ACS 5.x: TACACS+ Authentication and Command Authorization based on AD group membership Configuration Example

Document ID: 113590

Contents

Introduction

This document provides an example of configuring TACACS+ Authentication and Command Authorization based on AD group membership of a user with Cisco Secure Access Control System (ACS) 5.x and later. ACS uses Microsoft Active Directory (AD) as an external identity store to store resources such as users, machines, groups, and attributes.

Prerequisites

Requirements

Ensure that you meet these requirements before you attempt this configuration:

- ACS 5.x is fully integrated to the desired AD Domain. If the ACS is not integrated with the desired AD Domain, refer to ACS 5.x and later: Integration with Microsoft Active Directory Configuration Example for more information in order to perform the integration task.

Components Used

The information in this document is based on these software and hardware versions:

- Cisco Secure ACS 5.3
- Cisco IOS® Software Release 12.2(44)SE6.

  Note: This configuration can be done on all the Cisco IOS devices.
- Microsoft Windows Server 2003 Domain

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, make sure that you understand the potential impact of any command.

Conventions

Refer to the Cisco Technical Tips Conventions for more information on document conventions.

Configuration

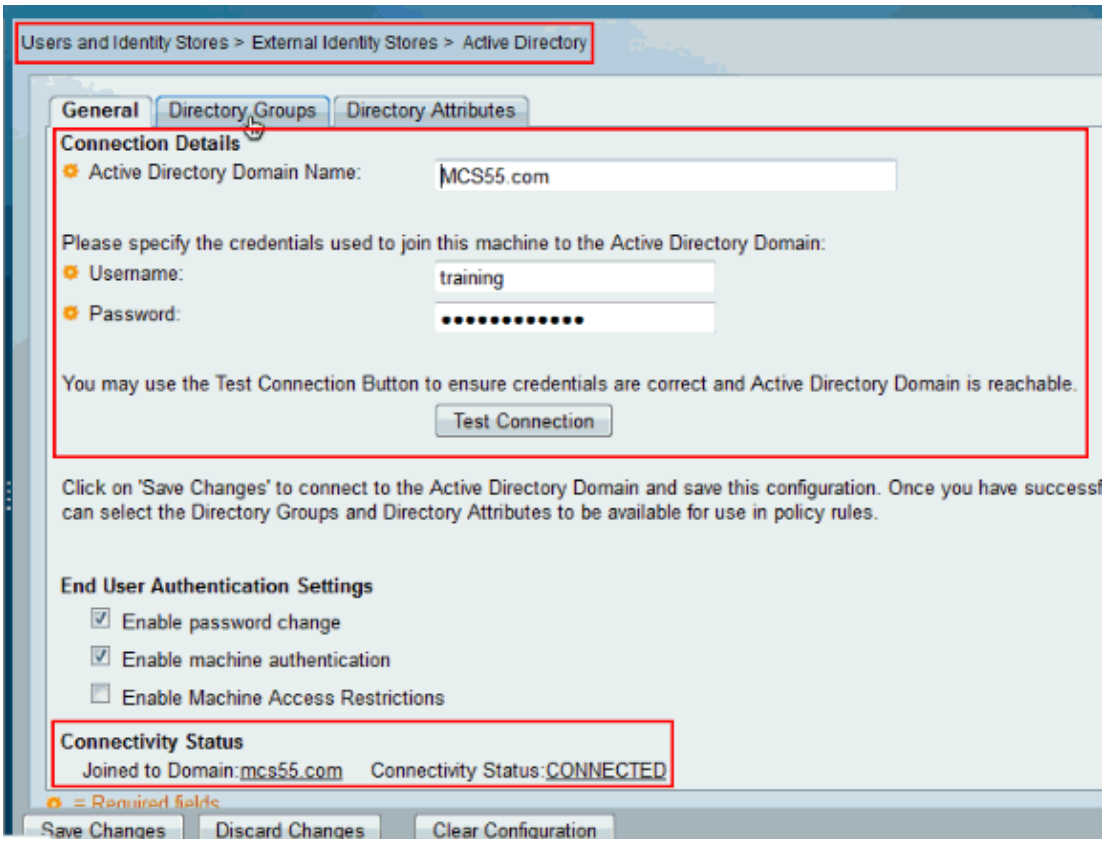
Configure ACS 5.x for Authentication and Authorization

Before you begin the configuration of the ACS 5.x for Authentication and Authorization, ACS should have been integrated successfully with Microsoft AD. If the ACS is not integrated with the desired AD Domain, refer to ACS 5.x and later: Integration with Microsoft Active Directory Configuration Example for more information in order to perform the integration task.

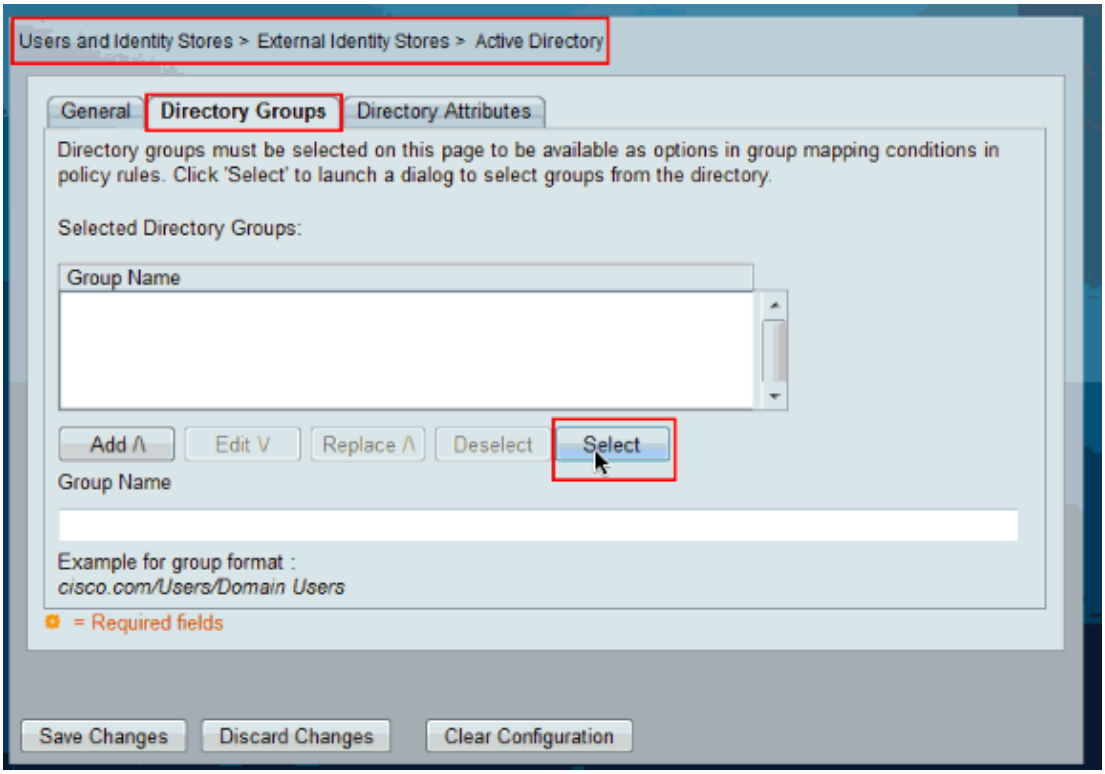
In this section, you map two AD groups to two different command sets and two Shell profiles, one with full−access and the other with limited−access on the Cisco IOS devices.

1. Log into the ACS GUI using Admin credentials.
2. Choose **Users and Identity Stores > External Identity Stores > Active Directory** and verify that the ACS has joined the desired domain and also that the **connectivity status** is shown as **connected**.

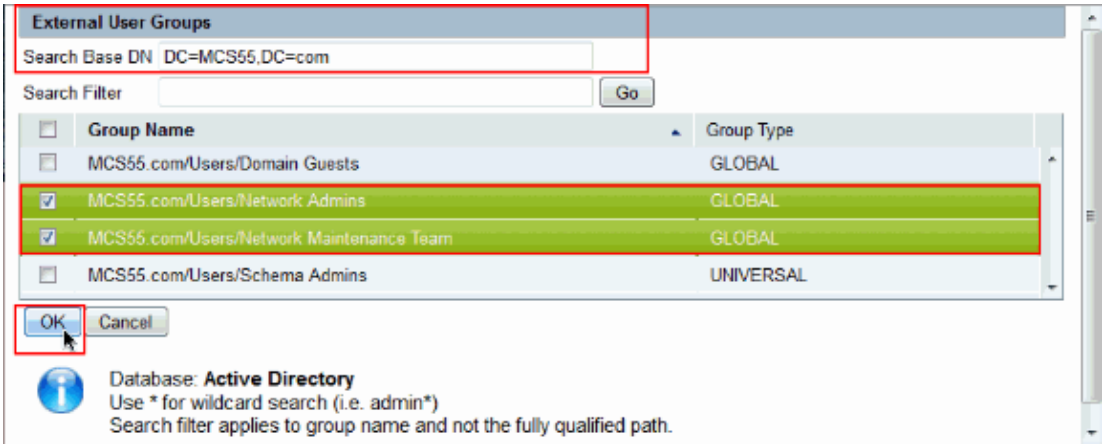
   Click on **Directory Groups** Tab.



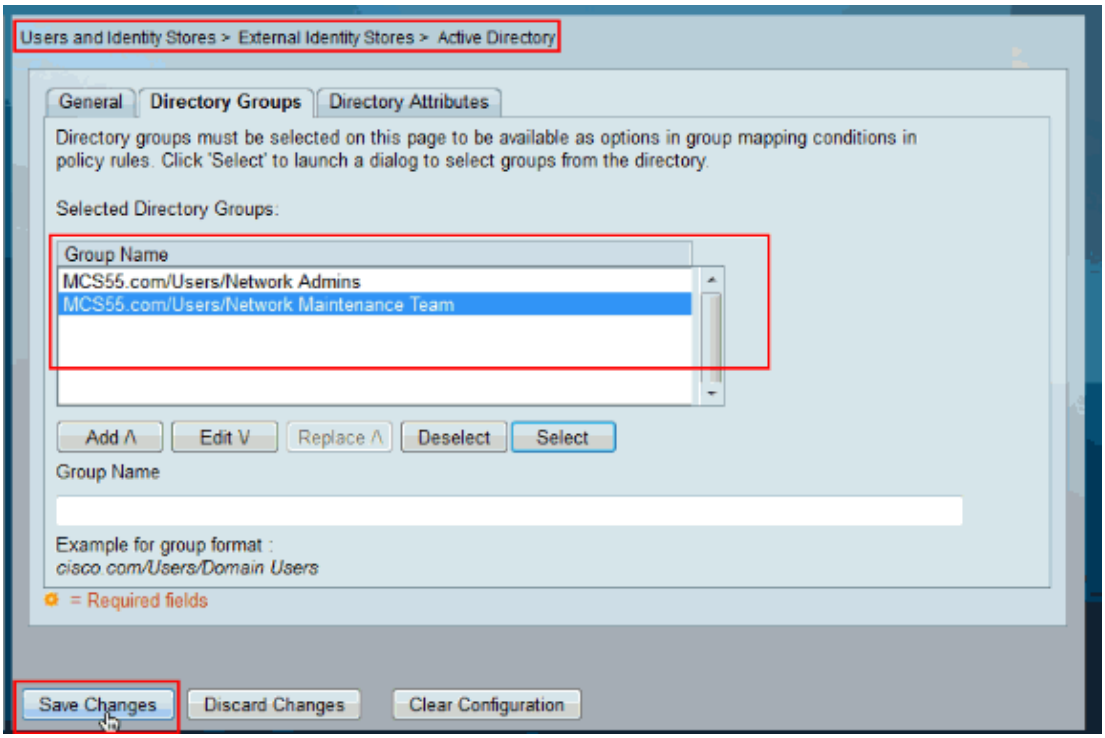
3. Click **Select**.



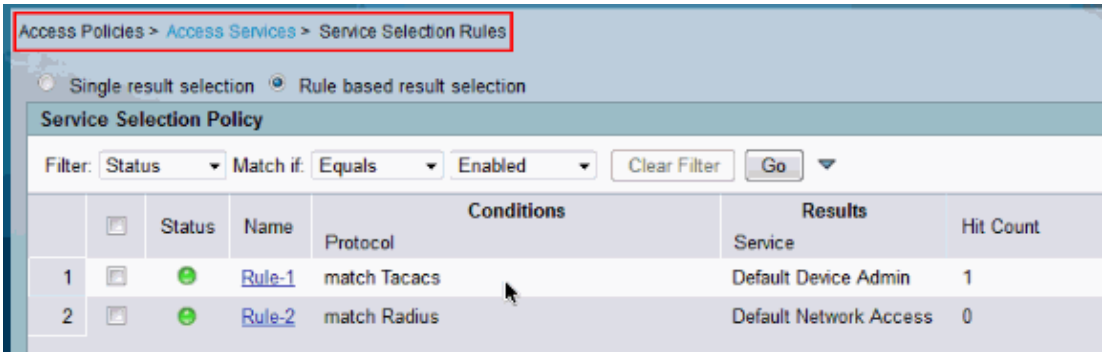
4. Choose the groups that need to be mapped to the Shell profiles and command sets in the later part of the configuration. Click **OK**.



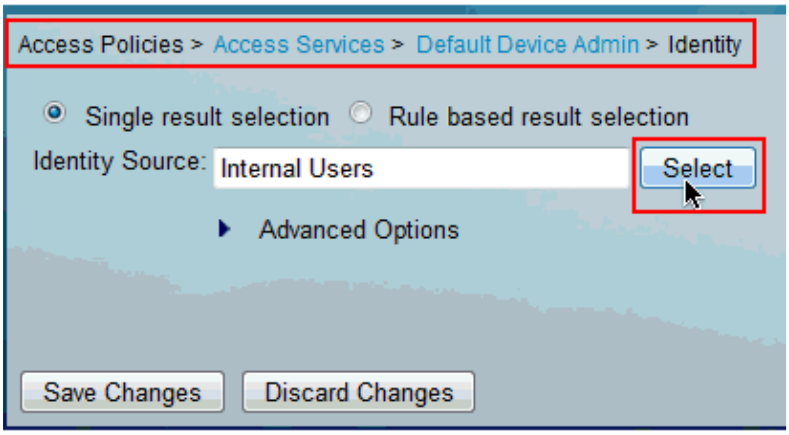
5. Click **Save Changes**.



