Configure SNMPv3 on Cisco ONS15454/NCS2000 Devices

Contents

Introduction

This document describes step-by-step instructions on how to configure the Simple Network Management Protocol version 3 (SNMPv3) on ONS15454/NCS2000 devices. All topics include examples.

> **Note**: The list of attributes provided in this document are not exhaustive or authoritative and might change at any time without an update to this document.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Cisco Transport Controller (CTC) GUI
- Basic server knowledge
- Basic Linux/Unix commands

Components Used

This document is not restricted to specific software and hardware versions.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Configure

On a Standalone/Multishelf Node

Configure authPriv Mode on ONS15454/NCS2000 Device

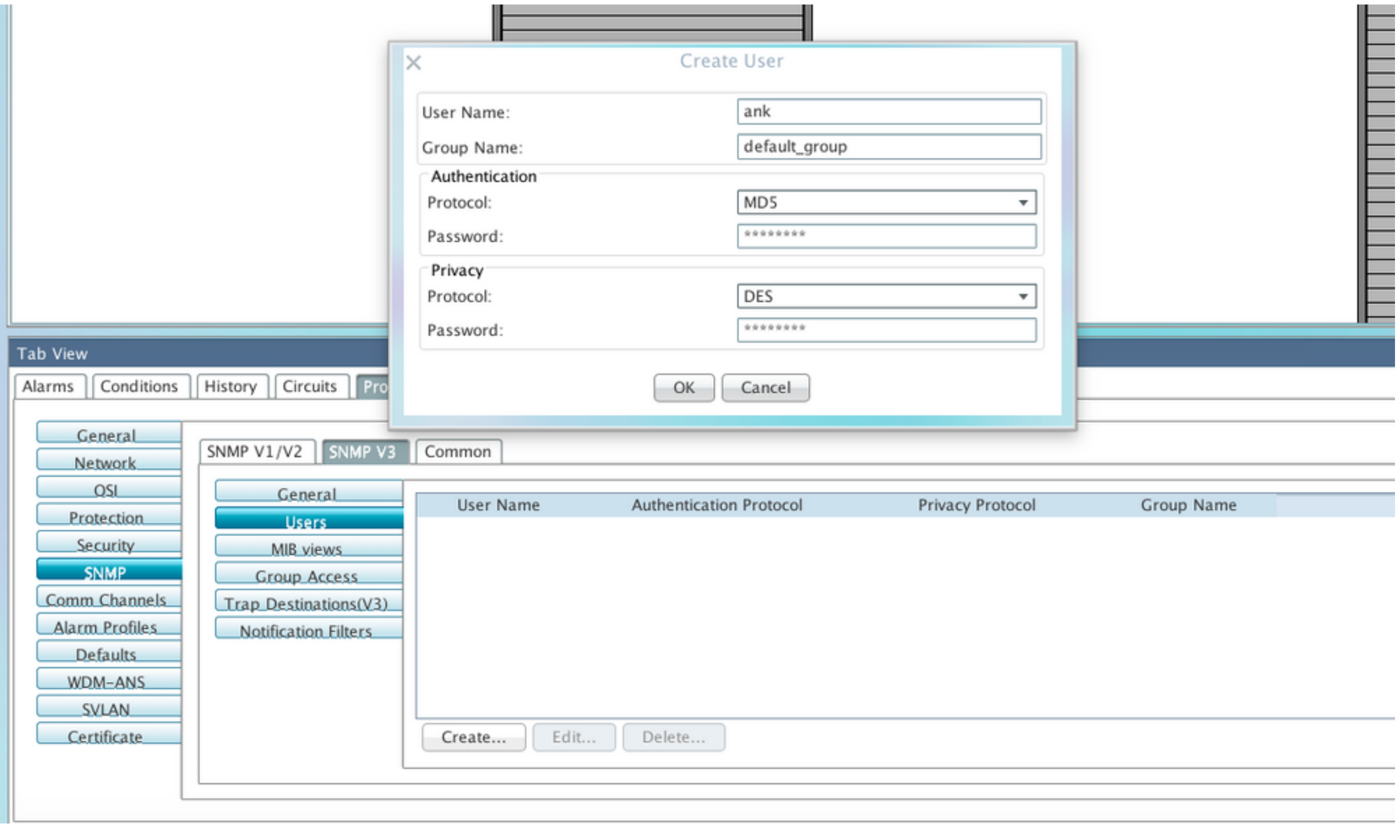
Step 1. Log in to the node via CTC with the use of the Super User credentials.

Step 2. Navigate to **Node view > Provisioning > SNMP > SNMP V3**.

Step 3. Navigate to the **Users** tab. Create users.

```
User Name:<anything based on specifications>

Group name:default_group

Authentication

      Protocol:MD5

      Password:<anything based on specifications>

   Privacy

          Protocol:DES

          Password:<anythingbased on specifications>
```

Step 4. Click on **OK** as shown in the image.



Create User

User Name: ank

Group Name: default_group

Authentication

Protocol: MD5

Password: ********

Privacy

Protocol: DES

Password: ********

User Name	Authentication Protocol	Privacy Protocol	Group Name

Specifications:

User Name - Specify the name of the user on the host that connects to the agent. The user name must be a minimum of 6 and a maximum of 40 characters (up to only 39 characters for the TACACS and RADIUS authentication). It includes alphanumeric (a-z, A-Z, 0-9) characters and the allowed special characters are @, "-" (hyphen), and "." (dot). For TL1 compatibility, the user name must be of 6 to 10 characters.

Group Name - Specify the group to which the user belongs.

Authentication:

Protocol - Select the authentication algorithm that you want to use. The options are NONE, MD5, and SHA.

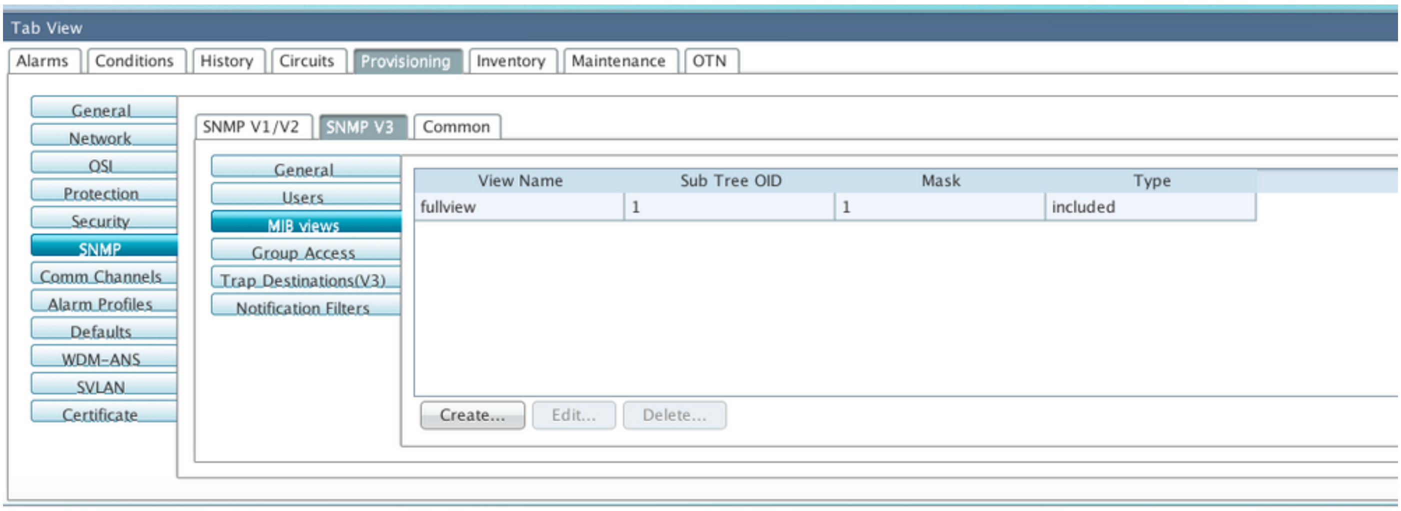
Password - Enter a password if you select MD5 or SHA. By default, the password length is set to a minimum of eight characters.

Privacy - Initiates a privacy authentication level setting session that enables the host to encrypt the contents of the message that is sent to the agent.

Protocol - Select the privacy authentication algorithm. The available options are None, DES, and AES-256-CFB.

Password - Enter a password if you select a protocol other than None.

Step 5. Ensure that MIB views are configured as per this image.



View Name	Sub Tree OID	Mask	Type
fullview	1	1	included

Specifications:

Name - Name of the view.

Subtree OID - The MIB subtree which, when combined with the mask, defines the family of subtrees.

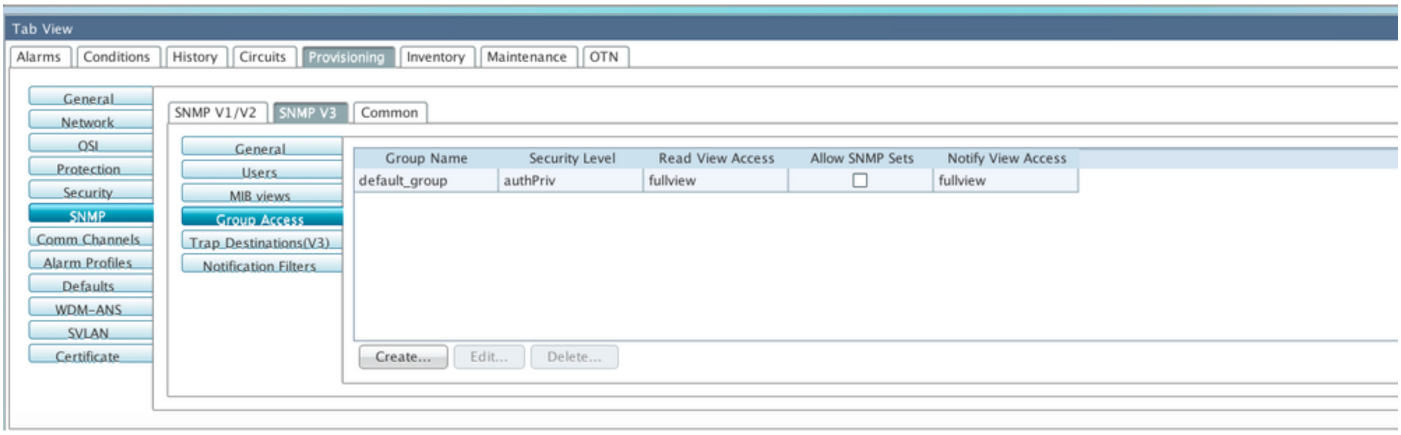
Bit Mask - A family of view subtrees. Each bit in the Bit Mask corresponds to a sub-identifier of the subtree OID.

Type - Select the view type. Options are Included and Excluded.

The type defines whether the family of subtrees that are defined by the subtree OID and the Bit Mask combination are included or excluded from the notification filter.

Step 6. Configure Group Access as shown in the image. By default, Group name will be default_group and security level as authPriv.

Note: Group name should be the same as the one used when you create the User in Step 3.



