Configure Secure Client IKEv2/ASA in ASDM with AAA & Cert Auth

Contents

Introduction

This document describes the steps necessary for configuring secure client over IKEv2 on ASA using ASDM with AAA and certificate authentication.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Configuration of Cisco Identity Services Engine (ISE)
- Configuration of CiscoAdaptive Security Virtual Appliance(ASAv)
- Configuration of Cisco Adaptive Security Device Manager (ASDM)
- VPN Authentication Flow

Components Used

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

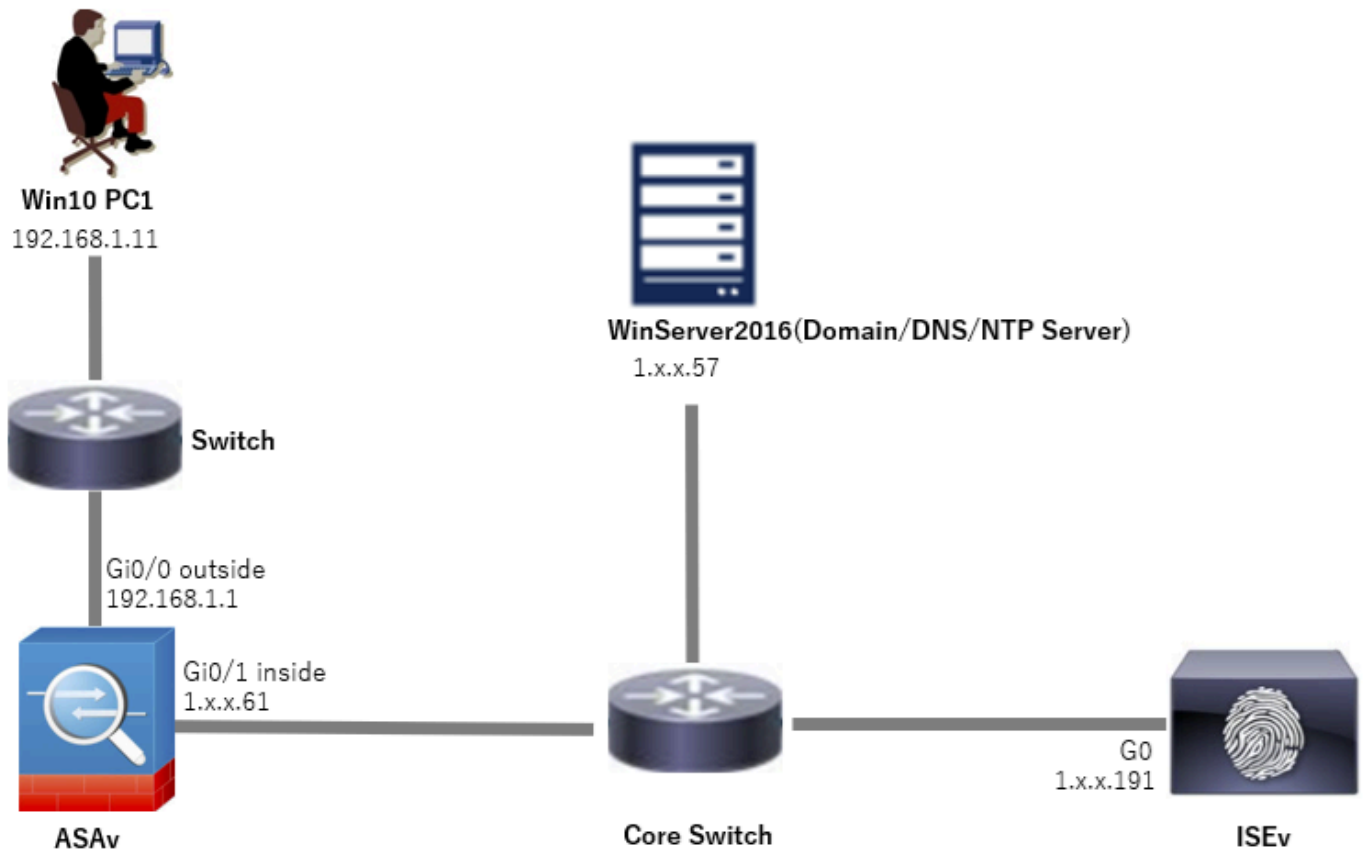
- Identity Services Engine Virtual 3.3 patch 1
- Adaptive Security Virtual Appliance 9.20(2)21
- Adaptive Security Device Manager 7.20(2)
- Cisco Secure Client 5.1.3.62
- Windows Server 2016
- Windows 10

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.

Network Diagram

This image shows the topology that is used for the example of this document.

The domain name configured on Windows Server 2016 is ad.rem-system.com, which is used as an example in this document.



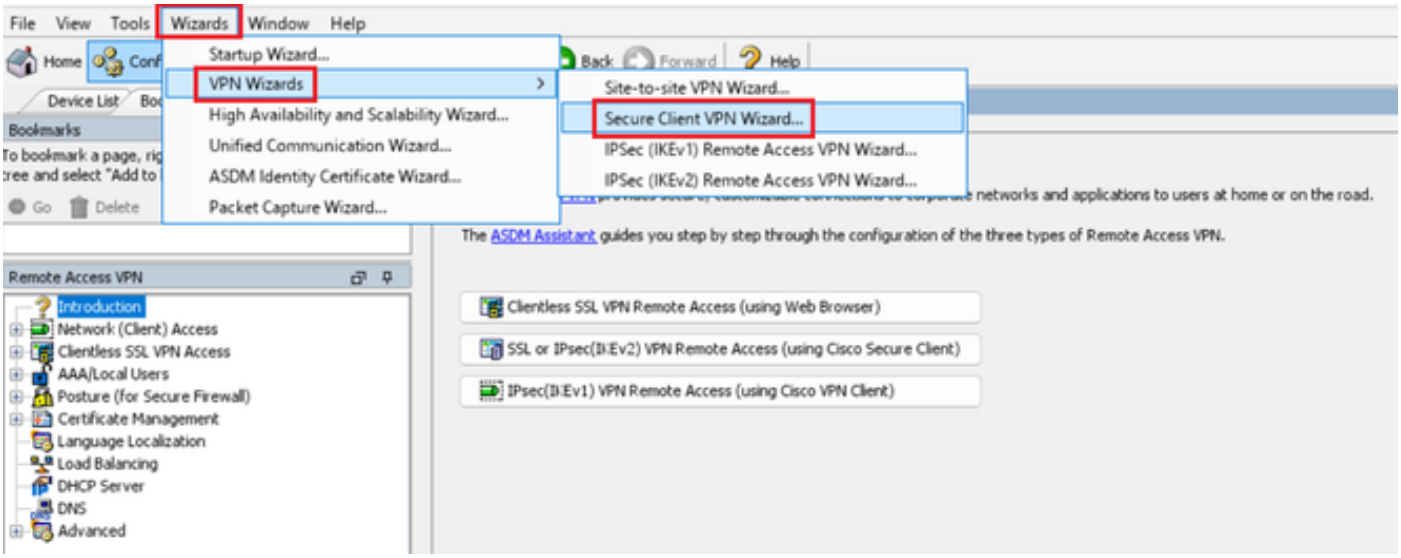
Network Diagram

Configurations

Configuration in ASDM

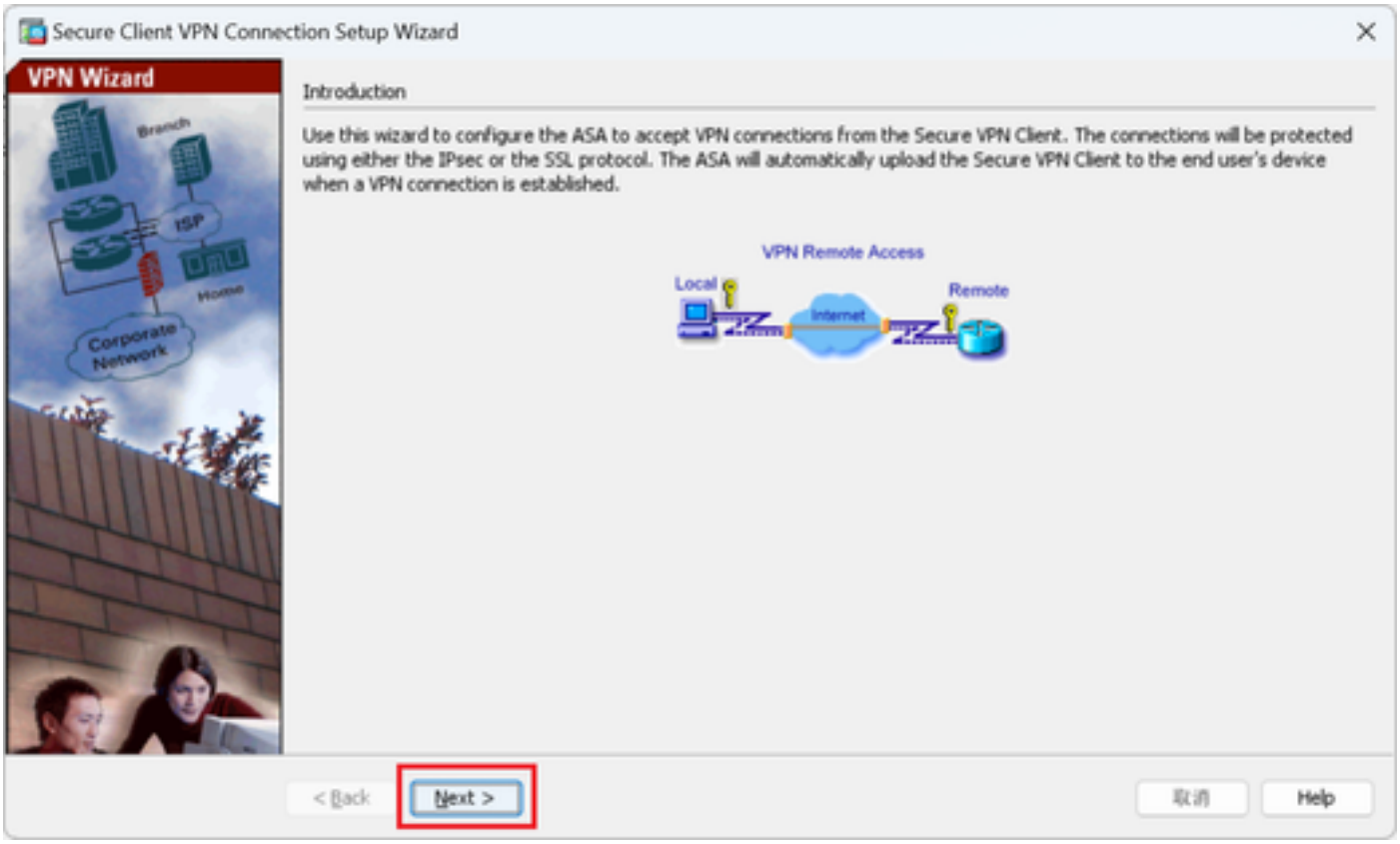
Step 1. Open VPN Wizards

Navigate to **Wizards > VPN Wizards**, click **Secure Client VPN Wizard**.



Open VPN Wizards

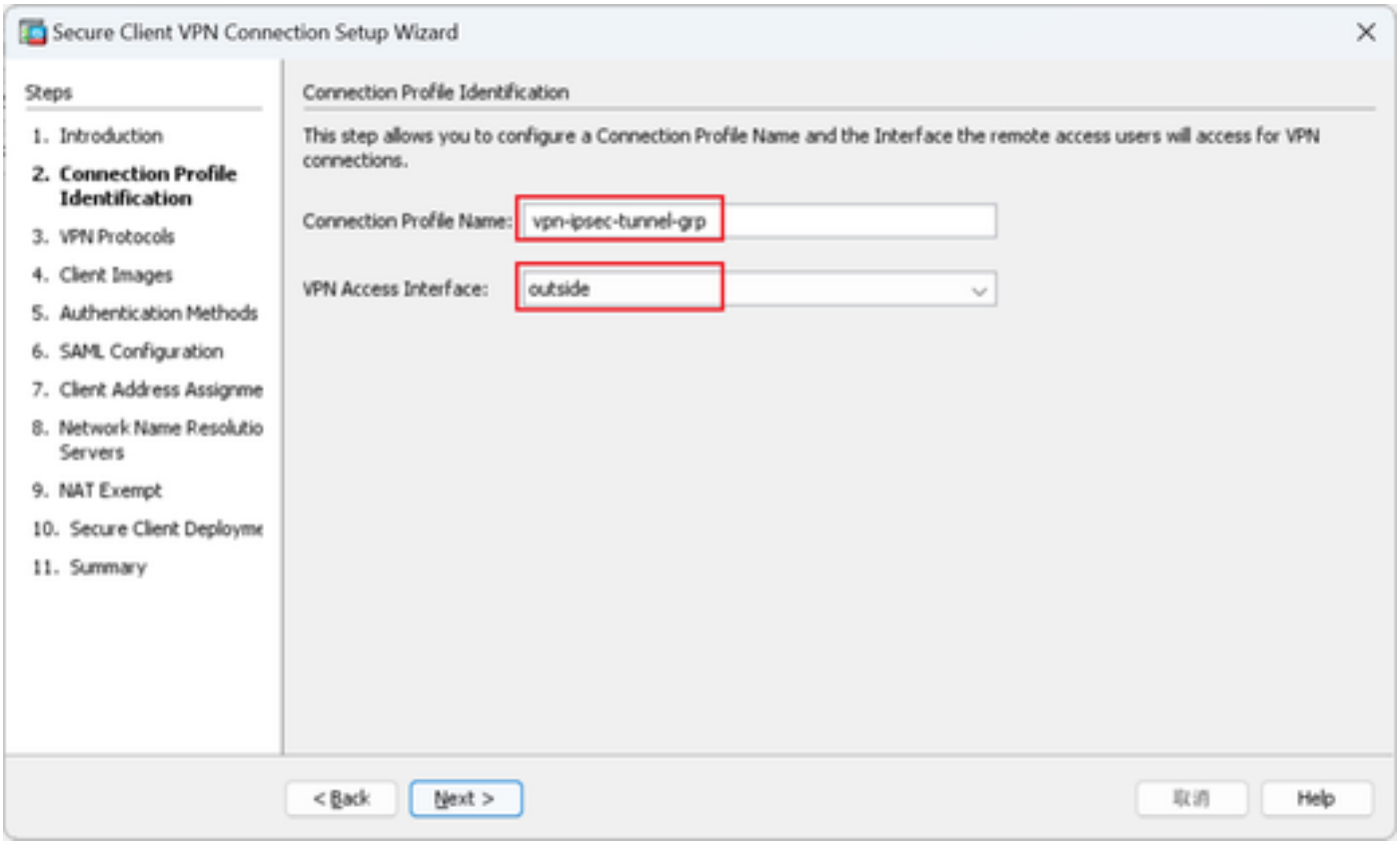
Click **Next**.



