Configure RA VPN with LDAP Authentication and Authorization for FTD

Contents

Introduction

This document describes how to configure Remote Access VPN with LDAP AA on a Firepower Threat Defense (FTD) managed by a Firepower Management Center.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Basic knowledge of Remote Access VPN (RA VPN) working.
- Understand navigation through the Firepower Management Center (FMC).
- Configuration of Lightweight Directory Access Protocol (LDAP) services on Microsoft Windows Server.

Components Used

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

- Cisco Firepower Management Center version 7.3.0
- Cisco Firepower Threat Defense version 7.3.0
- Microsoft Windows Server 2016, configured as LDAP server

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.

Background Information

This document describes the configuration of Remote Access VPN (RA VPN) with Lightweight Directory Access Protocol (LDAP) Authentication and Authorization on a Firepower Threat Defense (FTD) managed by a Firepower Management Center (FMC).

LDAP is an open, vendor-neutral, industry-standard application protocol to access and maintain distributed directory information services.

An LDAP attribute map equates attributes that exist in the Active Directory (AD) or LDAP server with Cisco attribute names. Then, when the AD or LDAP server returns authentication responses to the FTD device during a remote access VPN connection establishment, the FTD device can use the information to adjust how the AnyConnect client completes the connection.

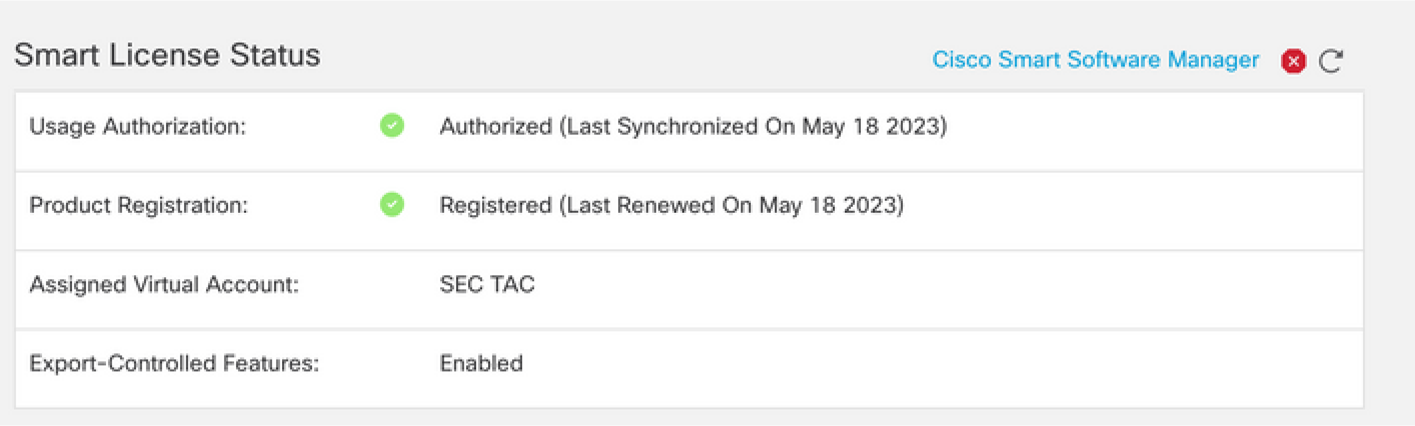
RA VPN with LDAP authentication has been supported on the FMC since version 6.2.1 and LDAP authorization prior to FMC version 6.7.0 was advised via FlexConfig in order to configure LDAP Attribute Map and associate it with the Realm Server. This feature, with version 6.7.0, has now been integrated with the RA VPN configuration wizard on the FMC and does not require the use of FlexConfig anymore.

> **Note:** This feature requires the FMC to be on version 6.7.0; whereas, the managed FTD can be on any version higher than 6.3.0.

License Requirements

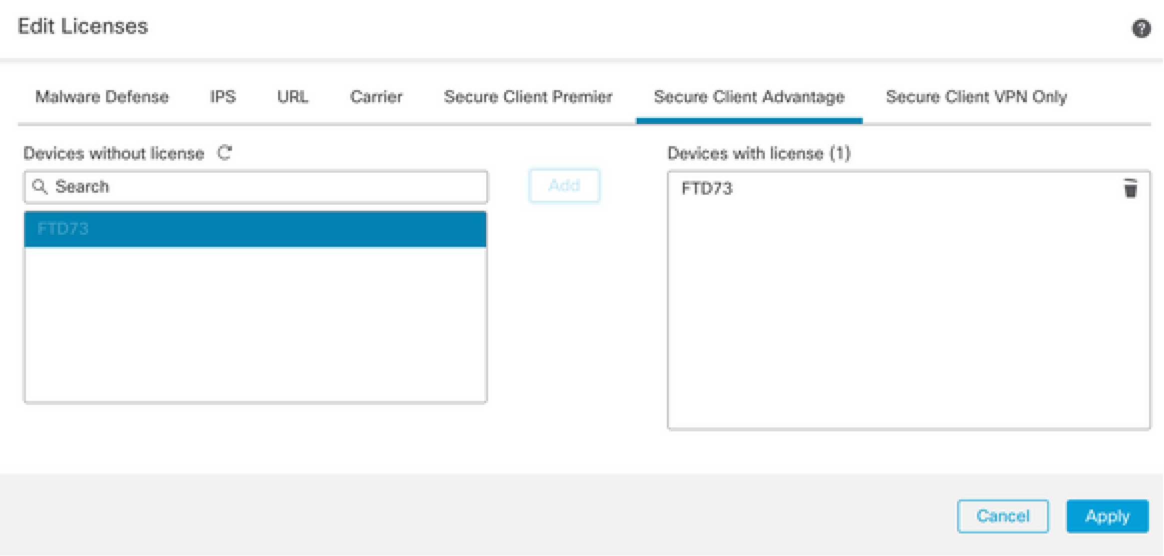
Requires AnyConnect Apex, AnyConnect Plus, or AnyConnect VPN Only license with export-controlled functionality enabled.

In order to check the license, navigate to **System > Licenses > Smart Licenses.**



Smart License Status

Usage Authorization:	✓	Authorized (Last Synchronized On May 18 2023)
Product Registration:	✓	Registered (Last Renewed On May 18 2023)
Assigned Virtual Account:		SEC TAC
Export-Controlled Features:		Enabled



Edit Licenses

Devices without license: FTD73

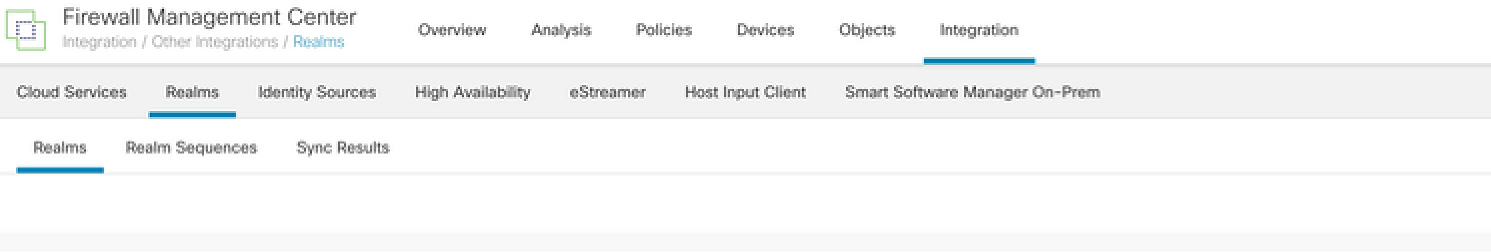
Devices with license (1): FTD73

Configuration Steps on FMC

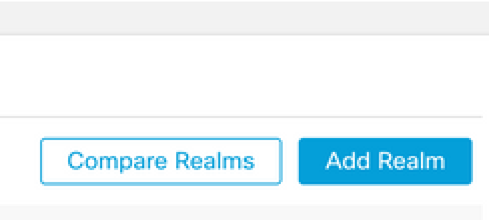
REALM / LDAP Server Configuration

> **Note:** The steps listed are only required if it is for configuration of a new REALM / LDAP server. If you have a pre-configured server, which could be used for authentication in RA VPN, then navigate to [RA VPN Configuration](#).