Group Name	Security Level	Read View Access	Allow SNMP Sets	Notify View Access
default_group	authPriv	fullview	☐	fullview

Specifications:

Group Name - The name of the SNMP group, or collection of users, who share a common access policy.

Security Level - The security level for which the access parameters are defined. Select from these options:

noAuthNoPriv - Uses a user name match for authentication.

AuthNoPriv - Provides authentication based on the HMAC-MD5 or HMAC-SHA algorithms.

AuthPriv - Provides authentication based on the HMAC-MD5 or HMAC-SHA algorithms. Provides DES 56-bit encryption based on the CBC-DES (DES-56) standard, in addition to authentication.

If you select authNoPriv or authPriv for a group, the corresponding user must be configured with an authentication protocol and password, with privacy protocol and password, or both.

Views

Read View Name - Read view name for the group.

Notify View Name - Notify view name for the group.

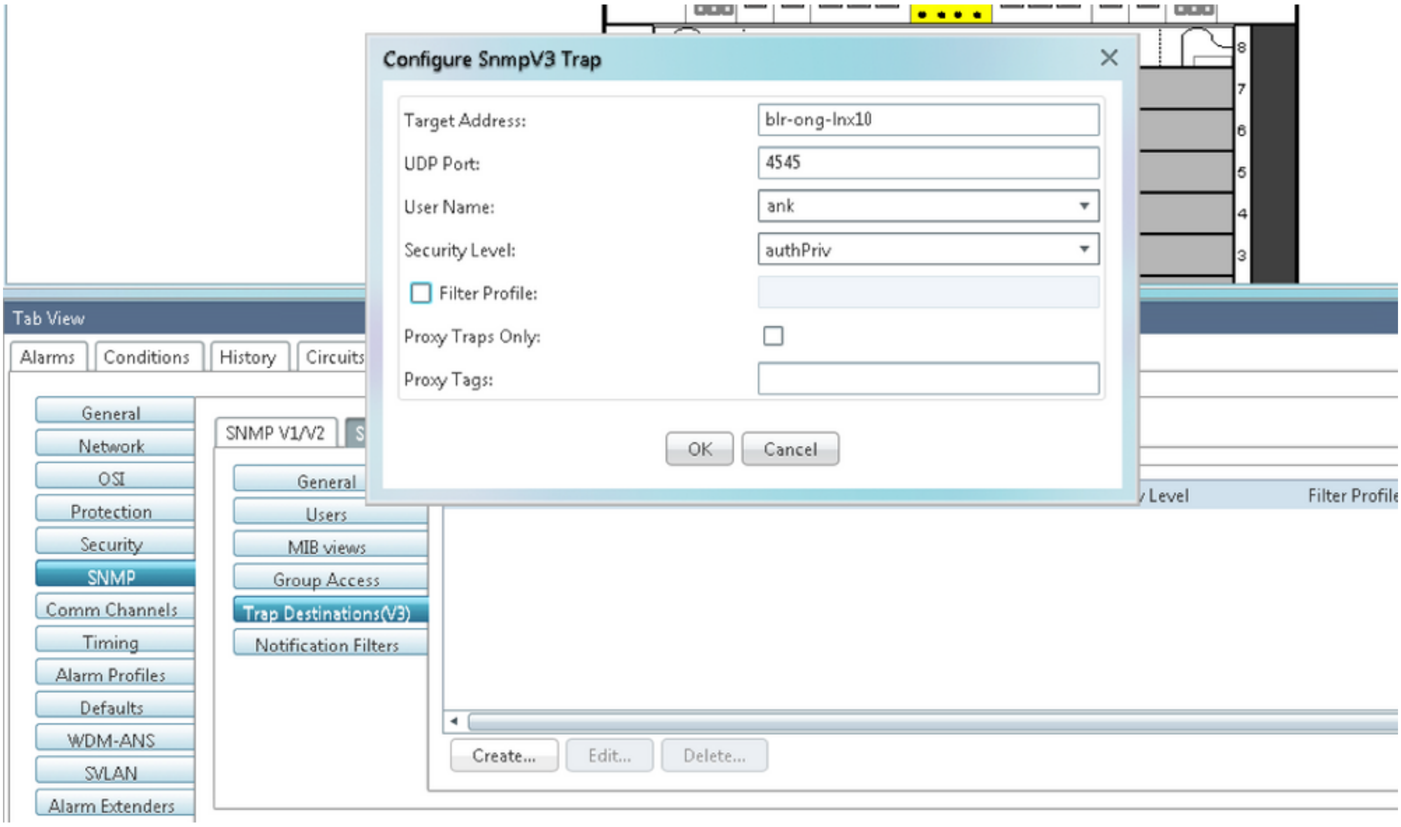
Allow SNMP Sets - Select this check box if you want the SNMP agent to accept SNMP SET requests. If this check box is not selected, SET requests are rejected.

Note: SNMP SET request access is implemented for very few objects.

Step 7. Navigate to **Node View > Provisioning > SNMP > SNMP V3 > Trap Destination (V3)**. Click on **Create** and **Configure**.

```
Target address:<any build server> (eg: blr-ong-lnx10)

UDP port: <anything between 1024 to 65535>

User name:<same as we created in step 3>

Security Level:AuthPriv
```

Step 8. Click on **OK** as shown in the image.



Configure SnmpV3 Trap

Target Address: blr-ong-lnx10

UDP Port: 4545

User Name: ank

Security Level: authPriv

□ Filter Profile:

Proxy Traps Only: □

Proxy Tags:

Note: blr-ong-lnx10 is the NMS server.

Specifications:

Target Address - Target to which the traps should be sent. Use an IPv4 or an IPv6 address.

UDP Port - UDP port number that the host uses. The default value is 162.

User Name - Specify the name of the user on the host that connects to the agent.

Security Level - Select one of these options:

noAuthNoPriv - Uses a user name match for authentication.

AuthNoPriv - Provides authentication based on the HMAC-MD5 or HMAC-SHA algorithms.

AuthPriv - Provides authentication based on the HMAC-MD5 or HMAC-SHA algorithms. Provides DES 56-bit encryption based on the CBC-DES (DES-56) standard, in addition to authentication.

Filter Profile - Select this check box and enter the filter profile name. Traps are sent only if you provide a filter profile name and create a notification filter.

Proxy Traps Only - If selected, forwards only proxy traps from the ENE. Traps from this node are not sent to the trap destination identified by this entry.

Proxy Tags - Specify a list of tags. The tag list is needed on a GNE only if an ENE needs to send traps to the trap destination identified by this entry, and wants to use the GNE as the proxy.

Configure NMS Server (blr-ong-lnx10)

Step 1. In your home directory of the server, create a directory with the name **snmp**.

Step 2. Under this directory, create a file **snmptrapd.conf**.

Step 3. Change the **snmptrapd.conf** file to:

```
vi snmptrapd.conf

createUser -e 0xEngine ID <user_name>< MD5> <password > DES <password>
```

For example:

```
createUser -e 0x0000059B1B00F0005523A71C ank MD5 cisco123 DES cisco123
```

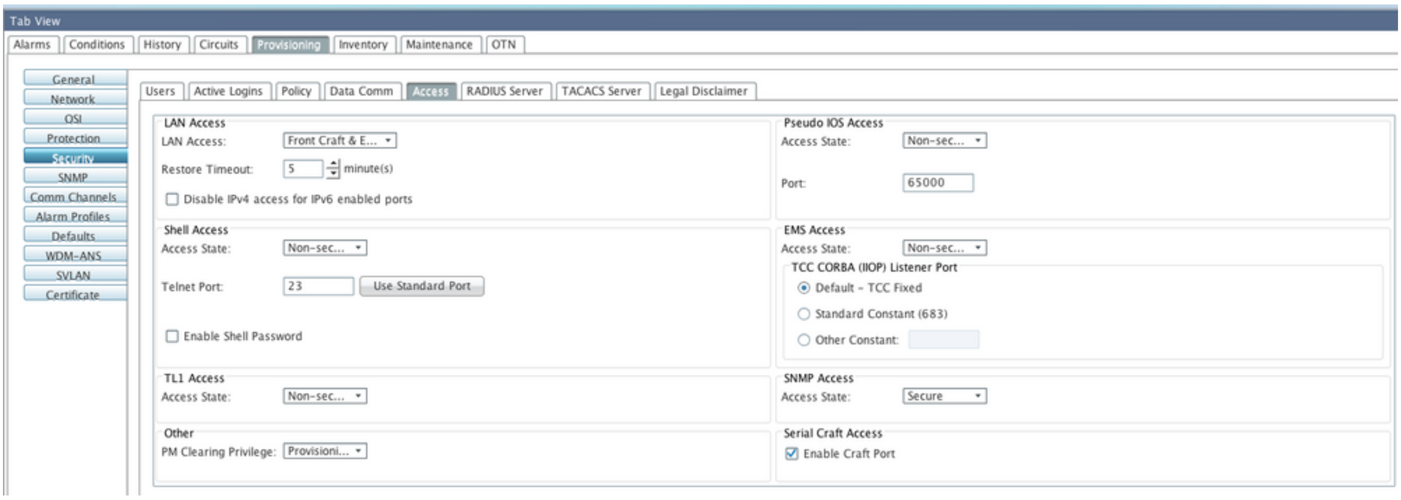
In this example:

```
user_name=ank

MD5 password = cisco123

DES password  = cisco123

Engine ID = can be available from CTC.
```

`Node view > Provisioning > SNMP > SNMP V3 > General`

Verify authPriv Mode

Step 1. In CTC, navigate to **Node View > Provisioning > Security > Access > change snmp access state to Secure** as shown in the image.



LAN Access
LAN Access: Front Craft & E...
Restore Timeout: 5 minute(s)
□ Disable IPv4 access for IPv6 enabled ports

Shell Access
Access State: Non-sec...
Telnet Port: 23
□ Enable Shell Password

TL1 Access
Access State: Non-sec...

Other
PM Clearing Privilege: Provisioni...

Pseudo IOS Access
Access State: Non-sec...
Port: 65000

EMS Access
Access State: Non-sec...
TCC CORBA (IIOP) Listener Port
● Default - TCC Fixed
○ Standard Constant (683)
○ Other Constant:

SNMP Access
Access State: Secure

Serial Craft Access
☑ Enable Craft Port

Step 2. Navigate to NMS server and do snmpwalk.