Click Next Button

Step 2. Connection Profile Identification

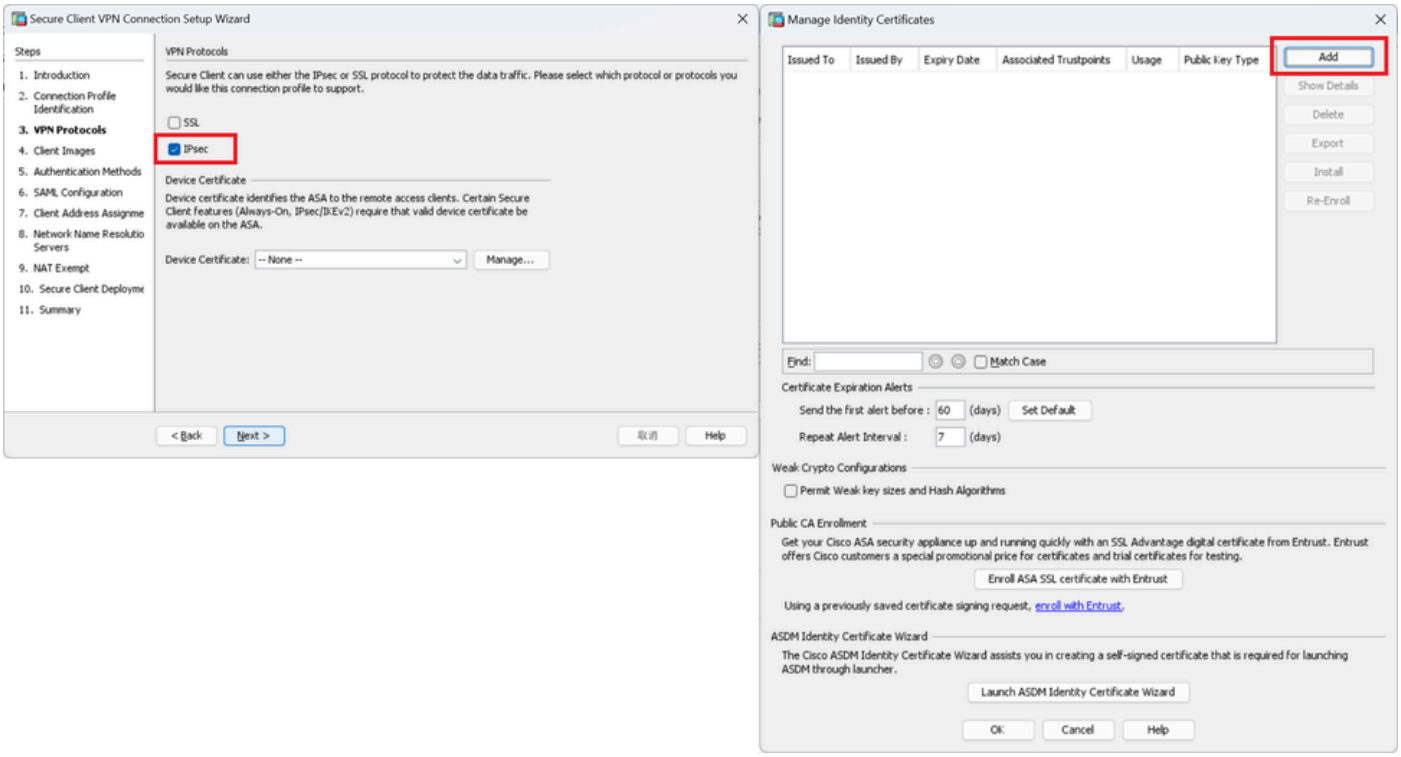
Input information for connection profile.
Connection Profile Name : vpn-ipsec-tunnel-grp
VPN Access Interface : outside



Connection Profile Identification

Step 3. VPN Protocols

Select **IPsec**, click **Add** button to add a new self-signed certificate.

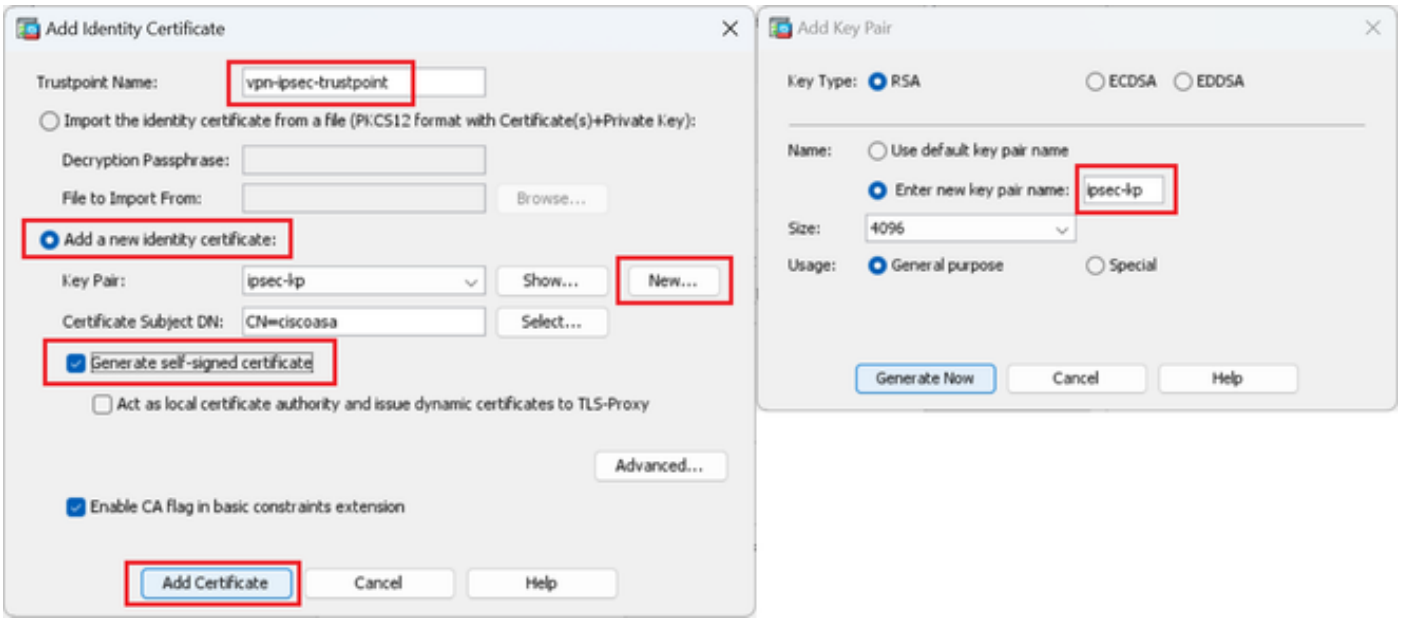


VPN Protocols

Input information for self-signed certificate.