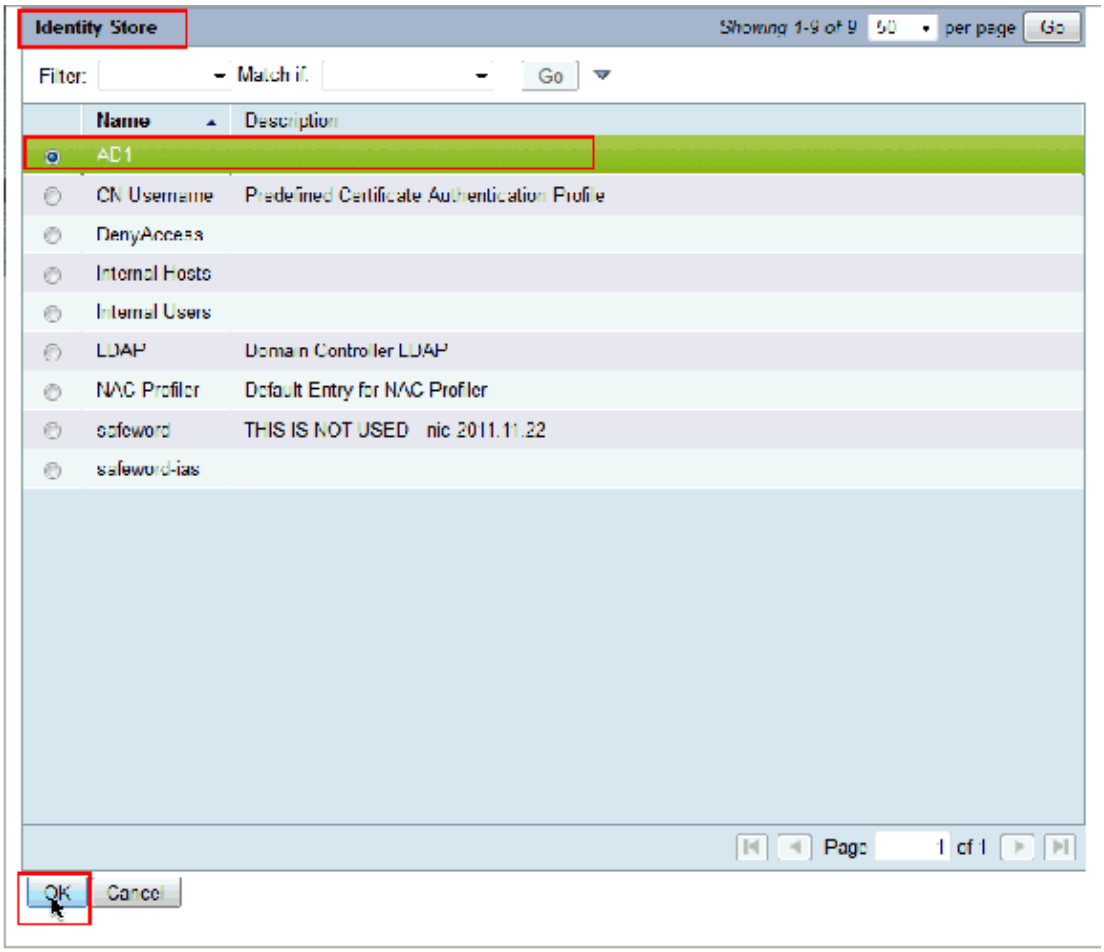
6. Choose **Access Policies** > **Access Services** > **Service Selection Rules** and identify the access service, which processes the TACACS+ Authentication. In this example, it is **Default Device Admin**.



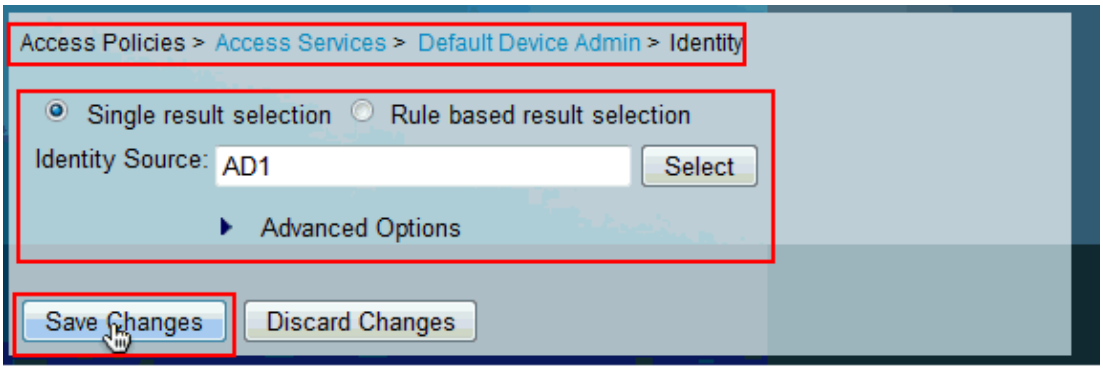
7. Choose **Access Policies** > **Access Services** > **Default Device Admin** > **Identity** and click **Select** next to **Identity Source**.



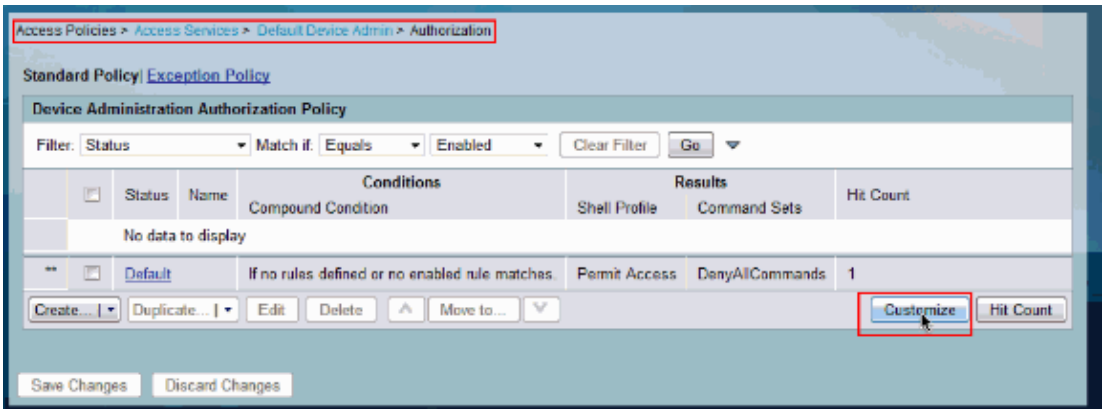
8. Choose **AD1** and click **OK**.



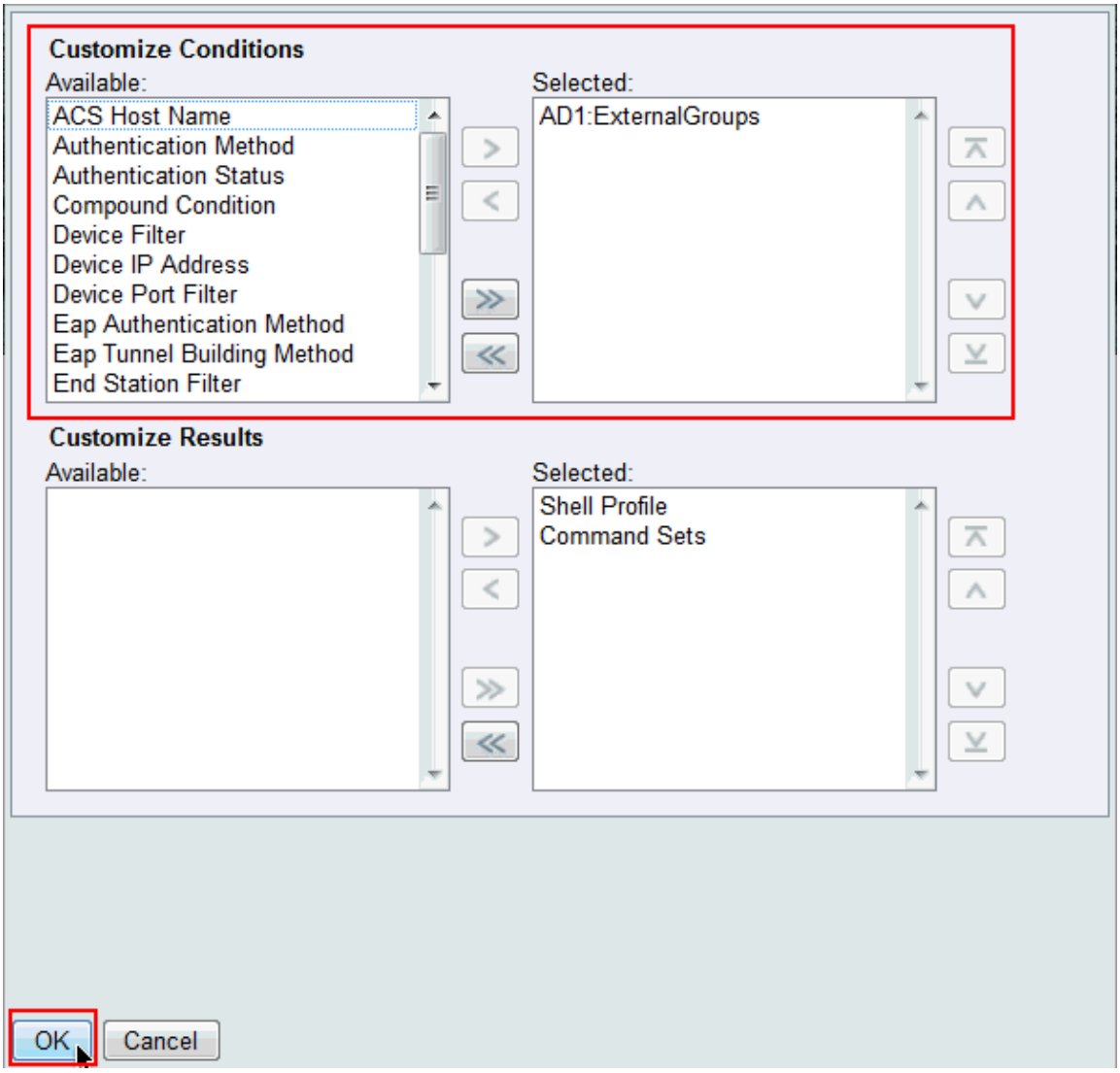
9. Click **Save Changes**.



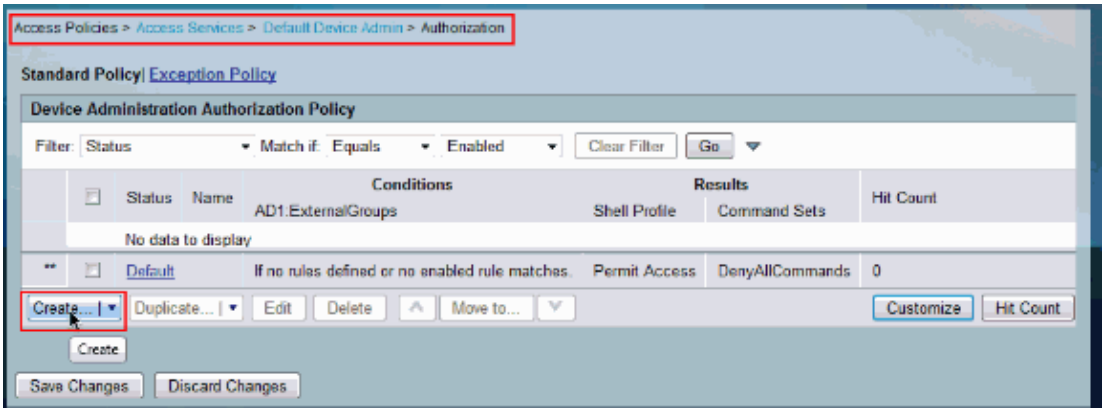
10. Choose **Access Policies** > **Access Services** > **Default Device Admin** > **Authorization** and click on **Customize**.



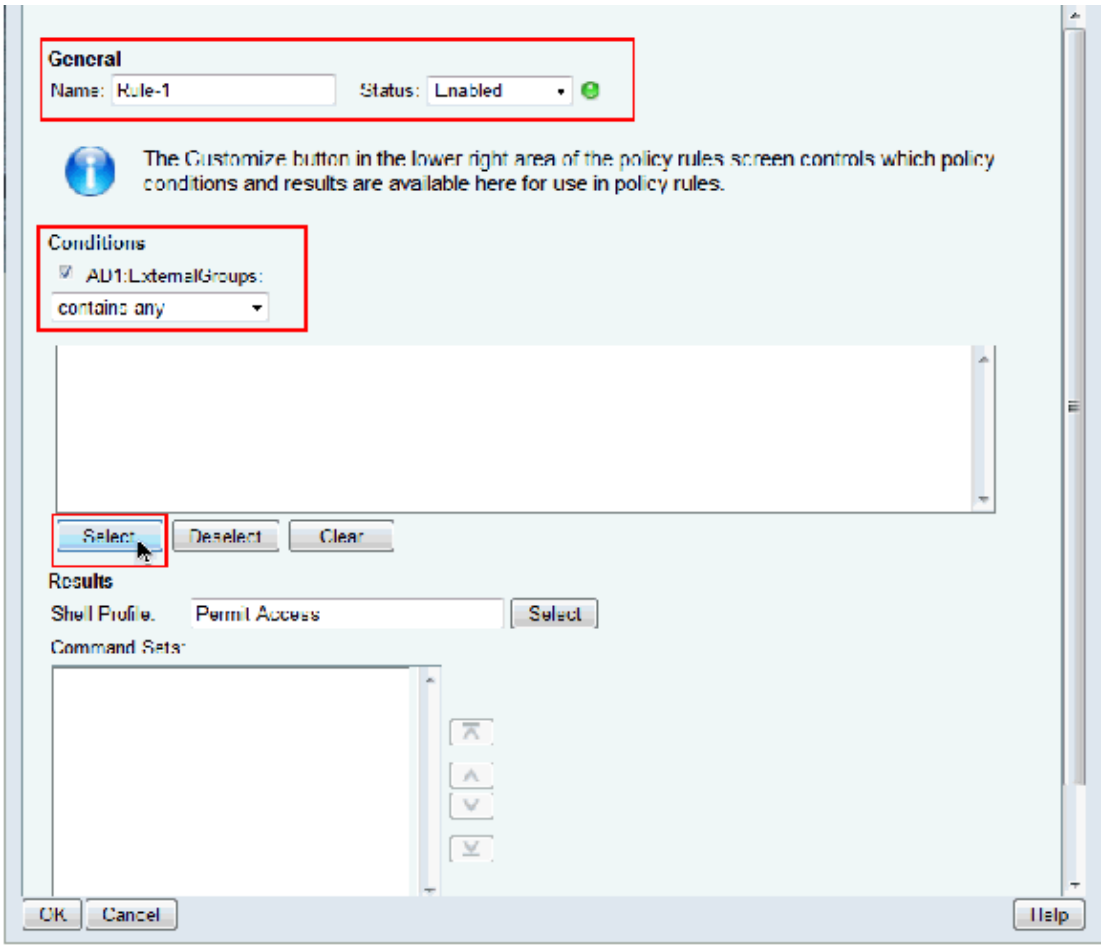
11. Copy **AD1:ExternalGroups** from **Available** to **Selected** section of **Customize Conditions** and then move **Shell Profile** and **Command Sets** from **Available** to **Selected** section of **Customize Results**. Now click **OK**.