Syntax:

```
snmpwalk -v 3 -l authpriv -u <user name> -a MD5 -A <password> -x DES -X <password> <node IP>
<MIB>
```

Example:

```
blr-ong-lnx10:151> snmpwalk -v 3 -l authpriv -u ank -a MD5 -A cisco123 -x DES -X cisco123
```

```
10.64.106.40 system

RFC1213-MIB::sysDescr.0 = STRING: "Cisco ONS 15454 M6 10.50-015E-05.18-SPA Factory Defaults
PLATFORM=15454-M6"

RFC1213-MIB::sysObjectID.0 = OID: CERENT-GLOBAL-REGISTRY::cerent454M6Node

DISMAN-EVENT-MIB::sysUpTimeInstance = Timeticks: (214312) 0:35:43.12

RFC1213-MIB::sysContact.0 = ""

RFC1213-MIB::sysName.0 = STRING: "Ankit_40"

RFC1213-MIB::sysLocation.0 = ""

RFC1213-MIB::sysServices.0 = INTEGER: 79
```

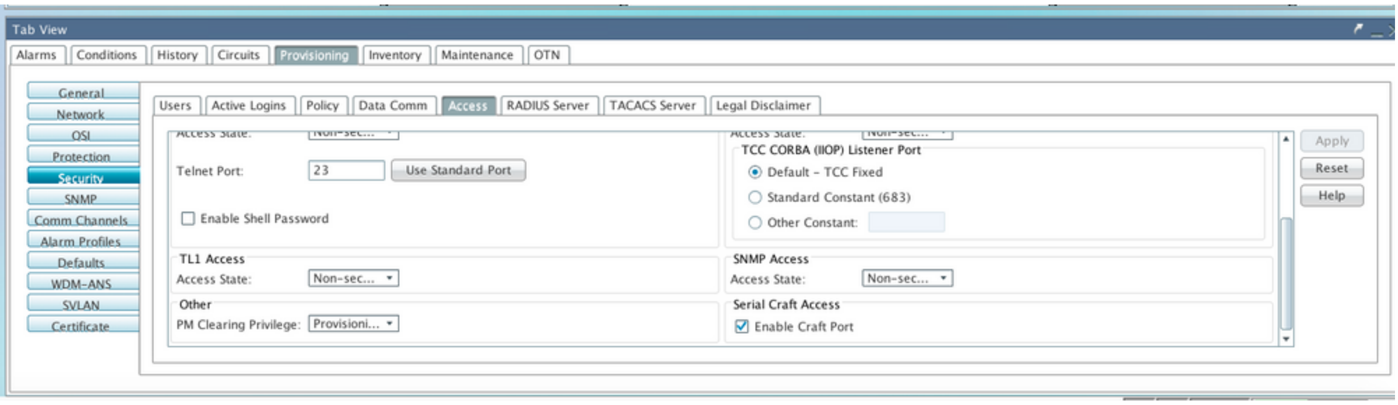
SNMP Trap:

```
snmptrapd -f -Lo -OQ -Ob -Ot -F "%V\n%B\n%N\n%w\n%q\n%P\n%v\n\n" <port number>
```

Trap cmd is the same for all versions.

Configure authNoPriv Mode on ONS15454/NCS2000 Device

Step 1. In CTC, navigate to **Node View > Provisioning > Security > Access > change snmp access state to Non-secure mode** as shown in the image.



Access State: Non-sec...

Telnet Port: 23

☐ Enable Shell Password

TL1 Access
Access State: Non-sec...

Other
PM Clearing Privilege: Provisioni...

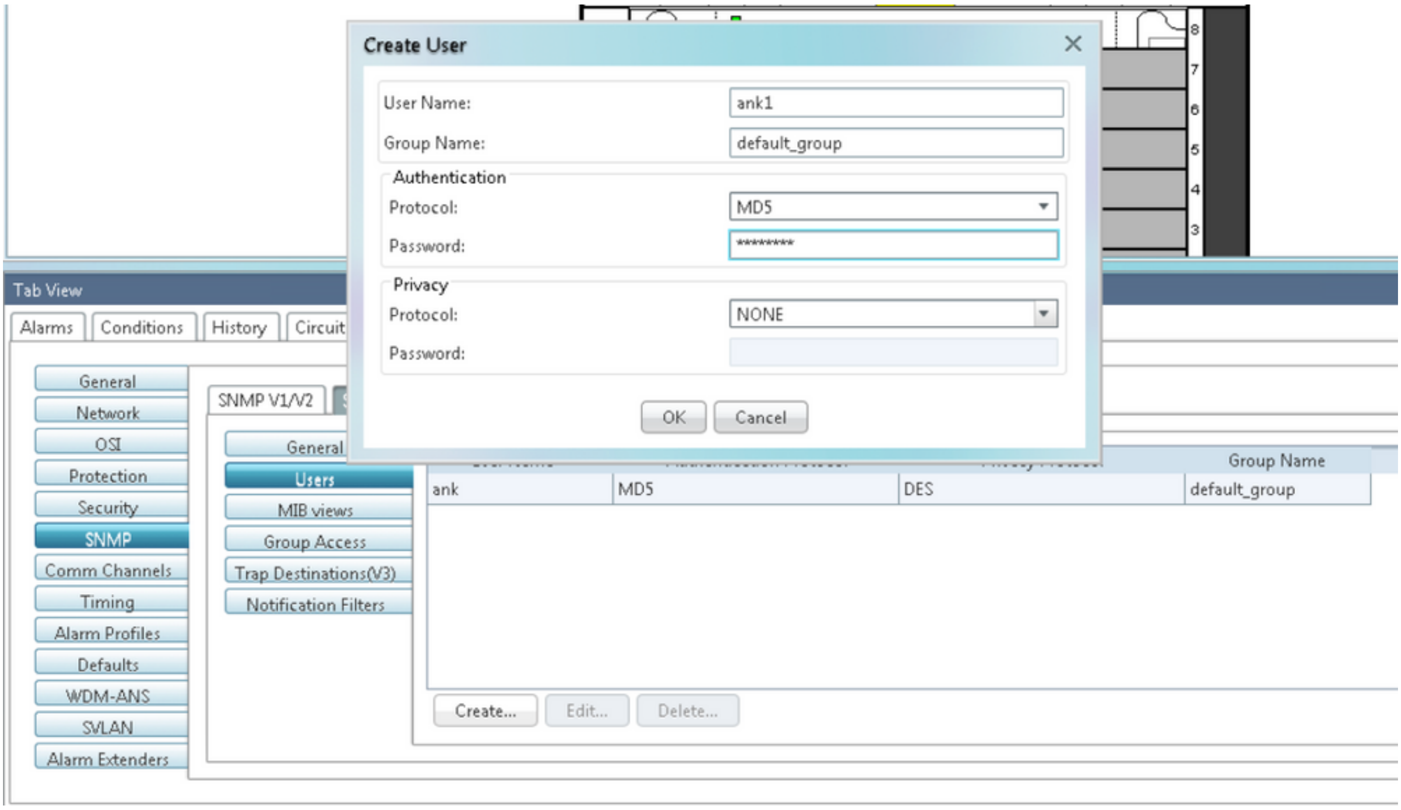
Access State: Non-sec...

TCC CORBA (IIOP) Listener Port
● Default - TCC Fixed
○ Standard Constant (683)
○ Other Constant:

SNMP Access
Access State: Non-sec...

Serial Craft Access
☑ Enable Craft Port

Step 2. Navigate to **Node View > Provisioning > SNMP > SNMP V3 > Users > Create User** and configure as shown in the image.



User Name: ank1

Group Name: default_group

Authentication

Protocol: MD5

Password: *********

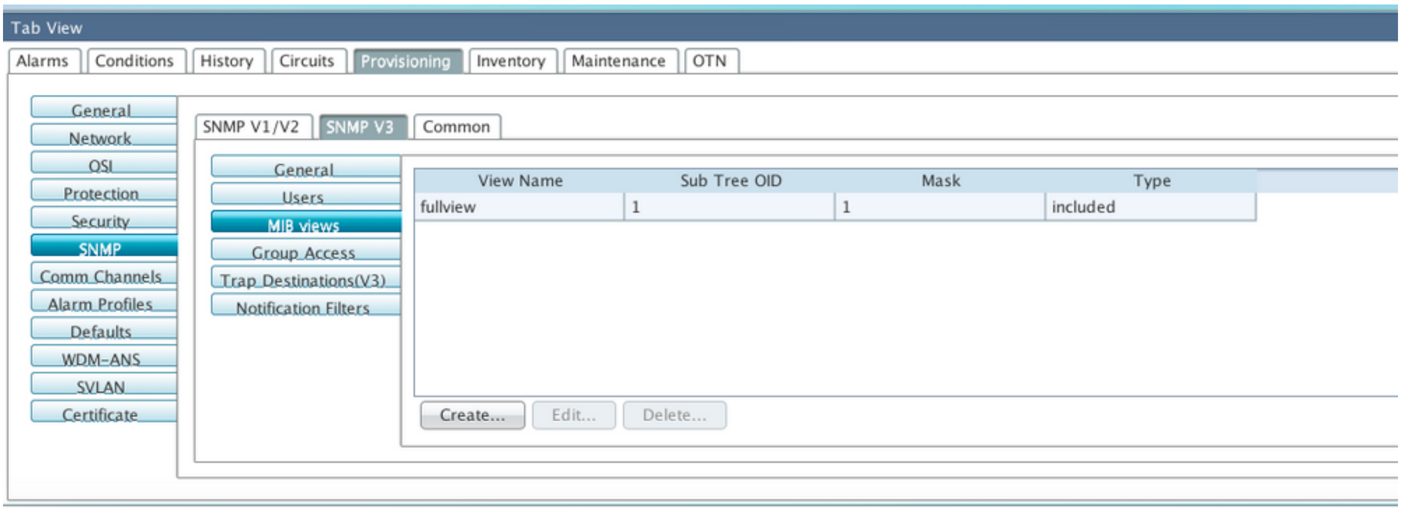
Privacy

Protocol: NONE

Password:

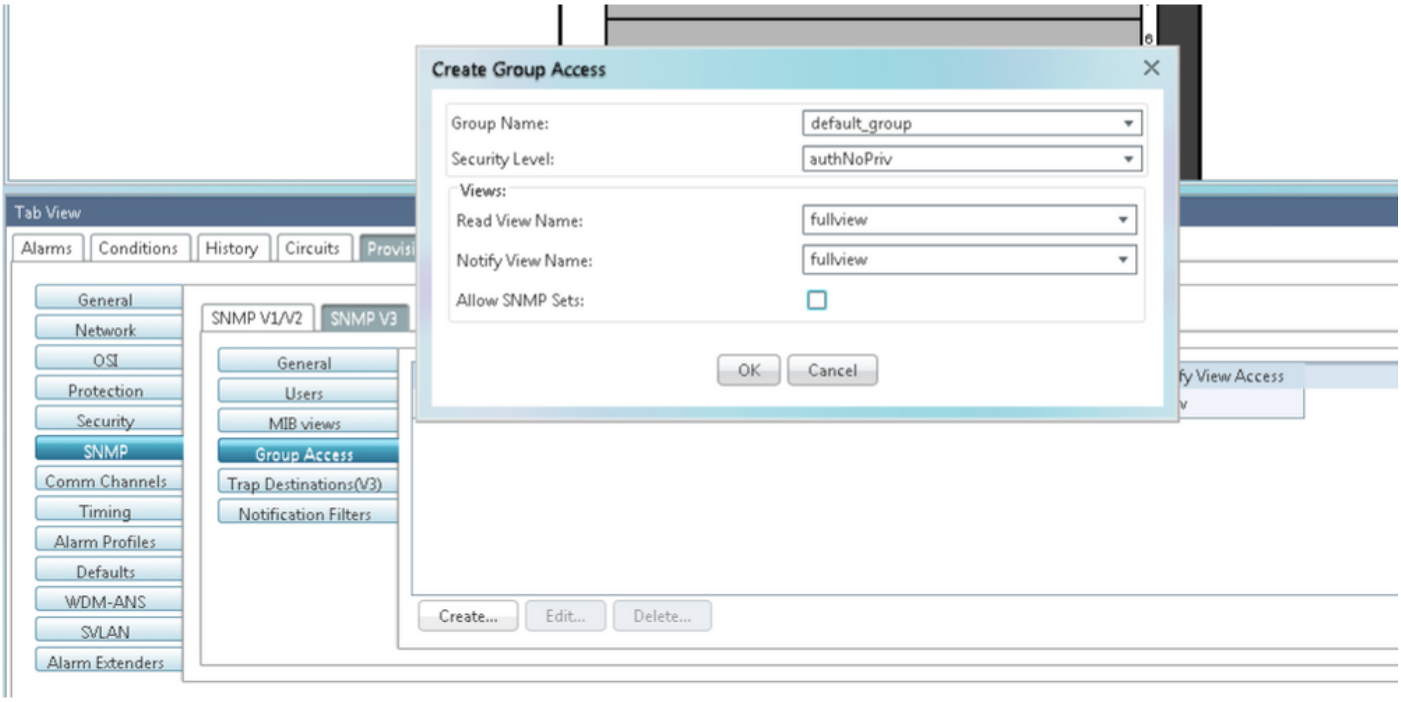
			Group Name
ank	MD5	DES	default_group

Step 3. Ensure that MIB views are configured as shown in the image.