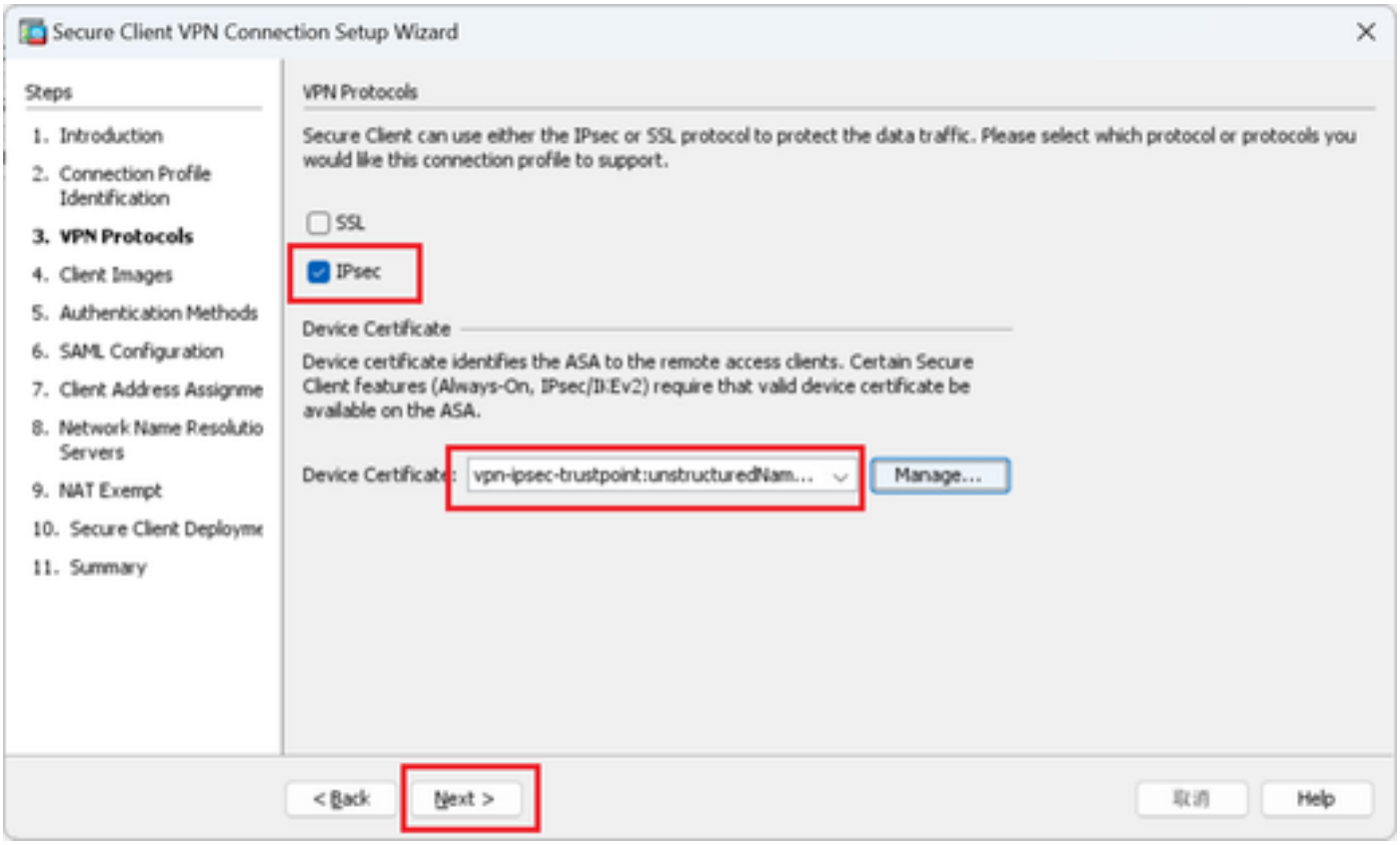
Trustpoint Name : vpn-ipsec-trustpoint

Key Pair : ipsec-kp



Detail of Self-Signed Certificate

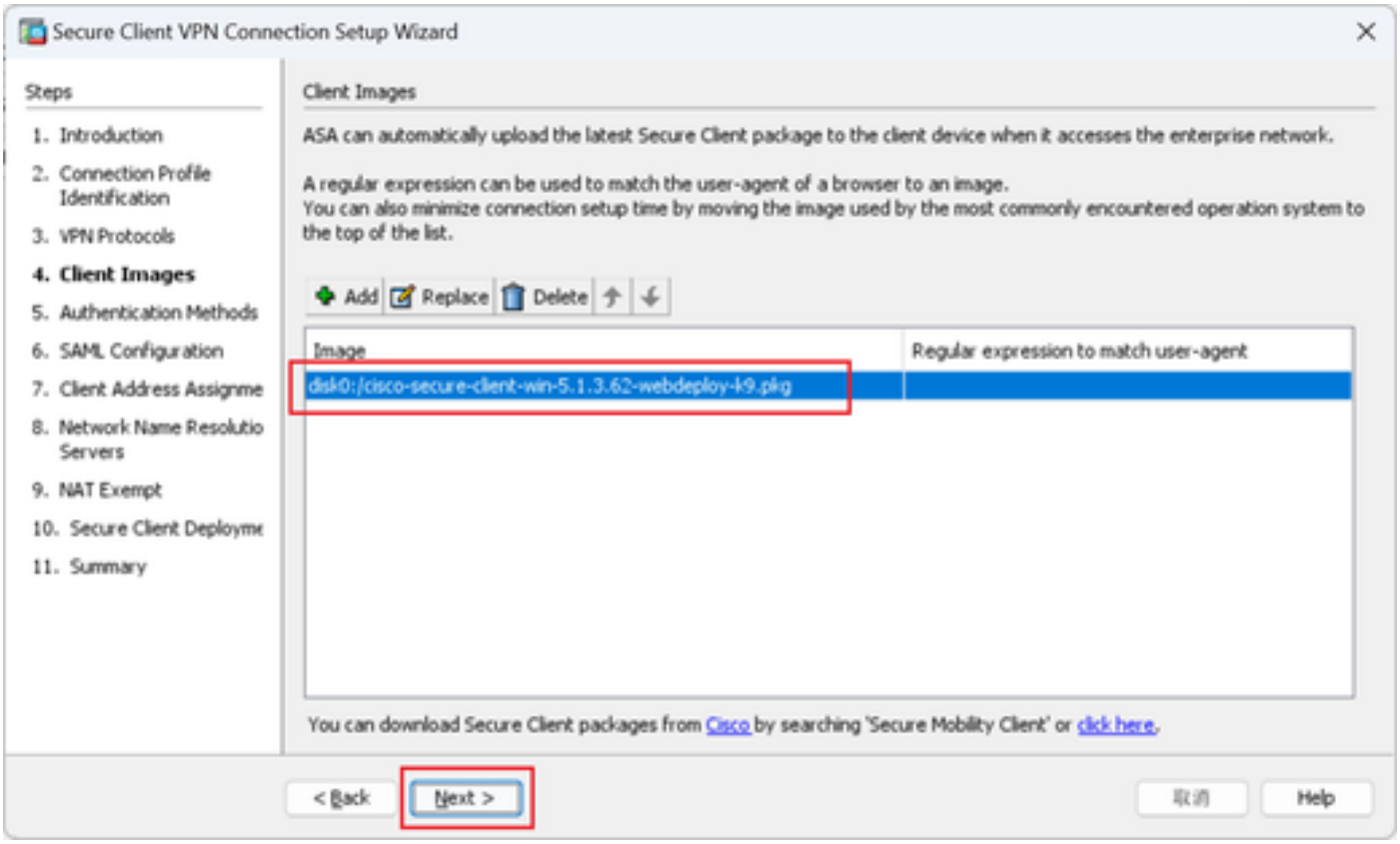
Confirm the settings of VPN protocols, click **Next** button.



Confirm Settings of VPN Protocol

Step 4. Client Images

Click **Add** button to add secure client image, click **Next** button.



Client Images

Step 5. Authentication Methods

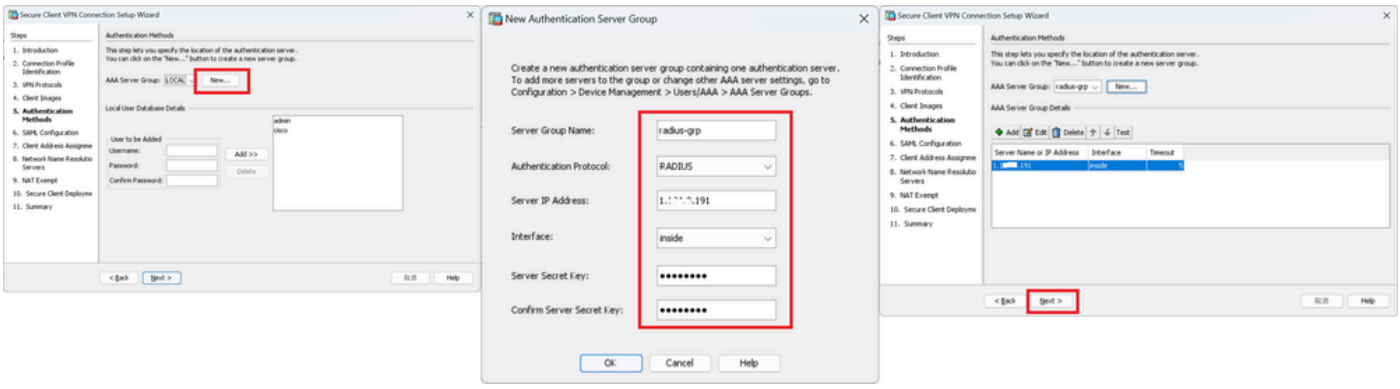
Click **New** button to add a new aaa server, click **Next** button.

Server Group Name : radius-grp

Authentication Protocol : RADIUS

Server IP Address : 1.x.x.191

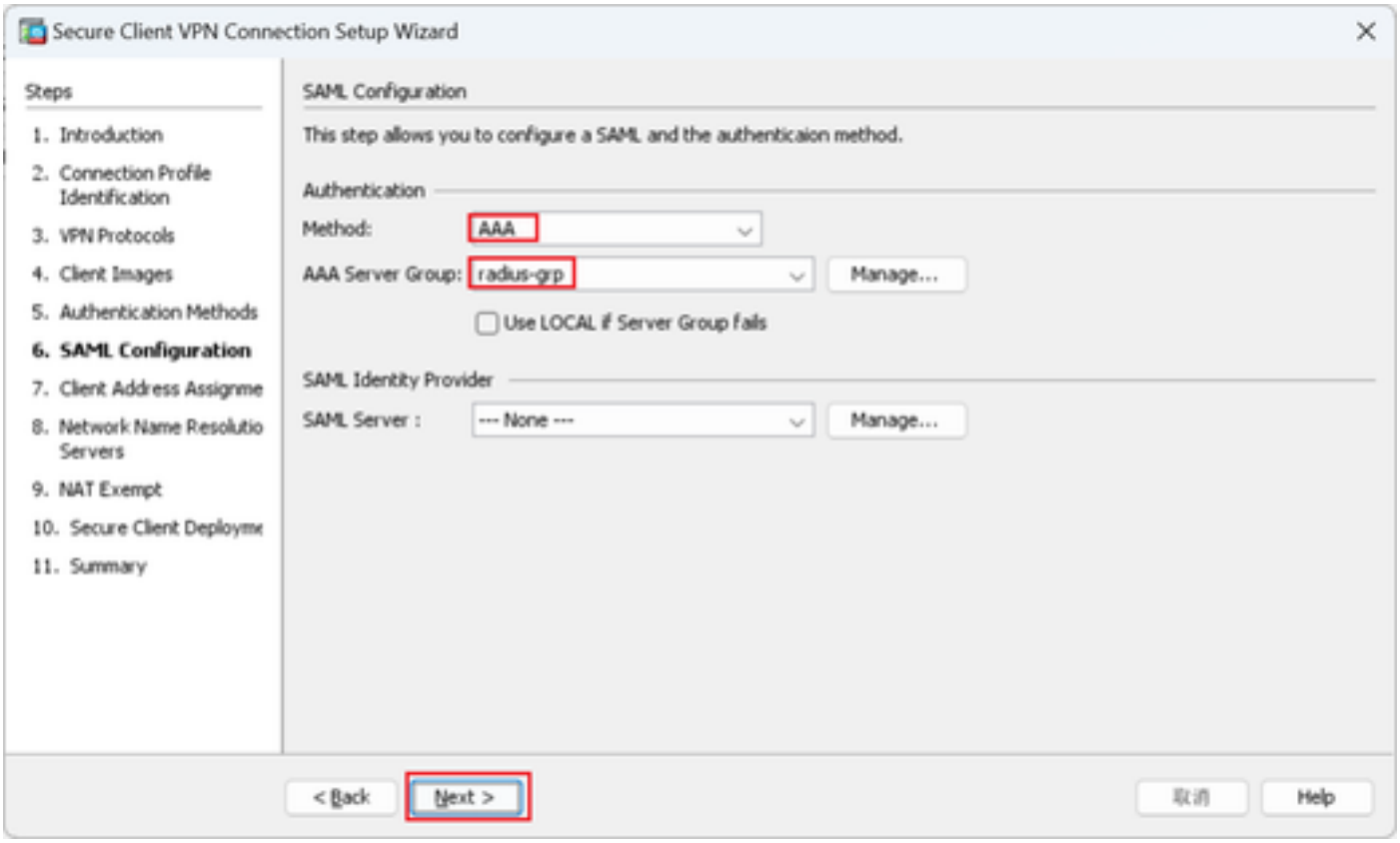
Interface : inside



Authentication Methods

Step 6. SAML Configuration

Click **Next** button.



SAML Configuration

Step 7. Client Address Assignme

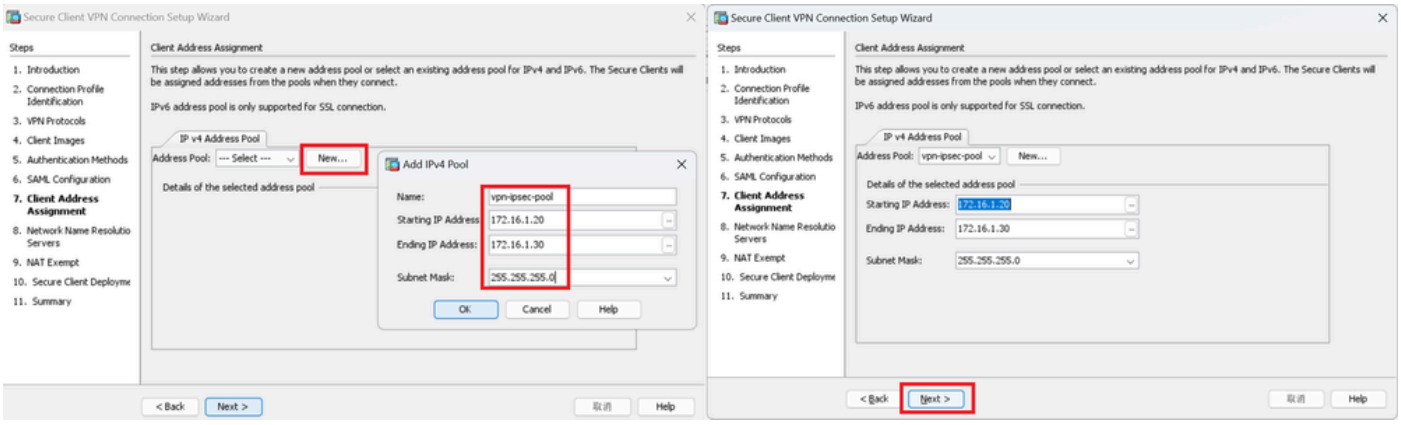
Click **New** button to add a new IPv4 pool, click **Next** button.

Name : vpn-ipsec-pool

Starting IP Address : 172.16.1.20

Ending IP Address : 172.16.1.30

Subnet Mask : 255.255.255.0



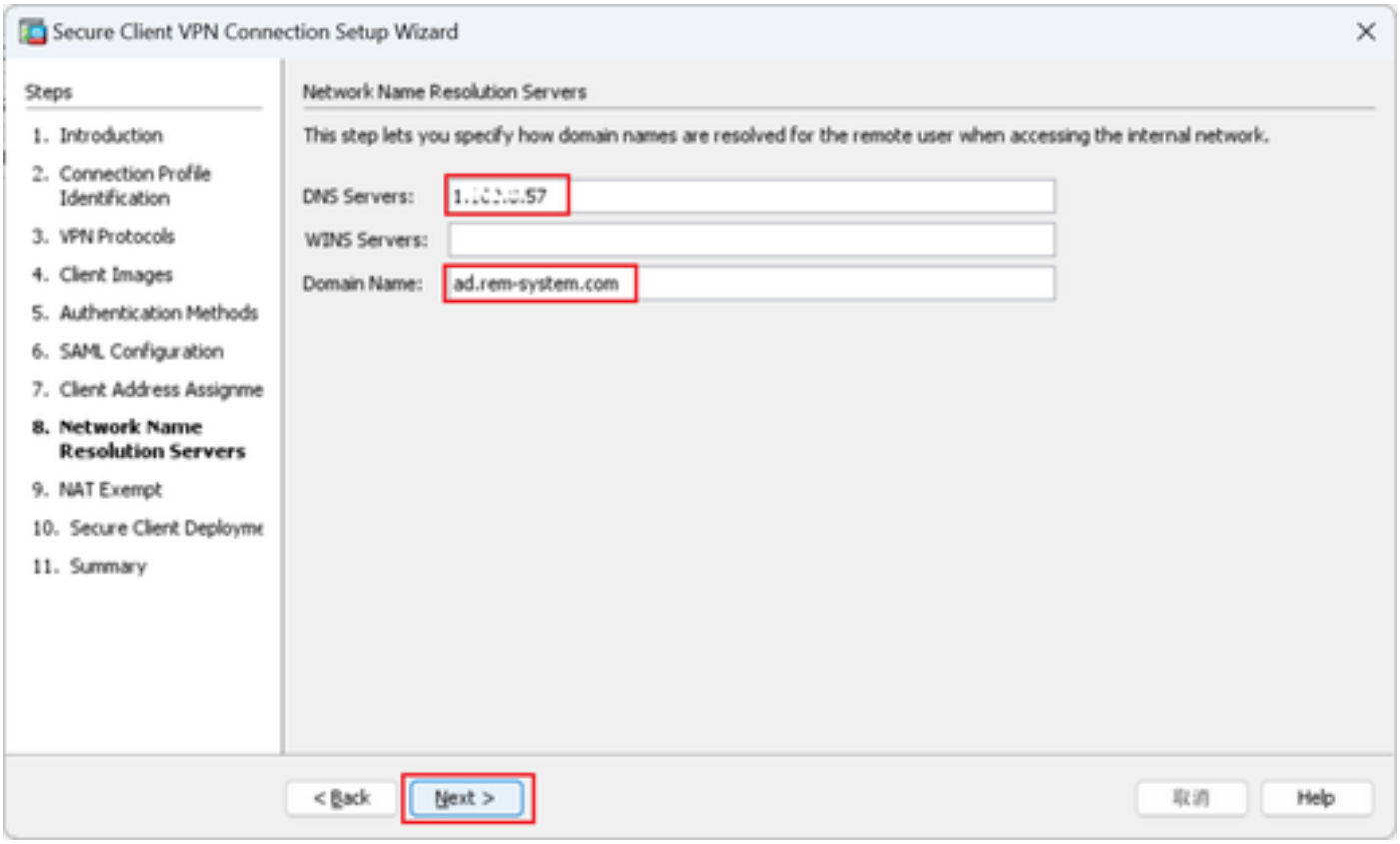
Client Address Assign

Step 8. Network Name Resolution Servers

Input information for DNS and domain, click **Next** button.