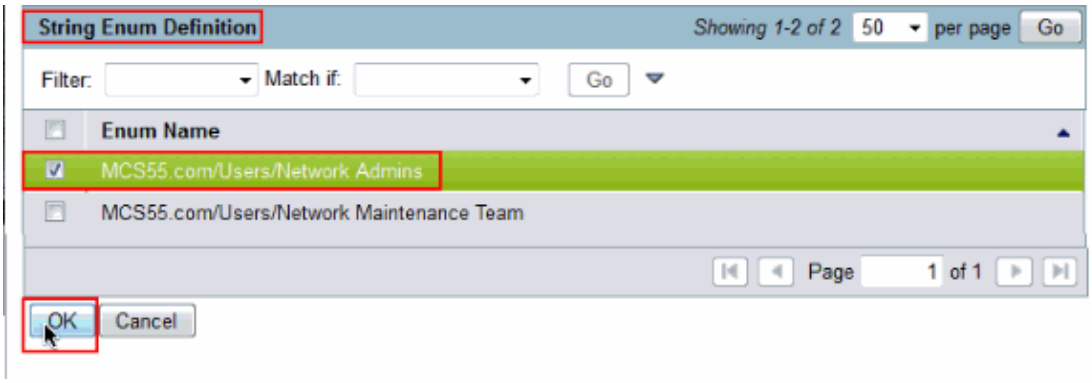
12. Click **Create** in order to create a new Rule.



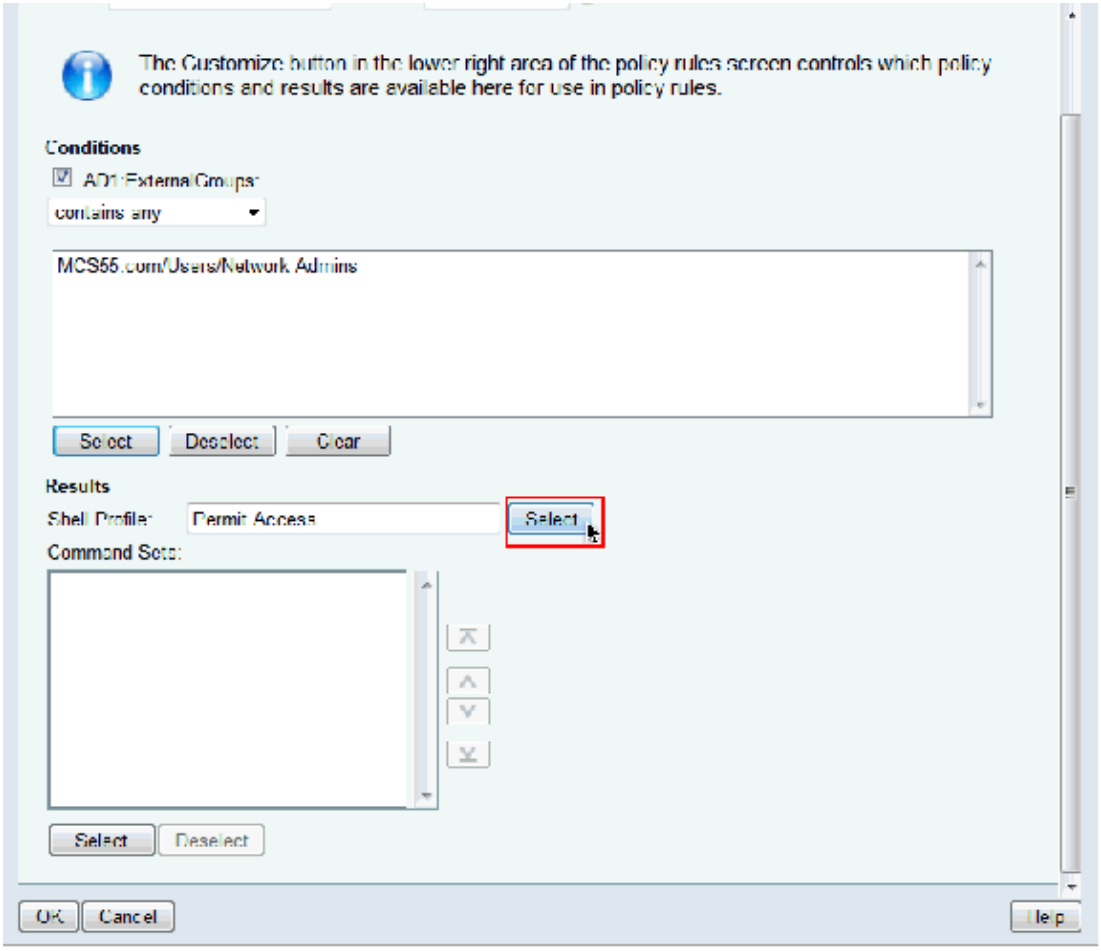
13. Click **Select** in the **AD1:ExternalGroups** Condition.



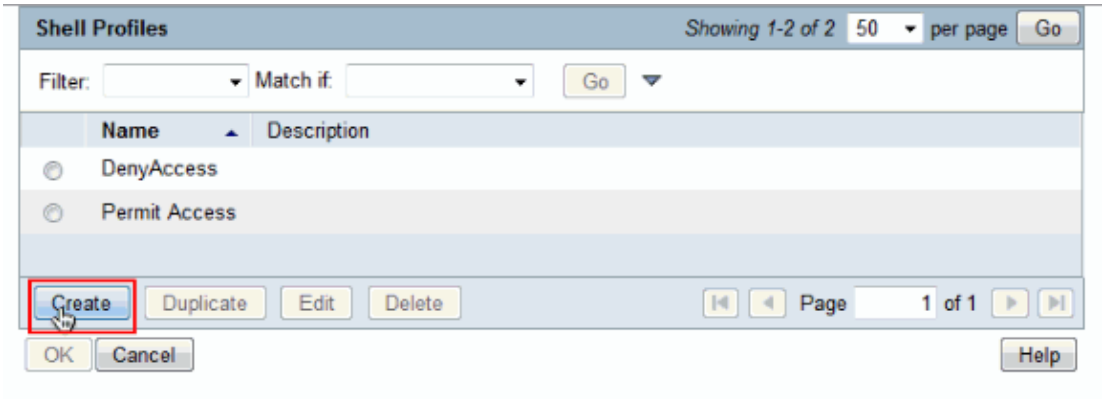
14. Choose the group that you want to provide full access on the Cisco IOS device. Click **OK**.



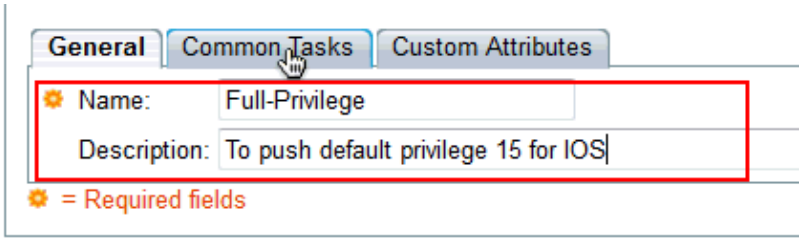
15. Click **Select** in the Shell Profile field.



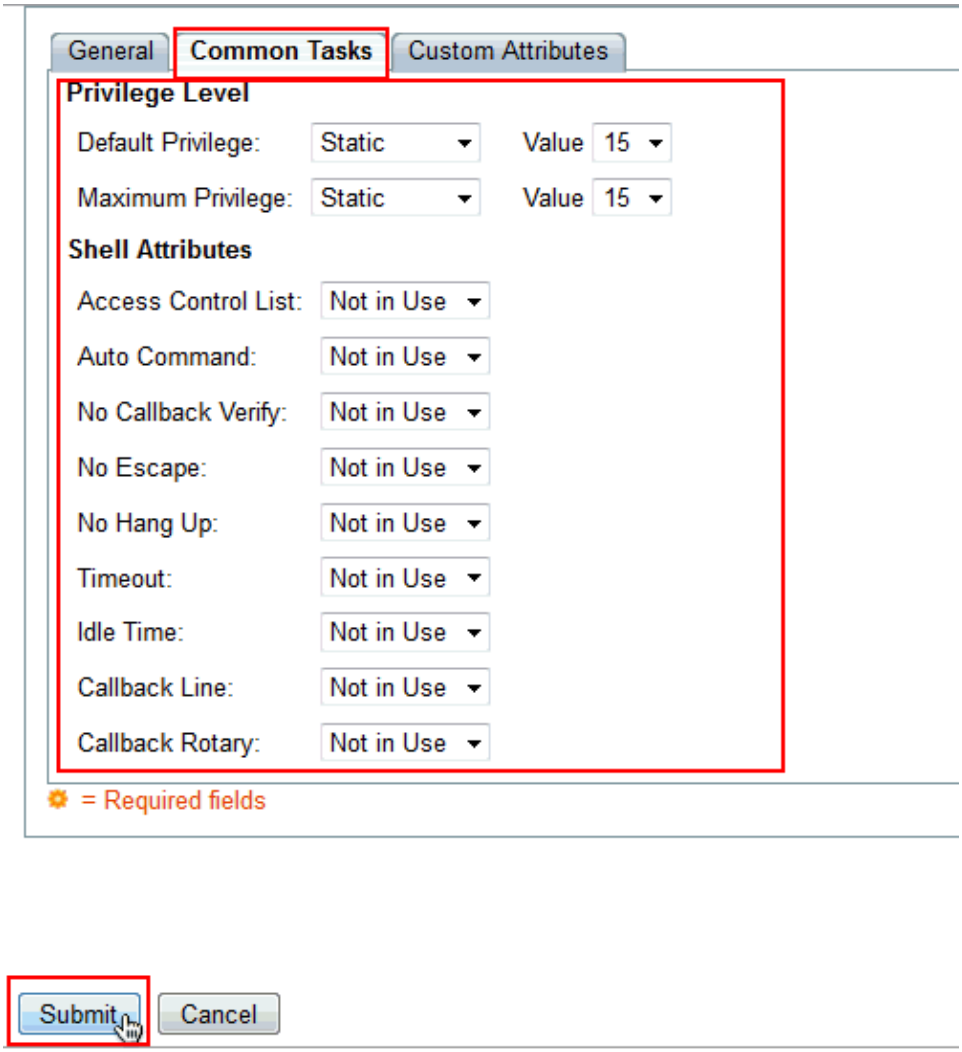
16. Click **Create** in order to create a new **Shell Profile** for full access users.



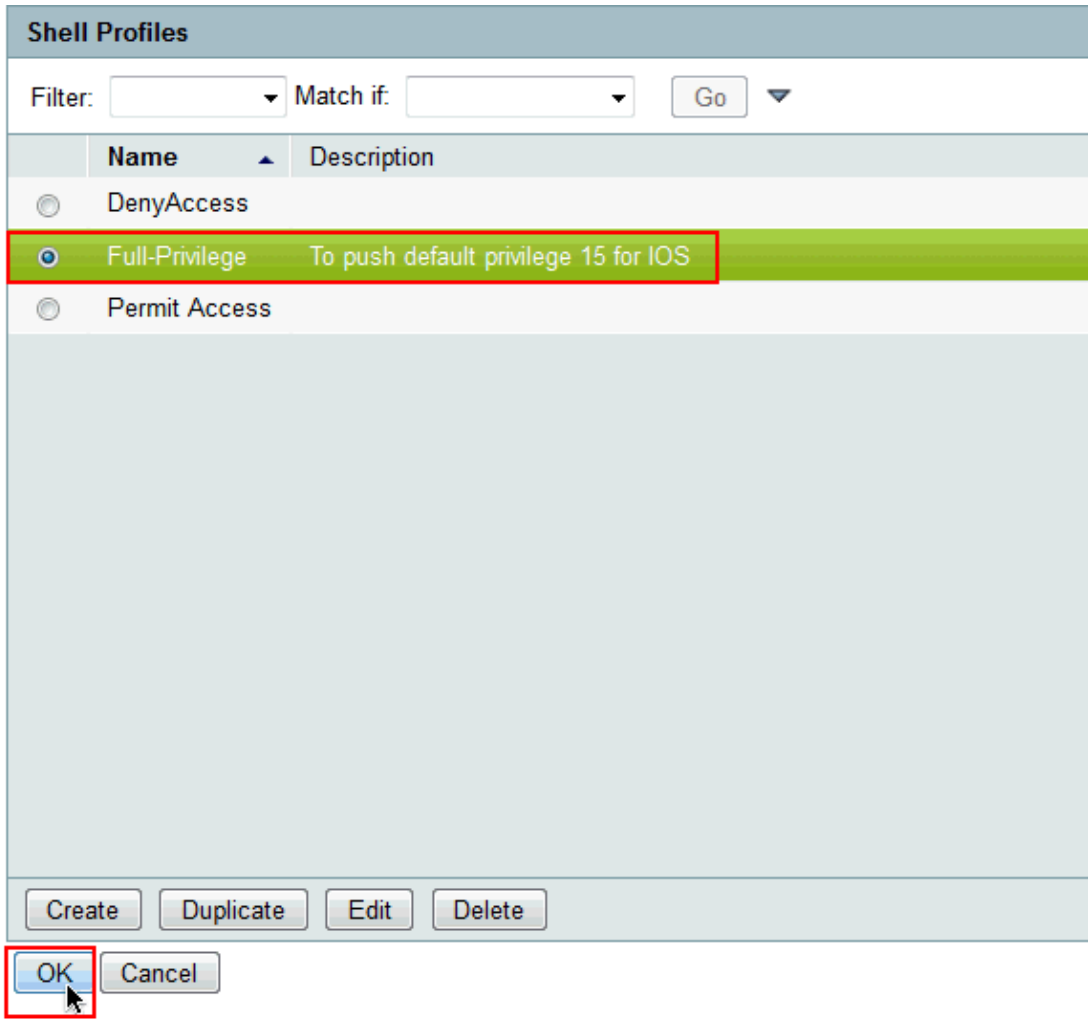
17. Provide a **Name** and **Description**(optional) in the **General tab** and click on **Common Tasks** tab.