View Name	Sub Tree OID	Mask	Type
fullview	1	1	included

Step 4. Configure Group Access as shown in the image for authnopriv mode.



Create Group Access

Group Name: default_group

Security Level: authNoPriv

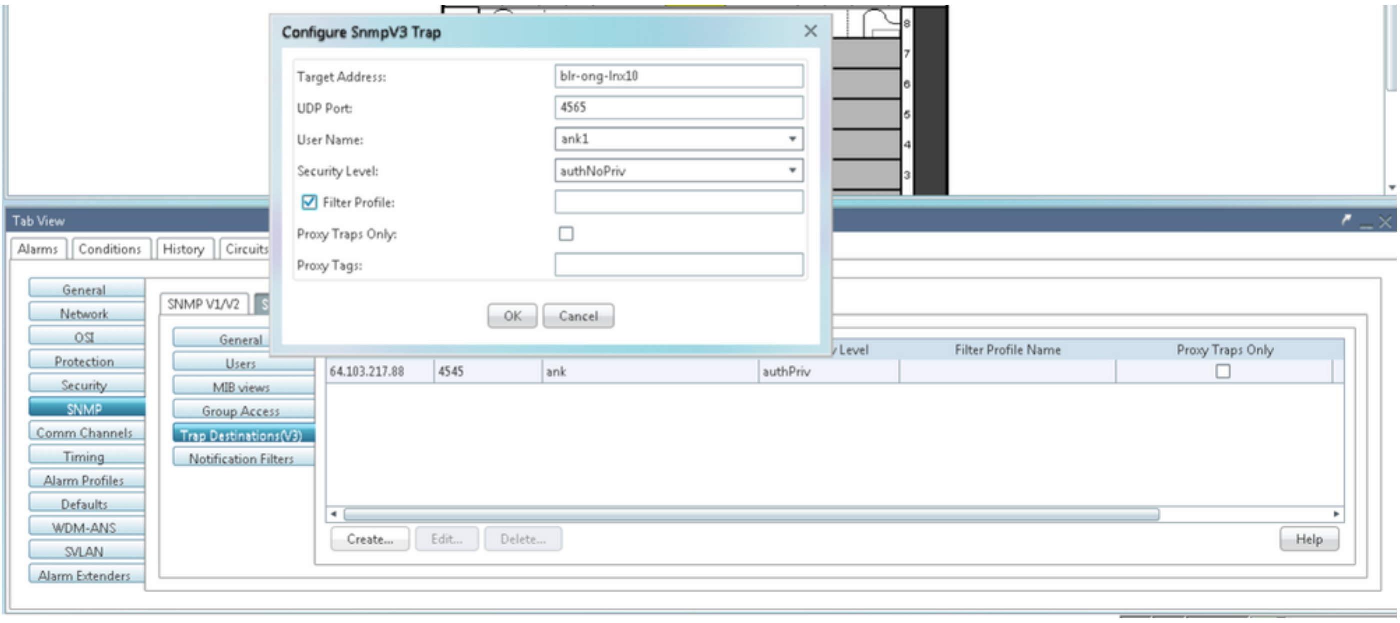
Views:

Read View Name: fullview

Notify View Name: fullview

Allow SNMP Sets: □

Step 5. Navigate to **Node View > Provisioning > SNMP > SNMP V3 > Trap Destination (V3)**. Click on **Create** and **Configure** as shown in the image.



Configure SnmpV3 Trap

Target Address: blr-ong-lnx10

UDP Port: 4565

User Name: ank1

Security Level: authNoPriv

☑ Filter Profile:

Proxy Traps Only: □

Proxy Tags:

			y Level	Filter Profile Name	Proxy Traps Only
64.103.217.88	4545	ank	authPriv		□

Verify authNoPriv Mode

Step 1. Navigate to the NMS server and do snmpwalk.

Syntax:

```
snmpwalk -v 3 -l authnopriv -u <user name> -a MD5 -A <password> <node IP> <MIB>
```

Example:

```
blr-ong-lnx10:154> snmpwalk -v 3 -l authnopriv -u ank1 -a MD5 -A cisco123  10.64.106.40 system

RFC1213-MIB::sysDescr.0 = STRING: "Cisco ONS 15454 M6 10.50-015E-05.18-SPA Factory Defaults
```

```
PLATFORM=15454-M6"

RFC1213-MIB::sysObjectID.0 = OID: CERENT-GLOBAL-REGISTRY::cerent454M6Node

DISMAN-EVENT-MIB::sysUpTimeInstance = Timeticks: (430323) 1:11:43.23

RFC1213-MIB::sysContact.0 = ""

RFC1213-MIB::sysName.0 = STRING: "Ankit_40"

RFC1213-MIB::sysLocation.0 = ""

RFC1213-MIB::sysServices.0 = INTEGER: 79
```

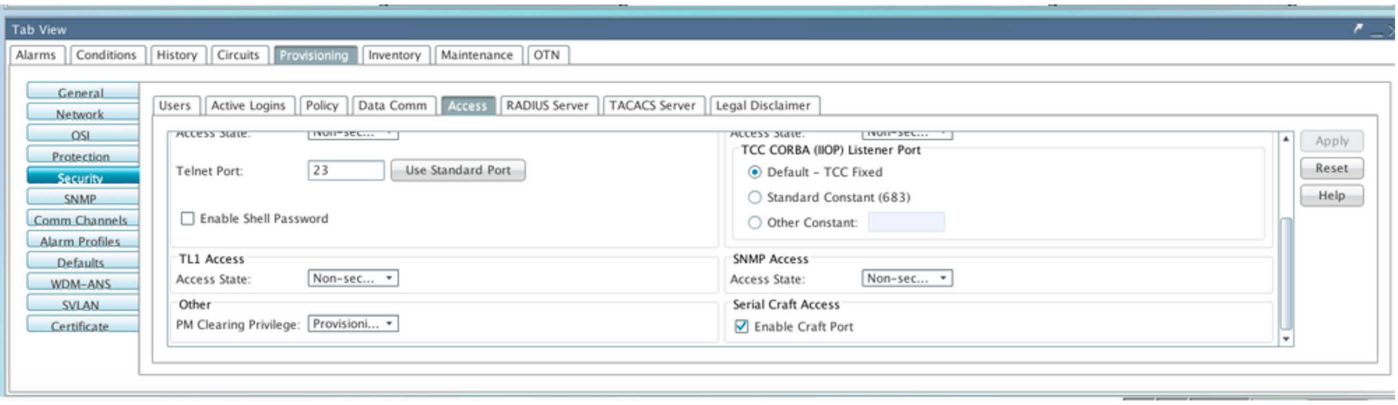
SNMP Trap:

```
snmptrapd -f -Lo -OQ -Ob -Ot -F "%V\n%B\n%N\n%w\n%q\n%P\n%v\n\n" <port number>
```

Trap cmd is the same for all versions.

Configure noAuthNoPriv Mode on ONS15454/NCS2000 Device

Step 1. In CTC, navigate to **Node View > Provisioning > Security > Access > change snmp access state to Non-secure mode** as shown in the image.



Access State: Non-sec...

Telnet Port: 23

□ Enable Shell Password

TL1 Access
Access State: Non-sec...

Other
PM Clearing Privilege: Provisioni...

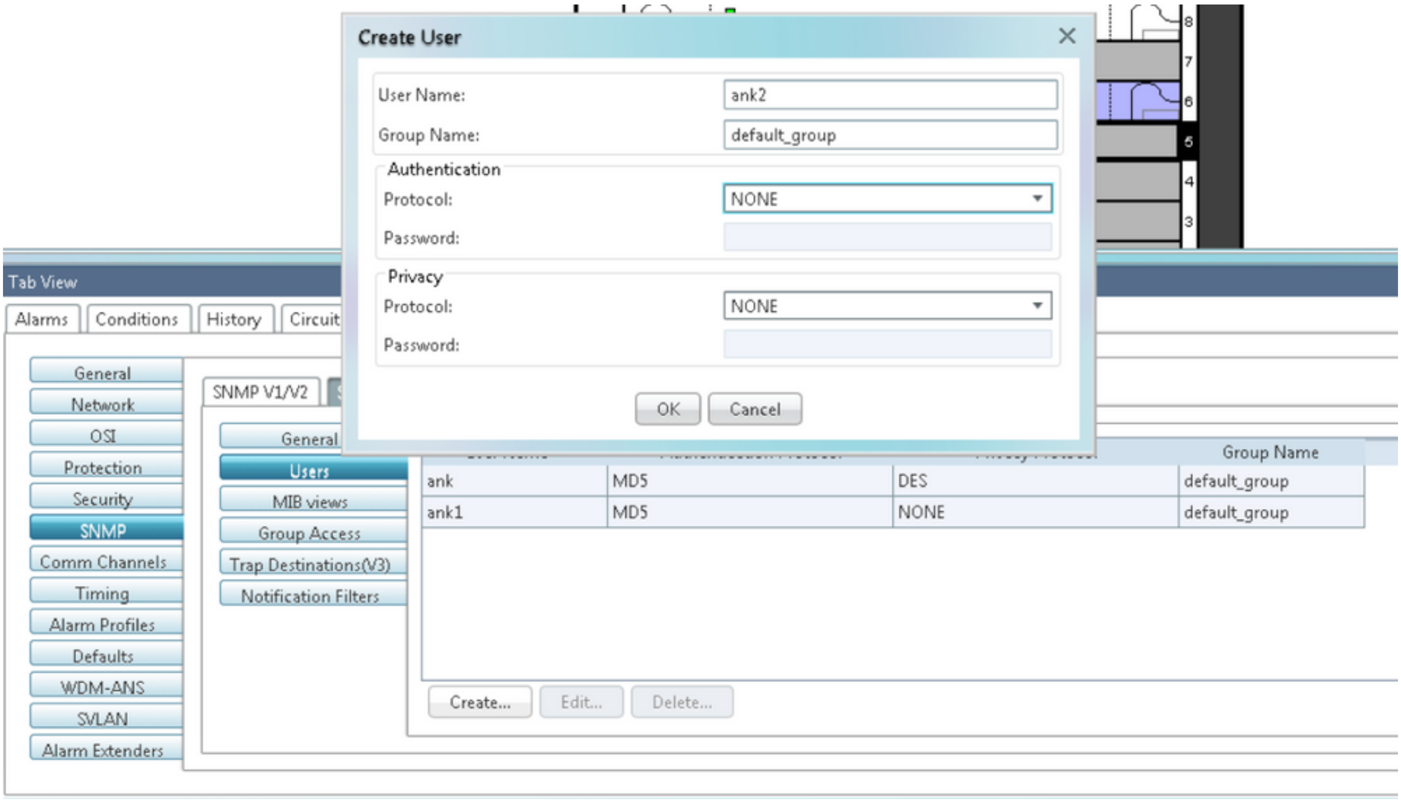
Access State: Non-sec...