DNS Servers : 1.x.x.57

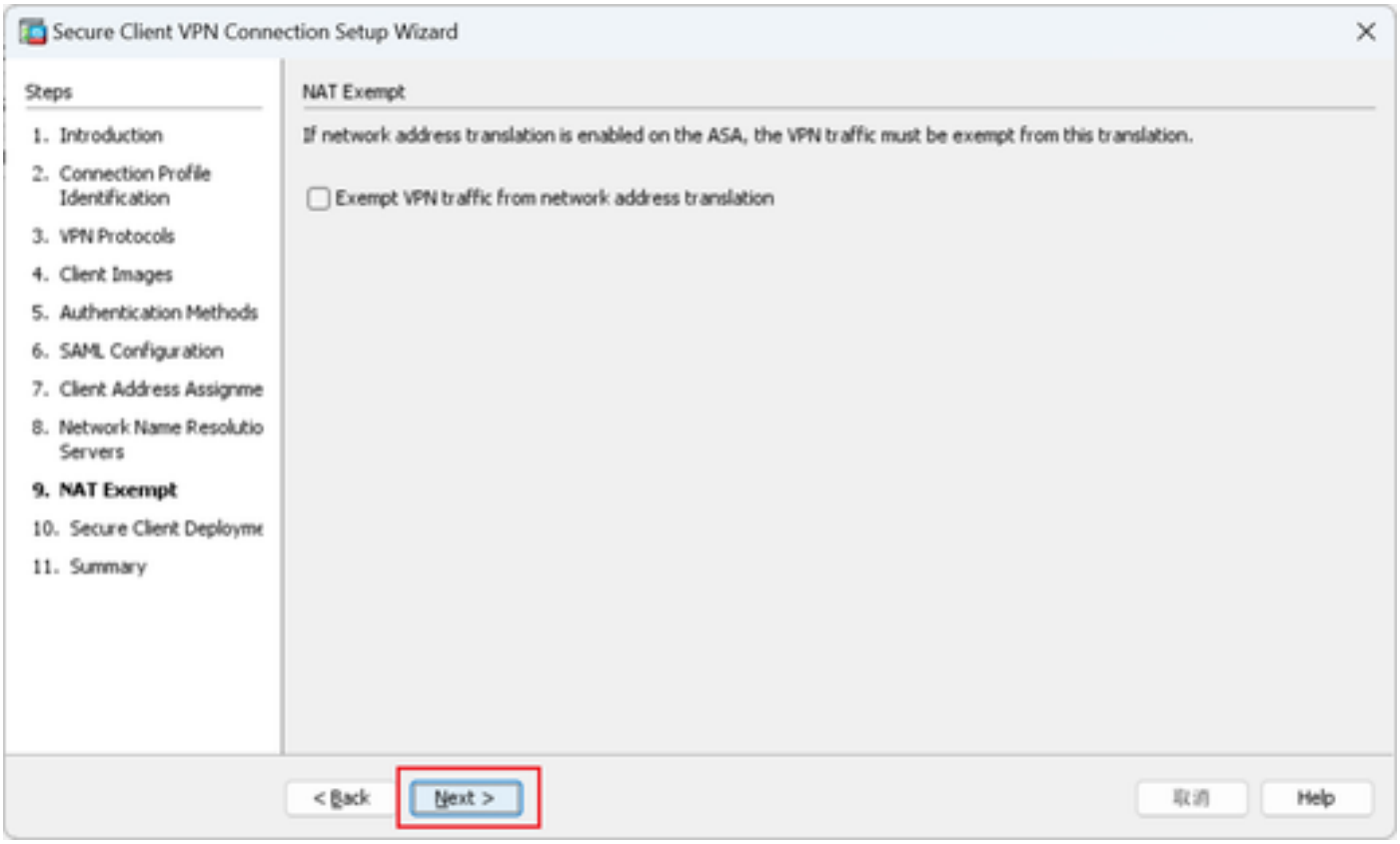
Domain Name : ad.rem-system.com



Network Name Resolution Servers

Step 9. NAT Exempt

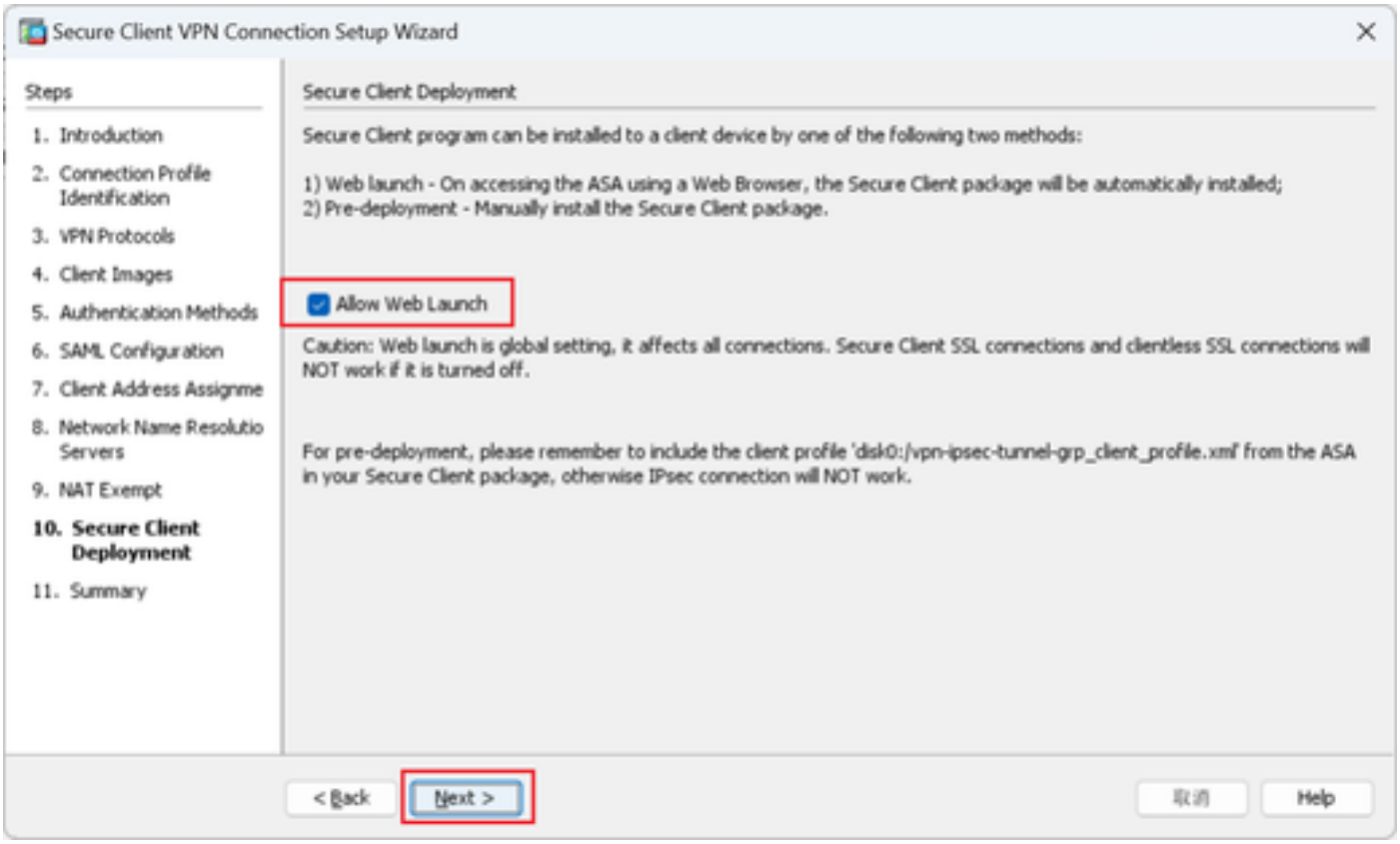
Click **Next** button.



NAT Exempt

Step 10. Secure Client Deployment

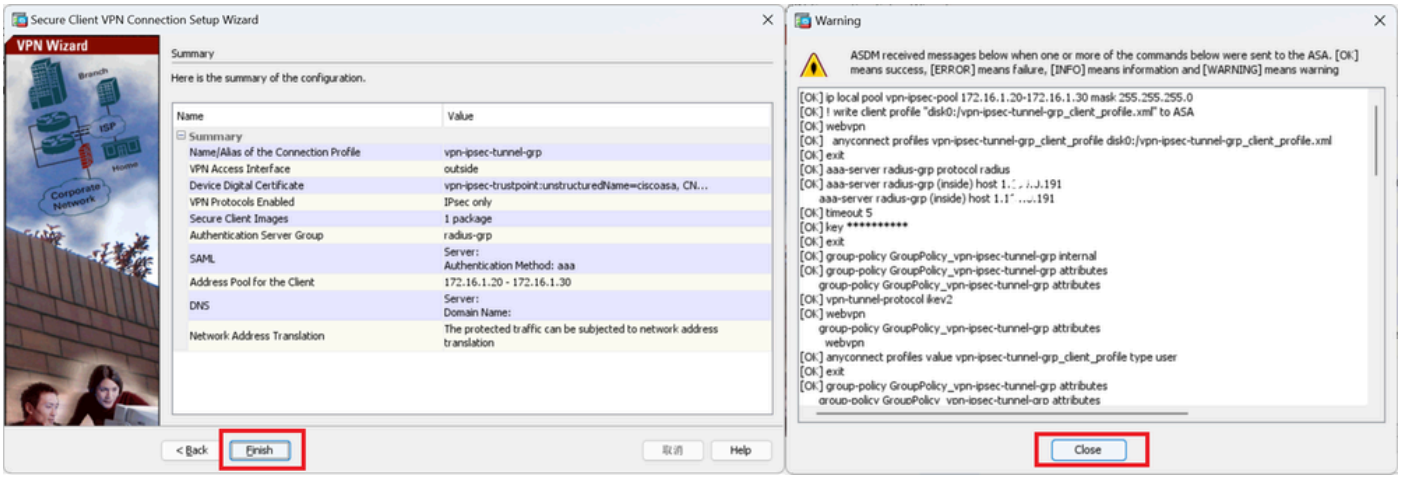
Select **Allow Web Launch**, click Next button.



Secure Client Deployment

Step 11. Save Settings

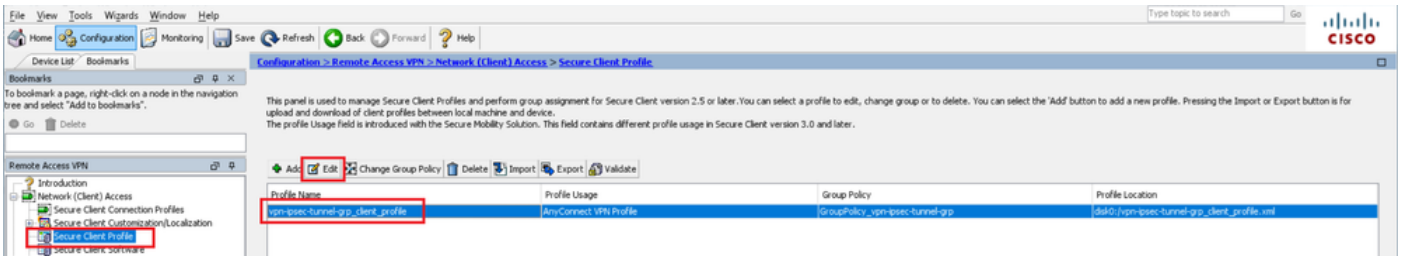
Click **Finish** button and save the settings.



Save Settings

Step 12. Confirm and Export Secure Client Profile

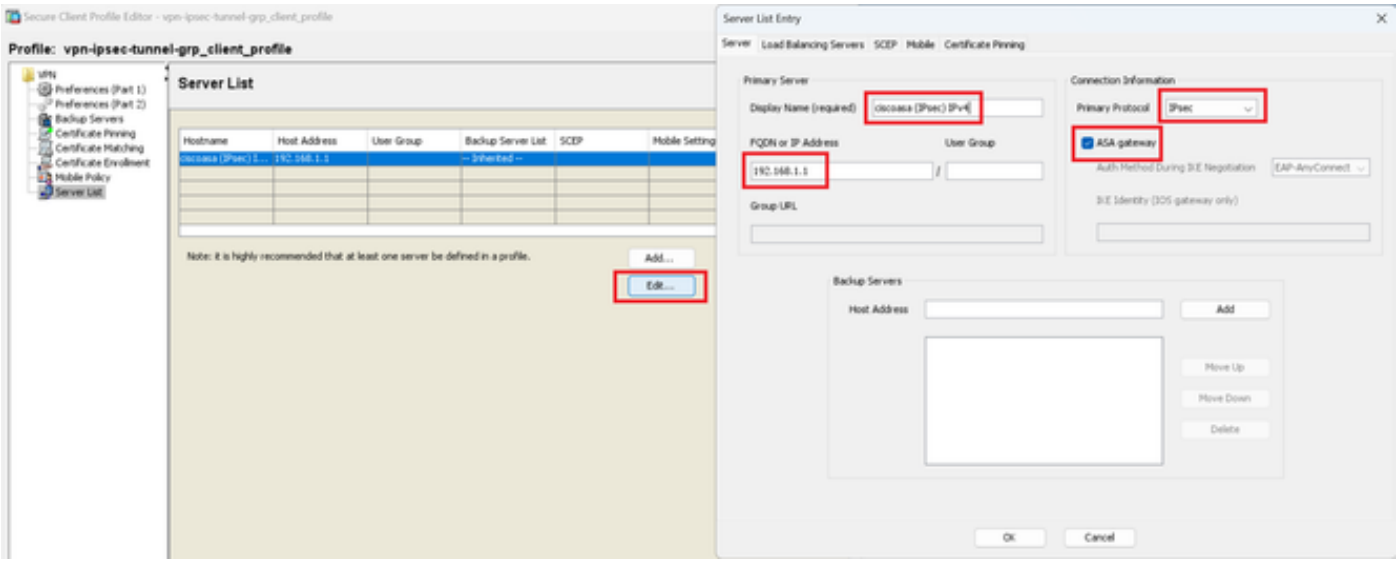
Navigate to **Configuration > Remote Access VPN > Network (Client) Access > Secure Client Profile**, click **Edit** button.



