imported file on PPS authentication server. Local Auth Server named as SBRMigrationAuthServer is created for SBR migration.
2. Auth Server will be created with default values.
3. Password storage type will be set to clear text 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



	Authentication/Authorization Servers	Type
	Administrators	Local Authentication
□	Certificate Authentication	Certificate Server
□	Guest Authentication	Local Authentication
□	Guest Wired Authentication	MAC Address Authentication
□	SBRMigrationAuthServer	Local Authentication
□	System Local	Local Authentication

Figure – Authentication Server Settings



Auth Servers > SBRMigrationAuthServer > Settings

Settings

*Name: SBRMigrationAuthServer Label to reference this server.

Password Options

Minimum length: 10 characters

Maximum length: 128 characters

☐ Password must have at least 1 digits

☐ Password must have at least 1 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 (3 and above)

Account Lockout period (minutes): 10 (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 href> tags to format the text.

☐ Maximum Account Validity Period: 24 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.

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: 1 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

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

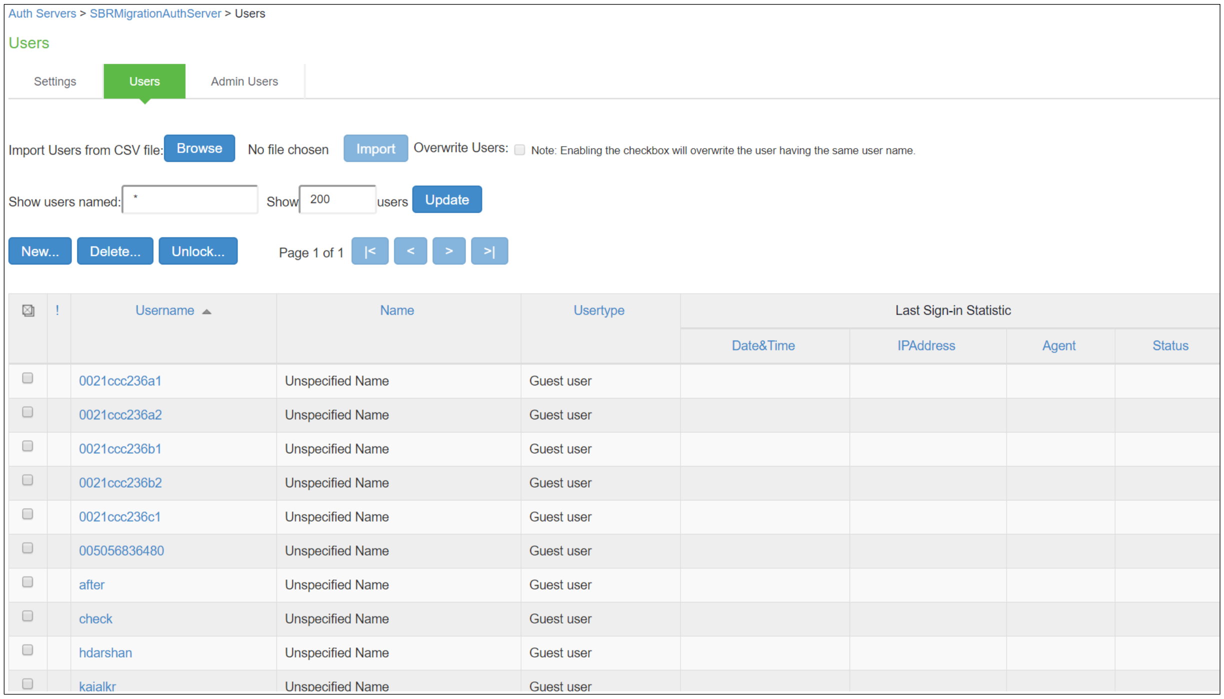
* indicates required field

User Creation on PPS

The Users are created on **SBRMigrationAuthServer**.

- Password will be stored in plain text.
- Default password will be *pulsesecure*.
- User must change password if next sign-in flag is enabled.
- 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



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 200 users

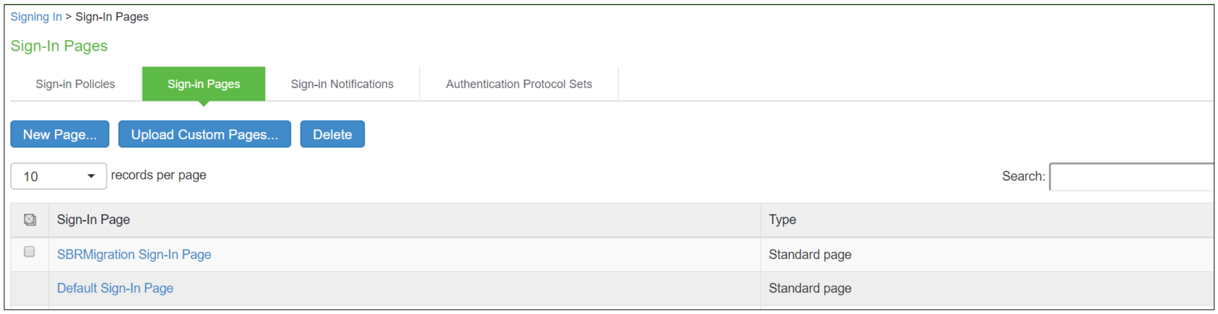
Page 1 of 1

☒	!	Username ▲	Name	Usertype	Last Sign-in Statistic			
					Date&Time	IPAddress	Agent	Status
□		0021ccc236a1	Unspecified Name	Guest user				
□		0021ccc236a2	Unspecified Name	Guest user				
□		0021ccc236b1	Unspecified Name	Guest user				
□		0021ccc236b2	Unspecified Name	Guest user				
□		0021ccc236c1	Unspecified Name	Guest user				
□		005056836480	Unspecified Name	Guest user				
□		after	Unspecified Name	Guest user				
□		check	Unspecified Name	Guest user				
□		hdarshan	Unspecified Name	Guest user				
□		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



10 records per page

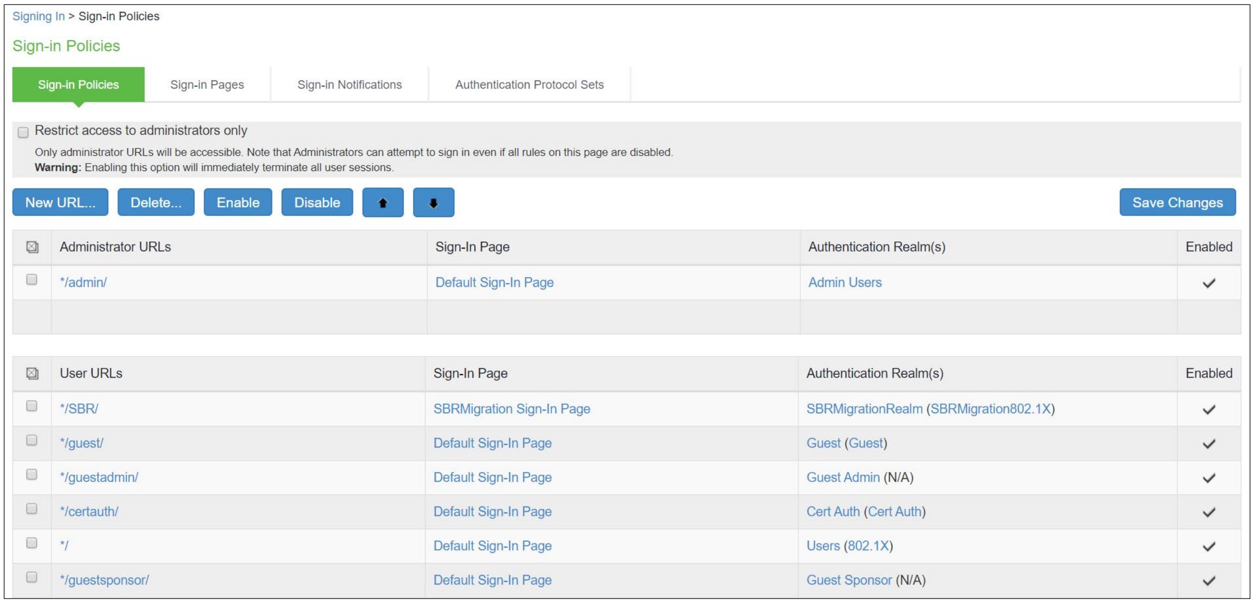
☒	Sign-In Page	Type
□	SBRMigration Sign-In Page	Standard page
	Default Sign-In Page	Standard page

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



□ 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.