Step 1. Navigate to System > Other Integrations > Realms, as shown in this image.



Step 2. As shown in the image, click **Add a new realm.**



Step 3. Provide the details of the AD server and directory. Click OK.

For the purpose of this demonstration:

Name: LDAP

Type: AD

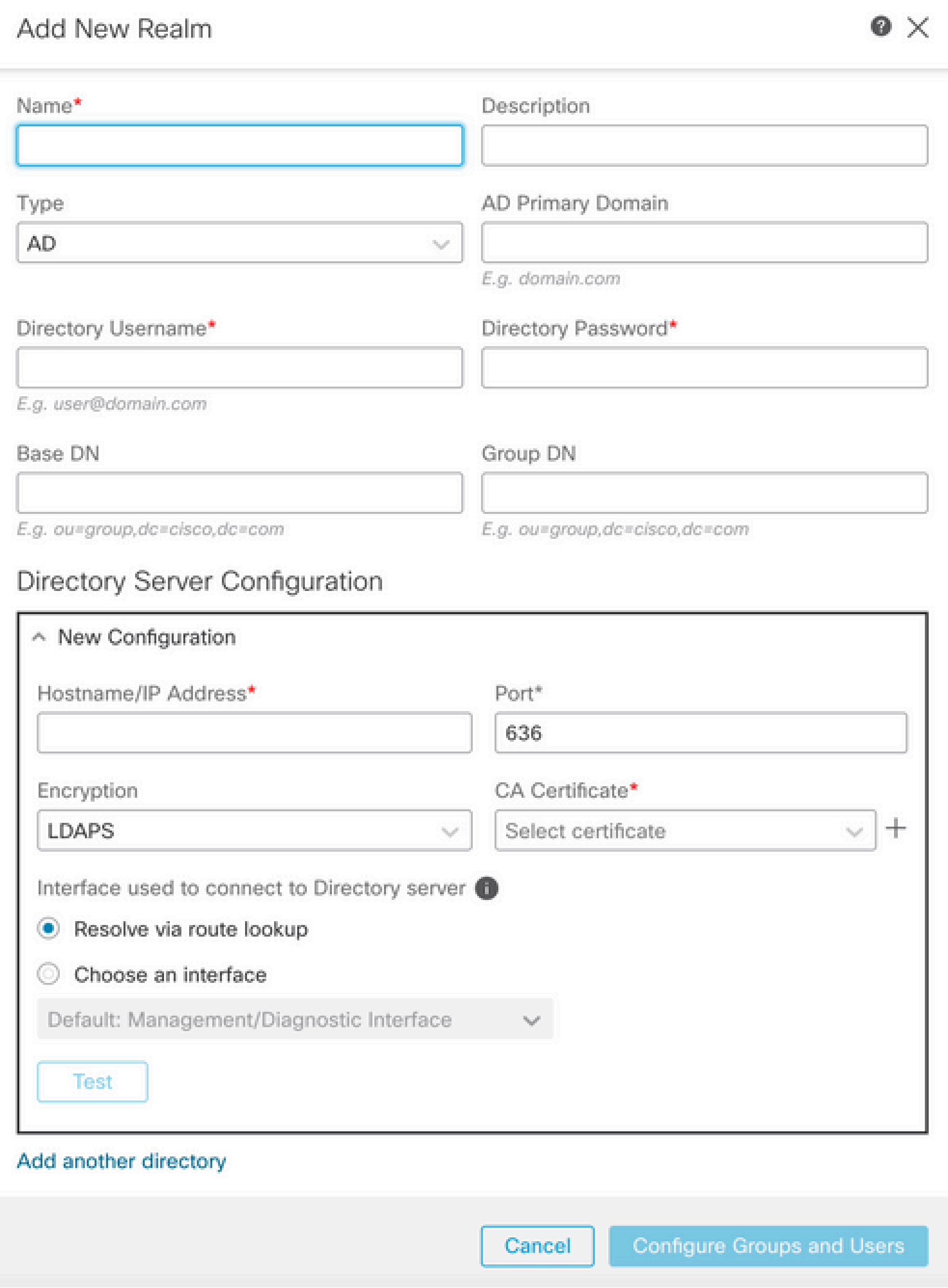
AD Primary Domain: test.com

Directory Username: CN=Administrator,CN=Users,DC=test,DC=com

Directory Password: <Hidden>

Base DN: DC=test,DC=com

Group DN: DC=test,DC=com



Add New Realm

Name*

Description

Type: AD

AD Primary Domain

E.g. domain.com

Directory Username*

E.g. user@domain.com

Directory Password*

Base DN

E.g. ou=group,dc=cisco,dc=com

Group DN

E.g. ou=group,dc=cisco,dc=com

Directory Server Configuration

New Configuration

Hostname/IP Address*

Port*: 636

Encryption: LDAPS

CA Certificate*: Select certificate

Interface used to connect to Directory server

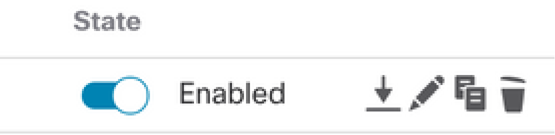
● Resolve via route lookup

○ Choose an interface

Default: Management/Diagnostic Interface

Step 4. Click Save to save the realm/directory changes, as shown in this image.

Step 5. Toggle the State button to change the State of the server to Enabled, as shown in this image.



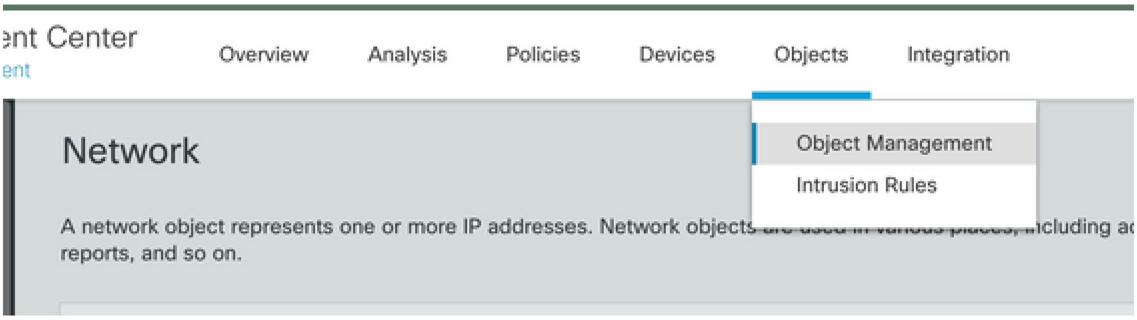
State

Enabled

RA VPN Configuration

These steps are needed to configure the Group Policy, which is assigned to Authorized VPN users. If the Group Policy is already defined, move to Step 5.