TCC CORBA (IIOP) Listener Port
● Default - TCC Fixed
○ Standard Constant (683)
○ Other Constant:

SNMP Access
Access State: Non-sec...

Serial Craft Access
☑ Enable Craft Port

Step 2. Navigate to **Node View > Provisioning > SNMP > SNMP V3 > Users > Create User and Configure** as shown in the image.



User Name: ank2

Group Name: default_group

Authentication

Protocol: NONE

Password:

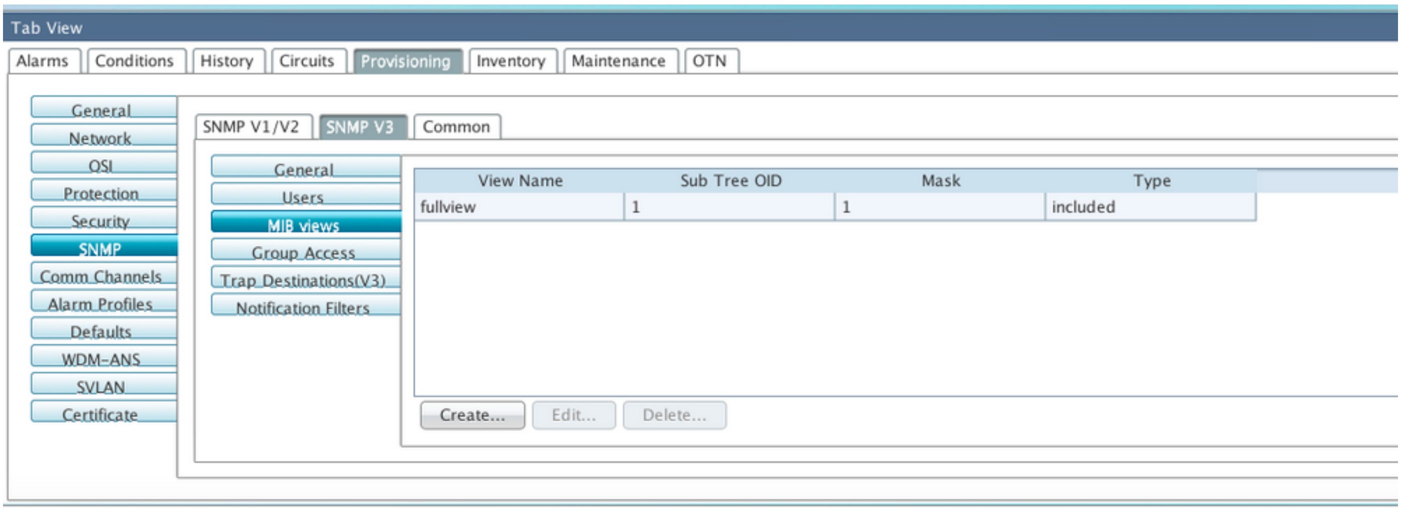
Privacy

Protocol: NONE

Password:

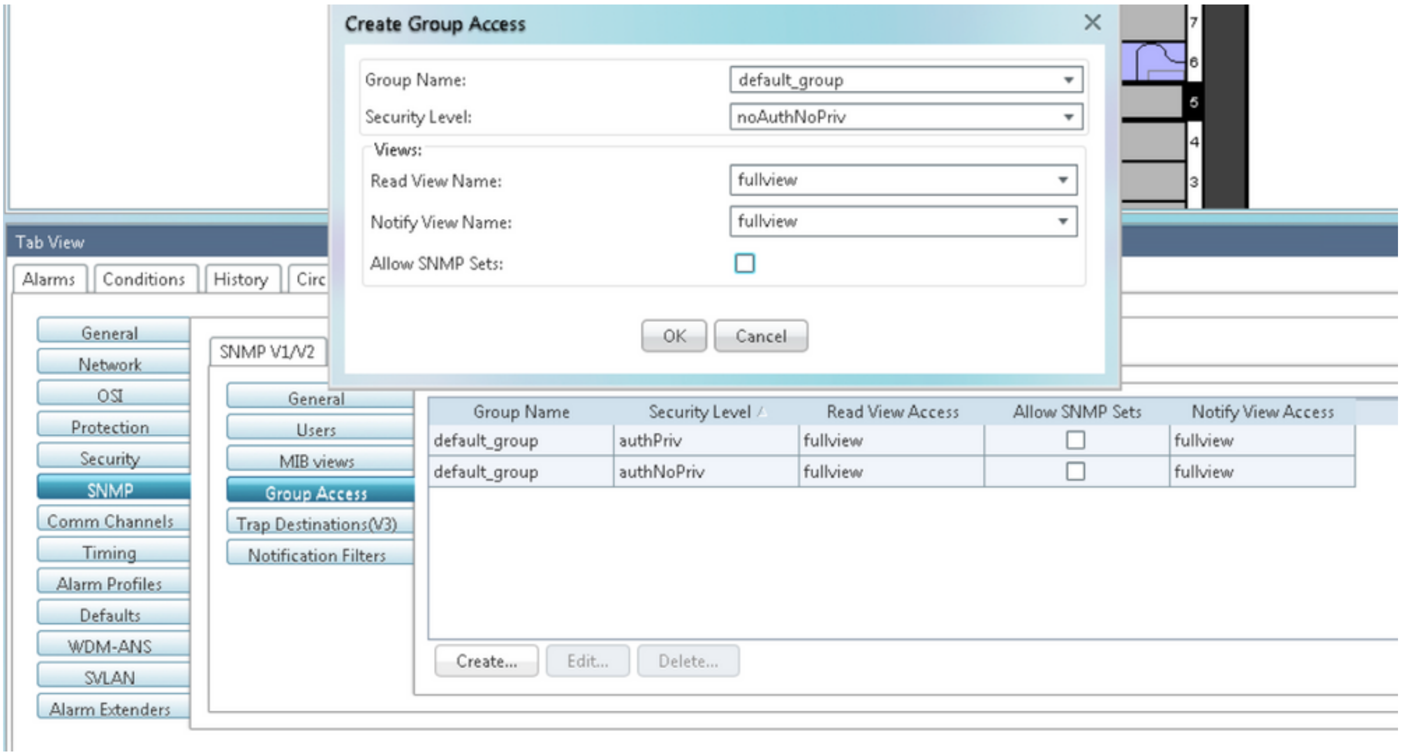
			Group Name
ank	MD5	DES	default_group
ank1	MD5	NONE	default_group

Step 3. Ensure that **MIB views** are configured as shown in the image.



View Name	Sub Tree OID	Mask	Type
fullview	1	1	included

Step 4. Configure Group Access as shown in the image for noauthnopriv mode.



Create Group Access

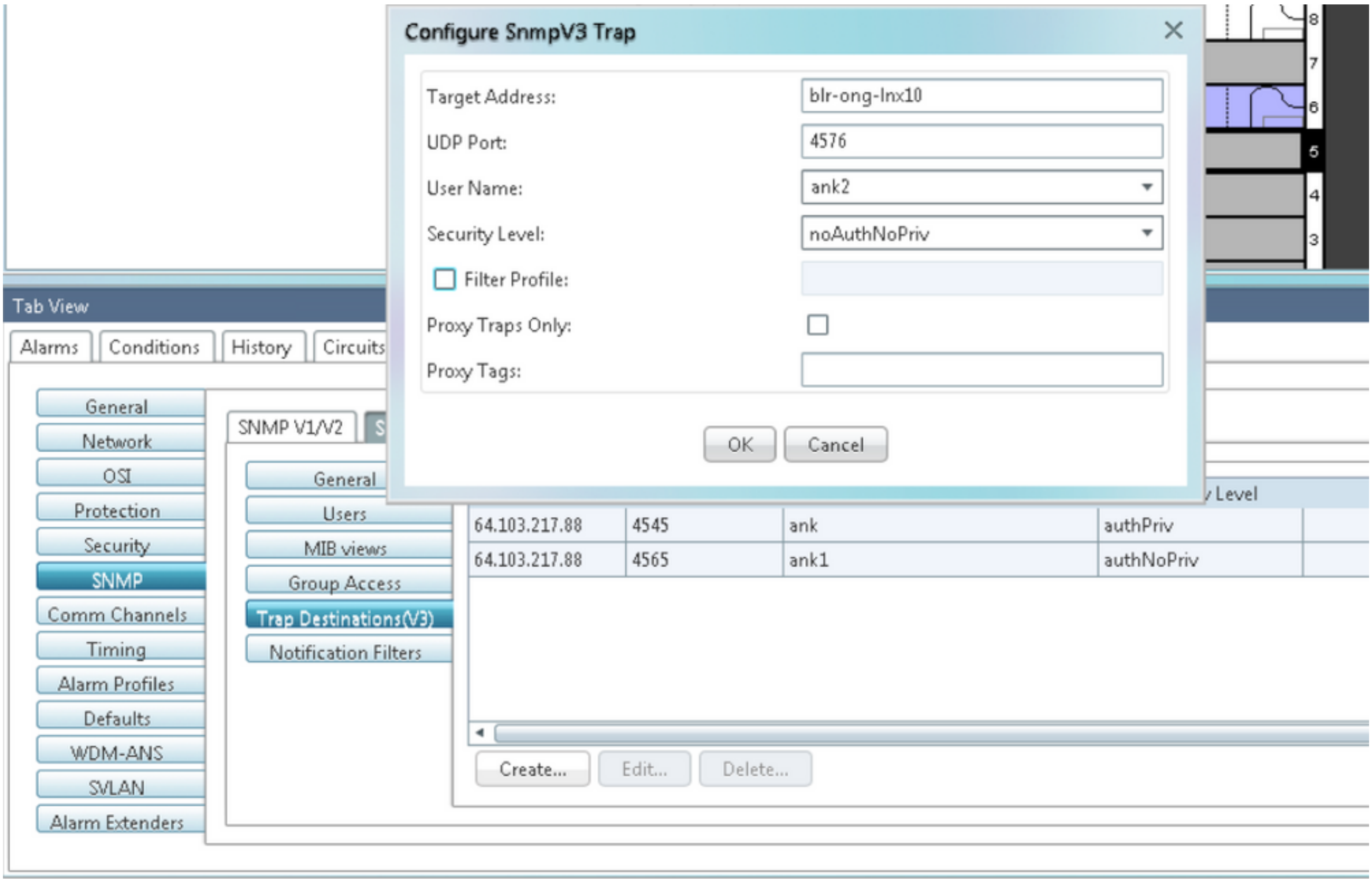
Group Name:	default_group
Security Level:	noAuthNoPriv

Views:

Read View Name:	fullview
Notify View Name:	fullview
Allow SNMP Sets:	□

Group Name	Security Level	Read View Access	Allow SNMP Sets	Notify View Access
default_group	authPriv	fullview	□	fullview
default_group	authNoPriv	fullview	□	fullview

Step 5. Navigate to **Node View > Provisioning > SNMP > SNMP V3 > Trap Destination (V3)**. Click on **Create** and **Configure** as shown in the image.