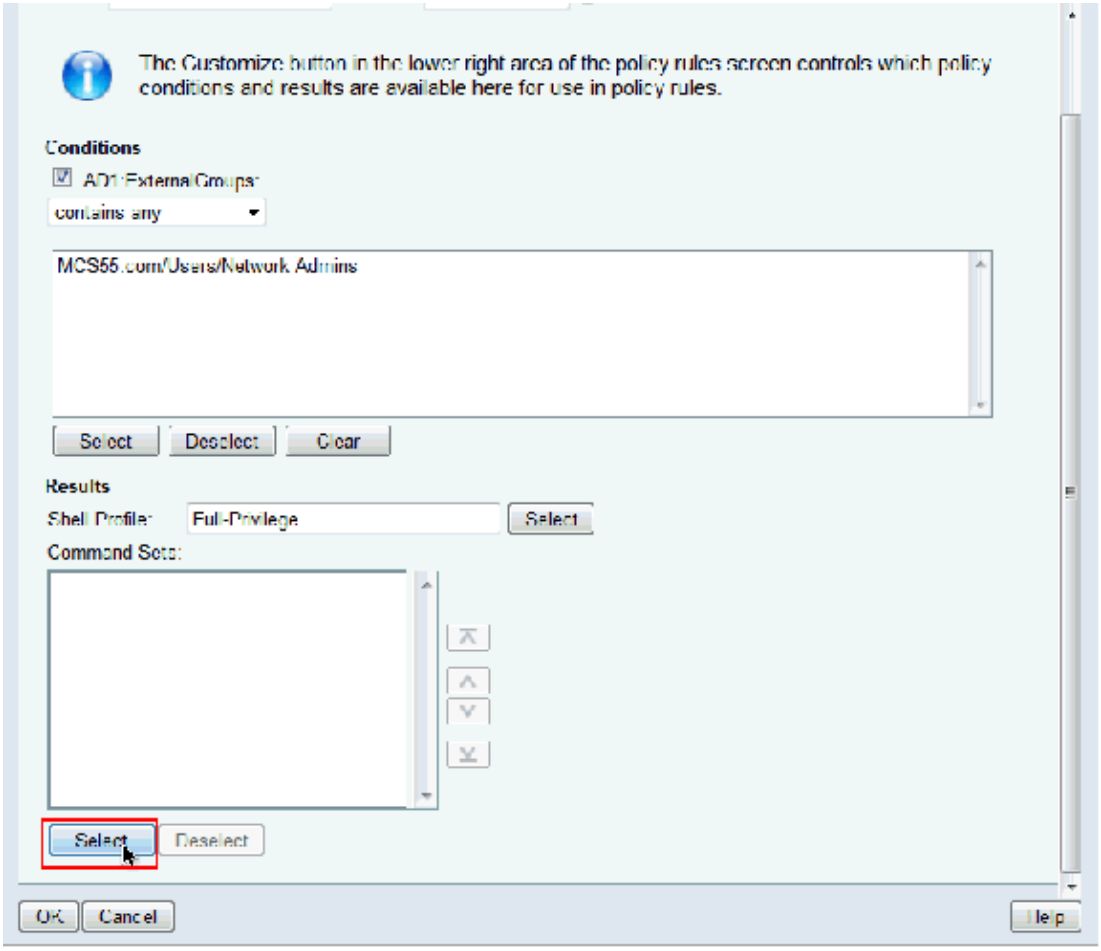
18. Change the **Default Privilege** and **Maximum Privilege** to **Static** with **Value 15**. Click **Submit**.



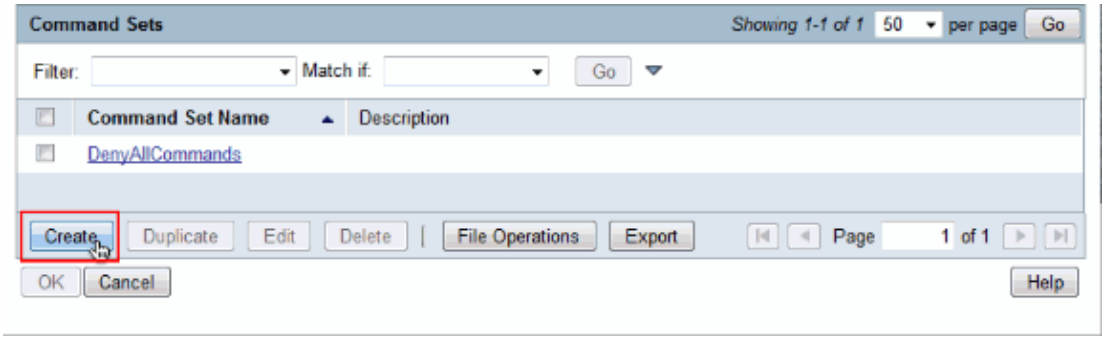
19. Now choose the newly created full access **Shell Profile** (Full−Privilege in this example) and click **OK**.



20. Click **Select** in the Command Sets field.

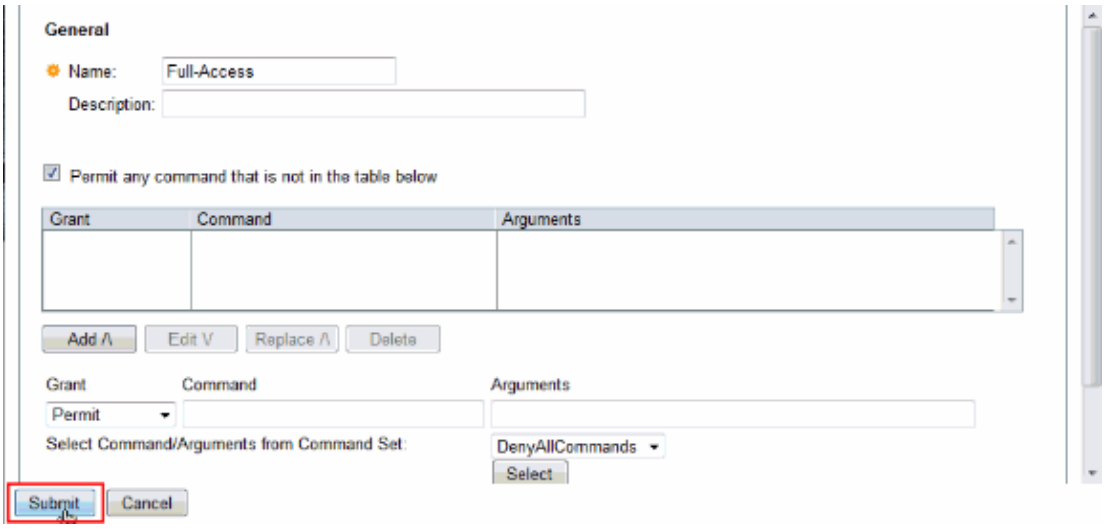


21. Click **Create** in order to create a new **Command Set** for **Full−Access** users.

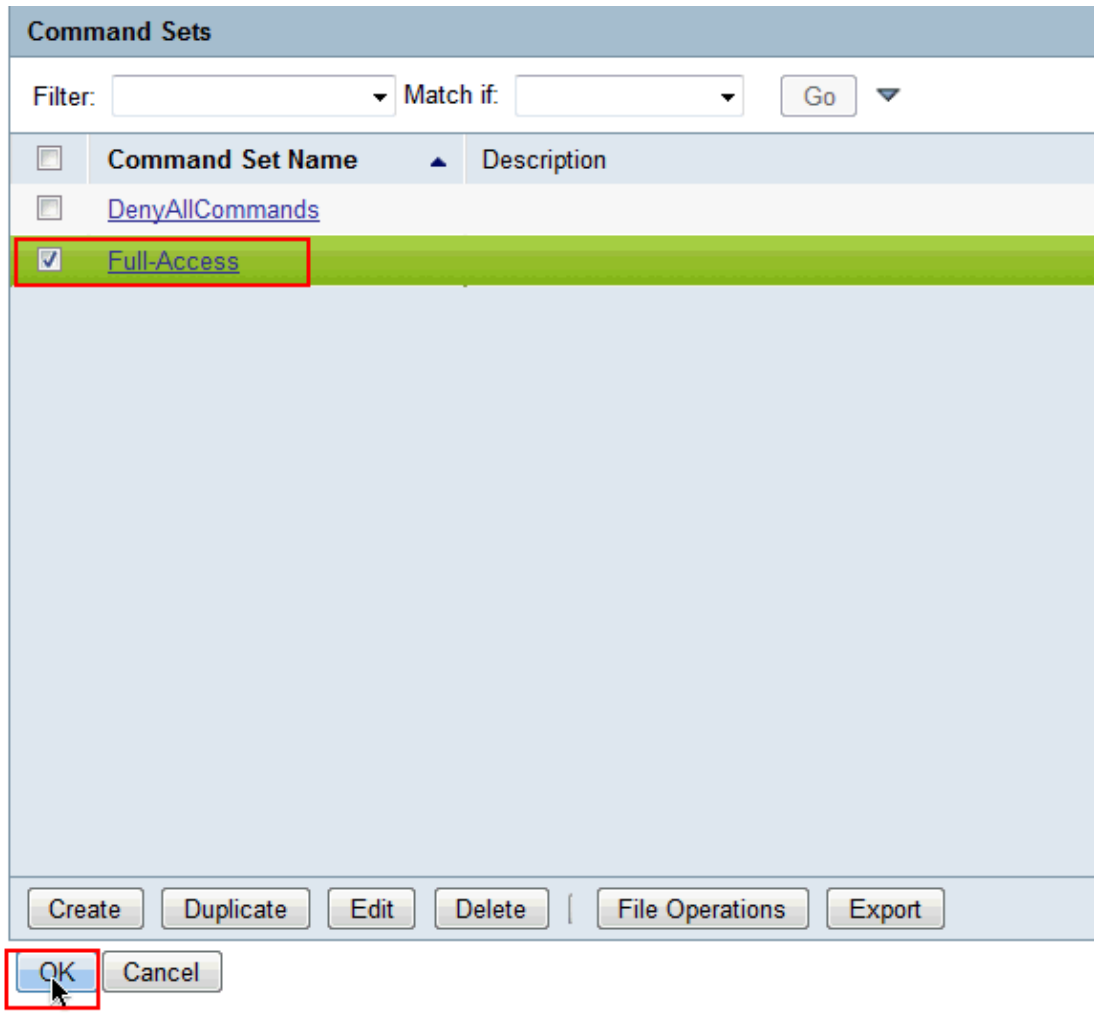


22. Provide a **Name** and ensure that the check box next to **Permit any command that is not in the table below** is checked. Click **Submit**.

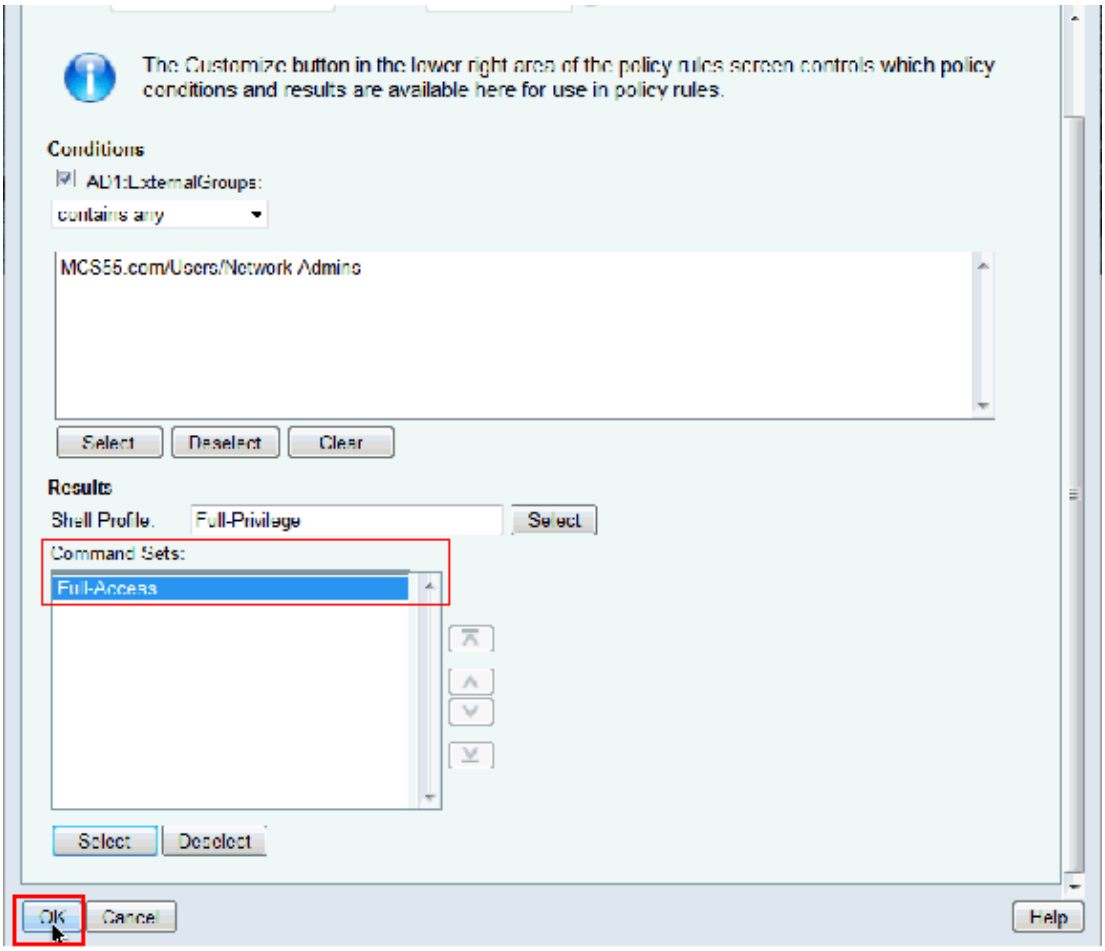
    Note: Refer to Creating, Duplicating, and Editing Command Sets for Device Administration for more information on Command Sets.