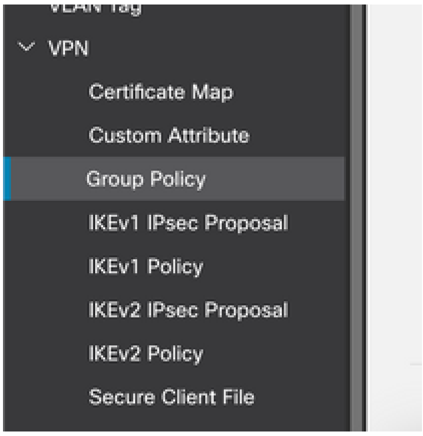
Step 1. Navigate to Objects > Object Management.



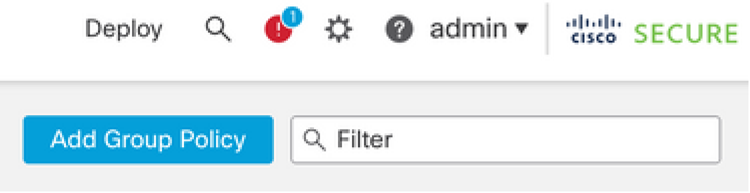
Network

A network object represents one or more IP addresses. Network objects are used in various places, including ac reports, and so on.

Step 2: In the left pane, navigate to VPN > Group Policy.



Step 3: Click **Add Group Policy**.



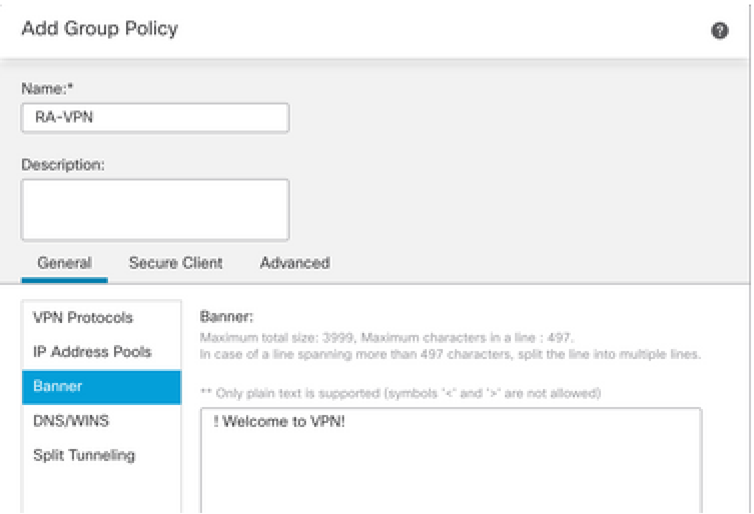
Step 4: Provide the Group Policy values.

For the purpose of this demonstration:

Name: RA-VPN

Banner: ! Welcome to VPN !

Simultaneous Login Per User: 3 (Default)



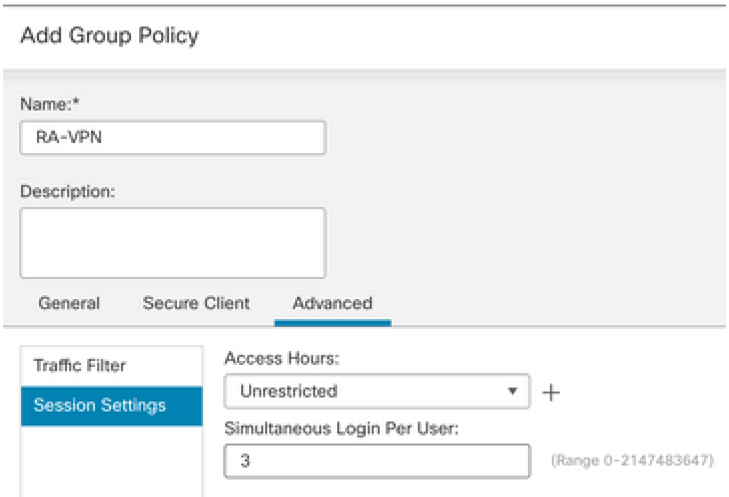
Name:* RA-VPN

Description:

Banner:
Maximum total size: 3999, Maximum characters in a line : 497.
In case of a line spanning more than 497 characters, split the line into multiple lines.

** Only plain text is supported (symbols '<' and '>' are not allowed)

! Welcome to VPN!



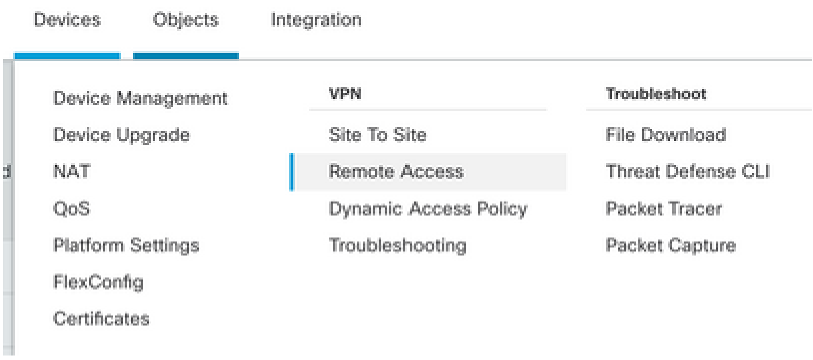
Name:* RA-VPN

Description:

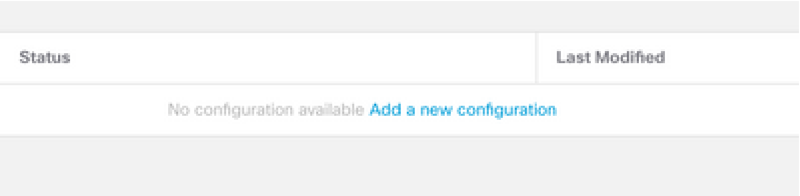
Access Hours: Unrestricted

Simultaneous Login Per User: 3 (Range 0-2147483647)

Step 5. Navigate to Devices > VPN > Remote Access.



Step 6. Click **Add a new configuration.**



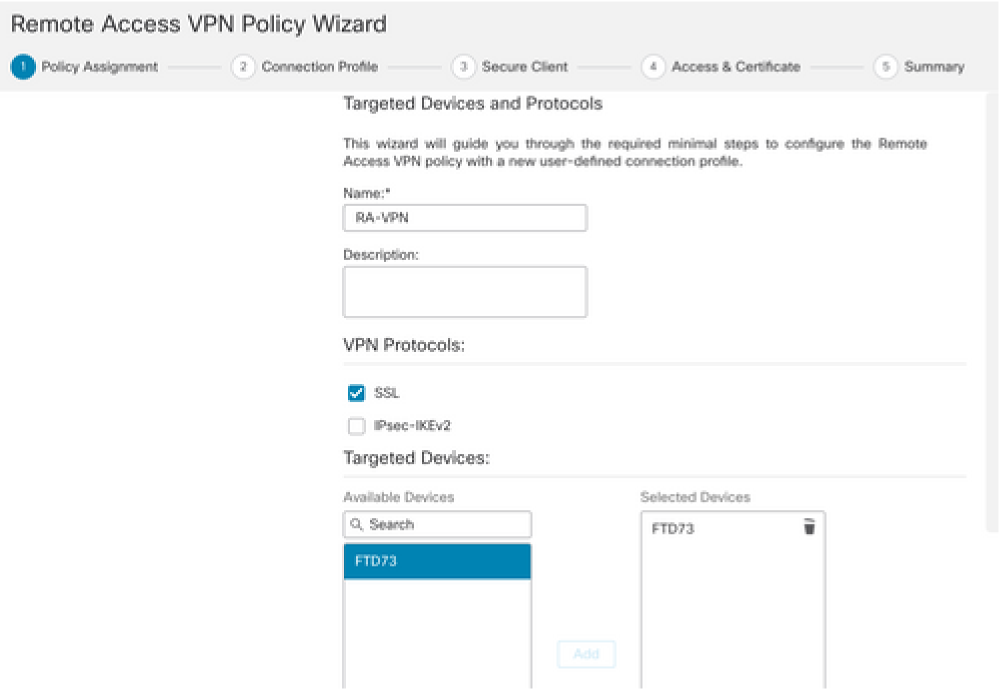
Step 7. Provide a Name for the RA VPN Policy. Choose **VPN Protocols** and choose **Targeted Devices.** Click **Next.**