Edit Secure Client Profile

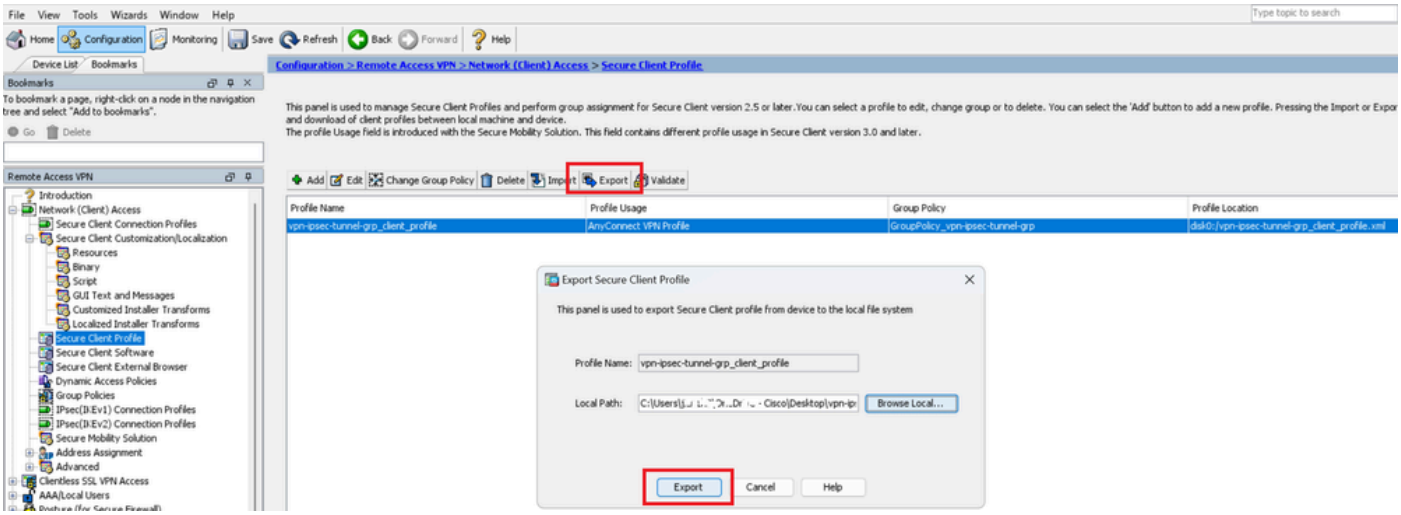
Confirm the detail of profile.

- **Display Name (required)** : ciscoasa (IPsec) IPv4
- **FQDN or IP Address** : 192.168.1.1
- **Primary Protocol** : IPsec



Confirm Secure Client Profile

Click **Export** button to export the profile to local PC.



Export Secure Client Profile

Step 13. Confirm Detail of Secure Client Profile

Open Secure Client Profile by browser, confirm that the primary protocol for host is IPsec.

```
▼<AnyConnectProfile xmlns="http://schemas.xmlsoap.org/encoding/">
  ▼<ServerList>
    ▼<HostEntry>
        <HostName>ciscoasa (IPsec) IPv4</HostName>
        <HostAddress>192.168.1.1</HostAddress>
        <PrimaryProtocol>IPsec</PrimaryProtocol>
      </HostEntry>
    </ServerList>
  </AnyConnectProfile>
```

Detail of Secure Client Profile

Step 14. Confirm Settings in ASA CLI

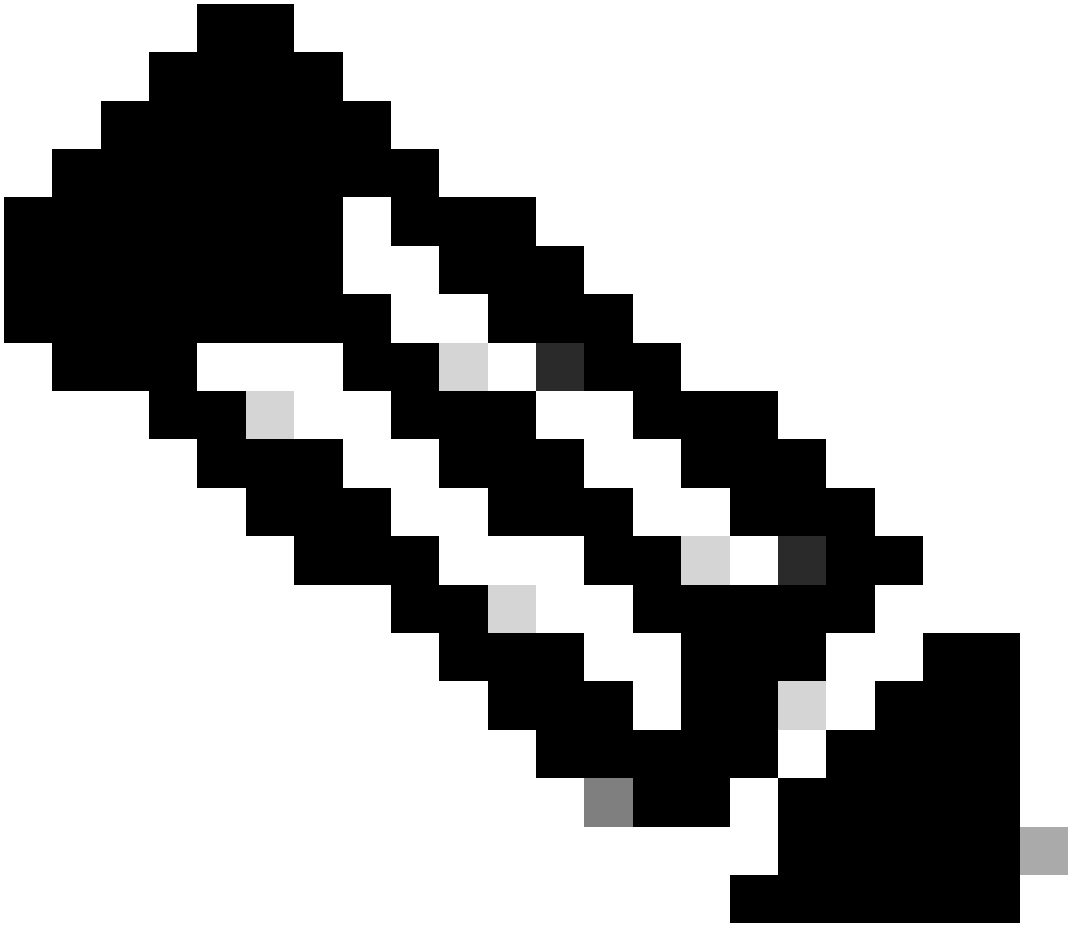
Confirm the IPsec settings created by ASDM in the ASA CLI.

```
// Defines a pool of addresses
ip local pool vpn-ipsec-pool 172.16.1.20-172.16.1.30 mask 255.255.255.0

// Defines radius server
aaa-server radius-grp protocol radius
aaa-server radius-grp (inside) host 1.x.x.191
timeout 5

// Define the transform sets that IKEv2 can use
crypto ipsec ikev2 ipsec-proposal AES256
protocol esp encryption aes-256
protocol esp integrity sha-256 sha-1
crypto ipsec ikev2 ipsec-proposal AES192
protocol esp encryption aes-192
protocol esp integrity sha-256 sha-1
crypto ipsec ikev2 ipsec-proposal AES
protocol esp encryption aes
protocol esp integrity sha-256 sha-1
crypto ipsec ikev2 ipsec-proposal 3DES
protocol esp encryption aes
protocol esp integrity sha-256 sha-1
crypto ipsec ikev2 ipsec-proposal DES
protocol esp encryption aes
protocol esp integrity sha-256 sha-1

// Configures the crypto map to use the IKEv2 transform-sets
crypto dynamic-map SYSTEM_DEFAULT_CRYPTO_MAP 65535 set ikev2 ipsec-proposal AES256 AES192 AES 3DES DES
crypto map outside_map 65535 ipsec-isakmp dynamic SYSTEM_DEFAULT_CRYPTO_MAP
crypto map outside_map interface outside

// Defines trustpoint
crypto ca trustpoint vpn-ipsec-trustpoint
enrollment self
subject-name CN=ciscoasa
keypair ipsec-kp
crl configure

// Defines self-signed certificate
crypto ca certificate chain vpn-ipsec-trustpoint
certificate 6651a2a2
308204ed 308202d5 a0030201 02020466 51a2a230 0d06092a 864886f7 0d01010b
......
ac76f984 efd41d13 073d0be6 f923a9c6 7b
quit

// IKEv2 Policies
crypto ikev2 policy 1
encryption aes-256
integrity sha256
group 5
prf sha256
lifetime seconds 86400
crypto ikev2 policy 10
encryption aes-192
integrity sha256
```

```
group 5
prf sha256
lifetime seconds 86400
crypto ikev2 policy 20
encryption aes
integrity sha256
group 5
prf sha256
lifetime seconds 86400
crypto ikev2 policy 40
encryption aes
integrity sha256
group 5
prf sha256
lifetime seconds 86400

// Enabling client-services on the outside interface
crypto ikev2 enable outside client-services port 443

// Specifiies the certificate the ASA uses for IKEv2
crypto ikev2 remote-access trustpoint vpn-ipsec-trustpoint

// Configures the ASA to allow Cisco Secure Client connections and the valid Cisco Secure Client images
webvpn
enable outside
enable
anyconnect image disk0:/cisco-secure-client-win-5.1.3.62-webdeploy-k9.pkg 1
anyconnect profiles vpn-ipsec-tunnel-grp_client_profile disk0:/vpn-ipsec-tunnel-grp_client_profile.xml
anyconnect enable
tunnel-group-list enable

// Configures the group-policy to allow IKEv2 connections and defines which Cisco Secure Client profile
group-policy GroupPolicy_vpn-ipsec-tunnel-grp internal
group-policy GroupPolicy_vpn-ipsec-tunnel-grp attributes
wins-server none
dns-server value 1.x.x.57
vpn-tunnel-protocol ikev2
default-domain value ad.rem-system.com
webvpn
anyconnect profiles value vpn-ipsec-tunnel-grp_client_profile type user

// Ties the pool of addressess to the vpn connection
tunnel-group vpn-ipsec-tunnel-grp type remote-access
tunnel-group vpn-ipsec-tunnel-grp general-attributes
address-pool vpn-ipsec-pool
authentication-server-group radius-grp
default-group-policy GroupPolicy_vpn-ipsec-tunnel-grp
tunnel-group vpn-ipsec-tunnel-grp webvpn-attributes
group-alias vpn-ipsec-tunnel-grp enable
```

Step 15. Add Cryptographic Algorithm

In ASA CLI, add group 19 to IKEv2 Policy.

