Windows Server 2012 루트 CA를 사용하는 RADIUS 서버로 Cisco ISE를 사용하여 FTD에서 AnyConnect VPN 구성

목차

목차

소개

이 문서에서는 Cisco ISE(Identity Services Engine)를 RADIUS 서버로 사용하는 FTD(Firepower Threat Defense) 방화벽에서 AnyConnect VPN(Virtual Private Network)을 구성하는 방법에 대해 설명합니다.Windows Server 2012를 루트 CA(Certificate Authority)로 사용하여 VPN을 통한 통신이 인증서로 보호되도록 합니다. 즉, Windows Server 2012 루트 CA에서 FTD VPN 인증서를 서명했기

때문에 직원 PC가 FTD 인증서를 신뢰하게 됩니다

사전 요구 사항

요구 사항

다음 항목을 네트워크에 배포하고 실행해야 합니다.

- 기본 연결과 함께 구축된 Firepower Management Center 및 Firepower Threat Defense 방화벽
- 네트워크에서 구축 및 실행 중인 Cisco ISE
- Windows Server(Active Directory 포함)가 배포되고 직원의 Windows/Mac PC가 AD(Active Directory) 도메인에 조인됨

아래 예에서는 직원이 Windows/Mac PC에서 AnyConnect 클라이언트를 열고 자격 증명을 사용하여 VPN을 통해 FTD의 외부 인터페이스에 안전하게 연결합니다.FTD는 Cisco ISE에 대한 사용자 이름 및 비밀번호를 확인합니다. Windows Server Active Directory에서 사용자 이름, 비밀번호 및 그룹(예: AD 그룹 '직원'의 사용자만 회사 네트워크에 VPN을 연결할 수 있습니다.

사용되는 구성 요소

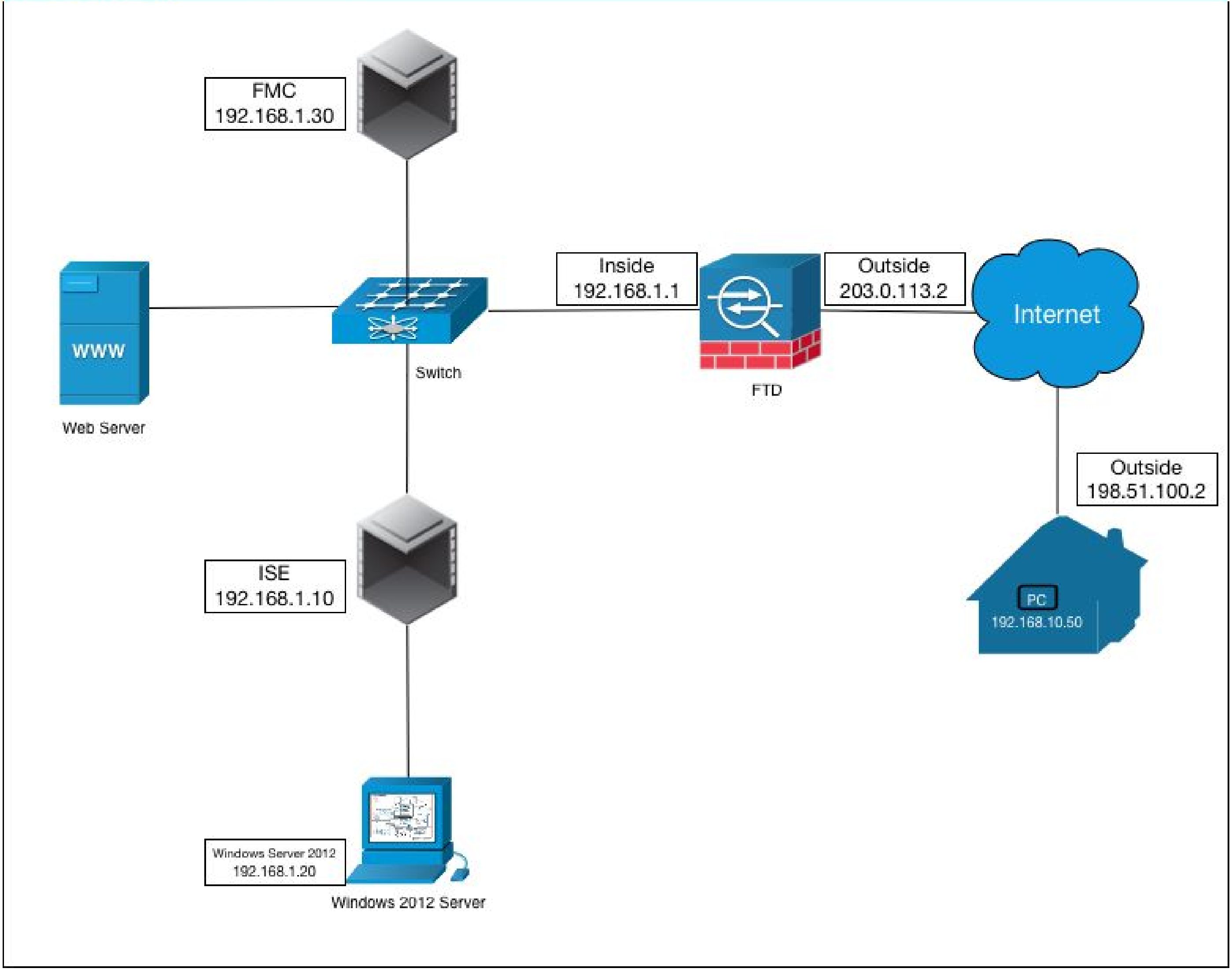
이 문서의 정보는 다음 소프트웨어 버전을 기반으로 합니다.