For the purpose of this demonstration:

Name: RA-VPN

VPN Protocols: SSL

Targeted Devices: FTD



Remote Access VPN Policy Wizard

Targeted Devices and Protocols

This wizard will guide you through the required minimal steps to configure the Remote Access VPN policy with a new user-defined connection profile.

Name:* RA-VPN

Description:

VPN Protocols:

☑ SSL

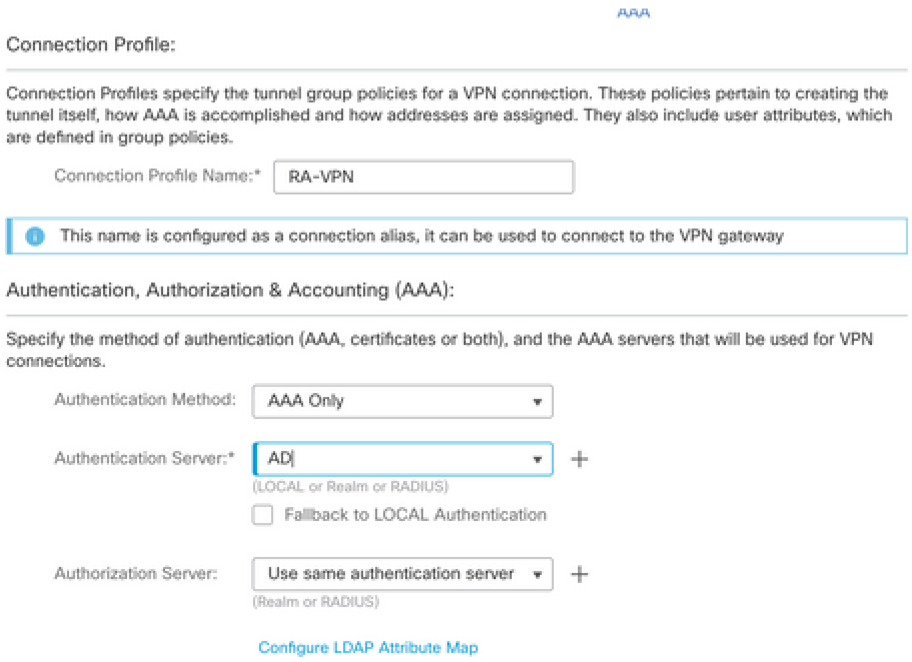
□ IPsec-IKEv2

Targeted Devices:

Available Devices: FTD73

Selected Devices: FTD73

Step 8. For the Authentication Method, choose **AAA Only**. Choose the REALM / LDAP server for the Authentication Server. Click **Configure LDAP Attribute Map** (to configure LDAP Authorization).



Connection Profile:

Connection Profiles specify the tunnel group policies for a VPN connection. These policies pertain to creating the tunnel itself, how AAA is accomplished and how addresses are assigned. They also include user attributes, which are defined in group policies.

Connection Profile Name:* RA-VPN

This name is configured as a connection alias, it can be used to connect to the VPN gateway

Authentication, Authorization & Accounting (AAA):

Specify the method of authentication (AAA, certificates or both), and the AAA servers that will be used for VPN connections.

Authentication Method: AAA Only

Authentication Server:* AD

(LOCAL or Realm or RADIUS)

□ Fallback to LOCAL Authentication

Authorization Server: Use same authentication server

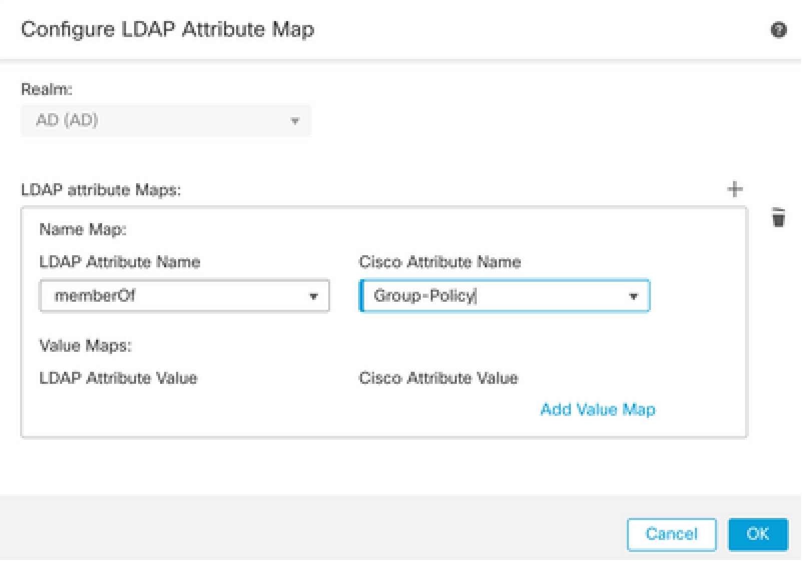
(Realm or RADIUS)

Step 9. Provide the LDAP Attribute Name and the Cisco Attribute Name. Click **Add Value Map**.

For the purpose of this demonstration:

LDAP Attribute Name: memberOfI

Cisco Attribute Name: Group-Policy



Configure LDAP Attribute Map

Realm: AD (AD)

LDAP attribute Maps:

Name Map:

LDAP Attribute Name: memberOf

Cisco Attribute Name: Group-Policy

Value Maps:

LDAP Attribute Value

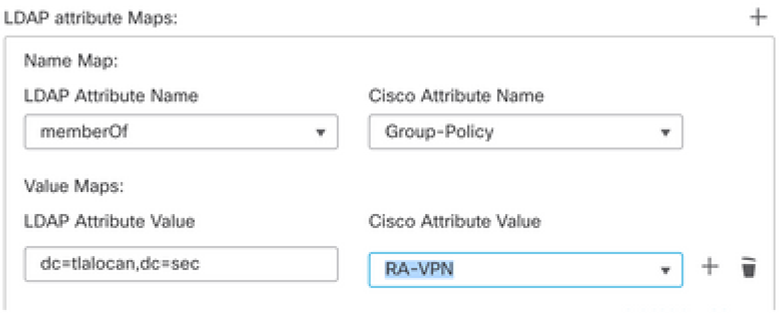
Cisco Attribute Value

Step 10. Provide the LDAP Attribute Value and the Cisco Attribute Value. Click **OK**.