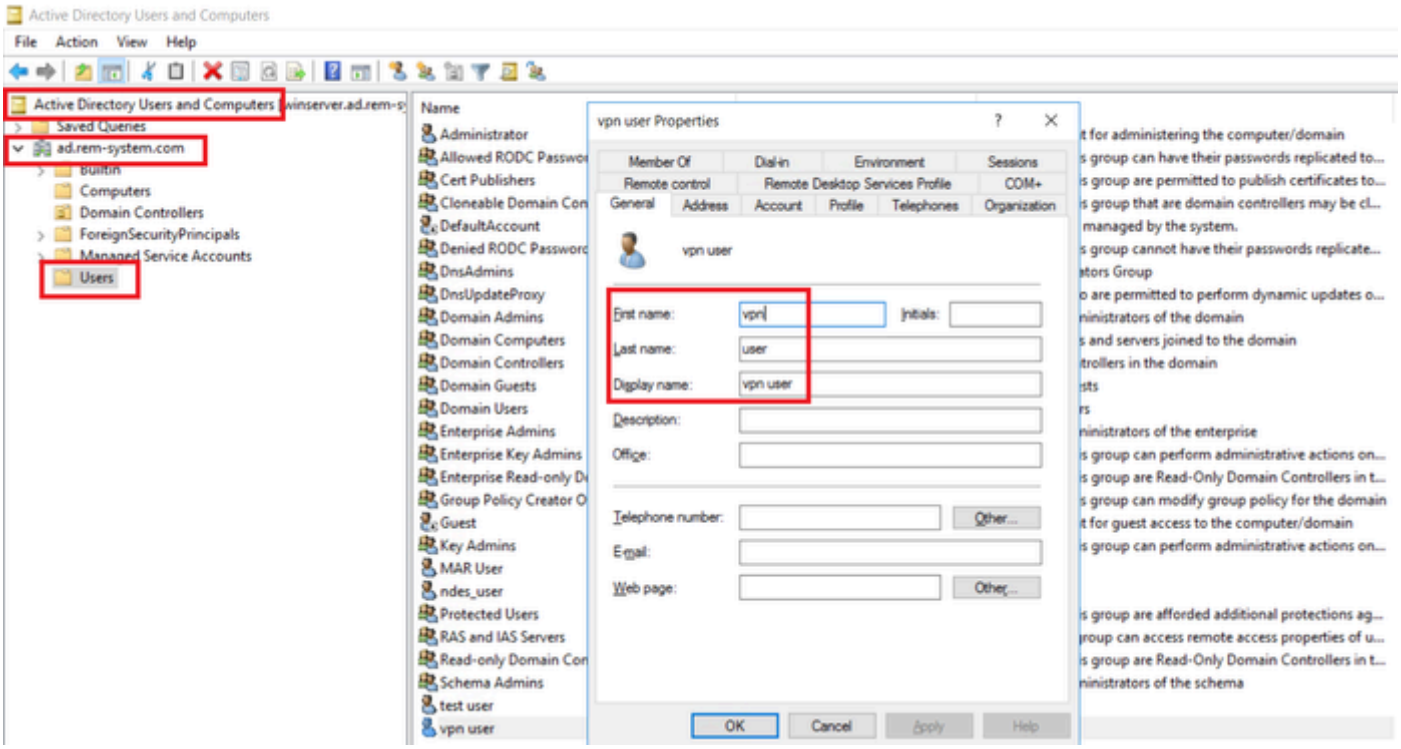


Note: For IKEv2/IPsec connections, Cisco Secure Client no longer supports Diffie-Hellman (DH) groups 2, 5, 14, and 24 as of version 4.9.00086. This change can result in connection failures due to cryptographic algorithm mismatches.

```
ciscoasa(config)# crypto ikev2 policy 1
ciscoasa(config-ikev2-policy)# group 19
ciscoasa(config-ikev2-policy)#
```

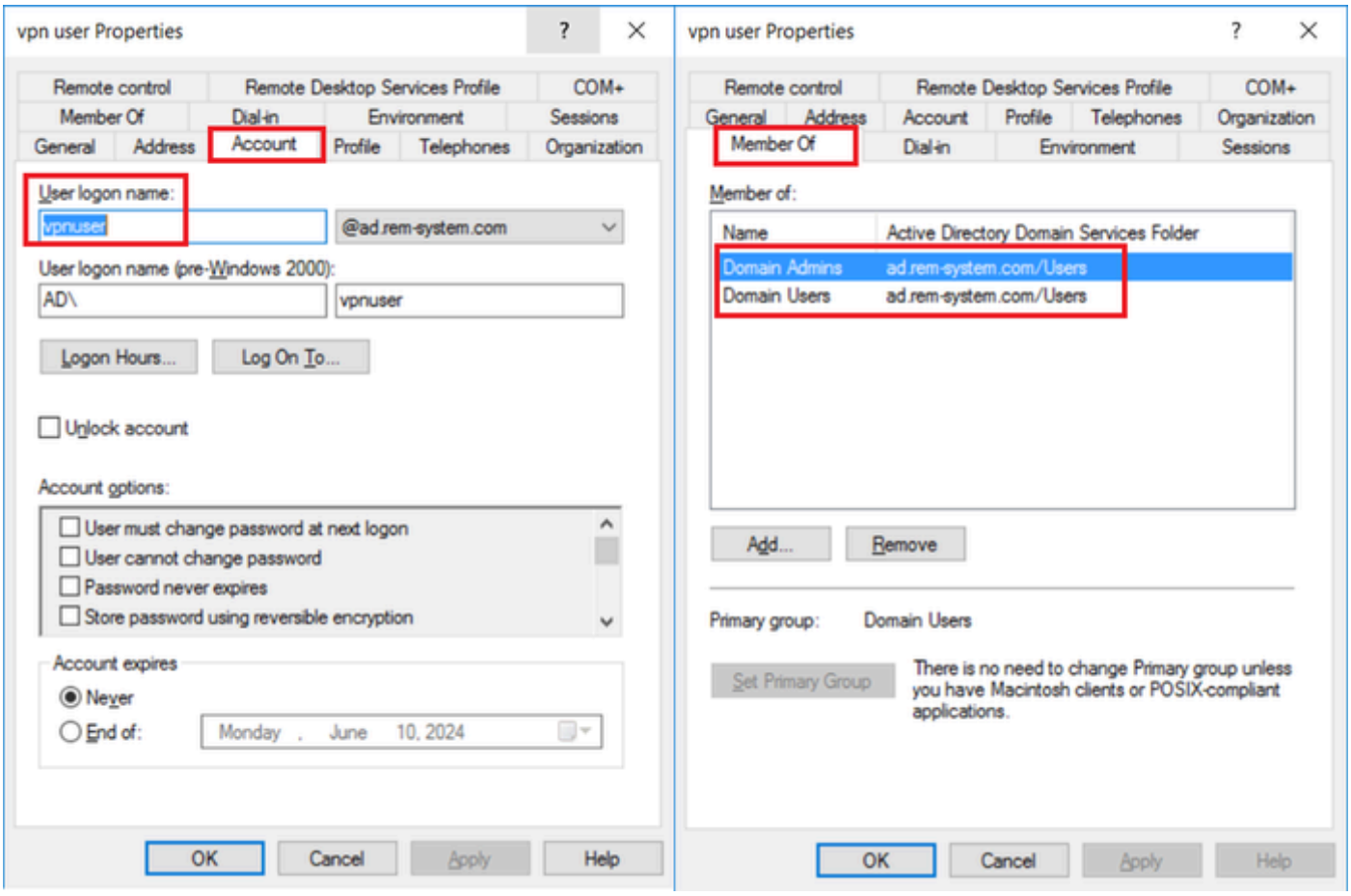
Configuration in Windows Server

You need to add a domain user for VPN connection. Navigate to**Active Directory Users and Computers**, click**Users**. Add vpnuser as domain user.



Add Domain User

Add the domain user to member of Domain Admins and Domain Users.

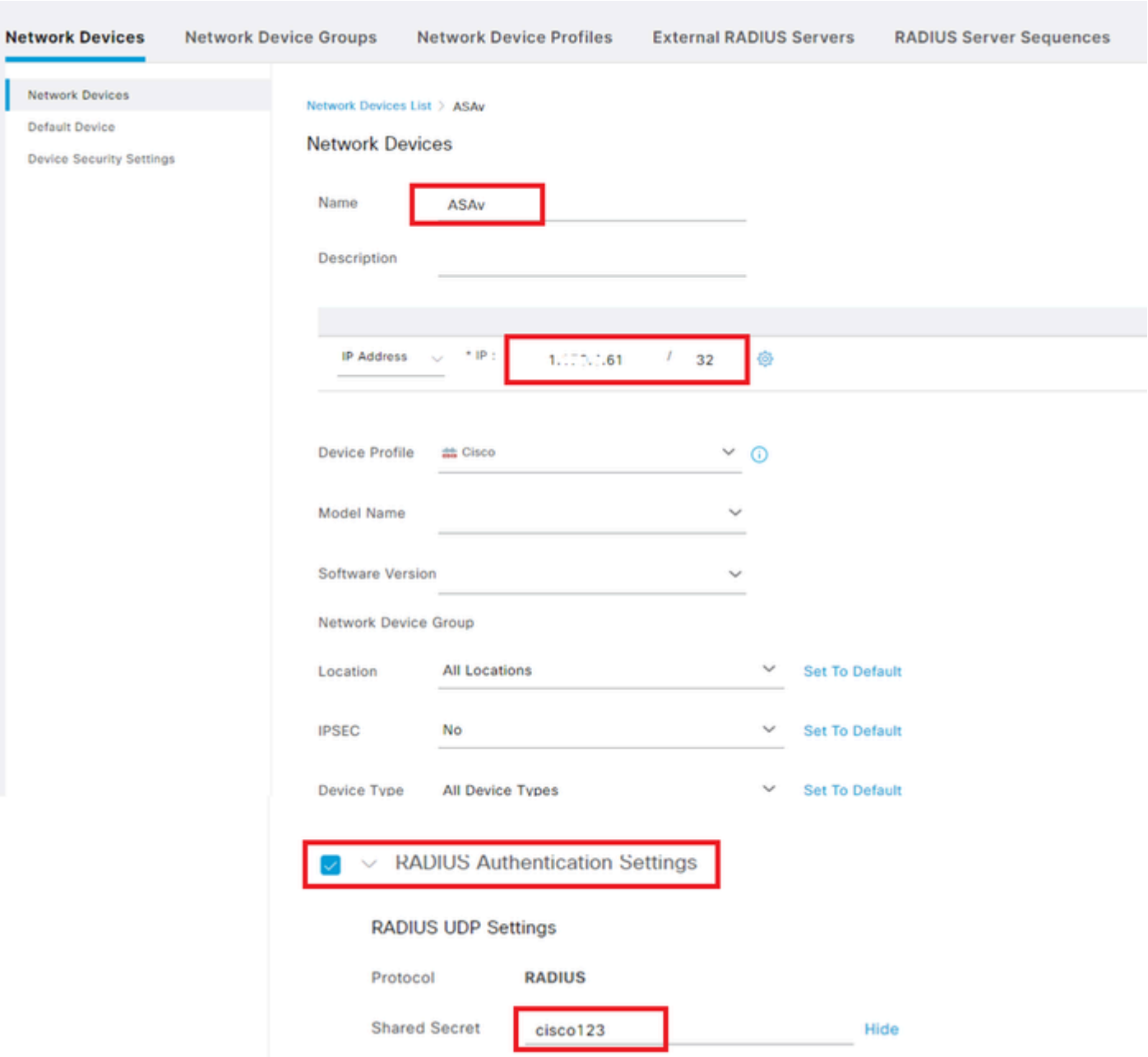


Domain Admins and Domain Users

Configuration in ISE

Step 1. Add Device

Navigate to**Administration > Network Devices**, click**Add**button to add ASAv device.

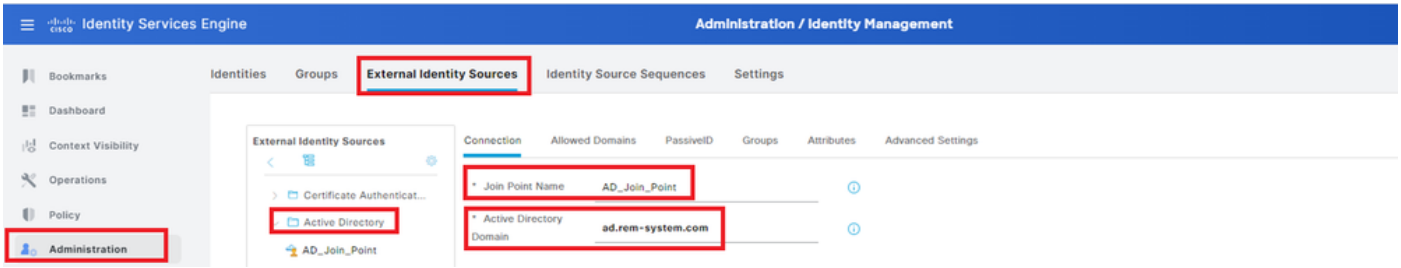


Add Device

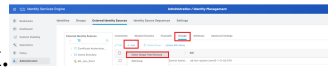
Step 2. Add Active Directory

Navigate to**Administration > External Identity Sources > Active Directory**, click**Connection**tab, add Active Directory to ISE.

- **Join Point Name**: AD_Join_Point
- **Active Directory Domain**: ad.rem-system.com

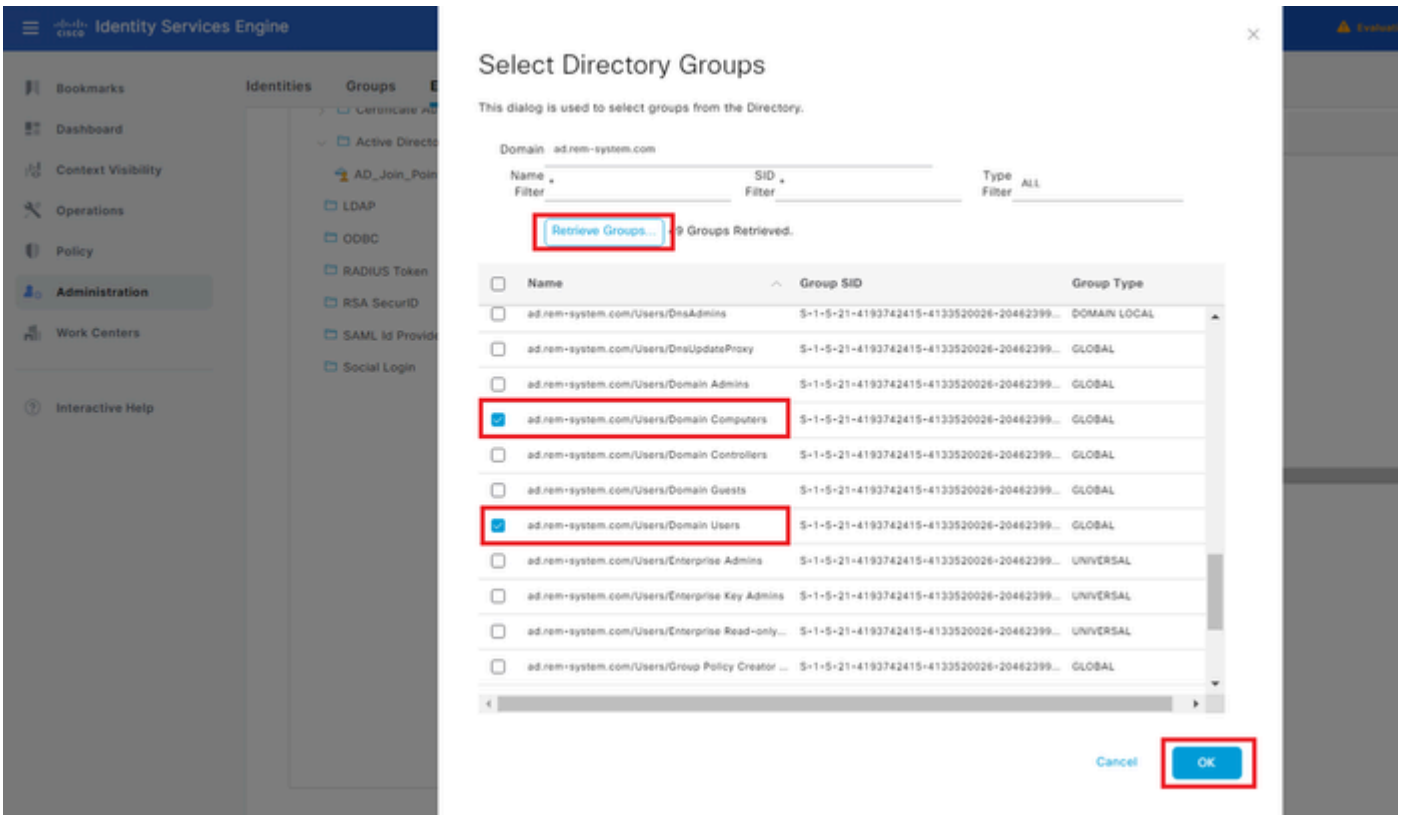


Add Active Directory

Navigate to **Groups** tab, select**Select Groups From Directory**from drop-down list. 