Configure SnmpV3 Trap

Target Address:	blr-ong-lnx10
UDP Port:	4576
User Name:	ank2
Security Level:	noAuthNoPriv
□ Filter Profile:	
Proxy Traps Only:	□
Proxy Tags:	

			Level
64.103.217.88	4545	ank	authPriv
64.103.217.88	4565	ank1	authNoPriv

Verify noAuthNoPriv Mode

Step 1. Navigate to NMS server and do snmpwalk.

```
snmpwalk -v 3 -l noauthnopriv -u <user name> <node IP> <MIB>
```

Example:

```
blr-ong-lnx10:155> snmpwalk -v 3 -l noauthnopriv -u ank2 10.64.106.40 system

RFC1213-MIB::sysDescr.0 = STRING: "Cisco ONS 15454 M6 10.50-015E-05.18-SPA Factory Defaults
PLATFORM=15454-M6"

RFC1213-MIB::sysObjectID.0 = OID: CERENT-GLOBAL-REGISTRY::cerent454M6Node

DISMAN-EVENT-MIB::sysUpTimeInstance = Timeticks: (486910) 1:21:09.10

RFC1213-MIB::sysContact.0 = ""

RFC1213-MIB::sysName.0 = STRING: "Ankit_40"

RFC1213-MIB::sysLocation.0 = ""

RFC1213-MIB::sysServices.0 = INTEGER: 79

blr-ong-lnx10:156>
```

SNMP Trap:

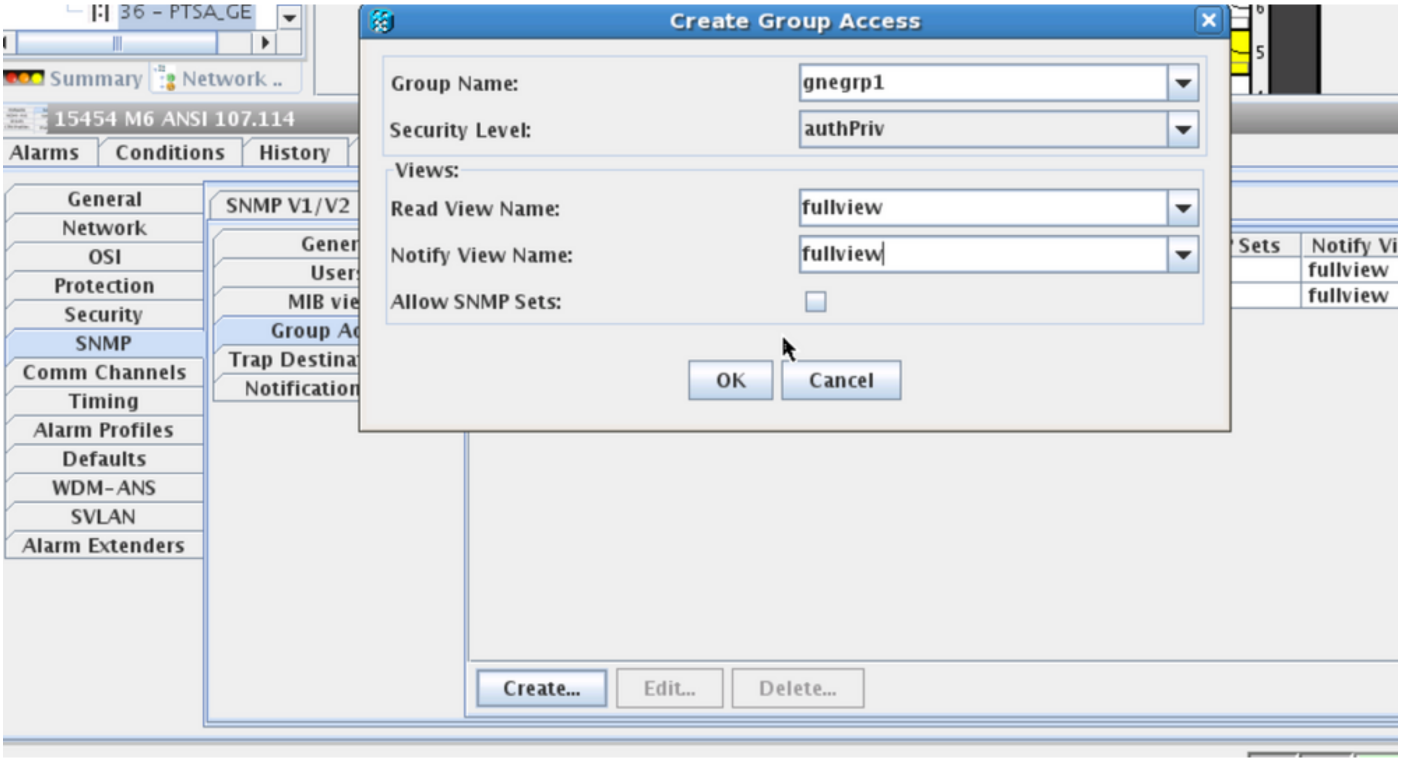
```
snmptrapd -f -Lo -OQ -Ob -Ot -F "%V\n%B\n%N\n%w\n%q\n%P\n%v\n\n" <port number>
```

Trap cmd is the same for all versions.

SNMP V3 Trap for GNE/ENE Setup

On GNE Node

Step 1. Navigate to **Provisioning > SNMP > SNMP V3 and Create Group Access (Group Access Tab): provide a group name with Security level (noAuthnoPriv|AuthnoPriv|authPriv) and full view Read and Notify access as shown in the image.**



Create Group Access

Group Name: gnegrp1

Security Level: authPriv

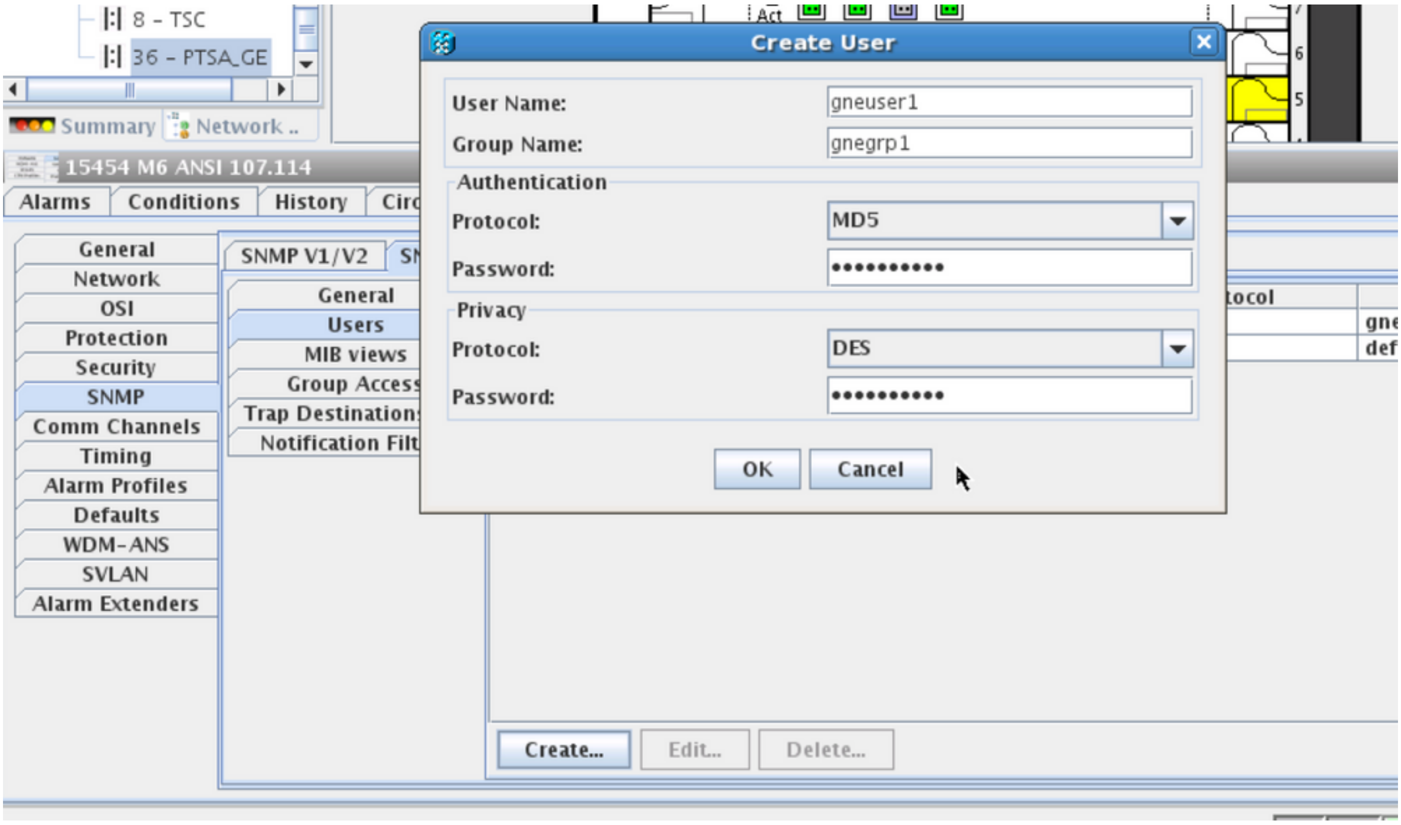
Views:

Read View Name: fullview

Notify View Name: fullview

Allow SNMP Sets: ☐

Step 2. Create User Access (Users Tab): create a user with the group name as same as created earlier in Group Access tab. Also, provide the Authentication based on access level as shown in the image.