For the purpose of this demonstration:

LDAP Attribute Value: DC=tlalocan,DC=sec

Cisco Attribute Value: RA-VPN



LDAP attribute Maps:

Name Map:

LDAP Attribute Name: memberOf

Cisco Attribute Name: Group-Policy

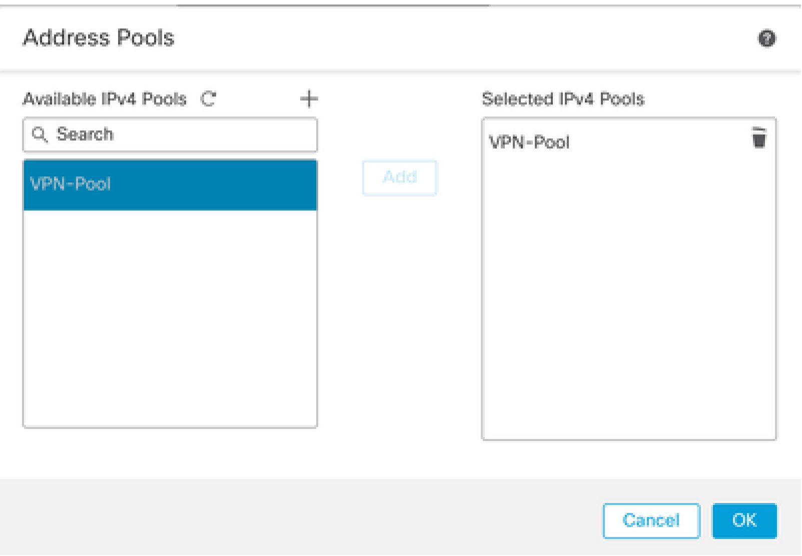
Value Maps:

LDAP Attribute Value: dc=tlalocan,dc=sec

Cisco Attribute Value: RA-VPN

Note: You can add more Value Maps as per the requirement.

Step 11. Add the Address Pool for the local address assignment. Click **OK**.



Step 12. Provide the **Connection Profile Name** and the Group-Policy. Click Next.

For the purpose of this demonstration:

Connection Profile Name: RA-VPN

Authentication Method: AAA Only

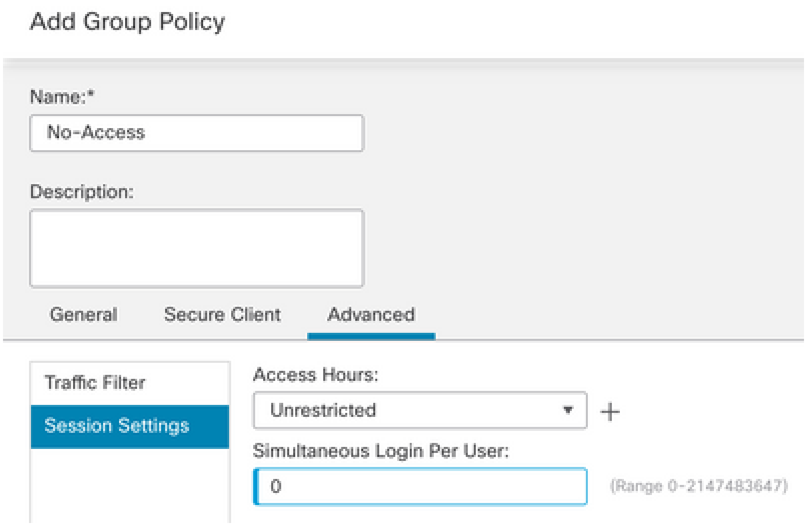
Authentication Server: LDAP

IPv4 Address Pool: VPN-Pool

Group-Policy: No-Access

> **Note:** The **Authentication Method**, **Authentication Server**, and the IPV4 Address Pool were configured in previous steps.

The No-Access group-policy has the Simultaneous Login Per User parameter set to 0 (To not allow users to be able to log in if they receive the default No-Access group-policy).



Add Group Policy

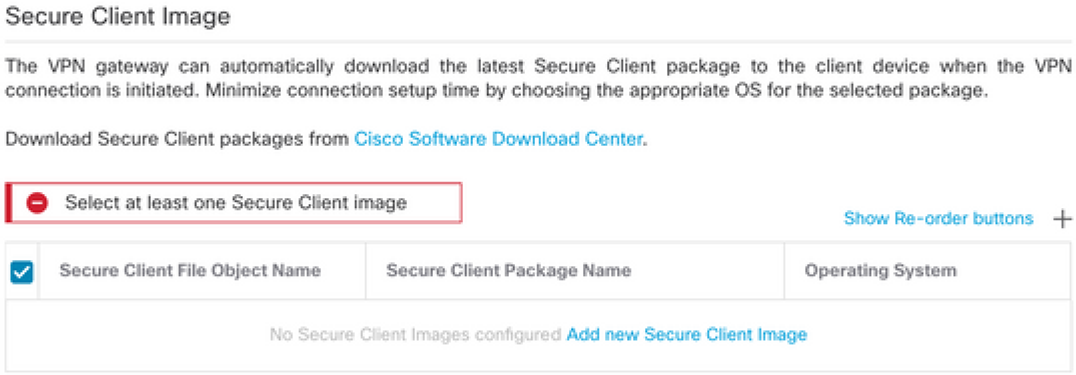
Name:* No-Access

Description:

Access Hours: Unrestricted

Simultaneous Login Per User: 0 (Range 0-2147483647)

Step 13. Click Add new AnyConnect Image in order to add an **AnyConnect Client Image** to the FTD.



Secure Client Image

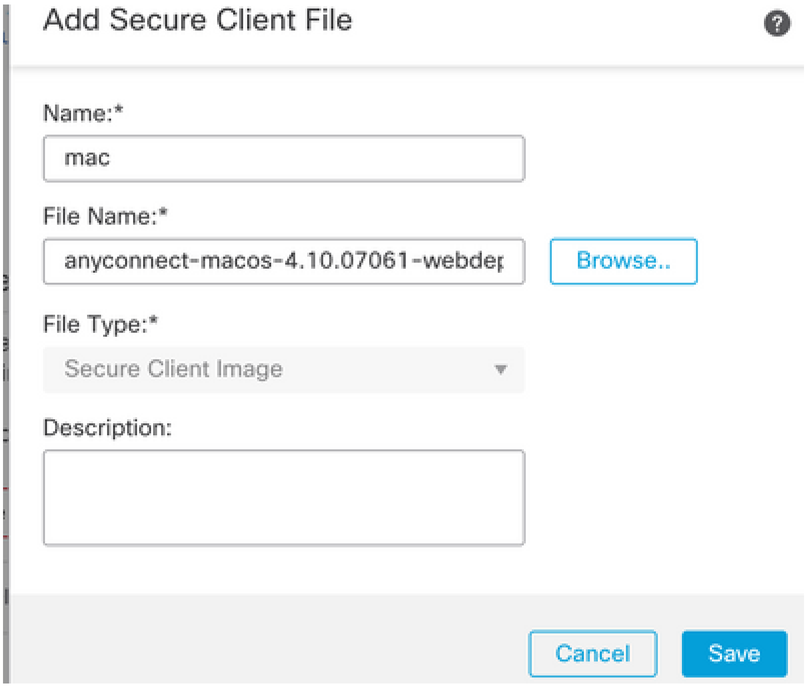
The VPN gateway can automatically download the latest Secure Client package to the client device when the VPN connection is initiated. Minimize connection setup time by choosing the appropriate OS for the selected package.