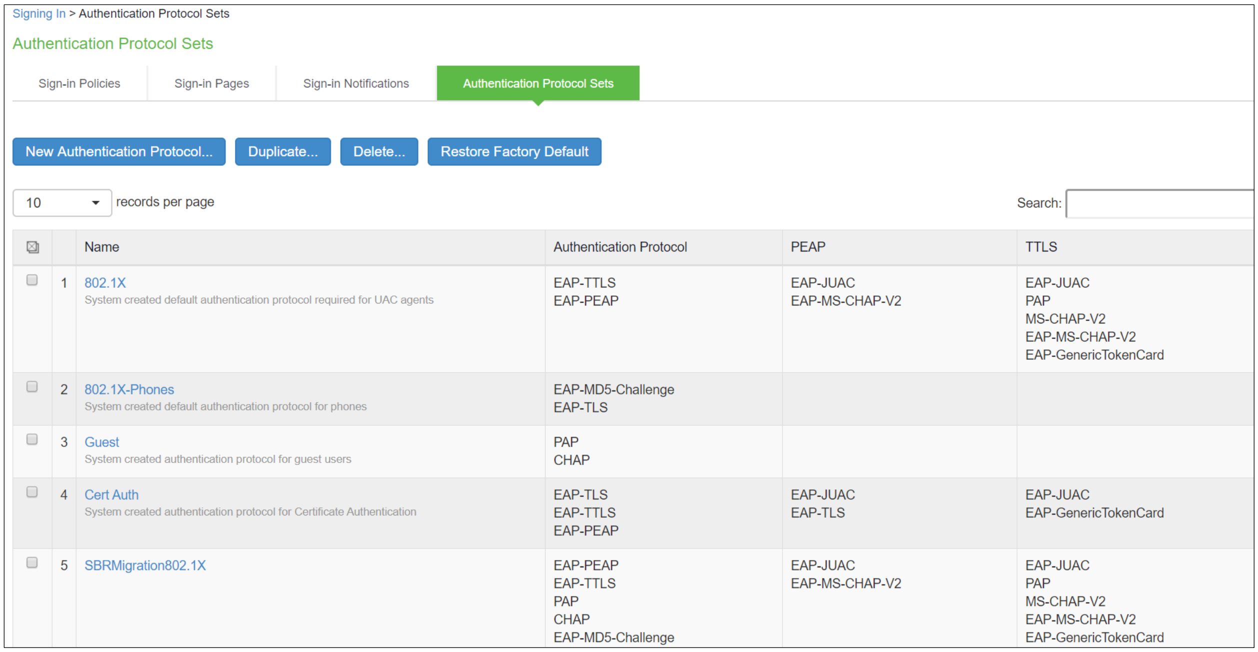
□	Administrator URLs	Sign-In Page	Authentication Realm(s)	Enabled
□	*/admin/	Default Sign-In Page	Admin Users	✓

□	User URLs	Sign-In Page	Authentication Realm(s)	Enabled
□	*/SBR/	SBRMigration Sign-In Page	SBRMigrationRealm (SBRMigration802.1X)	✓
□	*/guest/	Default Sign-In Page	Guest (Guest)	✓
□	*/guestadmin/	Default Sign-In Page	Guest Admin (N/A)	✓
□	*/certauth/	Default Sign-In Page	Cert Auth (Cert Auth)	✓
□	*/	Default Sign-In Page	Users (802.1X)	✓
□	*/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

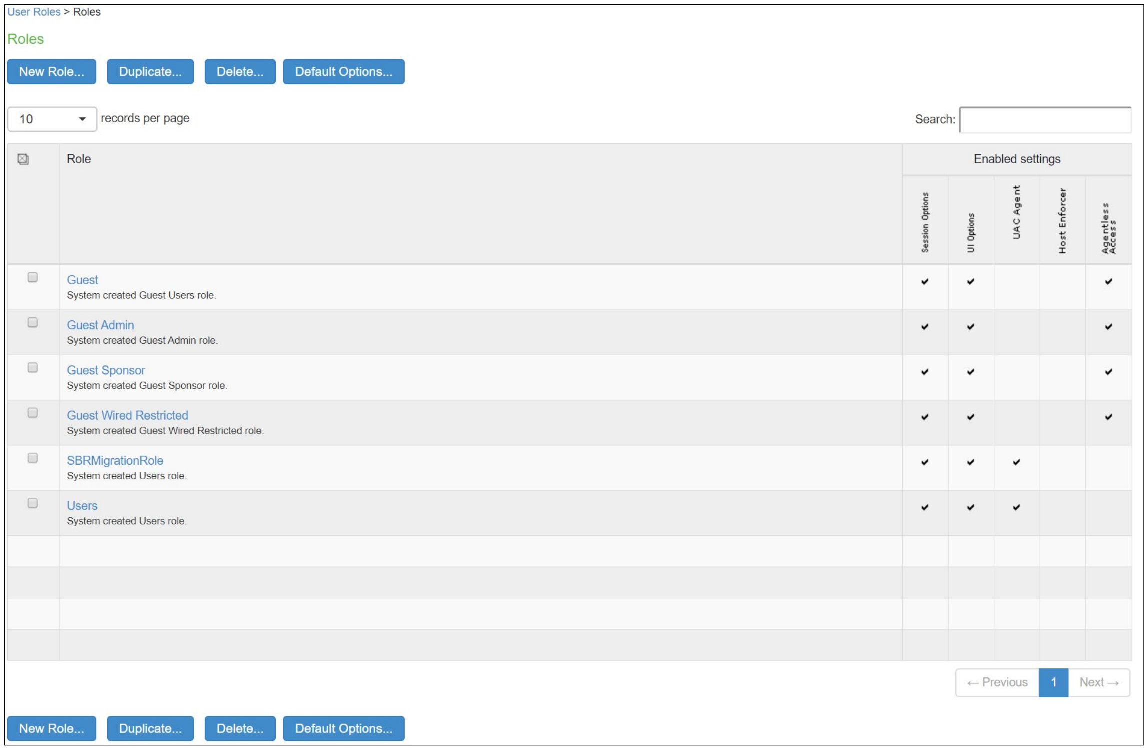

Signing In > Authentication Protocol Sets
Authentication Protocol Sets
Sign-in Policies
Sign-in Pages
Sign-in Notifications
Authentication Protocol Sets
New Authentication Protocol...
Duplicate...
Delete...
Restore Factory Default
10
records per page
Search:

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

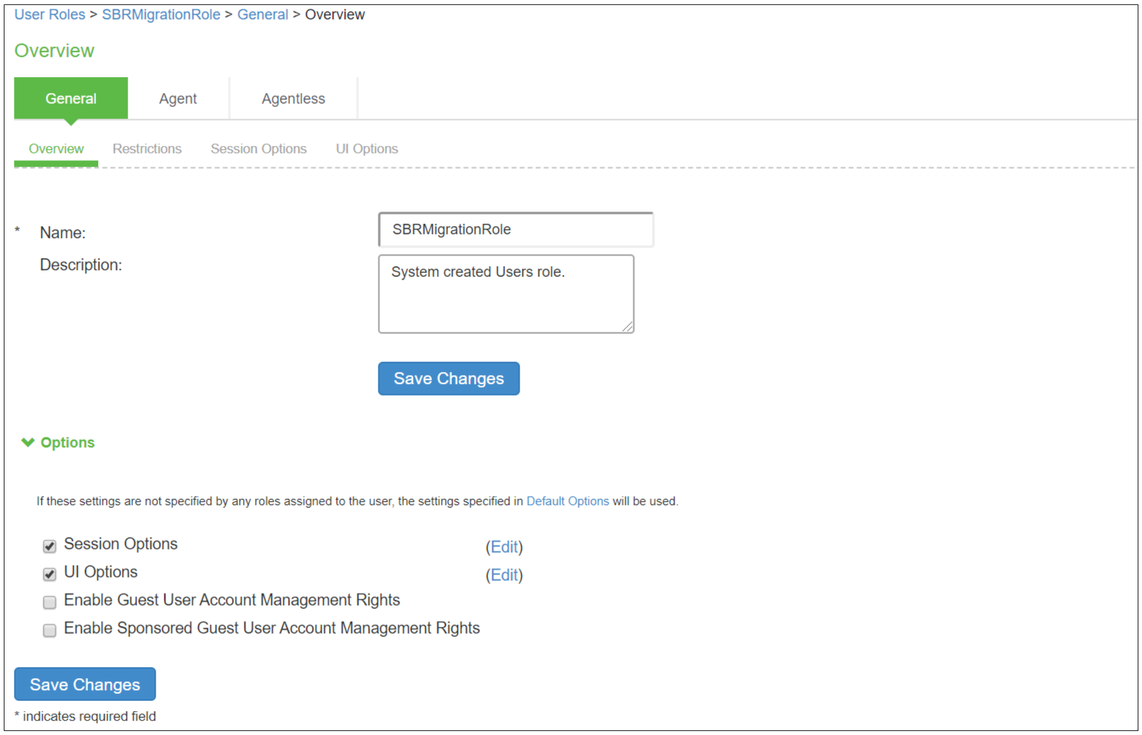
Roles

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

Figure – SBR Migration Role



	Role	Session Options	UI Options	UAC Agent	Host Enforcer	Agentless Access
□	Guest System created Guest Users role.	✓	✓			✓
□	Guest Admin System created Guest Admin role.	✓	✓			✓
□	Guest Sponsor System created Guest Sponsor role.	✓	✓			✓
□	Guest Wired Restricted System created Guest Wired Restricted role.	✓	✓			✓
□	SBRMigrationRole System created Users role.	✓	✓	✓		
□	Users System created Users role.	✓	✓	✓		



* Name: SBRMigrationRole

Description: System created Users role.