Create User

User Name: gneuser1

Group Name: gnegrp1

Authentication

Protocol: MD5

Password: ••••••••••

Privacy

Protocol: DES

Password: ••••••••••

Step 3. Trap Destination(V3) Tab:

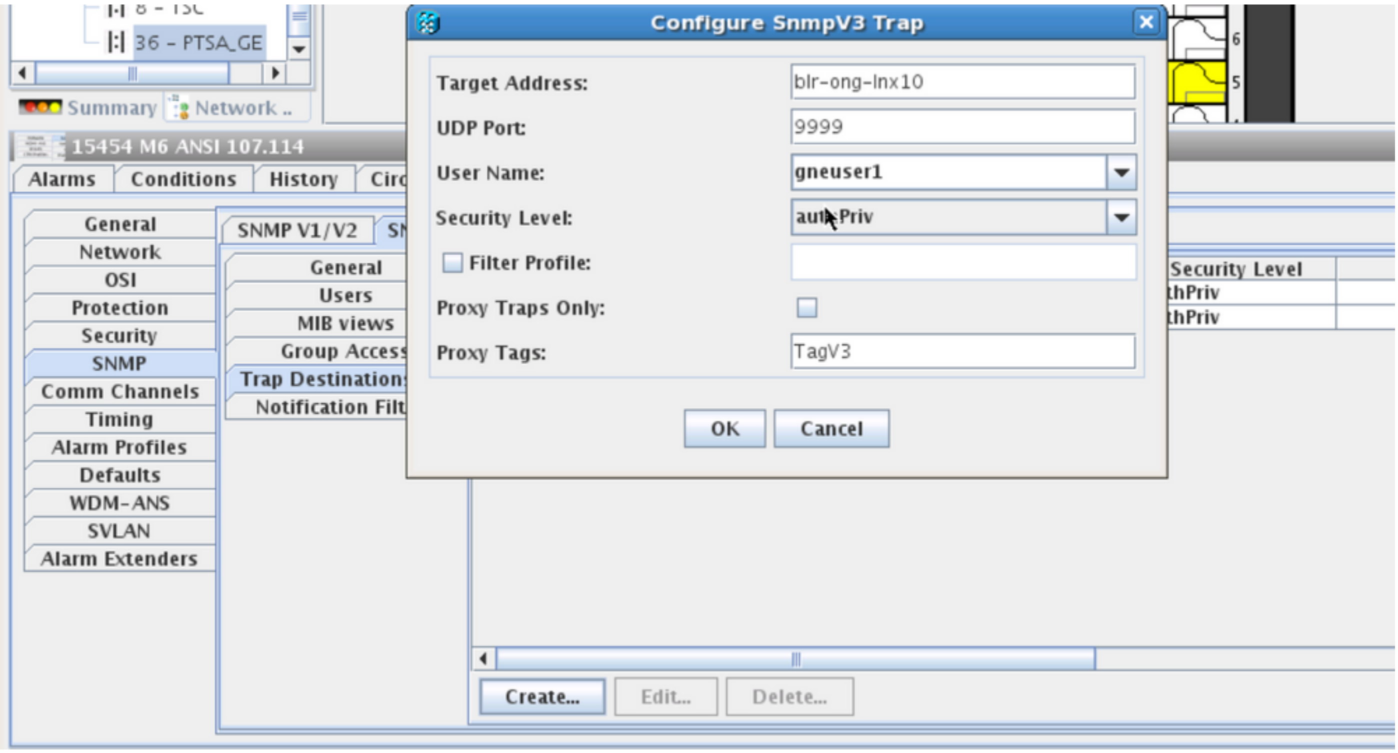
Target Address: Address of NMS server from where the trap will be running(ex. Blr-ong-lnx10).

UDP Port: Any port number where the trap will be listened(Ex. 9977).

User Name: Name of the User in the User tab.

Security level: As configured earlier in the User tab.

Proxy Tags: Provide a proxy tag (Ex. Tag75).



Configure SnmpV3 Trap

Target Address: blr-ong-lnx10

UDP Port: 9999

User Name: gneuser1

Security Level: authPriv

□ Filter Profile:

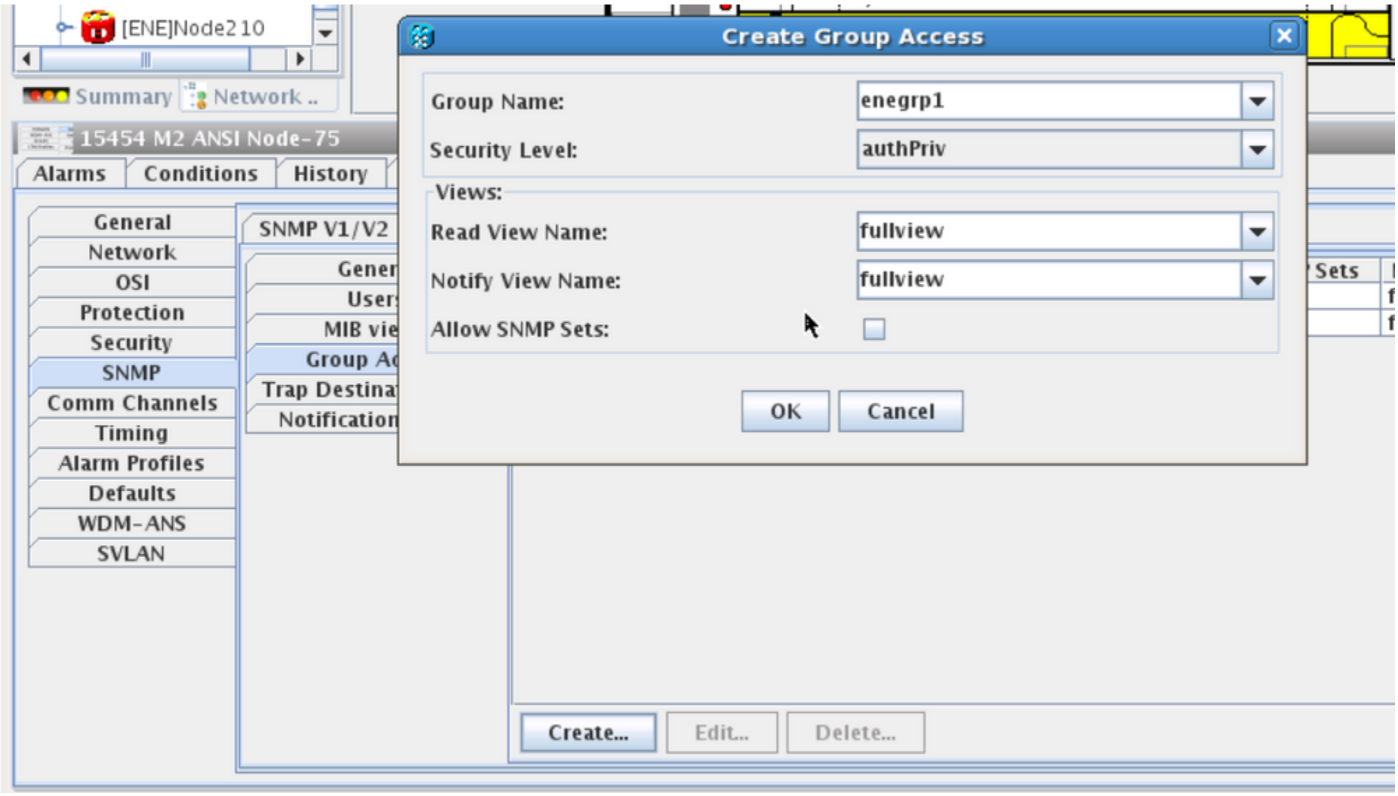
Proxy Traps Only: □

Proxy Tags: TagV3

OK Cancel

On ENE Node

Step 1. Navigate to **Provisioning > SNMP > SNMP V3 and Create Group Access (Group Access Tab): provide a group name with access level (noAuthnoPriv|AuthnoPriv|authPriv) and full view Read and Notify access as shown in the image.**



Create Group Access

Group Name: enegrp1

Security Level: authPriv

Views:

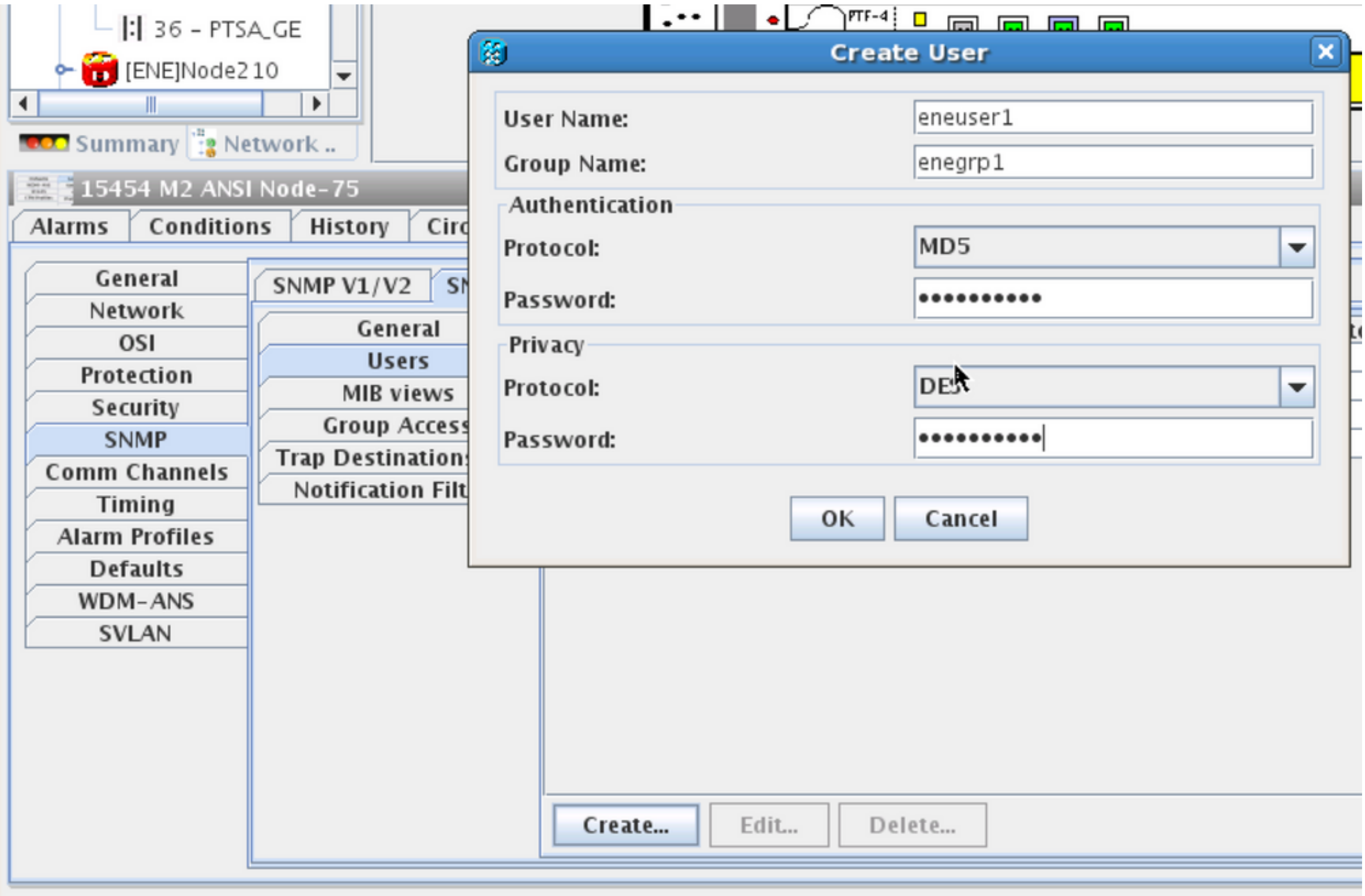
Read View Name: fullview

Notify View Name: fullview

Allow SNMP Sets: □

OK Cancel

Step 2. Create User Access (Users Tab): create a user with the group name as same as created earlier in Group Access tab. Also, provide the Authentication based on access level.