Download Secure Client packages from Cisco Software Download Center.

Select at least one Secure Client image

☑	Secure Client File Object Name	Secure Client Package Name	Operating System
	No Secure Client Images configured Add new Secure Client Image		

Step 14. Provide a Name for the image uploaded and browse from the local storage to upload the image. Click Save.



Add Secure Client File

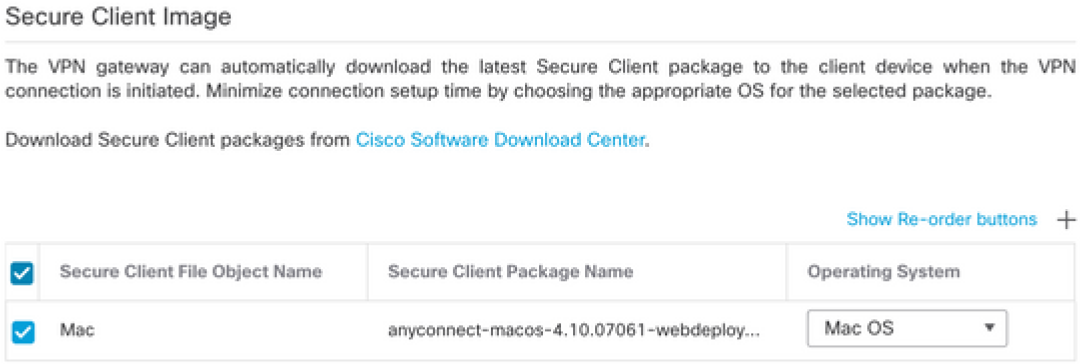
Name:* mac

File Name:* anyconnect-macos-4.10.07061-webdep

File Type:* Secure Client Image

Description:

Step 15. Click the check box next to the image in order to enable it for use. Click Next.



Secure Client Image

The VPN gateway can automatically download the latest Secure Client package to the client device when the VPN connection is initiated. Minimize connection setup time by choosing the appropriate OS for the selected package.

Download Secure Client packages from Cisco Software Download Center.

☑	Secure Client File Object Name	Secure Client Package Name	Operating System
☑	Mac	anyconnect-macos-4.10.07061-webdeploy...	Mac OS

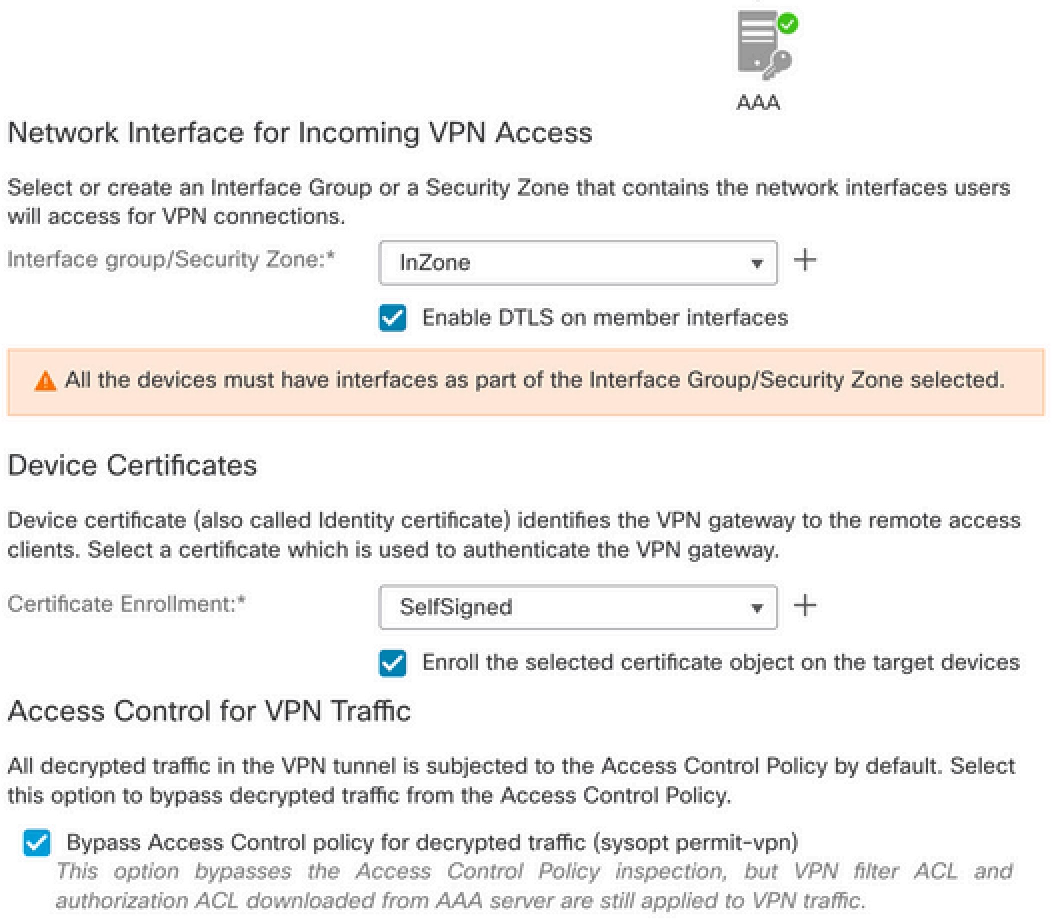
Step 16. Choose the Interface group/Security Zone and the Device Certificate. Click Next.

For the purpose of this demonstration:

Interface group/Security Zone: Out-Zone

Device Certificate: Self-Signed

> **Note:** You can choose to enable the Bypass Access Control policy option in order to bypass any access control check for encyrpted (VPN) traffic (Disabled by default).



Network Interface for Incoming VPN Access

Select or create an Interface Group or a Security Zone that contains the network interfaces users will access for VPN connections.

Interface group/Security Zone:* InZone

☑ Enable DTLS on member interfaces

⚠ All the devices must have interfaces as part of the Interface Group/Security Zone selected.

Device Certificates

Device certificate (also called Identity certificate) identifies the VPN gateway to the remote access clients. Select a certificate which is used to authenticate the VPN gateway.