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

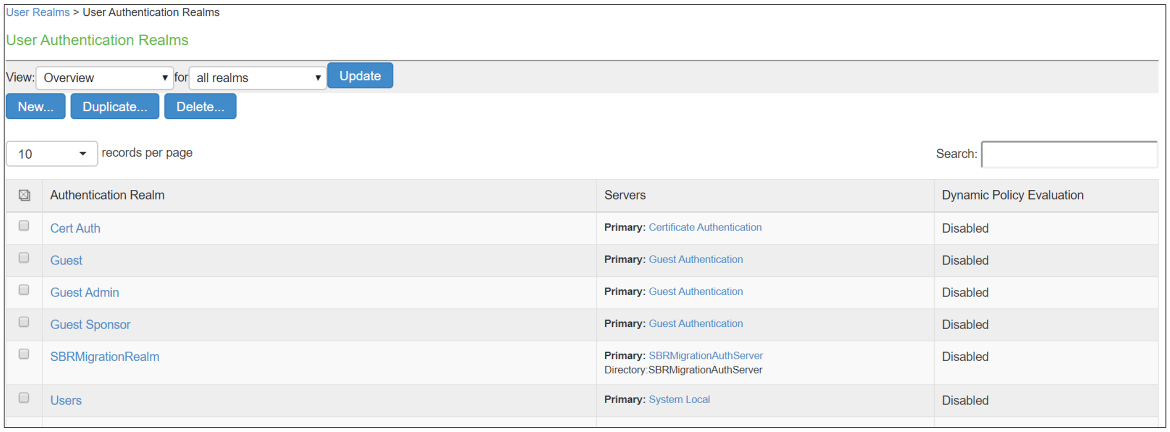
- ☑ Session Options (Edit)
- ☑ UI Options (Edit)
- □ Enable Guest User Account Management Rights
- □ Enable Sponsored Guest User Account Management Rights

* indicates required field

User Realms

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

Figure - Realm


User Realms > User Authentication Realms
View: Overview for all realms
Update
New...
Duplicate...
Delete...
records per page
Search:

User Authentication Realms

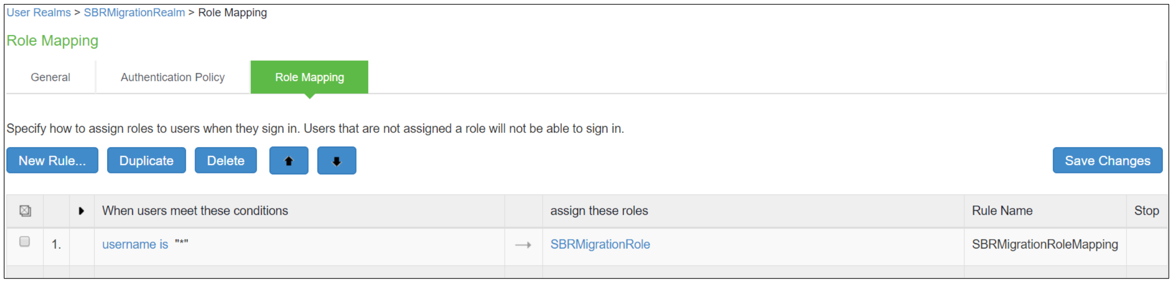
View: Overview for all realms

10 records per page

	Authentication Realm	Servers	Dynamic Policy Evaluation
□	Cert Auth	**Primary:** Certificate Authentication	Disabled
□	Guest	**Primary:** Guest Authentication	Disabled
□	Guest Admin	**Primary:** Guest Authentication	Disabled
□	Guest Sponsor	**Primary:** Guest Authentication	Disabled
□	SBRMigrationRealm	**Primary:** SBRMigrationAuthServer Directory:SBRMigrationAuthServer	Disabled
□	Users	**Primary:** System Local	Disabled

SBRMigrationRole is added in the role mapping rules.

Figure – Role Mapping Rules



Role Mapping

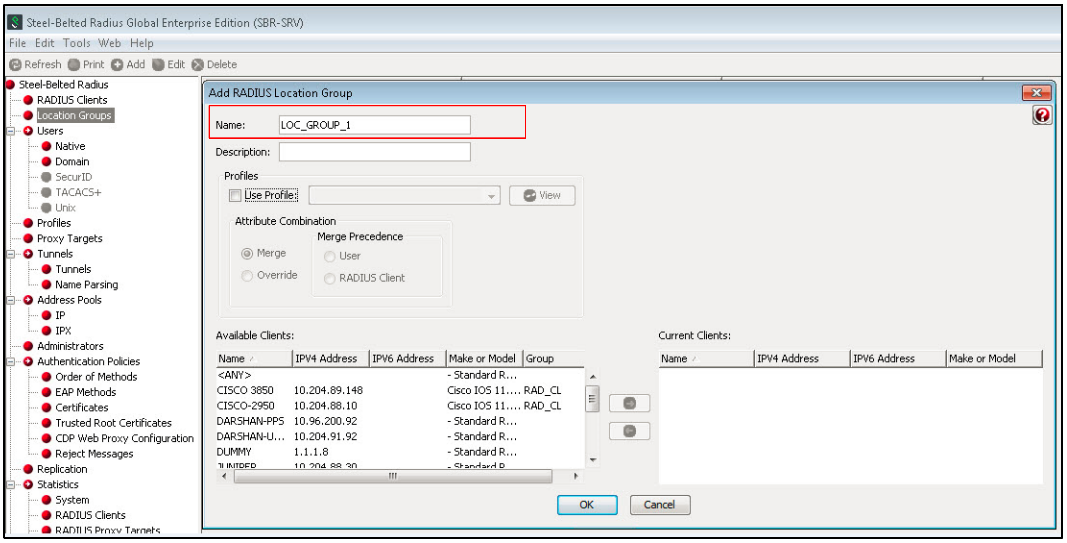
Specify how to assign roles to users when they sign in. Users that are not assigned a role will not be able to sign in.

		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



Add RADIUS Location Group

Name: LOC_GROUP_1

Description:

Profiles

□ Use Profile:

Attribute Combination

● Merge
○ Override

Merge Precedence

○ User
○ RADIUS Client

Available Clients:

Name	IPV4 Address	IPV6 Address	Make or Model	Group
<ANY>			- Standard R...	
CISCO 3850	10.204.89.148		Cisco IOS 11....	RAD_CL
CISCO-2950	10.204.88.10		Cisco IOS 11....	RAD_CL
DARSHAN-PPS	10.96.200.92		- Standard R...	
DARSHAN-U...	10.204.91.92		- Standard R...	
DUMMY	1.1.1.8		- Standard R...	
JUNIPER	10.204.88.30		- Standard R	

Current Clients:

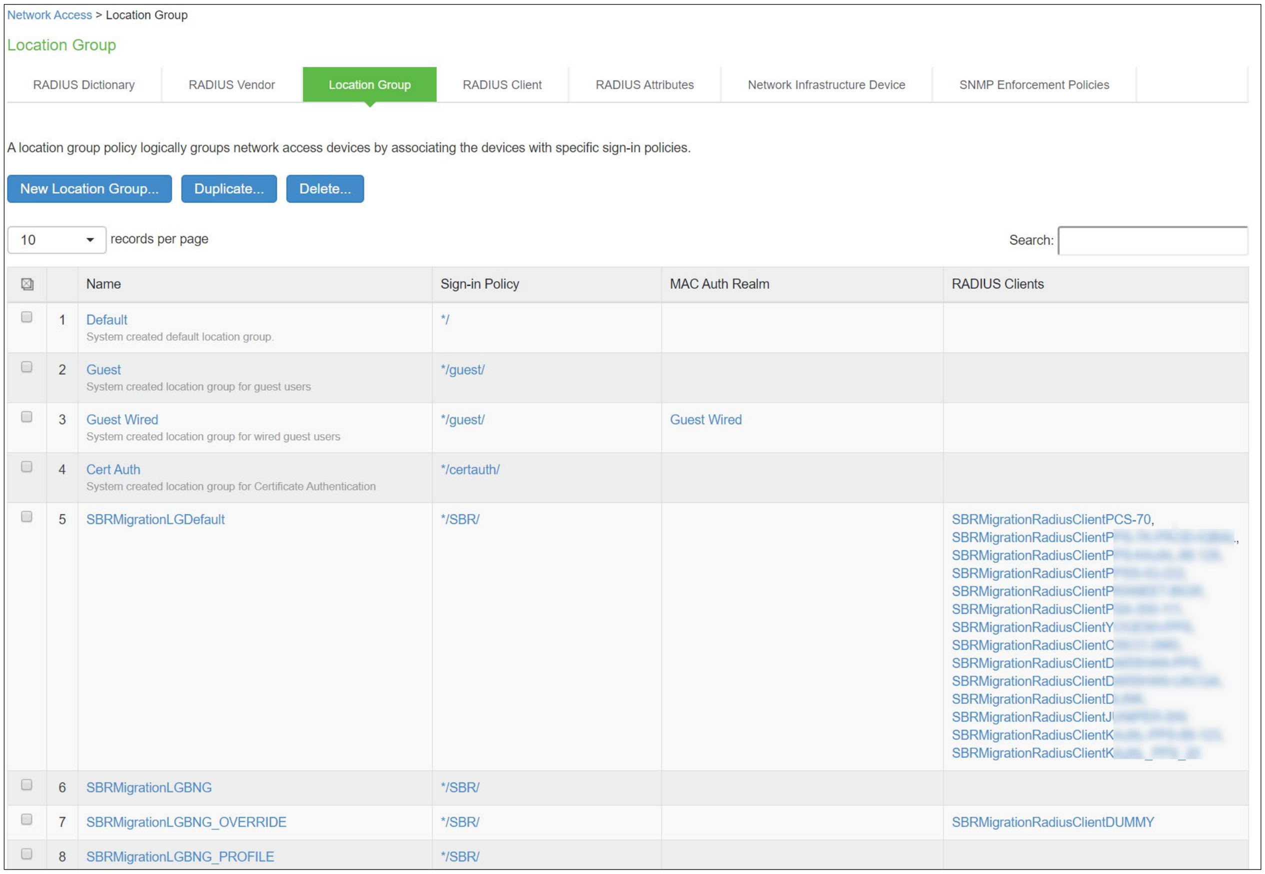
Name	IPV4 Address	IPV6 Address	Make or Model