- Firepower Management Center 및 Firepower Threat Defense 6.2.3 실행
- 2.4를 실행하는 Cisco Identity Services Engine
- 4.6.03049을 실행하는 Cisco AnyConnect Secure Mobility Client
- Active Directory 및 인증서 서비스를 실행하는 Windows Server 2012 R2(모든 인증서에 대한 루트 CA)
- Windows 7, Windows 10, Mac PC

구성

네트워크 다이어그램

Topology



이 활용 사례에서, AnyConnect VPN 클라이언트를 실행하는 직원의 Windows/Mac PC는 FTD 방화벽의 외부 공용 IP 주소에 연결되며, Cisco ISE는 Active Directory의 구성원인 AD 그룹에 따라 VPN을 통해 연결되면 특정 내부 또는 인터넷 리소스에 대한 제한 또는 전체 액세스(구성 가능)를 동적으로 부여합니다

장치	호스트 이름/FQDN	공용 IP 주소	개인 IP 주소	AnyConnect IP 주소
Windows PC	-	198.51.100.2	10.0.0.1	192.168.10.50
FTD	ciscofp3.cisco.com	203.0.113.2	192.168.1.1	-
FMC	-	-	192.168.1.30	-
Cisco ISE	ciscoise.cisco.com	-	192.168.1.10	-
Windows Server 2012	ciscodc.cisco.com	-	192.168.1.20	-
내부 서버	-	-	192.168.1.x	-