Certificate Enrollment:* SelfSigned

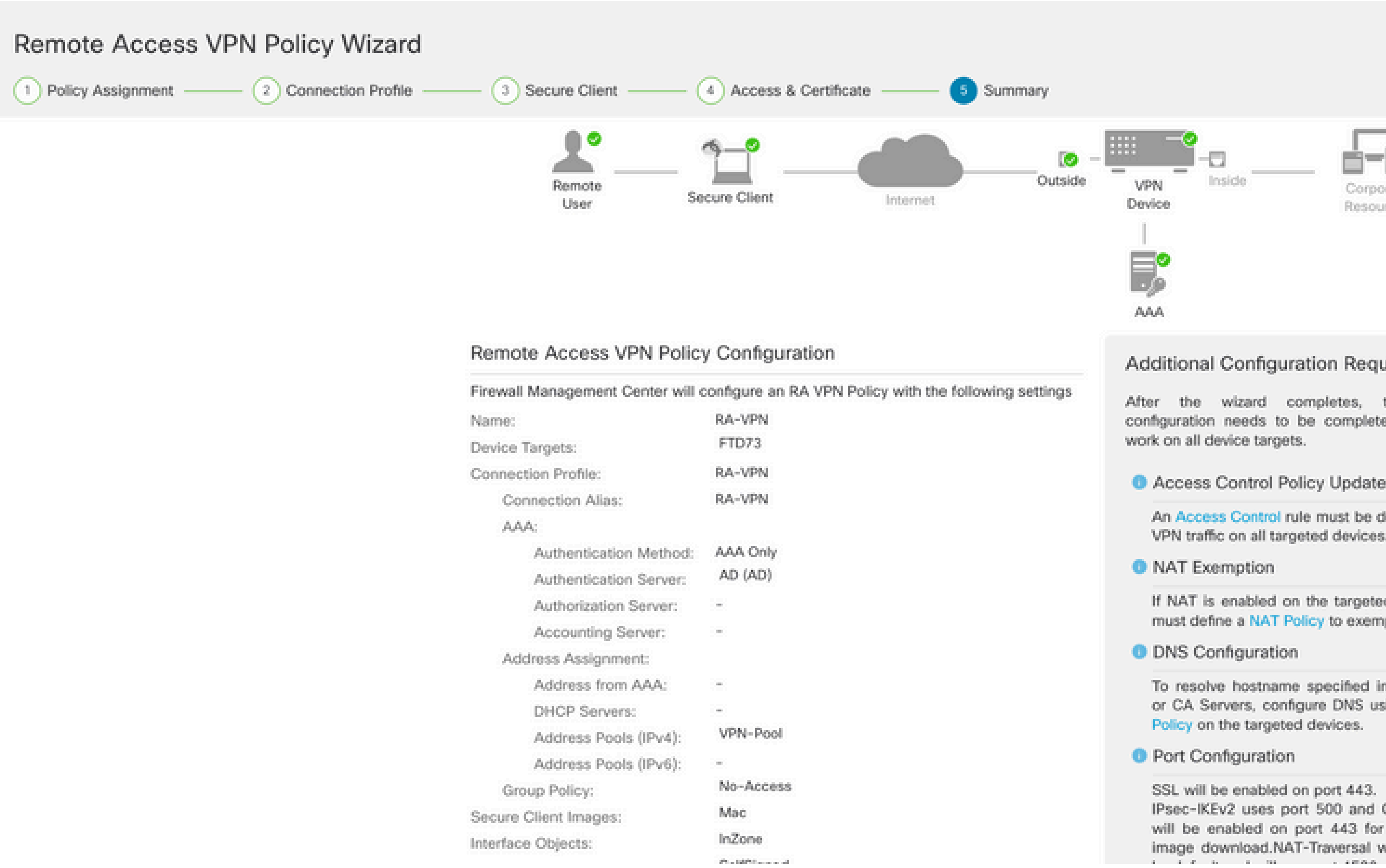
☑ Enroll the selected certificate object on the target devices

Access Control for VPN Traffic

All decrypted traffic in the VPN tunnel is subjected to the Access Control Policy by default. Select this option to bypass decrypted traffic from the Access Control Policy.

☑ Bypass Access Control policy for decrypted traffic (sysopt permit-vpn)
This option bypasses the Access Control Policy inspection, but VPN filter ACL and authorization ACL downloaded from AAA server are still applied to VPN traffic.

Step 17. View the summary of the RA VPN configuration. Click Finish to save, as shown in the image.



Remote Access VPN Policy Configuration

Firewall Management Center will configure an RA VPN Policy with the following settings

Name: RA-VPN
Device Targets: FTD73
Connection Profile: RA-VPN
Connection Alias: RA-VPN
AAA:
Authentication Method: AAA Only
Authentication Server: AD (AD)
Authorization Server: -
Accounting Server: -
Address Assignment:
Address from AAA: -
DHCP Servers: -
Address Pools (IPv4): VPN-Pool
Address Pools (IPv6): -
Group Policy: No-Access
Secure Client Images: Mac
Interface Objects: InZone

Additional Configuration Requ

After the wizard completes, t
configuration needs to be complete
work on all device targets.

Access Control Policy Update

An Access Control rule must be d
VPN traffic on all targeted devices.

NAT Exemption

If NAT is enabled on the targete
must define a NAT Policy to exem

DNS Configuration

To resolve hostname specified in
or CA Servers, configure DNS us
Policy on the targeted devices.

Port Configuration

SSL will be enabled on port 443.
IPsec-IKEv2 uses port 500 and
will be enabled on port 443 for
image download.NAT-Traversal w

Step 18. Navigate to Deploy > Deployment. Choose the FTD to which the configuration needs to be deployed. Click Deploy.

The configuration is pushed to the FTD CLI after successful deployment:

<#root>

```
!--- LDAP Server Configuration ---!



ldap attribute-map LDAP


 map-name memberOf Group-Policy
 map-value memberOf DC=tlalocan,DC=sec RA-VPN

aaa-server LDAP protocol ldap
 max-failed-attempts 4
 realm-id 2
aaa-server LDAP host 10.106.56.137
 server-port 389
 ldap-base-dn DC=tlalocan,DC=sec
 ldap-group-base-dn DC=tlalocan,DC=sec
 ldap-scope subtree
 ldap-naming-attribute sAMAccountName
 ldap-login-password *****
 ldap-login-dn CN=Administrator,CN=Users,DC=test,DC=com
 server-type microsoft
 ldap-attribute-map LDAP

!--- RA VPN Configuration ---!

webvpn
 enable Outside
 anyconnect image disk0:/csm/anyconnect-win-4.10.07061-webdeploy-k9.pkg 1 regex "Mac"
 anyconnect enable
 tunnel-group-list enable
 error-recovery disable

ssl trust-point Self-Signed

group-policy No-Access internal

group-policy No-Access attributes

 vpn-simultaneous-logins 0

 vpn-idle-timeout 30

 !--- Output Omitted ---!

 vpn-tunnel-protocol ssl-client
 split-tunnel-policy tunnelall
 ipv6-split-tunnel-policy tunnelall
 split-tunnel-network-list none

group-policy RA-VPN internal

group-policy RA-VPN attributes

banner value ! Welcome to VPN !

 vpn-simultaneous-logins 3

 vpn-idle-timeout 30

 !--- Output Omitted ---!

 vpn-tunnel-protocol ssl-client
 split-tunnel-policy tunnelall
 ipv6-split-tunnel-policy tunnelall
 split-tunnel-network-list non

ip local pool VPN-Pool 10.72.1.1-10.72.1.150 mask 255.255.255.0

tunnel-group RA-VPN type remote-access

tunnel-group RA-VPN general-attributes

address-pool VPN-Pool
```