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



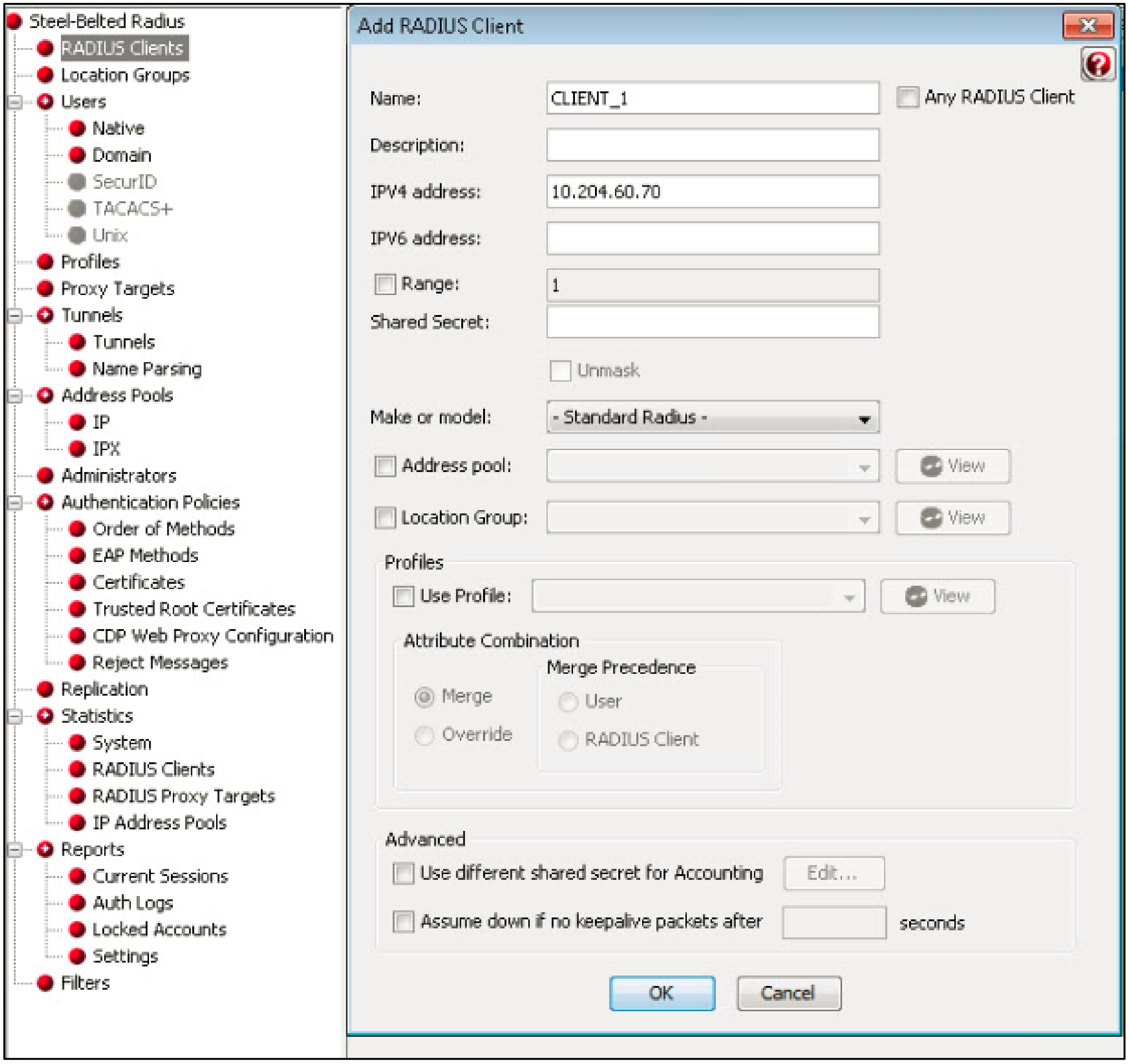
A location group policy logically groups network access devices by associating the devices with specific sign-in policies.

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

RADIUS Client Configured on SBR

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

Figure SBR RADIUS client



Add RADIUS Client

Name: CLIENT_1 □ Any RADIUS Client

Description:

IPV4 address: 10.204.60.70

IPV6 address:

□ Range: 1

Shared Secret:

□ Unmask

Make or model: - Standard Radius -

□ Address pool:

□ Location Group:

Profiles

□ Use Profile:

Attribute Combination

● Merge
○ Override

Merge Precedence

○ User
○ RADIUS Client

Advanced

□ Use different shared secret for Accounting

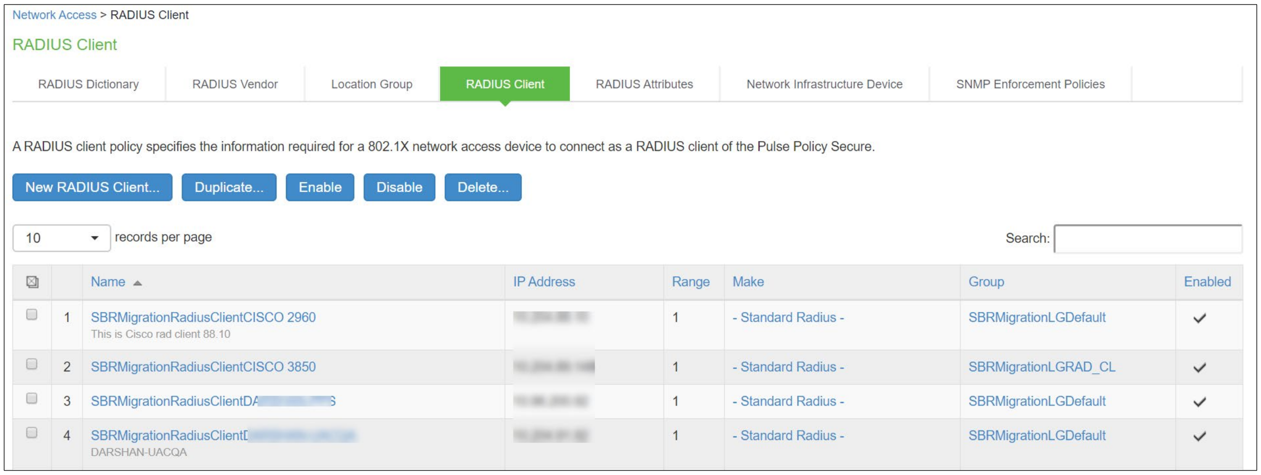
□ Assume down if no keepalive packets after seconds

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



Network Access > RADIUS Client

RADIUS Client

A RADIUS client policy specifies the information required for a 802.1X network access device to connect as a RADIUS client of the Pulse Policy Secure.

☒		Name ▲	IP Address	Range	Make	Group	Enabled
□	1	SBRMigrationRadiusClientCISCO 2960 This is Cisco rad client 88.10	[redacted]	1	- Standard Radius -	SBRMigrationLGDefault	✓
□	2	SBRMigrationRadiusClientCISCO 3850	[redacted]	1	- Standard Radius -	SBRMigrationLGRAD_CL	✓
□	3	SBRMigrationRadiusClientD[redacted]	[redacted]	1	- Standard Radius -	SBRMigrationLGDefault	✓
□	4	SBRMigrationRadiusClient[redacted] DARSHAN-UACQA	[redacted]	1	- Standard Radius -	SBRMigrationLGDefault	✓

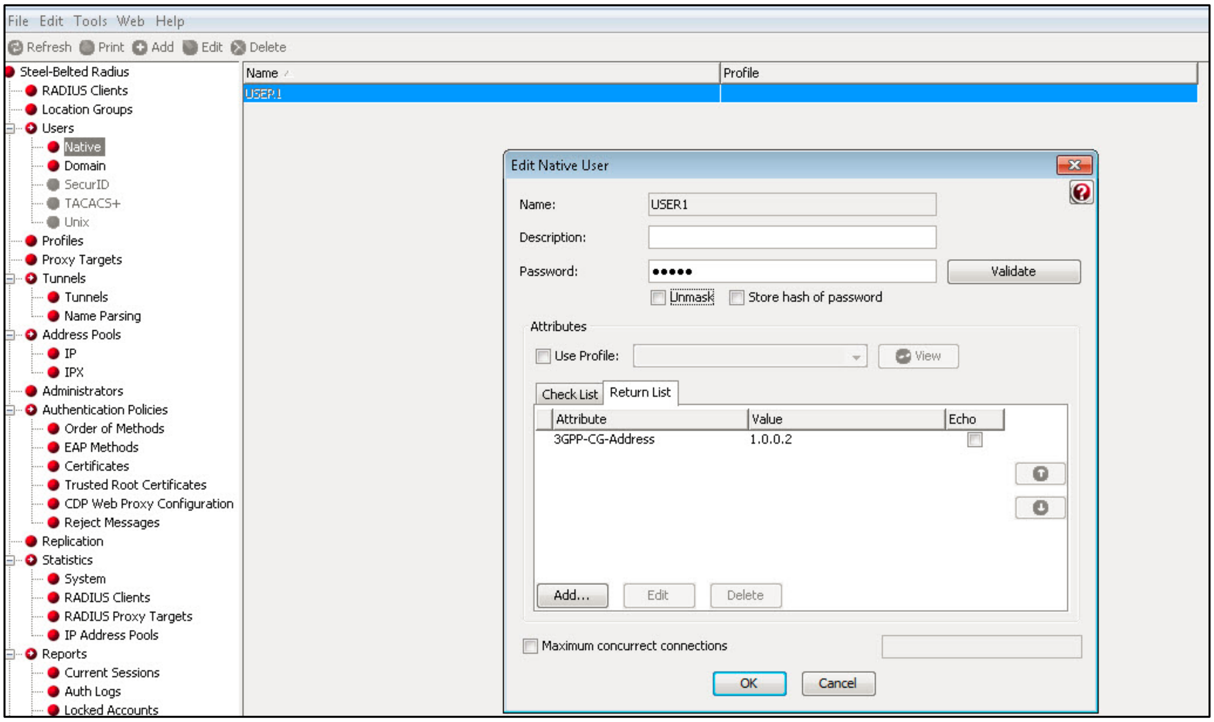
Note: If RADIUS client is not using profile and location group then the default Location group is used.

If a RADIUS Client is using Profiles then:

- If the profile is used by any of Location group: then will associate the RADIUS client 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 default shared secret will be **pulsesecure** for all imported RADIUS clients.

RADIUS Return Attribute on SBR

Select Return List and note down the attribute and value.