Select Groups from Directory

Click**Retrieve Groups**from drop-down list. Check**ad.rem-system.com/Users/Domain Computers**and**ad.rem-system.com/Users/Domain Users**and click**OK**.

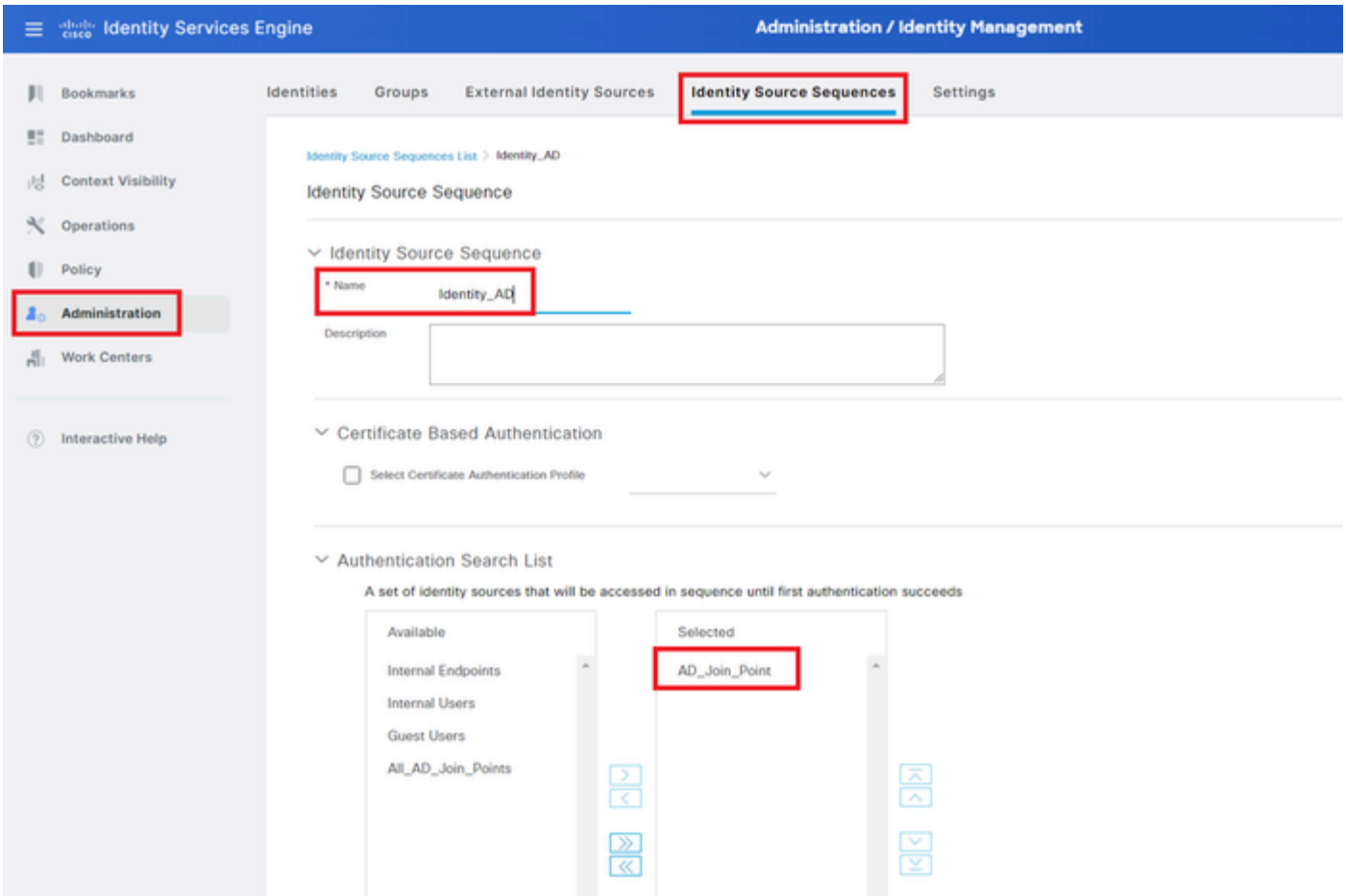


Add Domain Computers and Users

Step 3. Add Identity Source Sequesce

Navigate to**Administration > Identity Source Sequences**, add an Identity Source Sequence.

- **Name**: Identity_AD
- **Authentication Search List**: AD_Join_Point

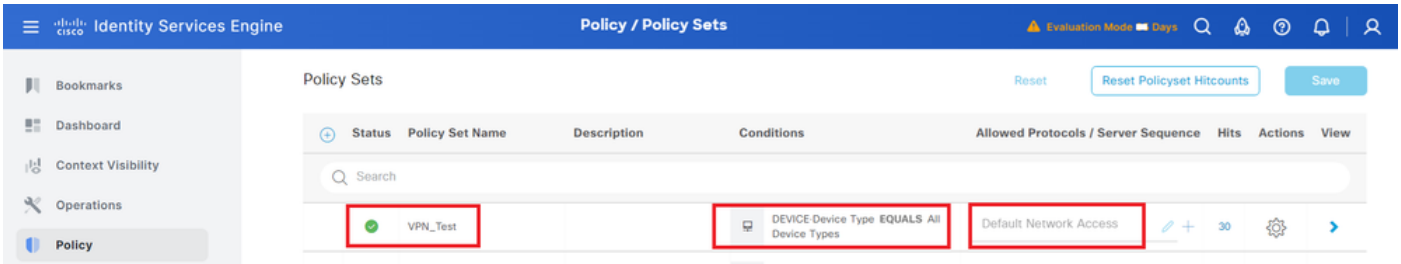


Add Identity Source Sequences

Step 4. Add Policy Set

Navigate to **Policy** > **Policy Sets**, click **+** to add a policy set.

- **Policy Set Name** : VPN_Test
- **Conditions** : DEVICE Device Type **EQUALS** All Device Types
- **Allowed Protocols / Server Sequence** : Default Network Access

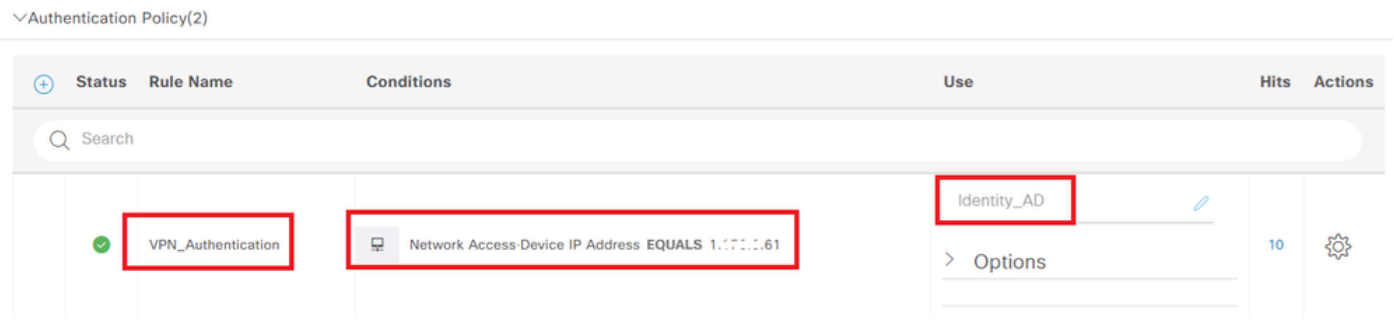


Add Policy Set

Step 5. Add Authentication Policy

Navigate to **Policy Sets**, click **VPN_Test** to add an authentication policy.

- **Rule Name** : VPN_Authentication
- **Conditions** : Network Access Device IP Address **EQUALS** 1.x.x.61
- **Use** : Identity_AD

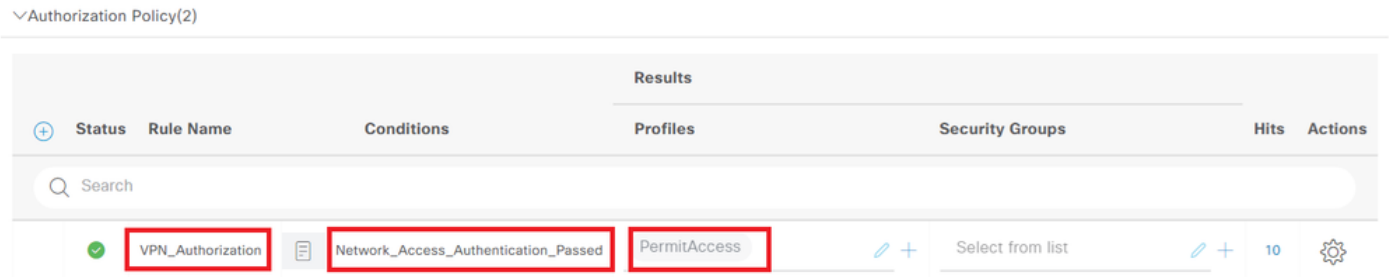


Add Authentication Policy

Step 6. Add Authorization Policy

Navigate to **Policy Sets**, click **VPN_Test** to add an authorization policy.

- **Rule Name** : VPN_Authorization
- **Conditions** : Network_Access_Authentication_Passed
- **Results** : PermitAccess

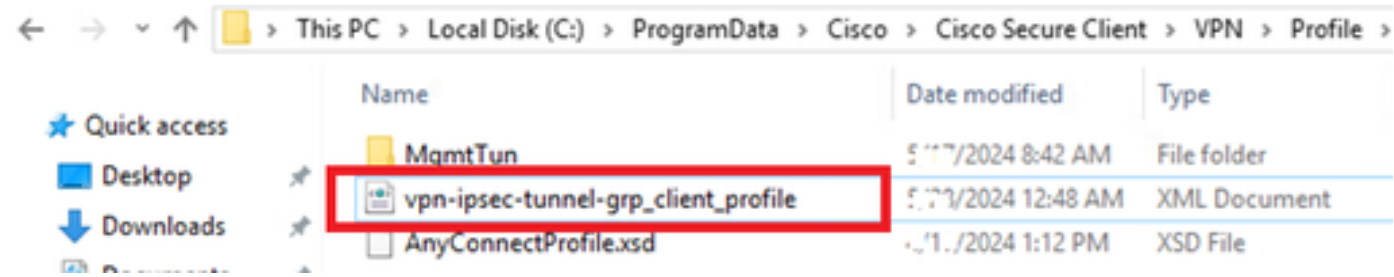


Add Authorization policy

Verify

Step 1. Copy Secure Client Profile to Win10 PC1

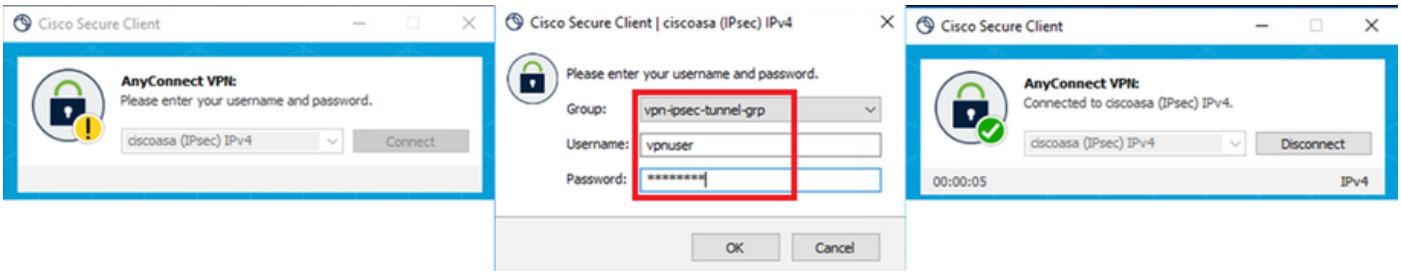
Copy the secure client profile to the **C:\ProgramData\Cisco\Cisco Secure Client\VPN\Profile** directory.



Copy Profile to PC

Step 2. Initiate VPN Connection

On the endpoint, run Cisco Secure Client and input the username and password, then confirm that Cisco Secure Client connects successfully.