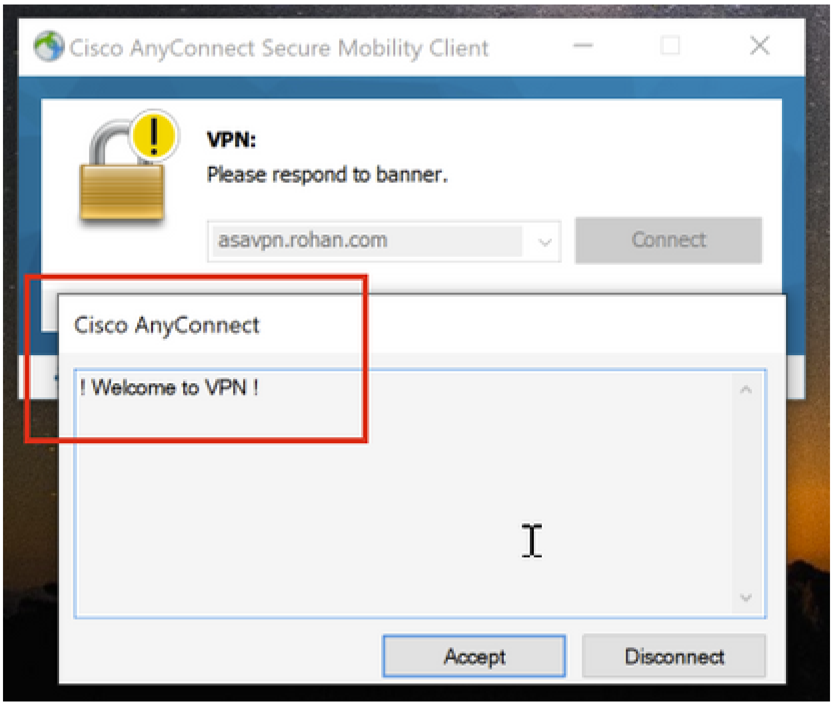
```
authentication-server-group LDAP
```

```
default-group-policy No-Access
```

```
tunnel-group RA-VPN webvpn-attributes
group-alias RA-VPN enable
```

Verify

On the AnyConect client, log in with Valid VPN User Group Credentials, and you get the correct group policy assigned by the LDAP Attribute Map:



VPN:
Please respond to banner.

asavpn.rohan.com

! Welcome to VPN !

From the LDAP Debug Snippet (debug ldap 255) you can see there is a match on the LDAP Attribute Map:

<#root>

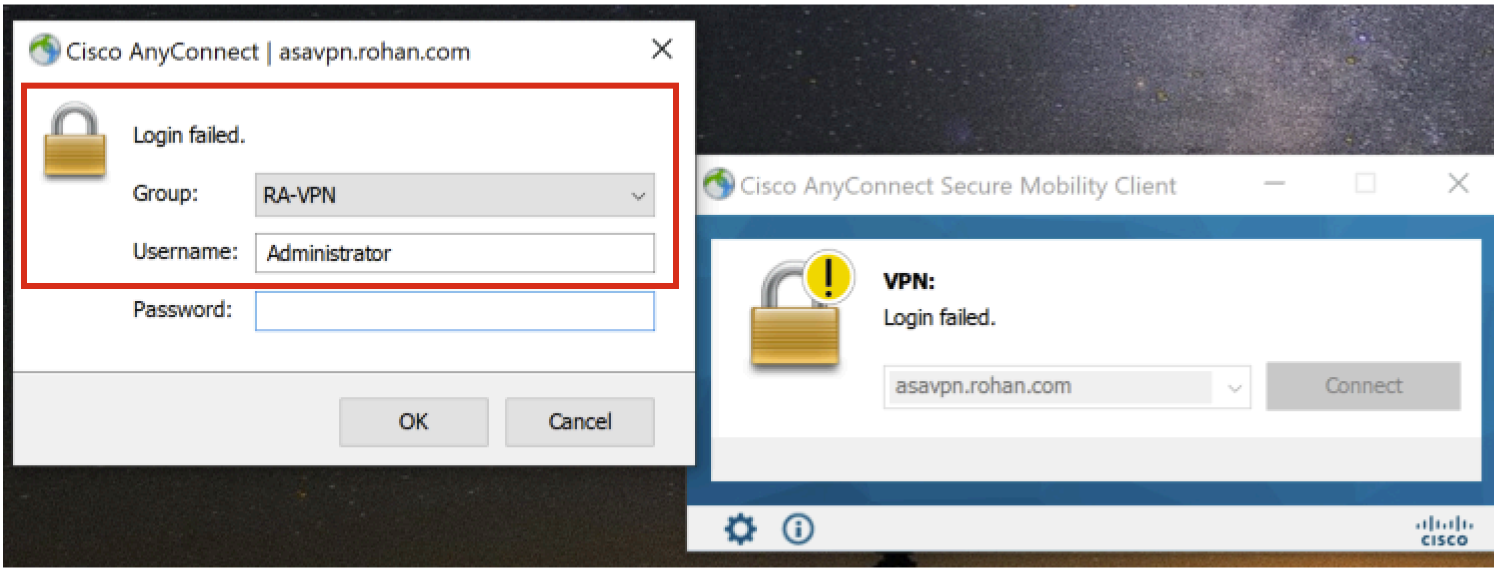
```
Authentication successful for test to 10.106.56.137


memberOf: value = DC=tlalocan,DC=sec

mapped to Group-Policy: value = RA-VPN


        mapped to LDAP-Class: value = RA-VPN
```

On the AnyConect client, log in with an Invalid VPN User Group Credential and you get the No-Access group policy.



Cisco AnyConnect | asavpn.rohan.com

Login failed.

Group: RA-VPN

Username: Administrator

Password:

Cisco AnyConnect Secure Mobility Client

VPN:
Login failed.

asavpn.rohan.com

<#root>

```
%FTD-6-113004: AAA user authentication Successful : server = 10.106.56.137 : user = Administrator

%FTD-6-113009: AAA retrieved default group policy (No-Access) for user = Administrator


%FTD-6-113013: AAA unable to complete the request Error : reason =

Simultaneous logins exceeded for user : user = Administrator
```

From LDAP Debug Snippet (debug ldap 255), you can see there is no match on the LDAP Attribute Map:

<#root>

```
Authentication successful for Administrator to 10.106.56.137



memberOf: value = CN=Group Policy Creator Owners,CN=Users,DC=tlalocan,DC=sec
        mapped to Group-Policy: value = CN=Group Policy Creator Owners,CN=Users,DC=tlalocan,DC=sec
        mapped to LDAP-Class: value = CN=Group Policy Creator Owners,CN=Users,DC=tlalocan,DC=sec
memberOf: value = CN=Domain Admins,CN=Users,DC=tlalocan,DC=sec
        mapped to Group-Policy: value = CN=Domain Admins,CN=Users,DC=tlalocan,DC=sec
        mapped to LDAP-Class: value = CN=Domain Admins,CN=Users,DC=tlalocan,DC=sec
memberOf: value = CN=Enterprise Admins,CN=Users,DC=tlalocan,DC=sec
        mapped to Group-Policy: value = CN=Enterprise Admins,CN=Users,DC=tlalocan,DC=sec
        mapped to LDAP-Class: value = CN=Enterprise Admins,CN=Users,DC=tlalocan,DC=sec
memberOf: value = CN=Schema Admins,CN=Users,DC=tlalocan,DC=sec
        mapped to Group-Policy: value = CN=Schema Admins,CN=Users,DC=tlalocan,DC=sec
        mapped to LDAP-Class: value = CN=Schema Admins,CN=Users,DC=tlalocan,DC=sec
memberOf: value = CN=IIS_IUSRS,CN=Builtin,DC=tlalocan,DC=sec
        mapped to Group-Policy: value = CN=IIS_IUSRS,CN=Builtin,DC=tlalocan,DC=sec
        mapped to LDAP-Class: value = CN=IIS_IUSRS,CN=Builtin,DC=tlalocan,DC=sec
memberOf: value = CN=Administrators,CN=Builtin,DC=tlalocan,DC=sec
        mapped to Group-Policy: value = CN=Administrators,CN=Builtin,DC=tlalocan,DC=sec
        mapped to LDAP-Class: value = CN=Administrators,CN=Builtin,DC=tlalocan,DC=sec
```