Create User

User Name: eneuser1

Group Name: enegrp1

Authentication

Protocol: MD5

Password: ●●●●●●●●●●

Privacy

Protocol: DES

Password: ●●●●●●●●●●

Ensure a default_group if shown in the User tab is created in Group access Tab in case it is missing in the Group Access Tab.

Step 3. Trap Destination(V3) Tab:

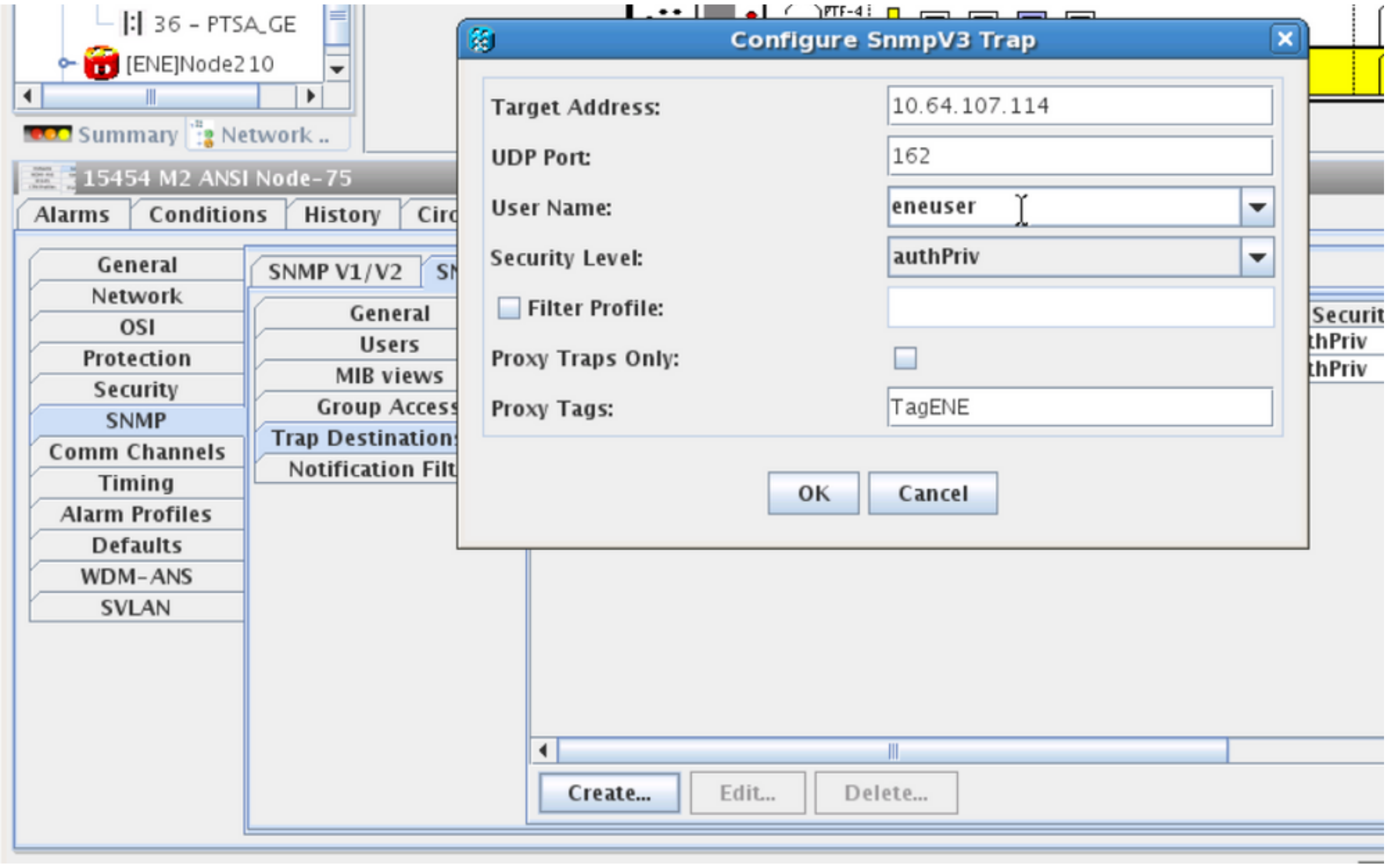
Target Address: GNE node IP.

UDP Port: 162.

User Name: Name of the User in the User tab.

Security level: As configured earlier in the User tab.

Proxy Tags: Provide any proxy tag same as GNE (Ex. Tag75).



Configure SnmpV3 Trap

Target Address: 10.64.107.114

UDP Port: 162

User Name: eneuser

Security Level: authPriv

□ Filter Profile:

Proxy Traps Only: □

Proxy Tags: TagENE

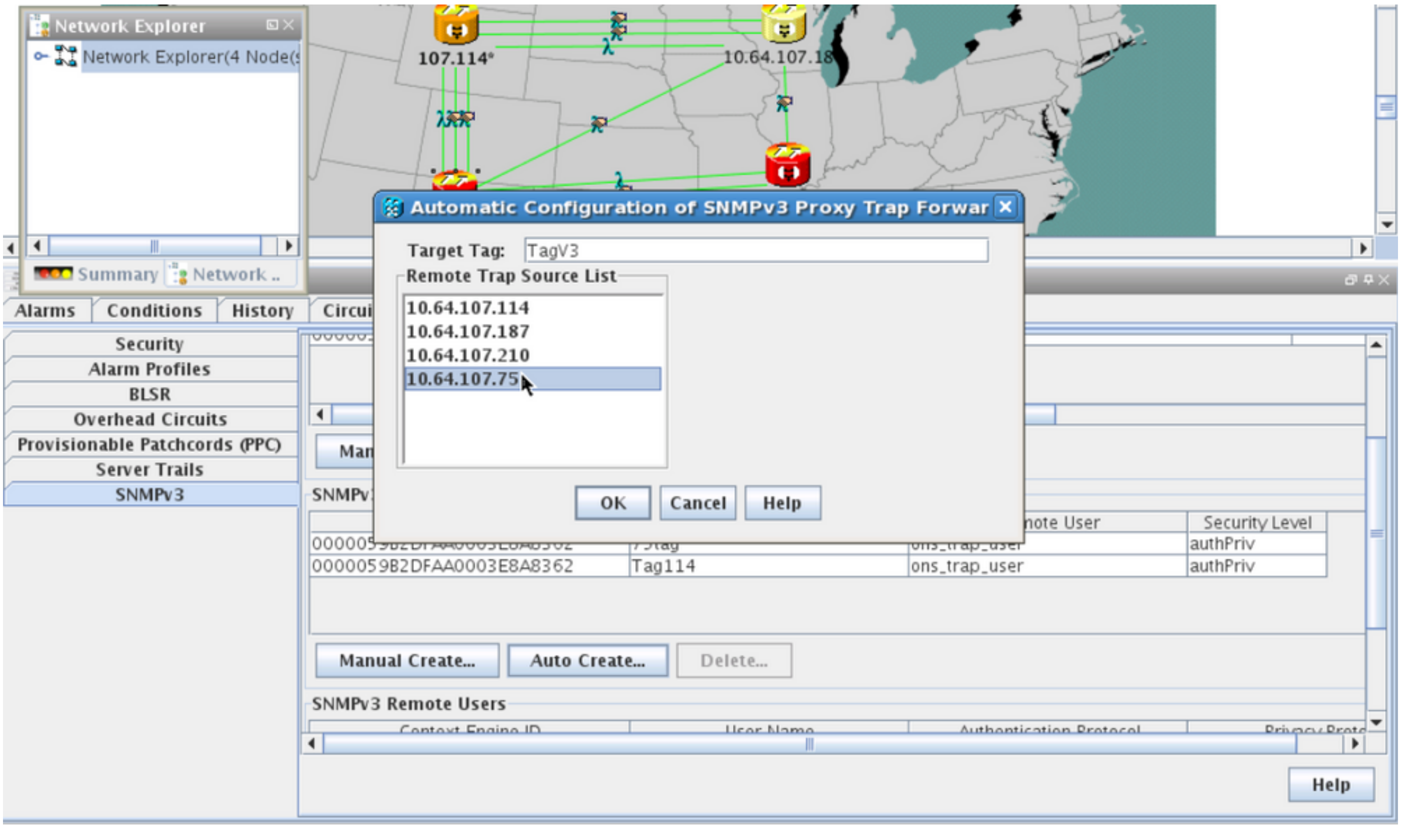
In CTC, navigate to network view:

Step 1. Navigate to **SNMPv3** tab.

Step 2. SNMPv3 Proxy Trap Forwarder Table: You can do either **Manual** or **Auto Create**.

Select **Auto Create**. Under that:

- Target Tag: Proxy tag set in GNE.
- Remote Trap Source List: select the ENE node IP as shown in the image.



Automatic Configuration of SNMPv3 Proxy Trap Forwar

Target Tag: TagV3

Remote Trap Source List

10.64.107.114
10.64.107.187
10.64.107.210
10.64.107.75

OK Cancel Help

		note User	Security Level
0000059B2DFAA0003E8A8362	75tag	ons_trap_user	authPriv
0000059B2DFAA0003E8A8362	Tag114	ons_trap_user	authPriv

Verify GNE/ENE Setup

Configure NMS Server (blr-ong-lnx10):

Step 1. In your home directory of the server, create a directory and name it **snmp**.

Step 2. Under this directory, create a file **snmptrapd.conf**.

Step 3. In **snmptrapd.conf**, create this configuration:

```
createUser -e 0x<GNE_ENGINE_NO> <GNE_USER_NAME>  MD5 <password1> DES <password2>

                              Engine_NO = can be available from CTC. Open GNE node-->Node view->Provisioning->SNMP->SNMP V3-->General.
```

SNMP Trap:

```
snmptrapd -f -Lo -OQ -Ob -Ot -F "%V\n%B\n%N\n%w\n%q\n%P\n%v\n\n" <port num configured in GNE>
```

snmpwalk on ENE:

For authpriv mode:

```
snmpwalk -v 3 -l authpriv -u <user_name> -a MD5 -A <auth_password>123 -x DES -X <des_password> -E <ene_engine_id> <gne_ip_address> <OID>
```

For authnopriv mode:

```
snmpwalk -v 3 -l authnopriv -u <user_name> -a MD5 -A <auth_password>  -E <ene_engine_id> <gne_ip_address> <OID>
```

For noauthnopriv mode:

```
snmpwalk -v 3 -l authpriv -u <user_name>  -E <ene_engine_id> <gne_ip_address> <OID>
```

Troubleshoot

There is currently no specific troubleshooting information available for this configuration.