Name: USER1

Description:

Password: ●●●●●

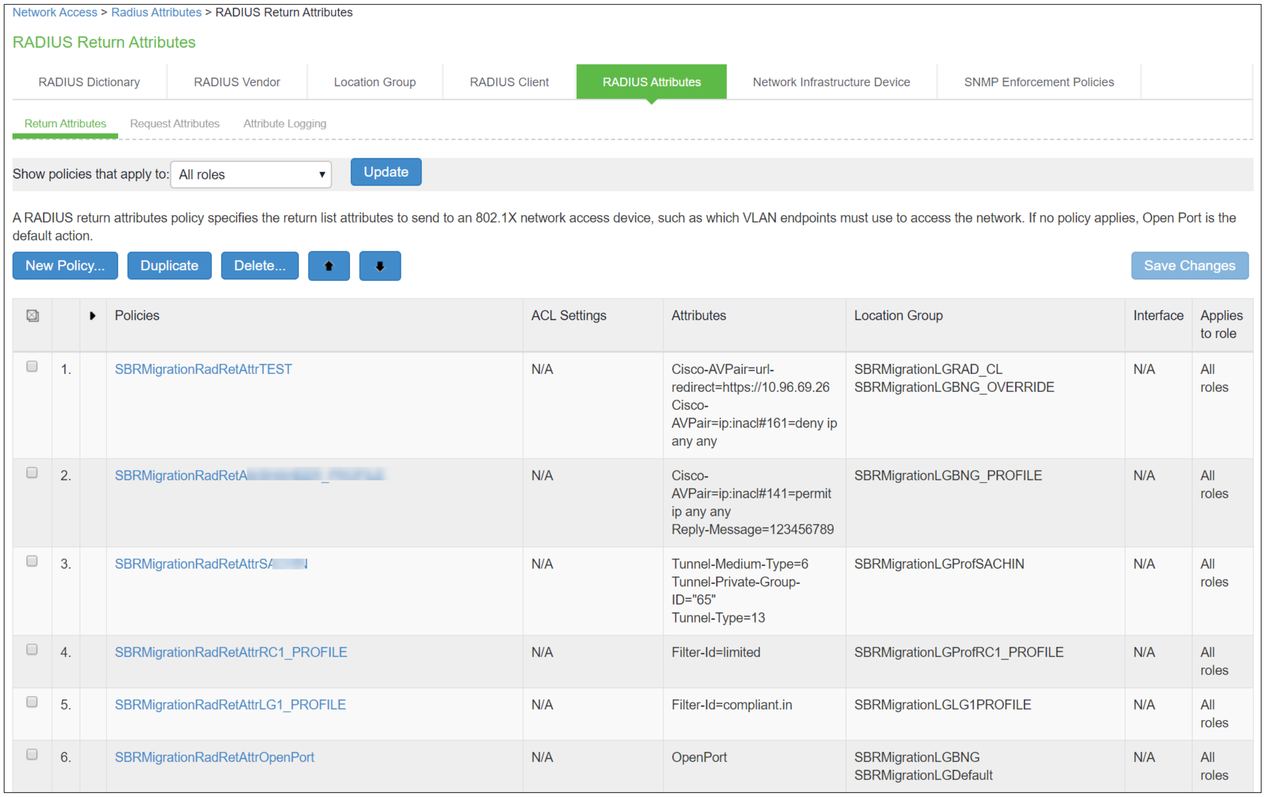
Attribute	Value	Echo
3GPP-CG-Address	1.0.0.2	□

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



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.

☐		Policies	ACL Settings	Attributes	Location Group	Interface	Applies to role
☐	1.	SBRMigrationRadRetAttrTEST	N/A	Cisco-AVPair=url-redirect=https://10.96.69.26 Cisco-AVPair=ip:inacl#161=deny ip any any	SBRMigrationLGRAD_CL SBRMigrationLGBNG_OVERRIDE	N/A	All roles
☐	2.	SBRMigrationRadRetA[redacted]	N/A	Cisco-AVPair=ip:inacl#141=permit ip any any Reply-Message=123456789	SBRMigrationLGBNG_PROFILE	N/A	All roles
☐	3.	SBRMigrationRadRetAttrS[redacted]	N/A	Tunnel-Medium-Type=6 Tunnel-Private-Group-ID="65" Tunnel-Type=13	SBRMigrationLGProfSACHIN	N/A	All roles
☐	4.	SBRMigrationRadRetAttrRC1_PROFILE	N/A	Filter-Id=limited	SBRMigrationLGProfRC1_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 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.

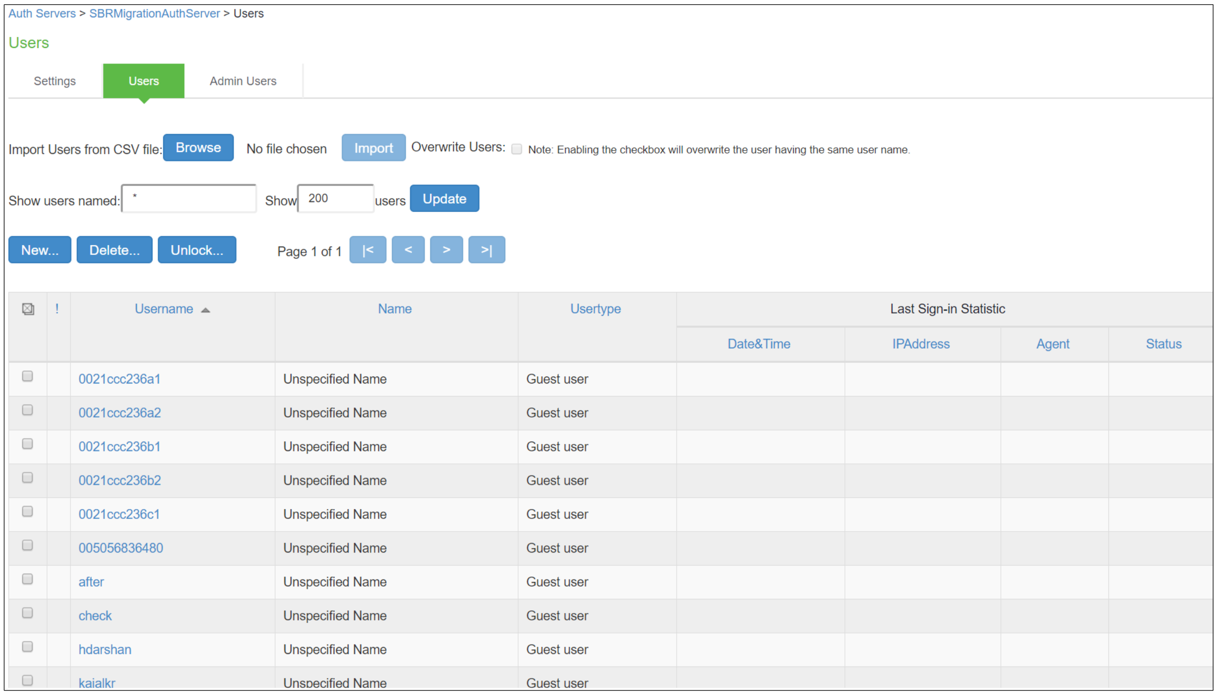
MAC Address Authentication Migration

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



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 200 users

Page 1 of 1

☐	!	Username ▲	Name	Usertype	Last Sign-in Statistic			
					Date&Time	IPAddress	Agent	Status
☐		0021ccc236a1	Unspecified Name	Guest user				
☐		0021ccc236a2	Unspecified Name	Guest user				
☐		0021ccc236b1	Unspecified Name	Guest user				
☐		0021ccc236b2	Unspecified Name	Guest user				
☐		0021ccc236c1	Unspecified Name	Guest user				
☐		005056836480	Unspecified Name	Guest user				
☐		after	Unspecified Name	Guest user				
☐		check	Unspecified Name	Guest user				
☐		hdarshan	Unspecified Name	Guest user				
☐		kaialkr	Unspecified Name	Guest user				

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 = spawnd {
        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_PASSWD = $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\.108\.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 $1$xxxxxxxx$hDZPHghXe8XvoHeFdqUwm/
       member = readwrite@world
    }