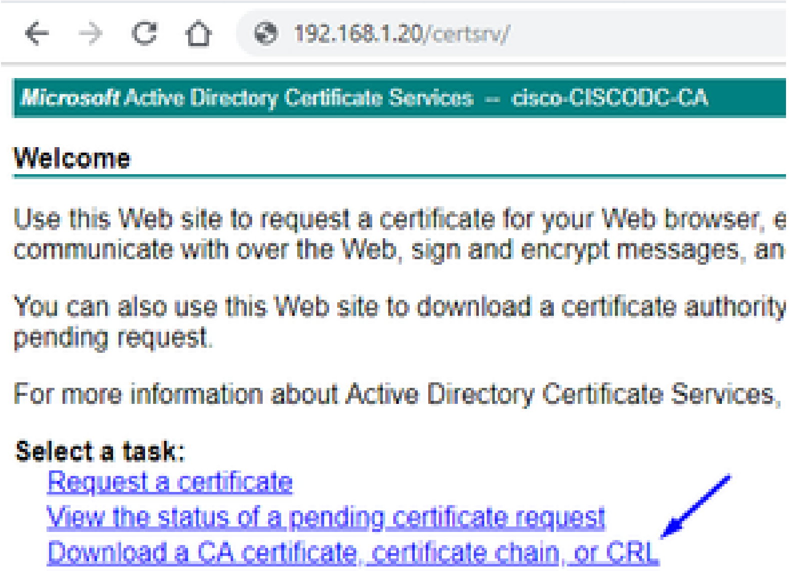
구성

Windows 서버에서 루트 CA 인증서 내보내기

이 문서에서는 인증서의 루트 CA로 Microsoft Windows Server 2012를 사용합니다.클라이언트 PC는 이 루트 CA가 VPN을 통해 FTD에 안전하게 연결하는 것을 신뢰합니다(아래 단계 참조). 이를 통해 인터넷을 통해 FTD에 안전하게 연결하고 집에서 내부 리소스에 액세스할 수 있습니다.PC는 브라우저 및 AnyConnect Client의 연결을 신뢰합니다.

Windows Server 루트 CA 인증서를 다운로드하려면 http://192.168.1.20/certsrv로 이동하여 다음 단계를 수행하십시오.

Download **a CA certificate, certificate chain or CRL(CA 인증서, 인증서 체인 또는 CRL 다운로드)을 클릭합니다.**



192.168.1.20/certsrv/

Microsoft Active Directory Certificate Services -- cisco-CISCODC-CA

Welcome

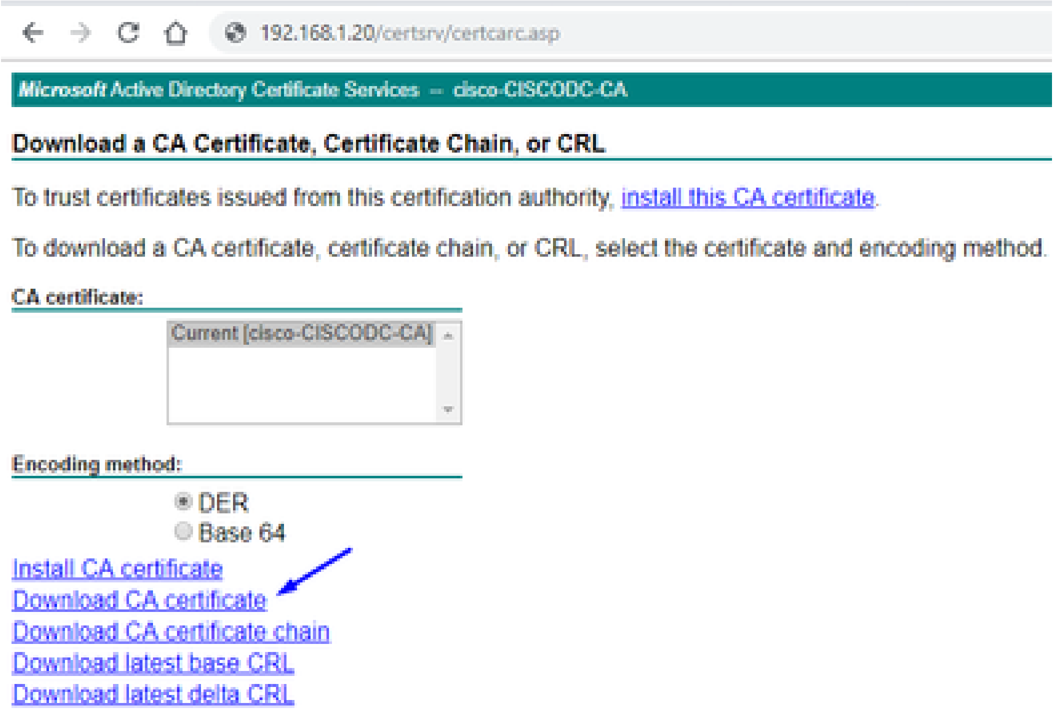
Use this Web site to request a certificate for your Web browser, e
communicate with over the Web, sign and encrypt messages, an

You can also use this Web site to download a certificate authority
pending request.

For more information about Active Directory Certificate Services,

Select a task:
- Request a certificate
- View the status of a pending certificate request
- Download a CA certificate, certificate chain, or CRL

Download **Certificate(인증서 다운로드**)를 클릭하고 이름을 'RootCAcert3.cer'로 바꿉니다.