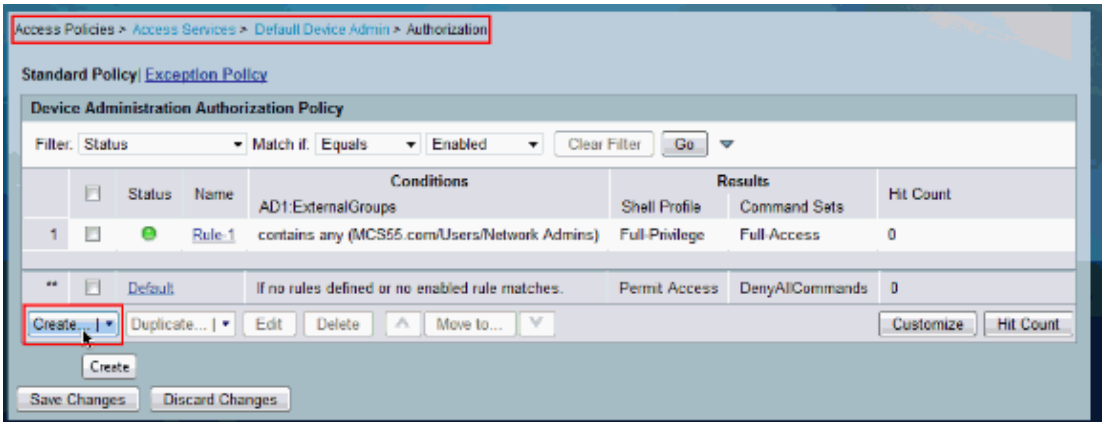
23. Click **OK**.



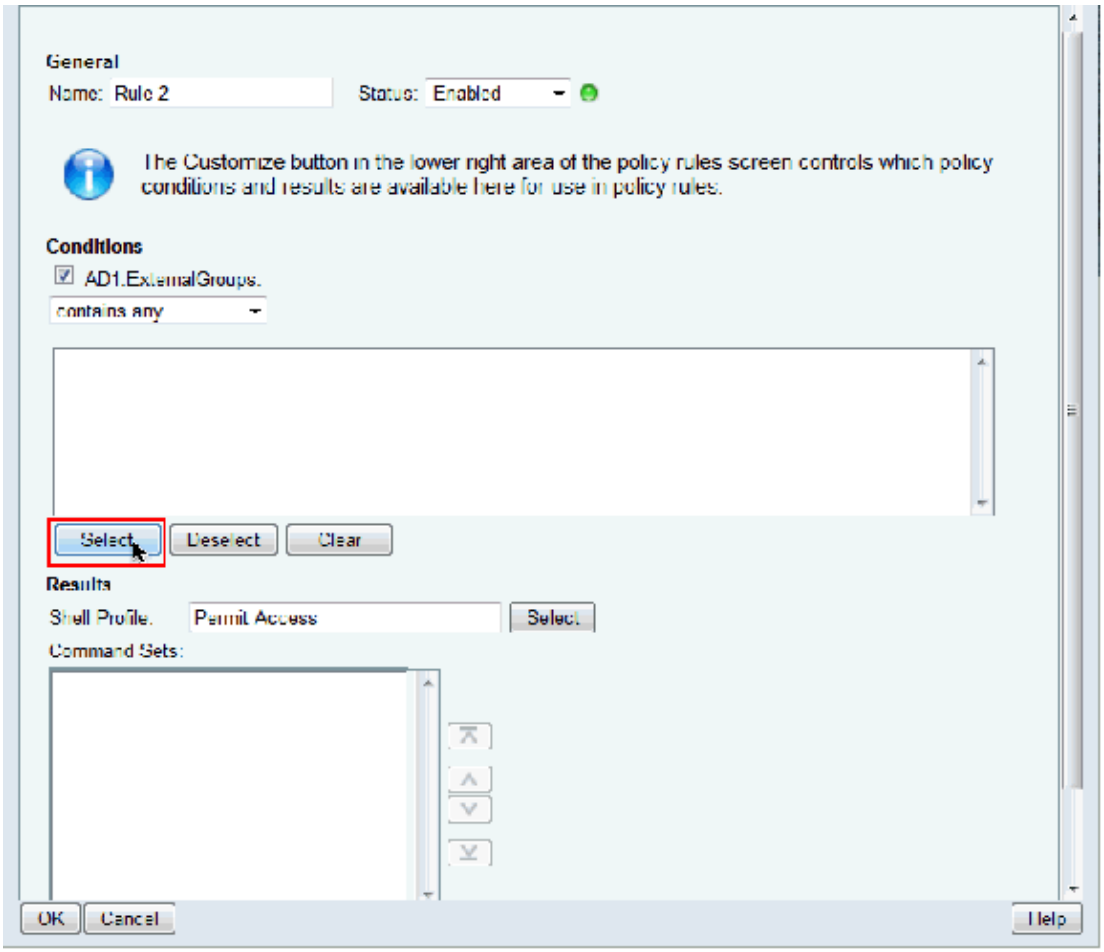
24. Click **OK**. This completes the configuration of **Rule−1**.



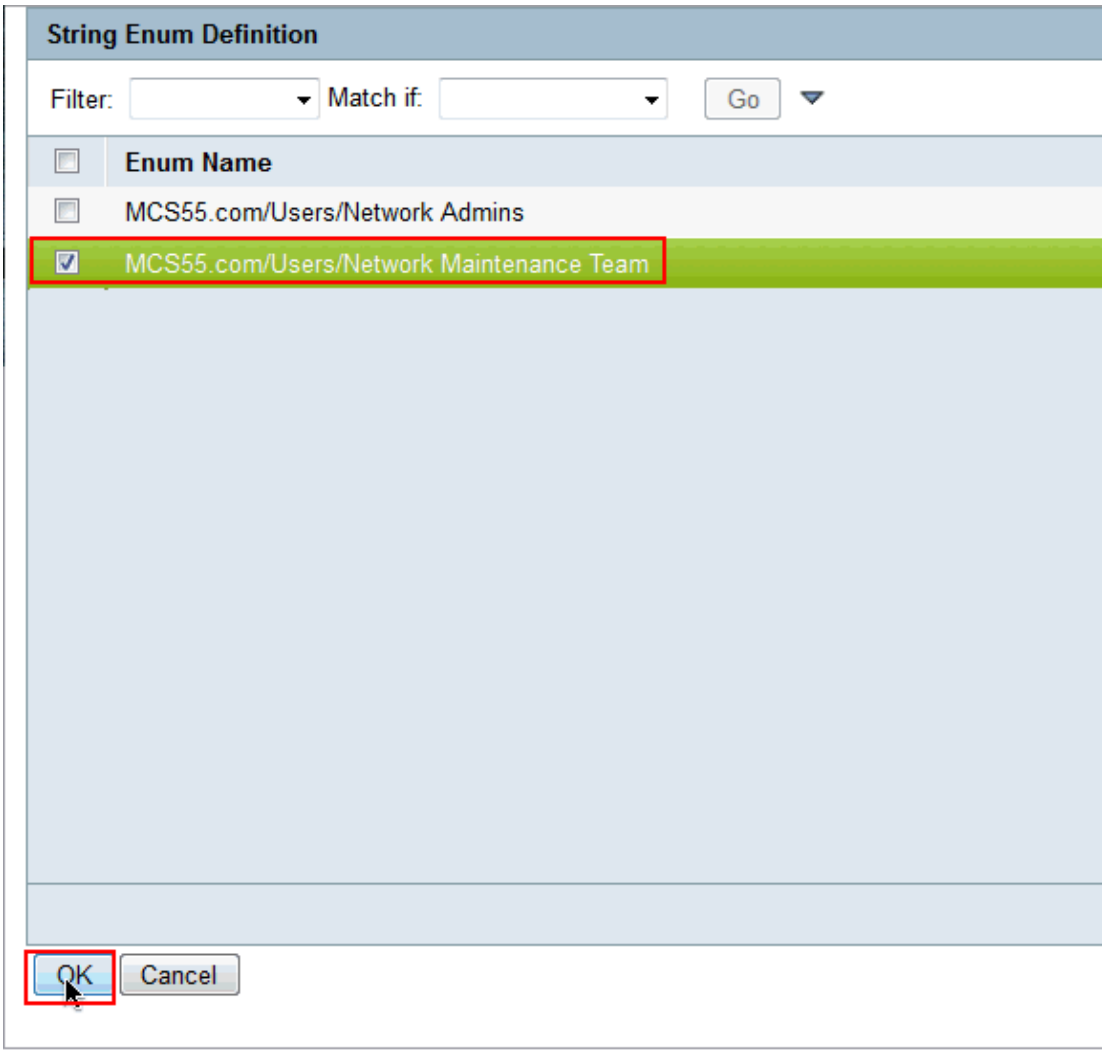
25. Click **Create** in order to create a new Rule for **limited access** users.



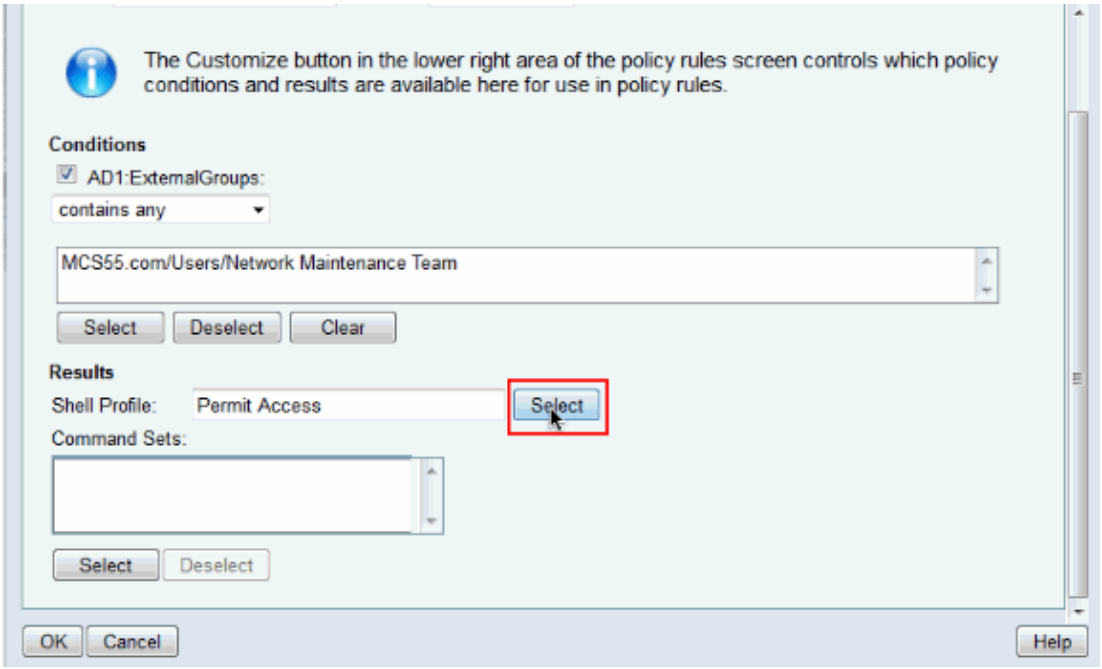
26. Choose **AD1:ExternalGroups** and click **Select**.



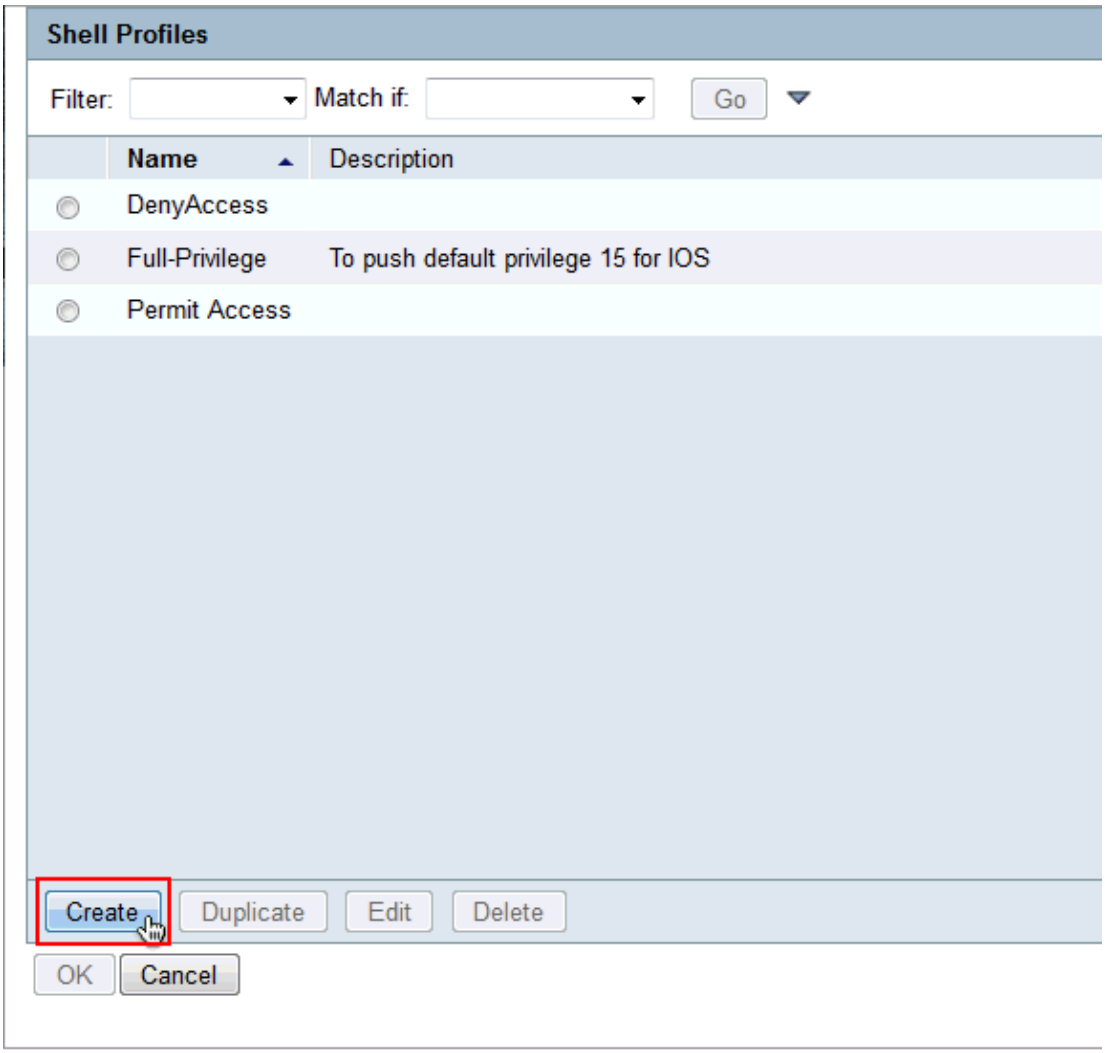
27. Choose the group (or) groups that you want to provide limited access to and click **OK**.