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

    user = fred {
       password = clear kurkure
       member = getconfig@world
    }
}
```

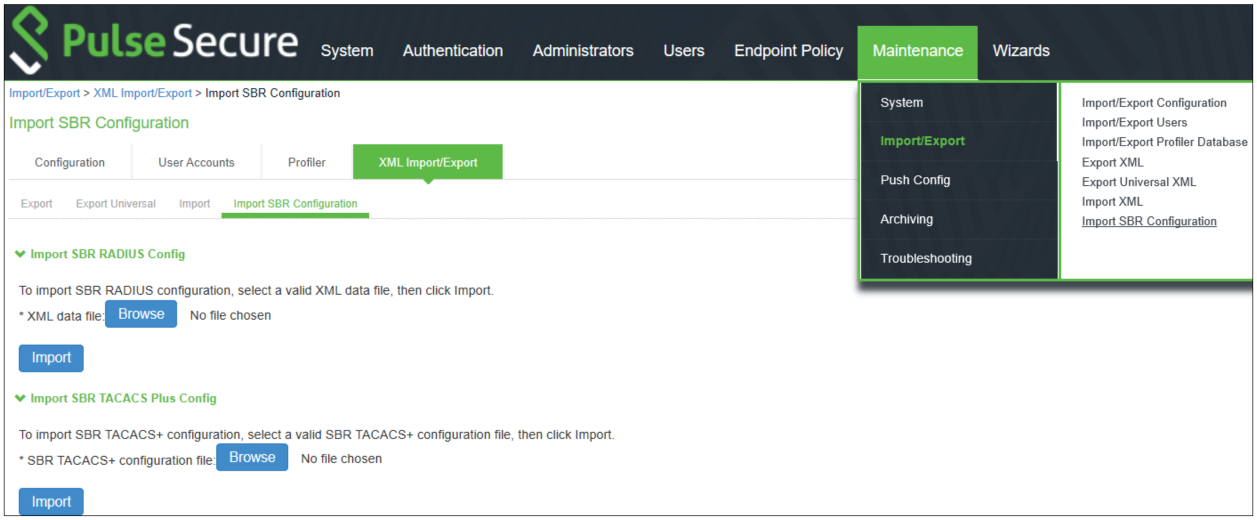
SBR TACACS+ config file

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



To import SBR RADIUS configuration, select a valid XML data file, then click Import.

* XML data file: Browse No file chosen

Import

To import SBR TACACS+ configuration, select a valid SBR TACACS+ configuration file, then click Import.

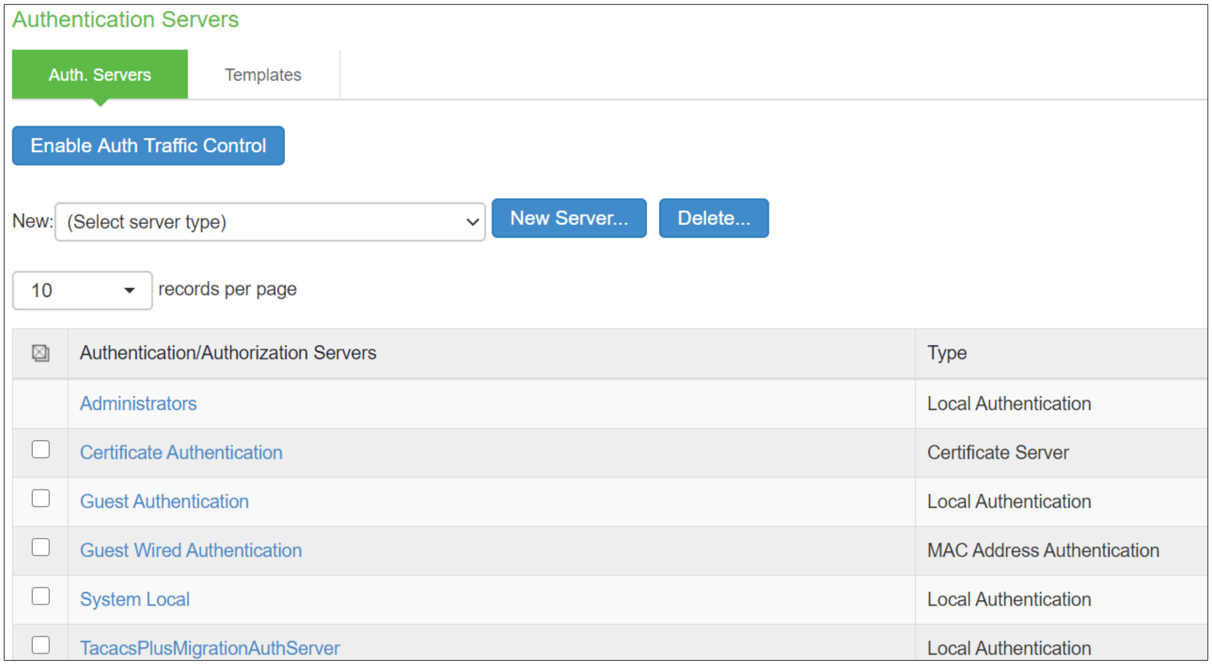
* SBR TACACS+ configuration file: Browse No file chosen

Import

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.



New: (Select server type)

10 records per page

☒	Authentication/Authorization Servers	Type
	Administrators	Local Authentication
□	Certificate Authentication	Certificate Server
□	Guest Authentication	Local Authentication
□	Guest Wired Authentication	MAC Address Authentication
□	System Local	Local Authentication
□	TacacsPlusMigrationAuthServer	Local Authentication

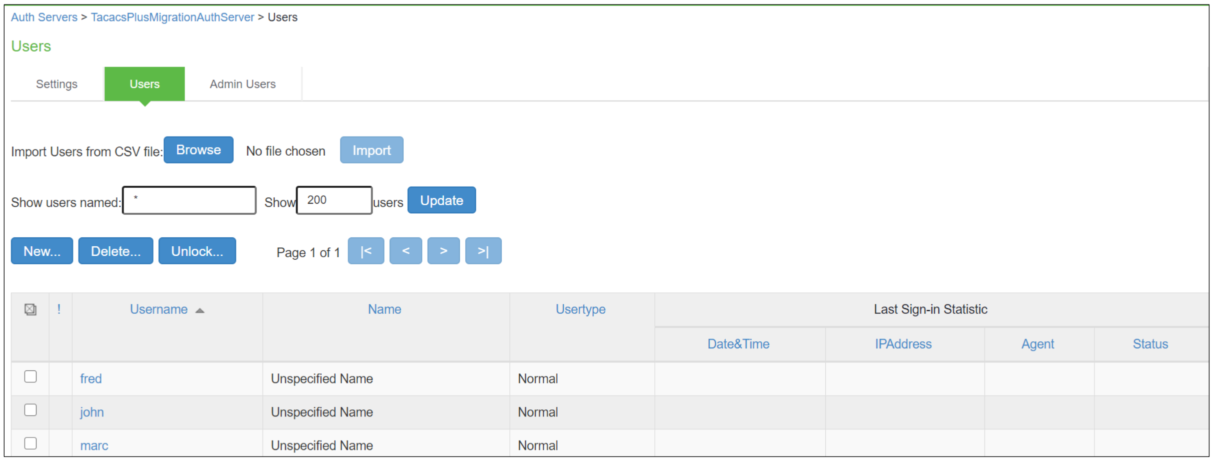
Note: Any secondary LDAP/AD servers configured in SBR tac_plusd.cfg file are not migrated and admin should configure them manually in PPS.

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



Import Users from CSV file: No file chosen

Show users named: * Show 200 users

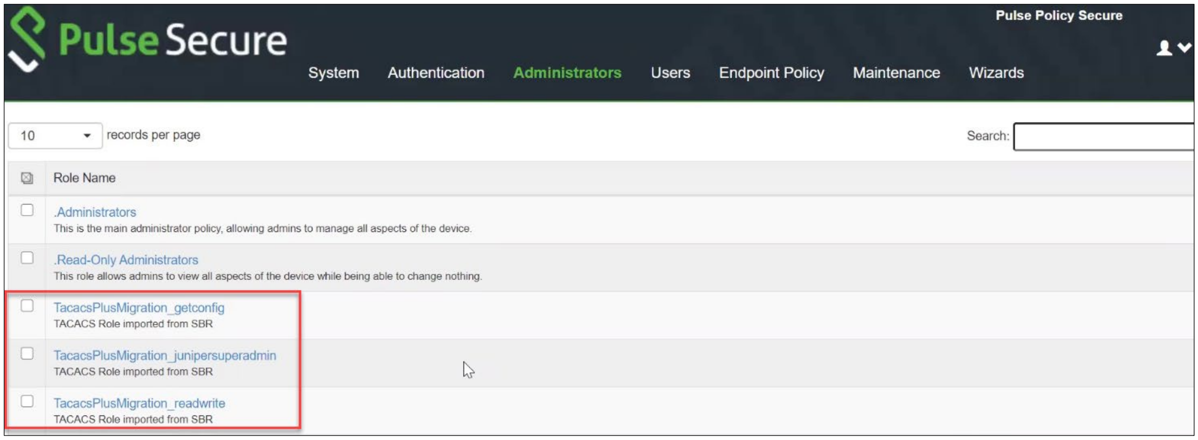
Page 1 of 1

☒	!	Username ▲	Name	Usertype	Last Sign-in Statistic			
					Date&Time	IPAddress	Agent	Status
□		fred	Unspecified Name	Normal				
□		john	Unspecified Name	Normal				
□		marc	Unspecified Name	Normal				

Roles

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

Figure –TacacsPlus Roles

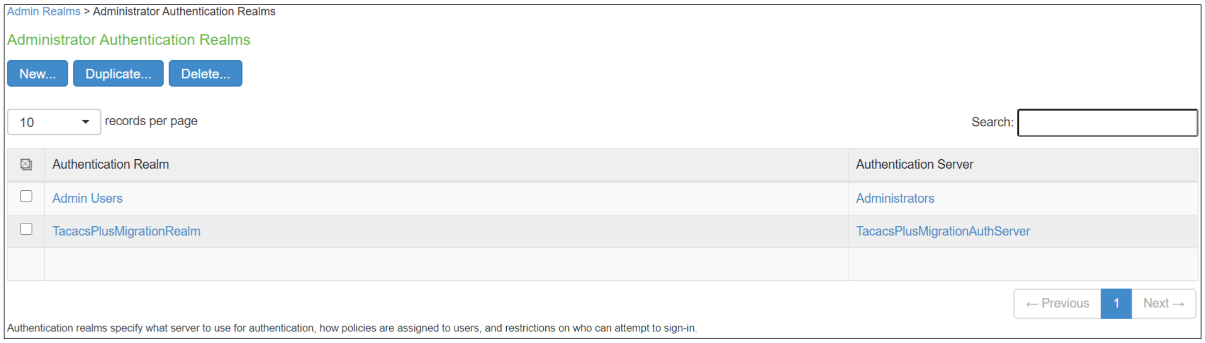


	Role Name
□	.Administrators This is the main administrator policy, allowing admins to manage all aspects of the device.
□	.Read-Only Administrators This role allows admins to view all aspects of the device while being able to change nothing.
□	TacacsPlusMigration_getconfig TACACS Role imported from SBR
□	TacacsPlusMigration_junipersuperadmin TACACS Role imported from SBR
□	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


Admin Realms > Administrator Authentication Realms
Administrator Authentication Realms
New...
Duplicate...
Delete...
10
records per page
Search:
← Previous
1
Next →

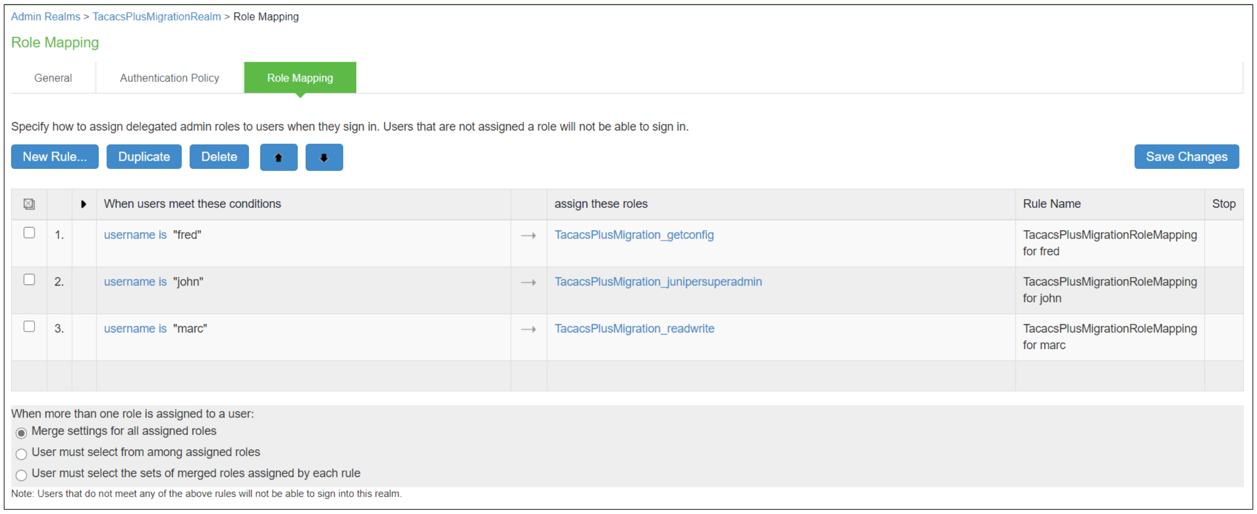