Connection Succeeded

Step 3. Confirm Syslog on ASA

In the syslog, confirm that the IKEv2 connection succeeded.

<#root>

```
May 28 20xx 08:xx:20: %ASA-5-750006: Local:192.168.1.1:4500 Remote:192.168.1.11:50982 Username:vpnuser
```

New Connection Established

```
May 28 20xx 08:xx:20: %ASA-6-751026: Local:192.168.1.1:4500 Remote:192.168.1.11:50982 Username:vpnuser
```

Step 4. Confirm IPsec Session on ASA

run show vpn-sessiondb detail anyconnect command to confirm the IKEv2/IPsec session on ASA.

<#root>

```
ciscoasa#
```

show vpn-sessiondb detail anyconnect

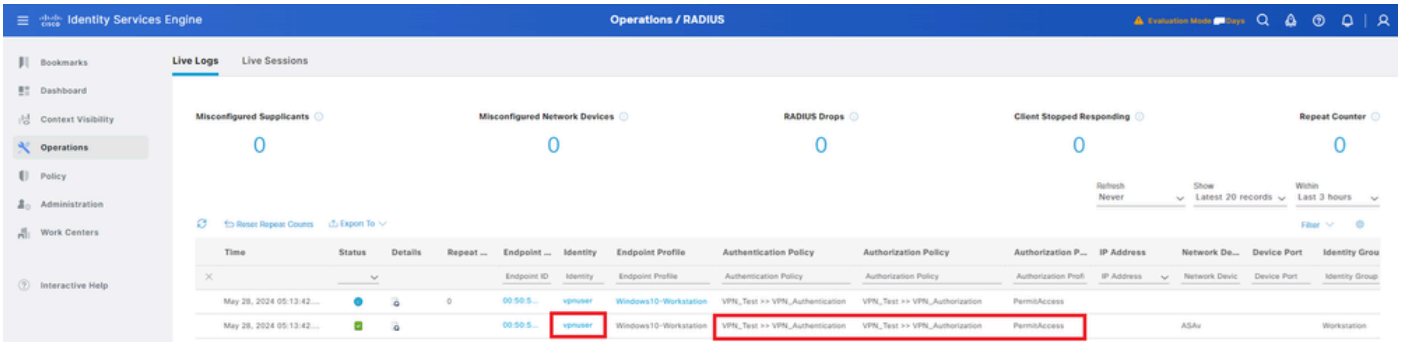
```
Session Type: AnyConnect Detailed

Username : vpnuser Index : 23
Assigned IP : 172.16.1.20 Public IP : 192.168.1.11
Protocol : IKEv2 IPsecOverNatT AnyConnect-Parent
License : AnyConnect Premium
Encryption : IKEv2: (1)AES256 IPsecOverNatT: (1)AES256 AnyConnect-Parent: (1)none
Hashing : IKEv2: (1)SHA256 IPsecOverNatT: (1)SHA256 AnyConnect-Parent: (1)none
Bytes Tx : 840 Bytes Rx : 52408
Pkts Tx : 21 Pkts Rx : 307
Pkts Tx Drop : 0 Pkts Rx Drop : 0
Group Policy : GroupPolicy_vpn-ipsec-tunnel-grp
Tunnel Group : vpn-ipsec-tunnel-grp
Login Time : 08:13:20 UTC Tue May 28 2024
Duration : 0h:10m:10s
Inactivity : 0h:00m:00s
VLAN Mapping : N/A VLAN : none
Audt Sess ID : 01aa003d0001700066559220
Security Grp : none
```

IKEv2 Tunnels: 1

```
IPsecOverNatT Tunnels: 1


AnyConnect-Parent Tunnels: 1


AnyConnect-Parent:
Tunnel ID : 23.1
Public IP : 192.168.1.11
Encryption : none Hashing : none
Auth Mode : userPassword
Idle Time Out: 30 Minutes Idle TO Left : 19 Minutes
Client OS : win
Client OS Ver: 10.0.15063
Client Type : AnyConnect
Client Ver : 5.1.3.62

IKEv2:
Tunnel ID : 23.2
UDP Src Port : 50982 UDP Dst Port : 4500
Rem Auth Mode: userPassword
Loc Auth Mode: rsaCertificate
Encryption : AES256 Hashing : SHA256
Rekey Int (T): 86400 Seconds Rekey Left(T): 85790 Seconds
PRF : SHA256 D/H Group : 19
Filter Name :
Client OS : Windows Client Type : AnyConnect

IPsecOverNatT:
Tunnel ID : 23.3
Local Addr : 0.0.0.0/0.0.0.0/0/0
Remote Addr : 172.16.1.20/255.255.255.255/0/0
Encryption : AES256 Hashing : SHA256
Encapsulation: Tunnel
Rekey Int (T): 28800 Seconds Rekey Left(T): 28190 Seconds
Idle Time Out: 30 Minutes Idle TO Left : 29 Minutes
Bytes Tx : 840 Bytes Rx : 52408
Pkts Tx : 21 Pkts Rx : 307
```

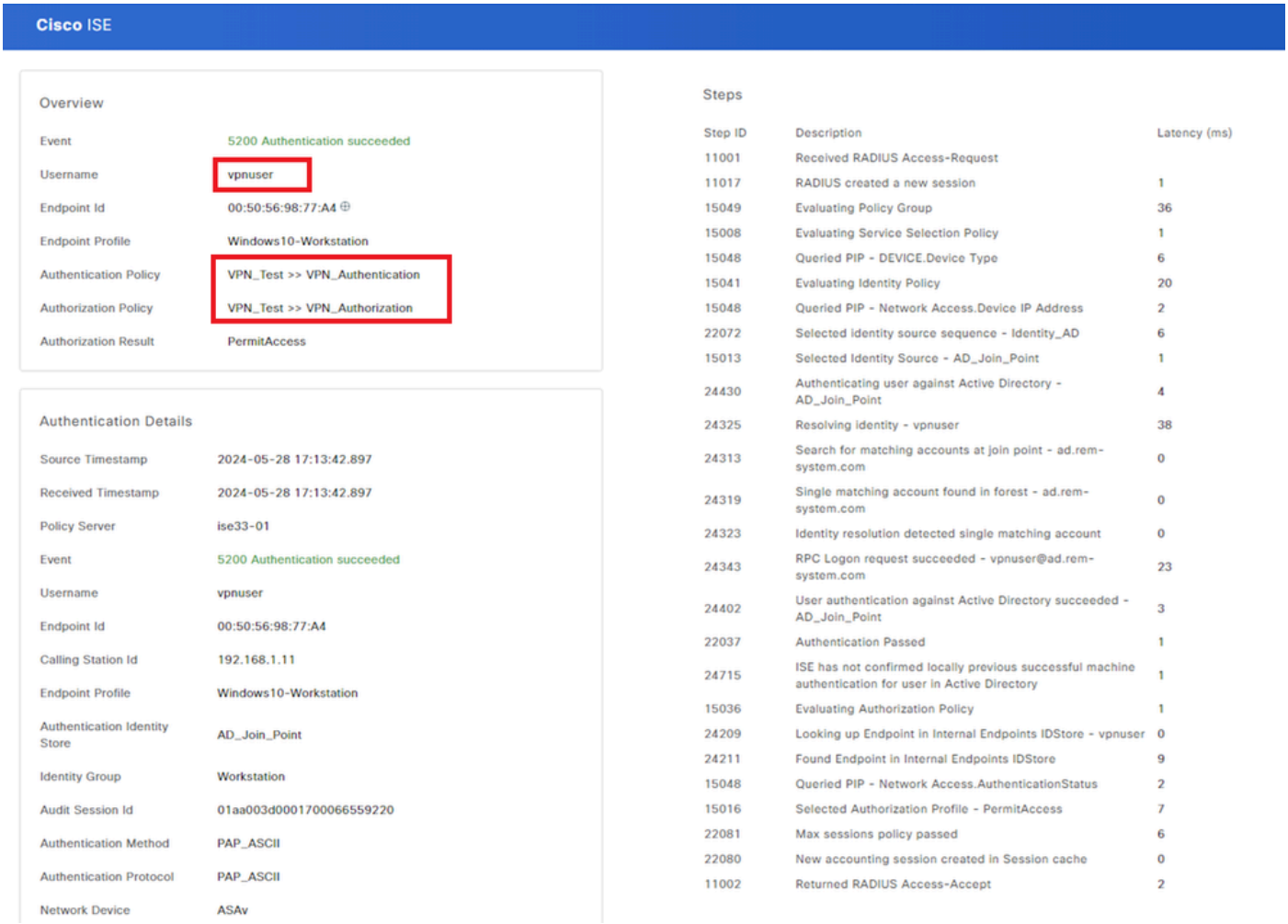
Step 5. Confirm Radius Live Log

Navigate to **Operations** > **RADIUS** > **Live Logs**in ISE GUI, confirm the live log for vpn authentication.



Radius Live Log

Click Status to confirm the detail of live log.



Cisco ISE

Overview

Event	5200 Authentication succeeded
Username	vpnuser
Endpoint Id	00:50:56:98:77:A4
Endpoint Profile	Windows10-Workstation
Authentication Policy	VPN_Test >> VPN_Authentication
Authorization Policy	VPN_Test >> VPN_Authorization
Authorization Result	PermitAccess

Authentication Details

Source Timestamp	2024-05-28 17:13:42.897
Received Timestamp	2024-05-28 17:13:42.897
Policy Server	ise33-01
Event	5200 Authentication succeeded
Username	vpnuser
Endpoint Id	00:50:56:98:77:A4
Calling Station Id	192.168.1.11
Endpoint Profile	Windows10-Workstation
Authentication Identity Store	AD_Join_Point
Identity Group	Workstation
Audit Session Id	01aa003d0001700066559220
Authentication Method	PAP_ASCII
Authentication Protocol	PAP_ASCII
Network Device	ASAv

Steps

Step ID	Description	Latency (ms)
11001	Received RADIUS Access-Request	
11017	RADIUS created a new session	1
15049	Evaluating Policy Group	36
15008	Evaluating Service Selection Policy	1
15048	Queried PIP - DEVICE.Device Type	6
15041	Evaluating Identity Policy	20
15048	Queried PIP - Network Access.Device IP Address	2
22072	Selected identity source sequence - Identity_AD	6
15013	Selected Identity Source - AD_Join_Point	1
24430	Authenticating user against Active Directory - AD_Join_Point	4
24325	Resolving identity - vpnuser	38
24313	Search for matching accounts at join point - ad.rem-system.com	0
24319	Single matching account found in forest - ad.rem-system.com	0
24323	Identity resolution detected single matching account	0
24343	RPC Logon request succeeded - vpnuser@ad.rem-system.com	23
24402	User authentication against Active Directory succeeded - AD_Join_Point	3
22037	Authentication Passed	1
24715	ISE has not confirmed locally previous successful machine authentication for user in Active Directory	1
15036	Evaluating Authorization Policy	1
24209	Looking up Endpoint in Internal Endpoints IDStore - vpnuser	0
24211	Found Endpoint in Internal Endpoints IDStore	9
15048	Queried PIP - Network Access.AuthenticationStatus	2
15016	Selected Authorization Profile - PermitAccess	7
22081	Max sessions policy passed	6
22080	New accounting session created in Session cache	0
11002	Returned RADIUS Access-Accept	2

Detail of Live Log

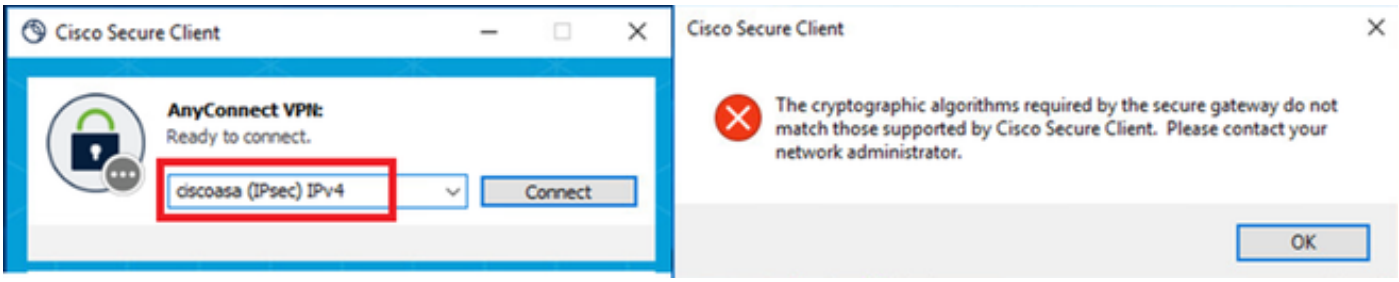
Troubleshoot

The cryptographic algorithms mismatch can result in connection failures. This is an example of when an algorithms mismatch issue occurs. Executing Step 15 of section Configuration in ASDM can solve the issue.

Step 1. Initiate VPN Connection

On the endpoint, run the Cisco Secure Client and confirm that the connection failed due to a cryptographic algorithms mismatch.

```
The cryptographic algorithms required by the secure gateway do not match those supported by AnyConnect.
```



Connection Failed

Step 2. Confirm Syslog in CLI

In the syslog, confirm that the IKEv2 negotiation failed.

<#root>

```
May 28 20xx 08:xx:29: %ASA-5-750002: Local:192.168.1.1:500 Remote:192.168.1.11:57711 Username:Unknown I
May 28 20xx 08:xx:29: %ASA-4-750003: Local:192.168.1.1:500 Remote:192.168.1.11:57711 Username:Unknown I
```

Failed to find a matching policy

Reference

[AnyConnect Over IKEv2 to ASA with AAA and Certificate Authentication]