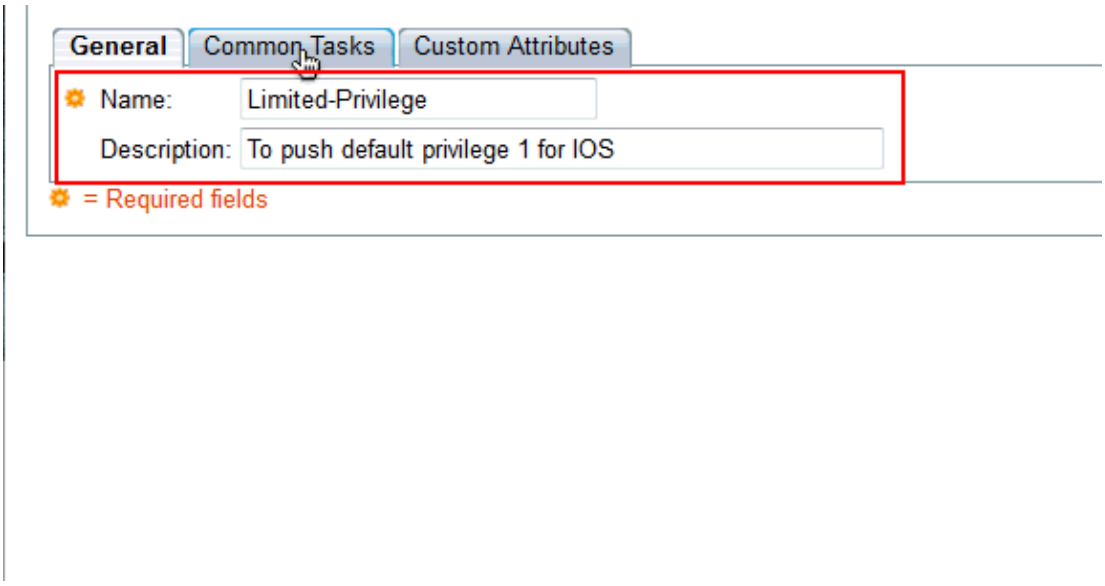
28. Click **Select** in the Shell Profile field.



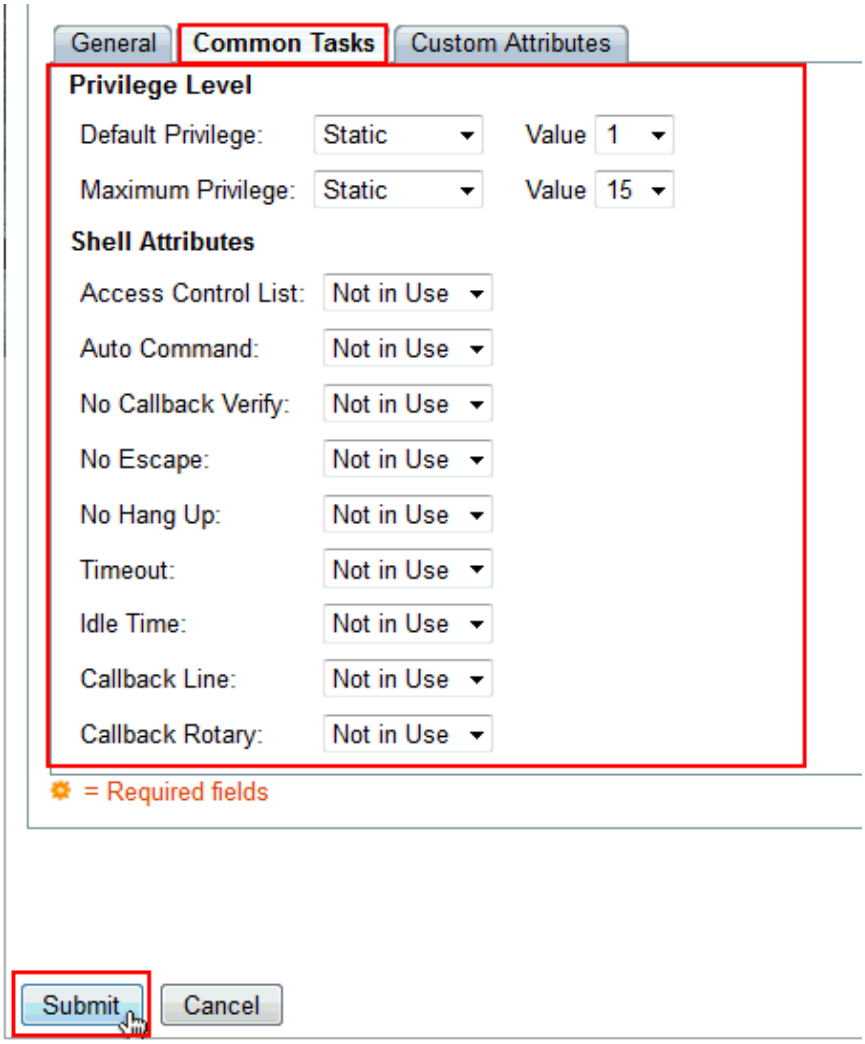
29. Click **Create** in order to create a new **Shell Profile** for limited access.



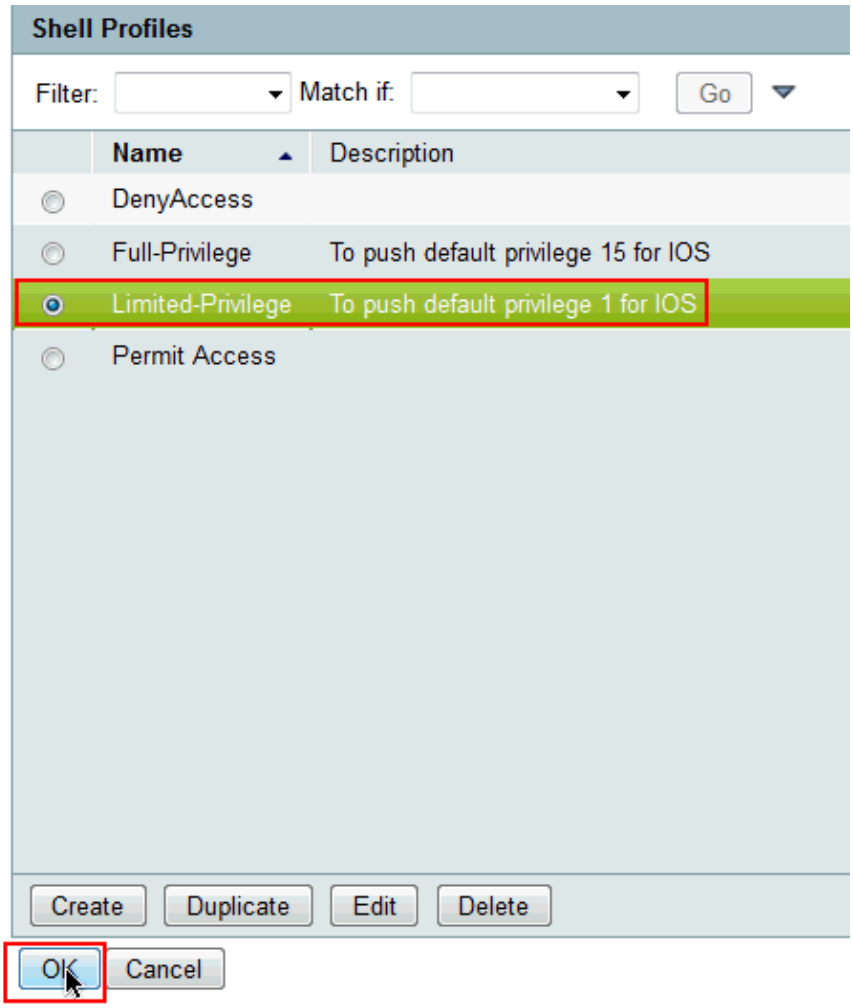
30. Provide a **Name** and **Description**(optional) in the **General** tab and click on **Common Tasks** tab.



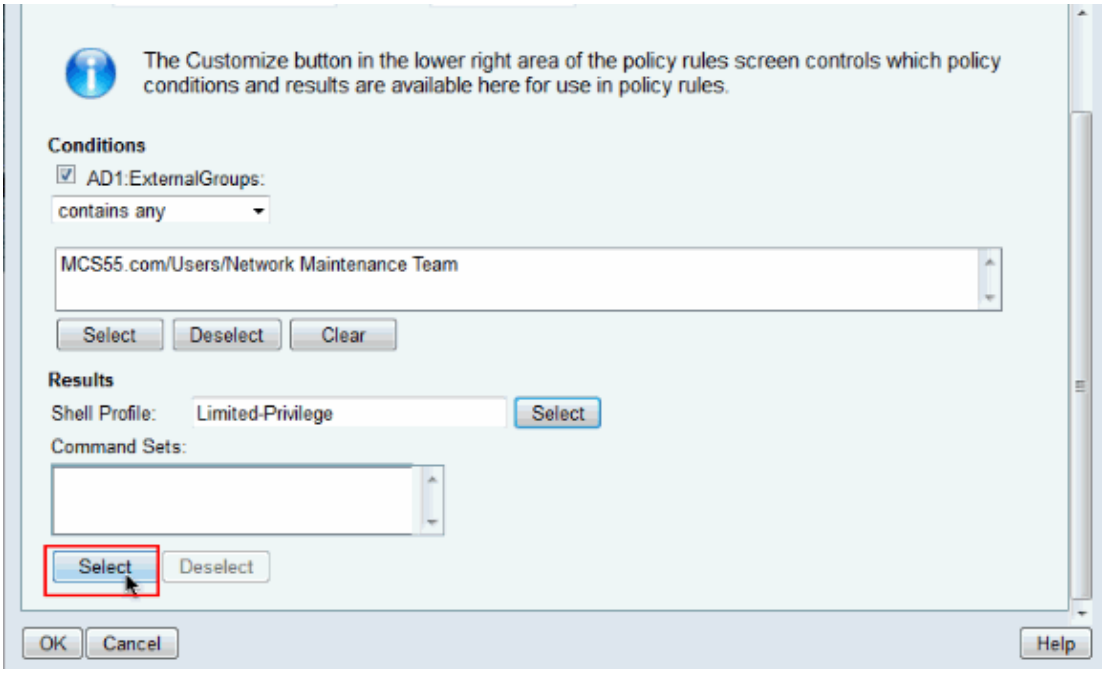
31. Change the **Default Privilege** and **Maximum Privilege** to **Static** with Values **1** and **15** respectively. Click **Submit**.


General
Common Tasks
Custom Attributes
Privilege Level
Default Privilege:
Static
Value
1
Maximum Privilege:
Static
Value
15
Shell Attributes
Access Control List:
Not in Use
Auto Command:
Not in Use
No Callback Verify:
Not in Use
No Escape:
Not in Use
No Hang Up:
Not in Use
Timeout:
Not in Use
Idle Time:
Not in Use
Callback Line:
Not in Use
Callback Rotary:
Not in Use
= Required fields
Submit
Cancel

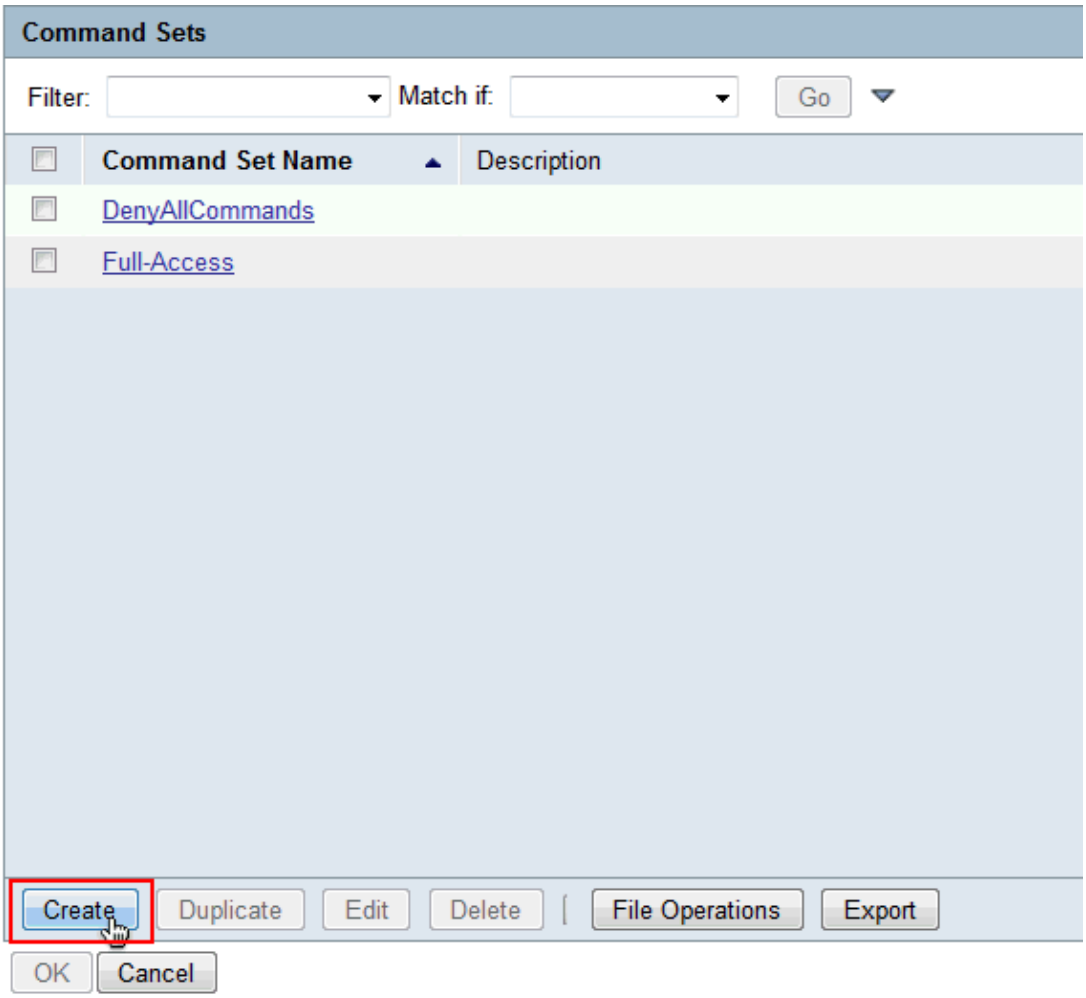
32. Click **OK**.