	Authentication Realm	Authentication Server
□	Admin Users	Administrators
□	TacacsPlusMigrationRealm	TacacsPlusMigrationAuthServer

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



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.

☐		When users meet these conditions		assign these roles	Rule Name	Stop
☐	1.	username is "fred"	→	TacacsPlusMigration_getconfig	TacacsPlusMigrationRoleMapping for fred	
☐	2.	username is "john"	→	TacacsPlusMigration_junipersuperadmin	TacacsPlusMigrationRoleMapping for john	
☐	3.	username is "marc"	→	TacacsPlusMigration_readwrite	TacacsPlusMigrationRoleMapping for marc	

When more than one role is assigned to a user:

● Merge settings for all assigned roles

○ User must select from among assigned roles

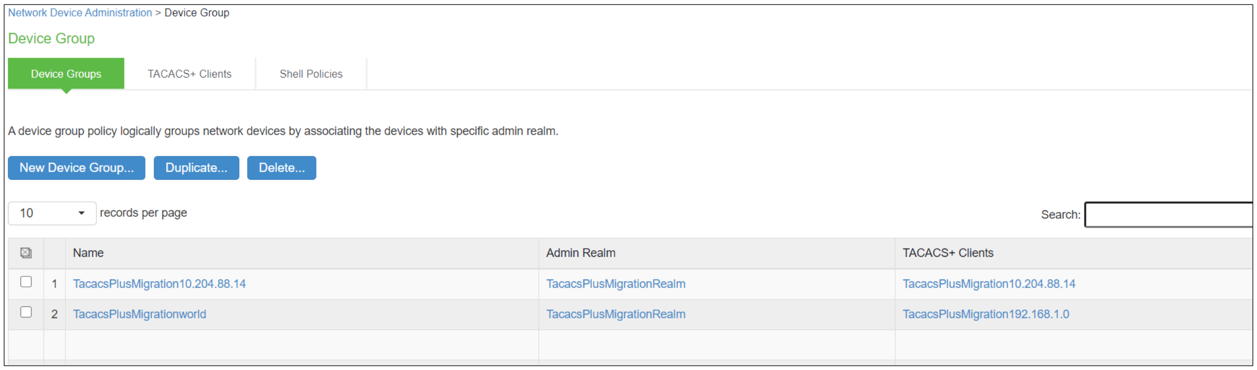
○ User must select the sets of merged roles assigned by each rule

Note: Users that do not meet any of the above rules will not be able to sign into this realm.

Device groups

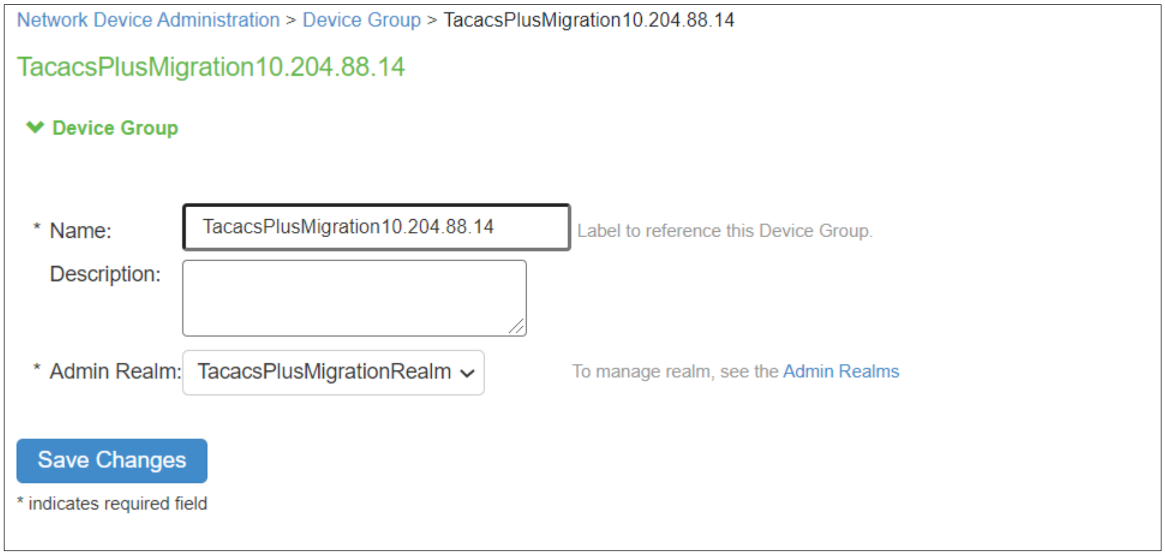
Navigate to **Network Device Administration > Device Group** to view the device group policy, which logically groups network devices by associating the devices with specific admin realm TacacsPlusMigrationRealm. The device groups imported from SBR are prefixed with TacacsPlusMigration.

Figure –TacacsPlus Device Group



A device group policy logically groups network devices by associating the devices with specific admin realm.

☐		Name	Admin Realm	TACACS+ Clients
☐	1	TacacsPlusMigration10.204.88.14	TacacsPlusMigrationRealm	TacacsPlusMigration10.204.88.14
☐	2	TacacsPlusMigrationworld	TacacsPlusMigrationRealm	TacacsPlusMigration192.168.1.0



Network Device Administration > Device Group > TacacsPlusMigration10.204.88.14

TacacsPlusMigration10.204.88.14

Device Group

* Name: TacacsPlusMigration10.204.88.14 Label to reference this Device Group.

Description:

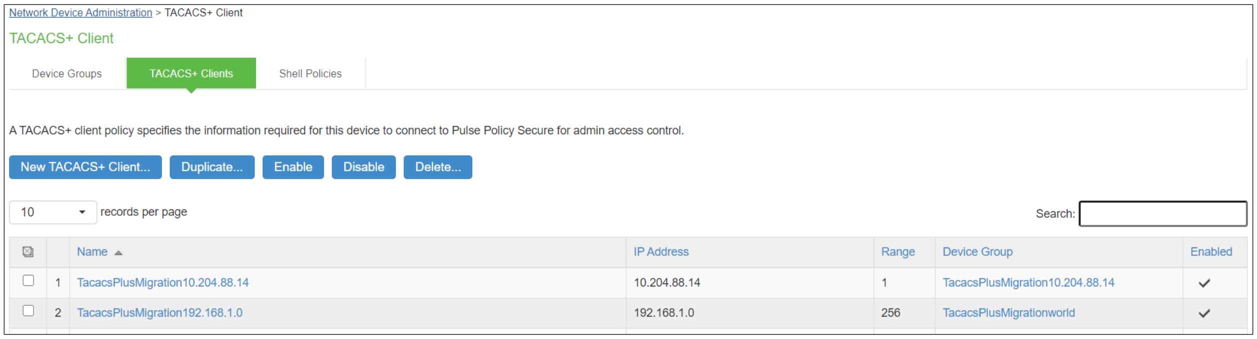
* Admin Realm: TacacsPlusMigrationRealm To manage realm, see the Admin Realms

* 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

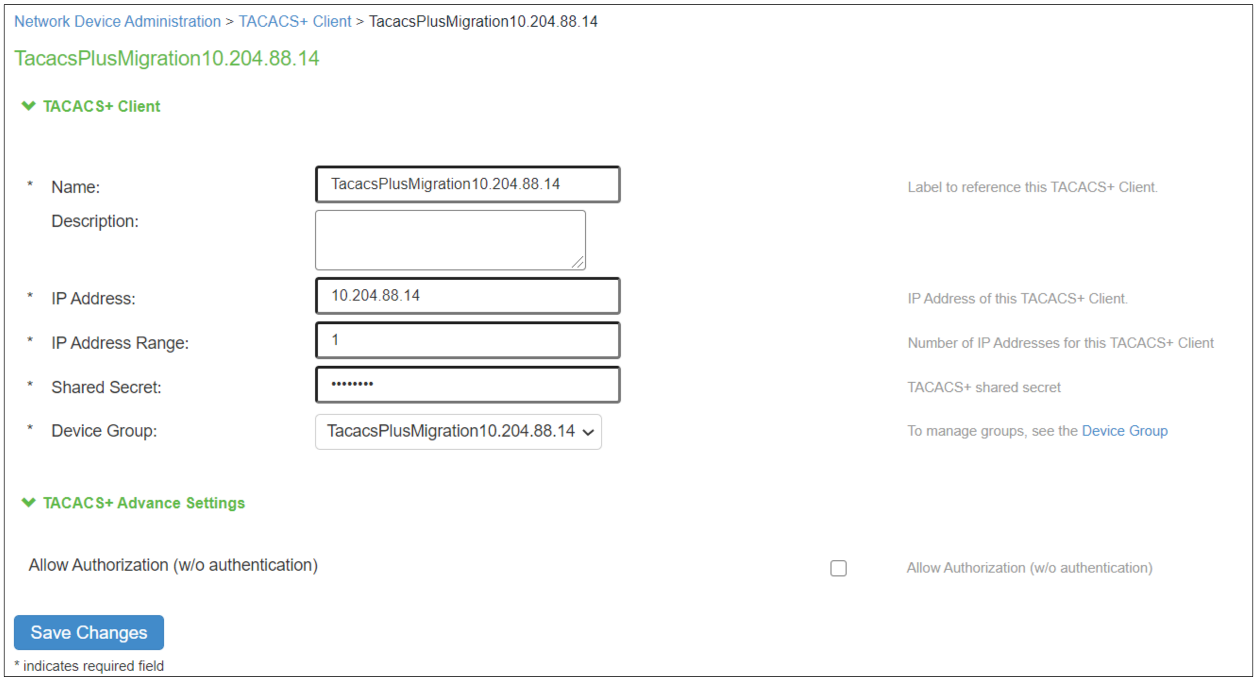


Network Device Administration > TACACS+ Client

TACACS+ Client

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

□		Name ▲	IP Address	Range	Device Group	Enabled
□	1	TacacsPlusMigration10.204.88.14	10.204.88.14	1	TacacsPlusMigration10.204.88.14	✓