192.168.1.20/certsrv/certcarc.asp

Microsoft Active Directory Certificate Services -- cisco-CISCODC-CA

Download a CA Certificate, Certificate Chain, or CRL

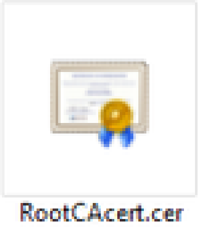
To trust certificates issued from this certification authority, install this CA certificate.

To download a CA certificate, certificate chain, or CRL, select the certificate and encoding method.

CA certificate:
Current [cisco-CISCODC-CA]

Encoding method:
● DER
○ Base 64

Install CA certificate
Download CA certificate
Download CA certificate chain
Download latest base CRL
Download latest delta CRL



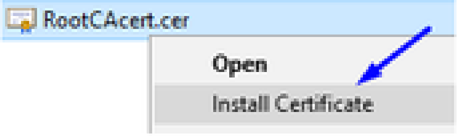
직원 Windows/Mac PC에 루트 CA 인증서 설치

방법 1: Windows Server Group Policy(Windows 서버 그룹 정책)를 통해 모든 직원 PC에 인증서를 설치하여 설치합니다(10명 이상의 VPN 사용자에게 적합).

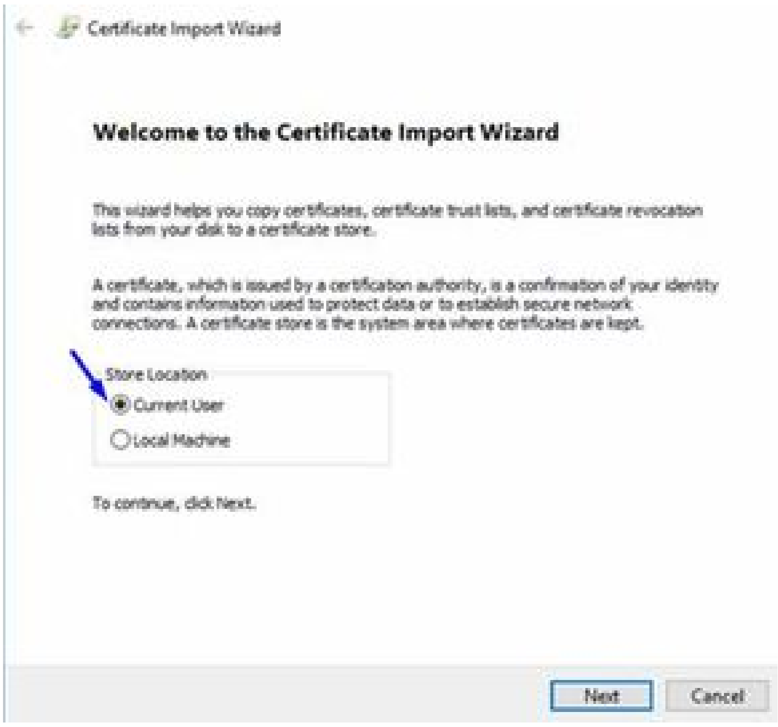
[그룹 정책을 사용하여 Windows 서버를 사용하여 클라이언트 컴퓨터에 인증서를 배포하는 방법]

방법 2:각 PC에 인증서를 개별적으로 설치하여 모든 직원 PC에 인증서를 설치합니다(VPN 사용자 한 명을 테스트하는 데 적합).

직원의 Windows/Mac PC에서 인증서를 마우스 오른쪽 단추로 클릭하고 **Install** Certificate(**인증서 설치)를** 클릭합니다.