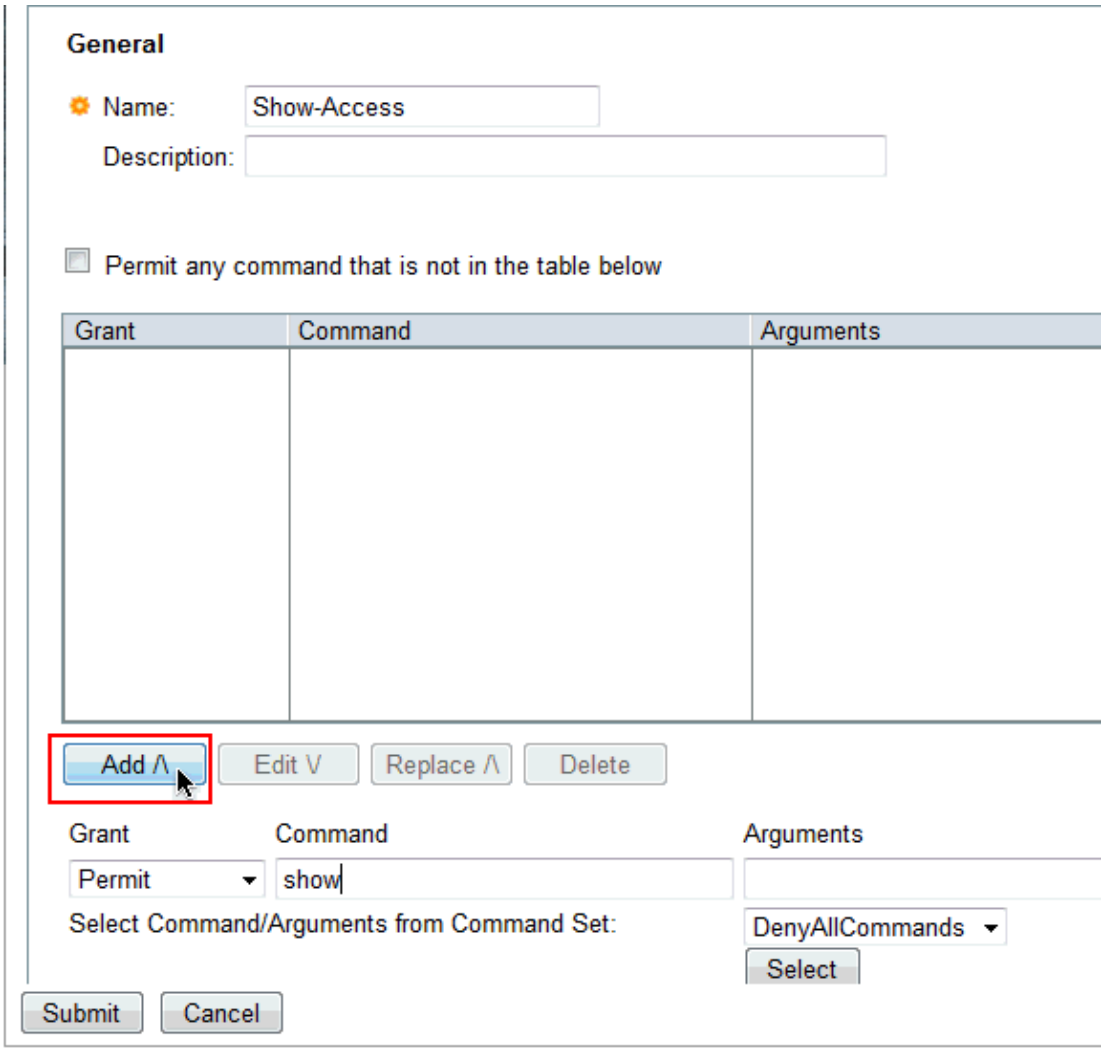
33. Click **Select** in the Command Sets field.



34. Click **Create** to create a new **Command Set** for the limited access group.

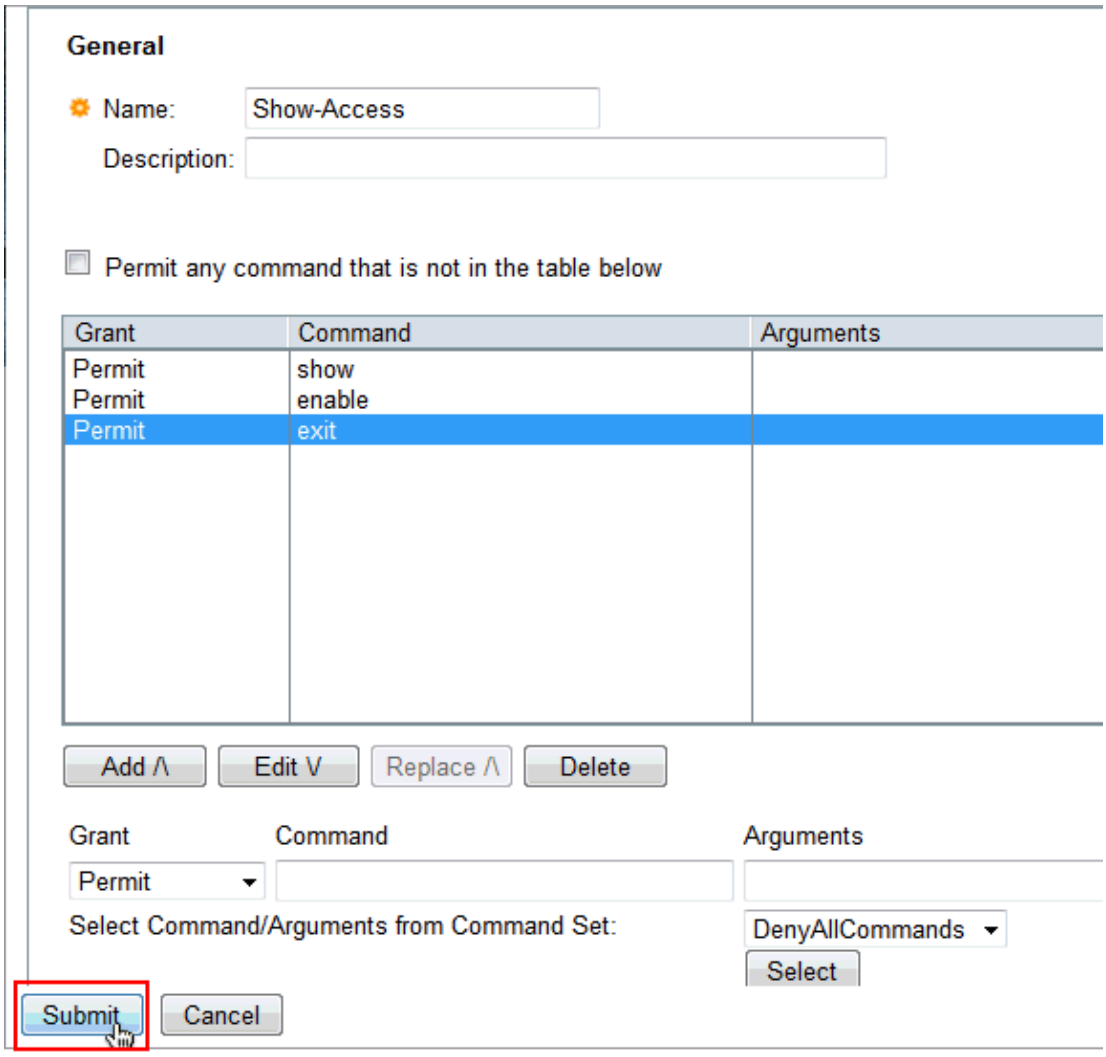


35. Provide a **Name** and ensure that the checkbox next to **Permit any command that is not in the table below** is not selected. Click **Add** after typing **show** in the space provided in the **command** section and choose **Permit** in the **Grant** section so that only the show commands are permitted for the users in the limited access group.

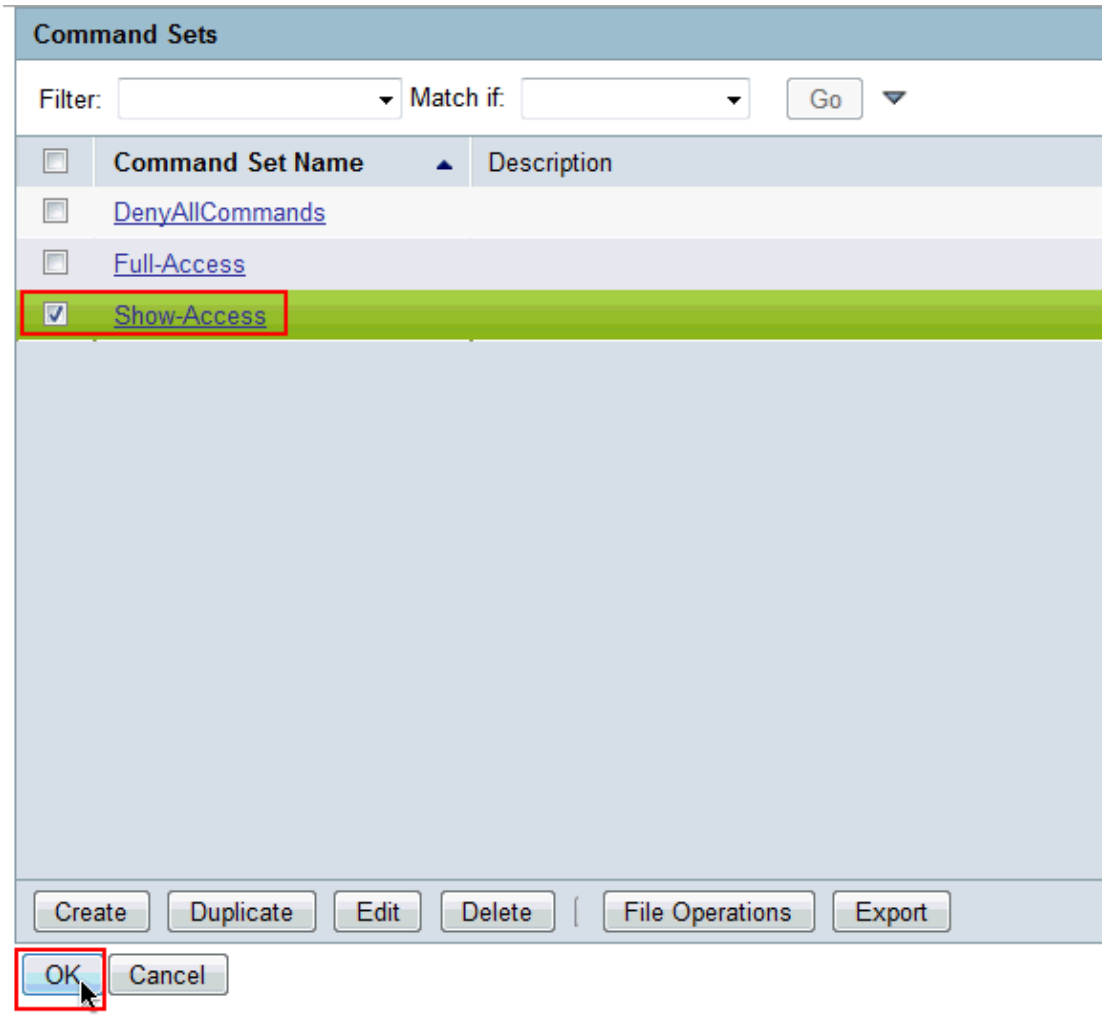


36. Similarly add any other commands to be permitted for the users in limited access group with the use of **Add**. Click **Submit**.

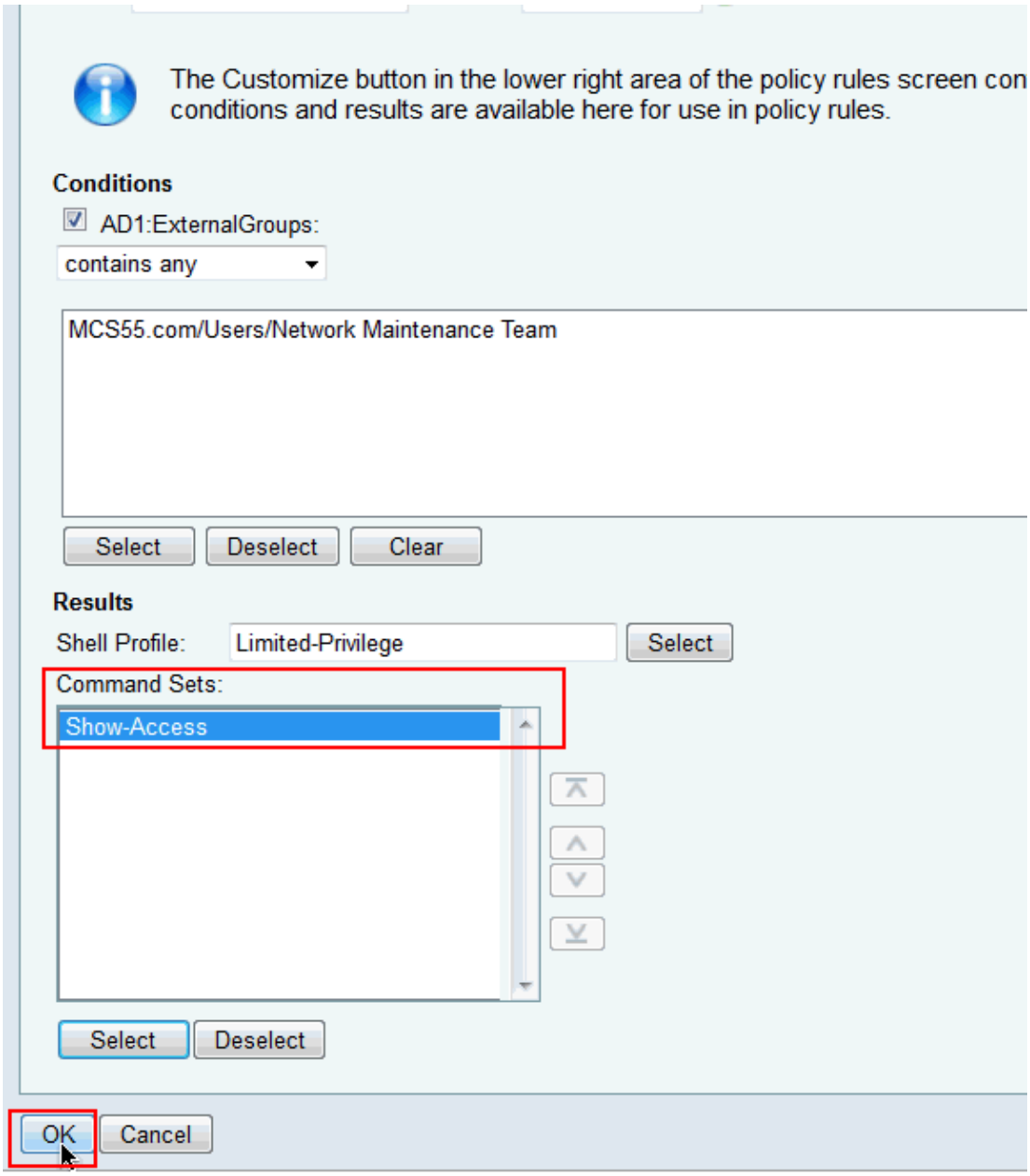
    Note: Refer to Creating, Duplicating, and Editing Command Sets for Device Administration for more information on Command Sets.