□	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:	TacacsPlusMigration10.204.88.14	Label to reference this TACACS+ Client.
	Description:		
*	IP Address:	10.204.88.14	IP Address of this TACACS+ Client.
*	IP Address Range:	1	Number of IP Addresses for this TACACS+ Client
*	Shared Secret:	••••••••	TACACS+ shared secret
*	Device Group:	TacacsPlusMigration10.204.88.14	To manage groups, see the Device Group

TACACS+ Advance Settings

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

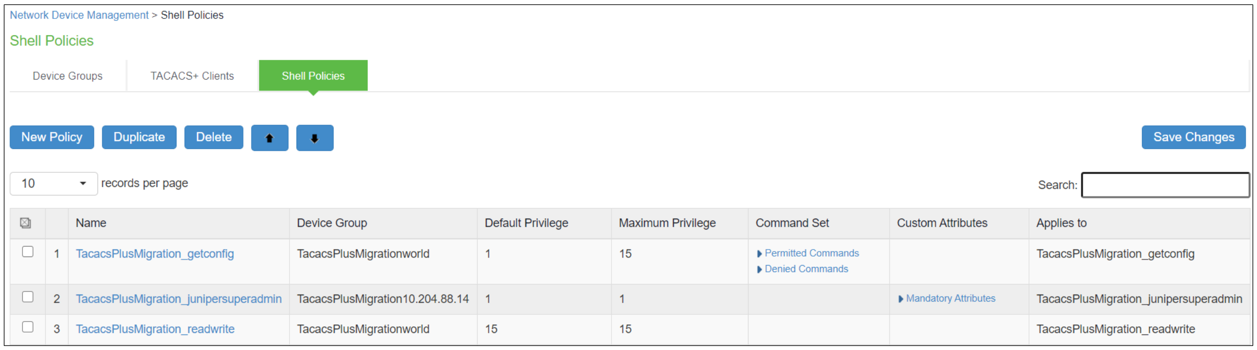
* indicates required field

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

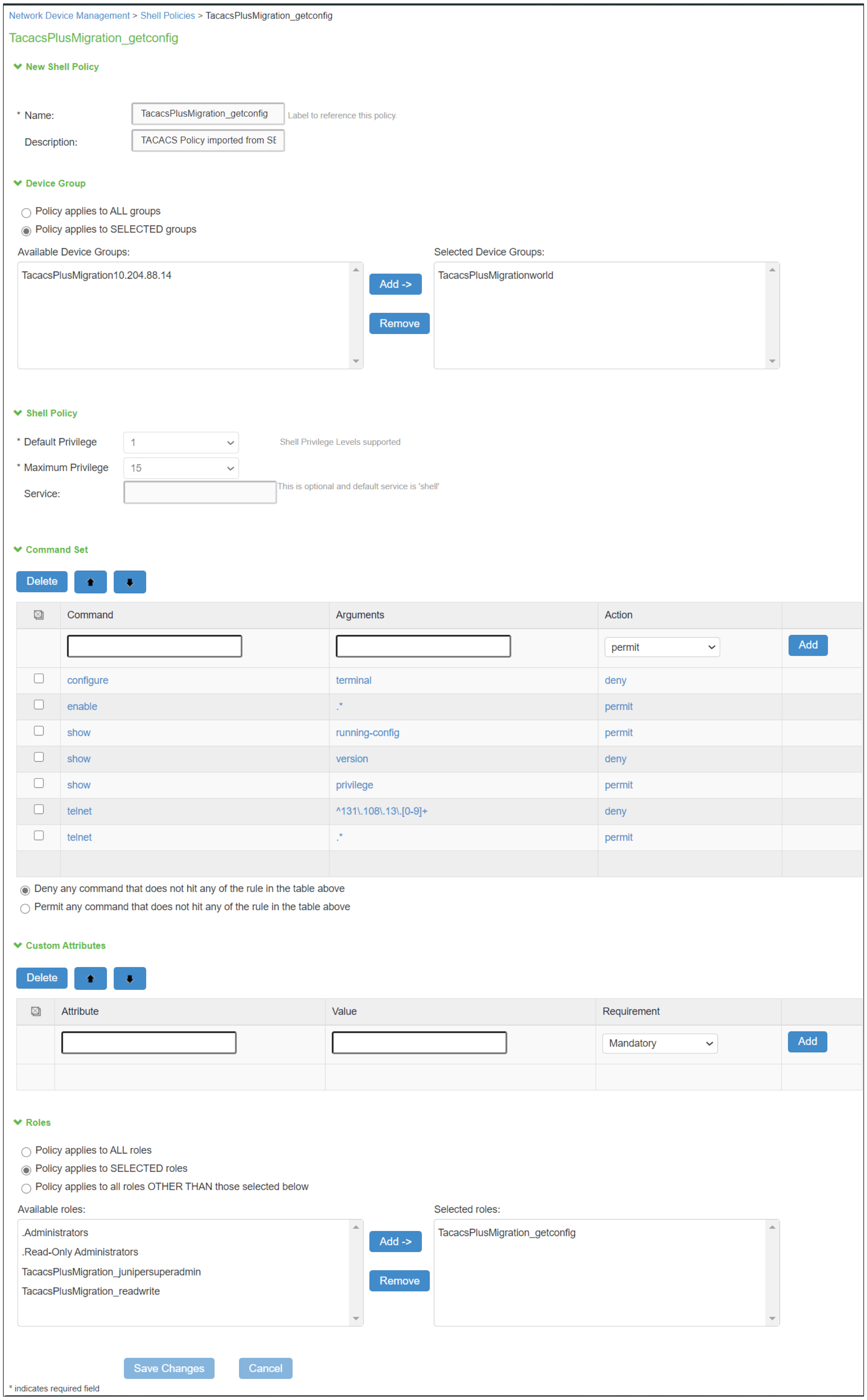


Network Device Management > Shell Policies

Shell Policies

□		Name	Device Group	Default Privilege	Maximum Privilege	Command Set	Custom Attributes	Applies to
□	1	TacacsPlusMigration_getconfig	TacacsPlusMigrationworld	1	15	▸ Permitted Commands ▸ Denied Commands		TacacsPlusMigration_getconfig
□	2	TacacsPlusMigration_junipersuperadmin	TacacsPlusMigration10.204.88.14	1	1		▸ Mandatory Attributes	TacacsPlusMigration_junipersuperadmin
□	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".



Network Device Management > Shell Policies > TacacsPlusMigration_getconfig

TacacsPlusMigration_getconfig

New Shell Policy

* Name:	TacacsPlusMigration_getconfig	Label to reference this policy.
Description:	TACACS Policy imported from SE	

Device Group

○ Policy applies to ALL groups
● Policy applies to SELECTED groups

Available Device Groups: TacacsPlusMigration10.204.88.14

Selected Device Groups: TacacsPlusMigrationworld

Shell Policy

* Default Privilege	1	Shell Privilege Levels supported
* Maximum Privilege	15	
Service:		This is optional and default service is 'shell'

Command Set

☒	Command	Arguments	Action	
			permit	Add
□	configure	terminal	deny	
□	enable	.*	permit	
□	show	running-config	permit	
□	show	version	deny	
□	show	privilege	permit	
□	telnet	^131\.108\.13\.[0-9]+	deny	
□	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

☒	Attribute	Value	Requirement	
			Mandatory	Add

Roles

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

Available roles:
.Administrators
.Read-Only Administrators
TacacsPlusMigration_junipersuperadmin
TacacsPlusMigration_readwrite

Selected roles:
TacacsPlusMigration_getconfig

* 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 and https://tools.ietf.org/id/draft-ietf-opsawg-tacacs-07.html