General
Name:
Show-Access
Description:
Permit any command that is not in the table below
Grant
Command
Arguments
Permit
show
Permit
enable
Permit
exit
Add /\
Edit V
Replace /\
Delete
Grant
Command
Arguments
Permit
Select Command/Arguments from Command Set:
DenyAllCommands
Select
Submit
Cancel

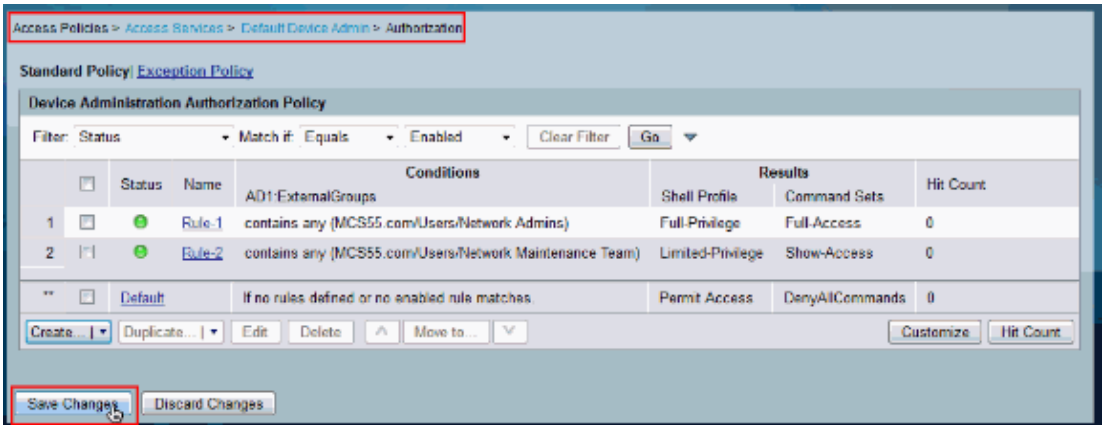
37. Click **OK**.


Command Sets
Filter:
Match if:
Go
Command Set Name
Description
DenyAllCommands
Full-Access
Show-Access
Create
Duplicate
Edit
Delete
File Operations
Export
OK
Cancel

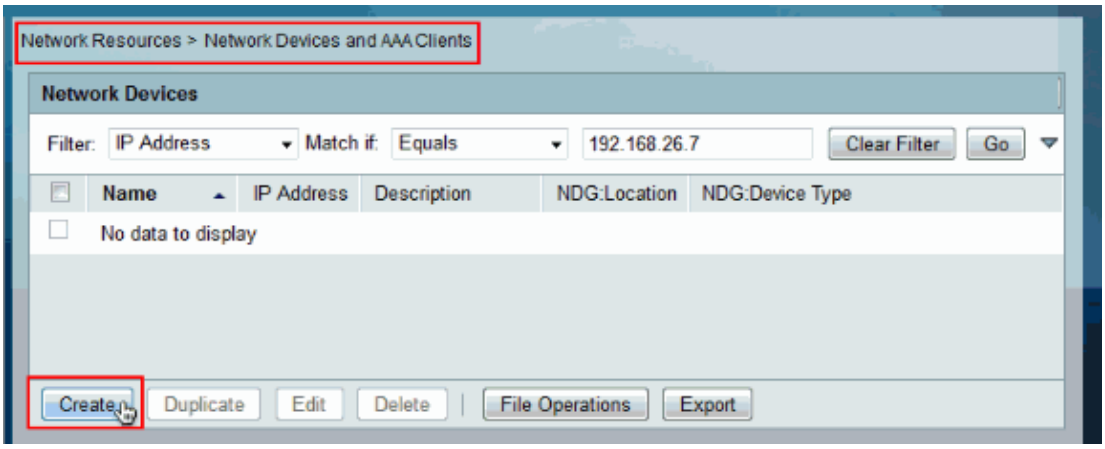
38. Click **OK**.



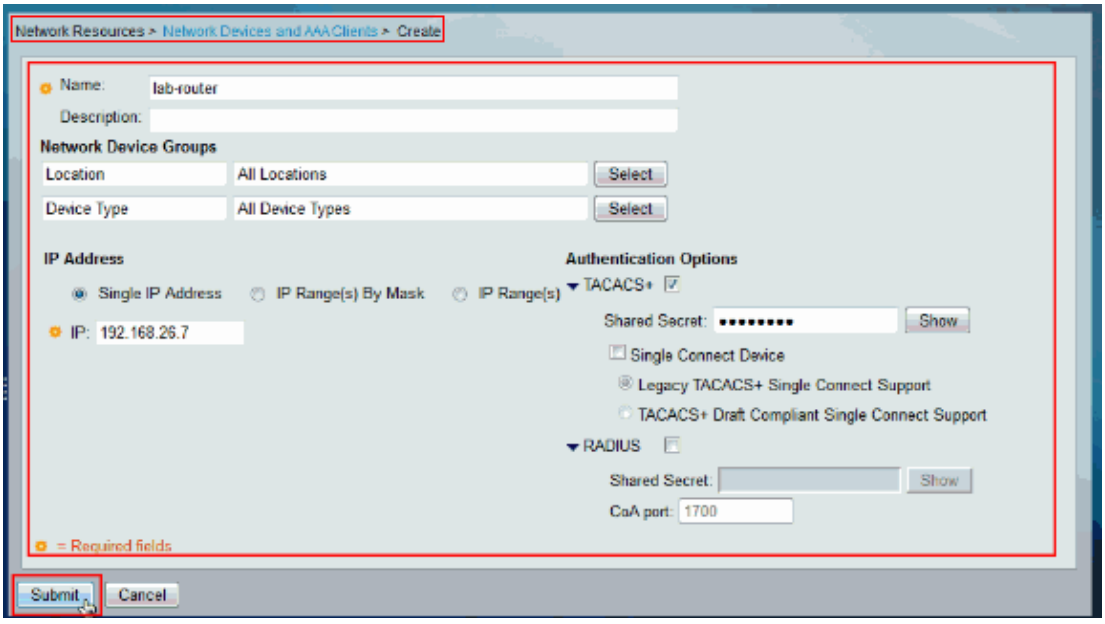
39. Click **Save Changes**.



40. Click **Create** in order to add the **Cisco IOS** device as a **AAA Client** on the ACS.



41. Provide a **Name, IP Address, Shared Secret** for **TACACS+** and click **Submit**.



Configure the Cisco IOS device for Authentication and Authorization

Complete these steps in order to configure Cisco IOS device and ACS for Authentication and Authorization.

1. Create a local user with full privilege for fallback with the **username** command as shown here:

```
username admin privilege 15 password 0 cisco123!
```

2. Provide the IP address of the ACS in order to enable AAA and add ACS 5.x as TACACS server.

```
aaa new-model
tacacs-server host 192.168.26.51 key cisco123
```

Note: The key should match with the Shared−Secret provided on the ACS for this Cisco IOS device.

3. Test the TACACS server reachability with the **test aaa** command as shown.

```
test aaa group tacacs+ user1 xxxxx legacy
Attempting authentication test to server-group tacacs+ using tacacs+
User was successfully authenticated.
```

The output of the previous command shows that the TACACS server is reachable and the user has been successfully authenticated.

Note: User1 and password xxx belong to AD. If the test fails please ensure that the Shared−Secret provided in the previous step is correct.

4. Configure login and enable authentications and then use the Exec and command authorizations as shown here:

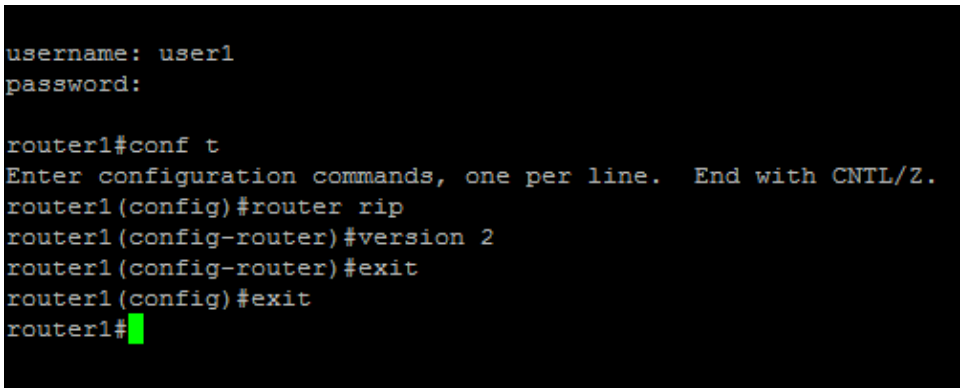
```
aaa authentication login default group tacacs+ local
aaa authentication enable default group tacacs+ enable
aaa authorization exec default group tacacs+ local
aaa authorization commands 0 default group tacacs+ local
aaa authorization commands 1 default group tacacs+ local
aaa authorization commands 15 default group tacacs+ local
aaa authorization config−commands
```

Note: The Local and Enable keywords are used for fallback to the Cisco IOS local user and enable secret respectively if the TACACS server is unreachable.

Verify

In order to verify authentication and authorization login to the Cisco IOS device through Telnet.

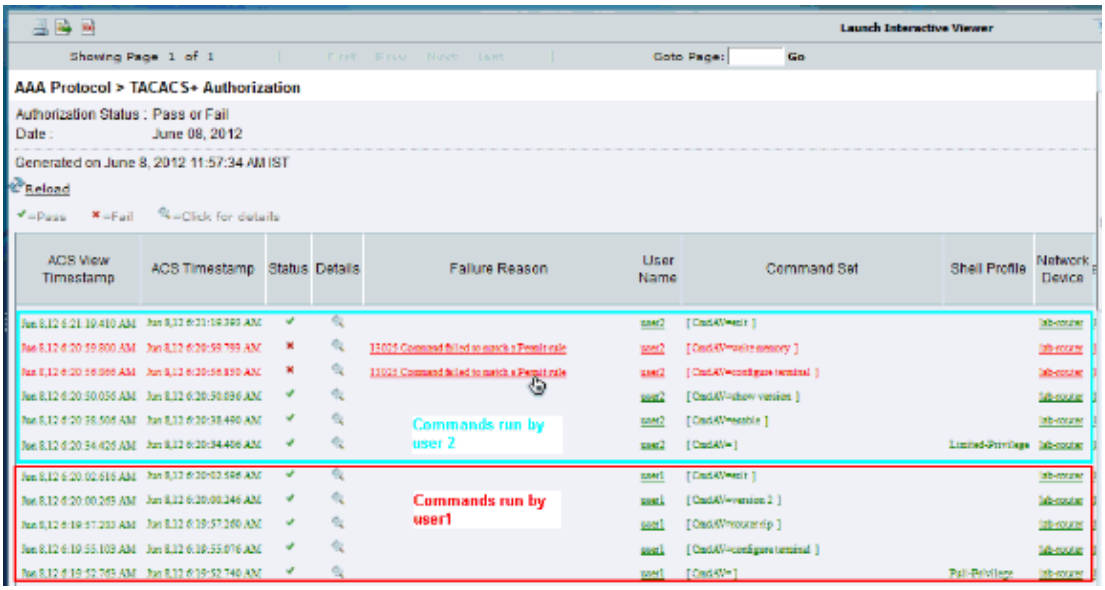
1. Telnet to the Cisco IOS device as user1 who belongs to the full−access group in AD. Network Admins group is the group in AD which is mapped to Full−Privilege Shell Profile and Full−Access Command set on the ACS. Try to run any command to ensure that you have full access.



2. Telnet to the Cisco IOS device as user2 who belongs to the limited−access group in AD. (**Network Maintenance Team** group is the group in AD which is mapped to **Limited−Privilege Shell Profile** and **Show−Access Command set** on the ACS). If you try to run any command other than the ones mentioned in the Show−Access command set, you should get a `Command Authorization Failed` error, which shows that the user2 has limited access.

```
username: user2
password:

router1>enable
password:
router1#
router1#
router1#show version
Cisco IOS Software, C3550 Software (C3550-IPBASEK9-M), Version 12.2(44)SE6, RELEASE S
OFTWARE (fc1)
Copyright (c) 1986-2009 by Cisco Systems, Inc.
Compiled Mon 09-Mar-09 20:26 by gereddy
Image text-base: 0x00003000, data-base: 0x00EA3DE8

ROM: Bootstrap program is C3550 boot loader

router1 uptime is 16 hours, 46 minutes
System returned to ROM by power-on
System image file is "flash:c3550-ipbasek9-mz.122-44.SE6.bin"

This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.

router1#cont t
Command authorization failed.

router1#wr mem
Command authorization failed.

router1#
```

3. Login to the ACS GUI and launch **Monitoring and Reports viewer**. Choose **AAA Protocol > TACACS+Authorization** in order to verify the activities performed by user1 and user2.



Related Information

- **Cisco Secure Access Control System**
- **Technical Support & Documentation − Cisco Systems**

Updated: Jun 29, 2012 Document ID: 113590