'현재 사용자' 선택


Certificate Import Wizard

Welcome to the Certificate Import Wizard

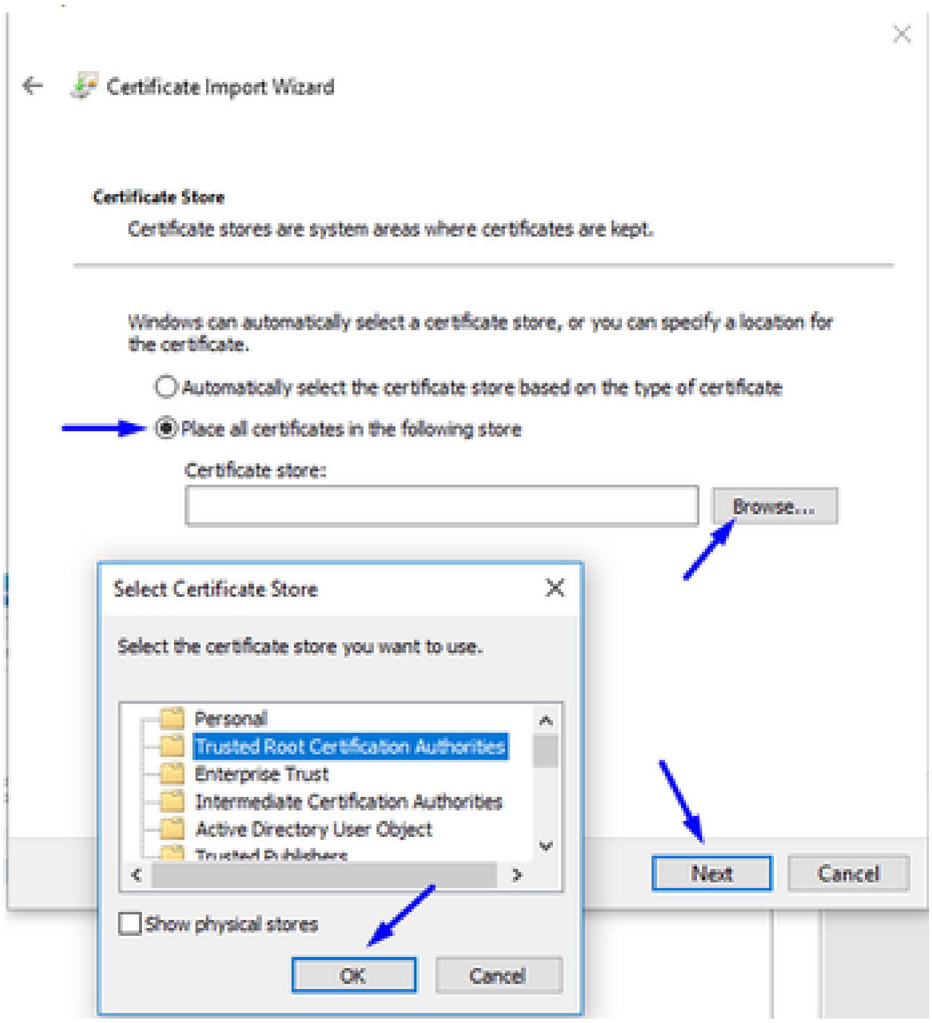
This wizard helps you copy certificates, certificate trust lists, and certificate revocation lists from your disk to a certificate store.

A certificate, which is issued by a certification authority, is a confirmation of your identity and contains information used to protect data or to establish secure network connections. A certificate store is the system area where certificates are kept.

Store Location
● Current User
○ Local Machine

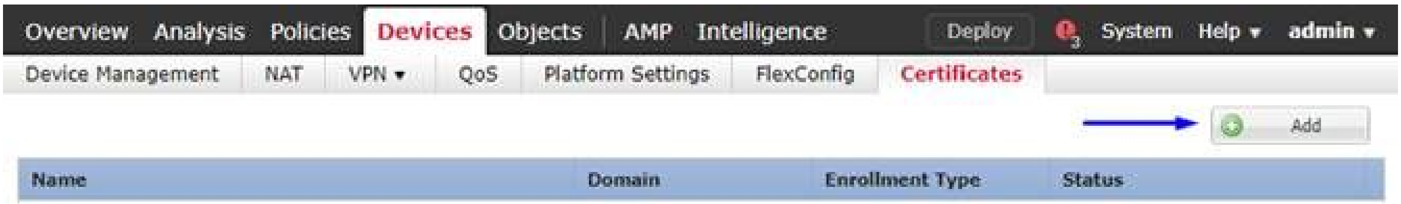
To continue, click Next.

Place **all certificates in the following store(다음 저장소에 모든 인증서 배치)를** 선택하고 **Trusted Root Certification Authorities(신뢰할 수 있는 루트 인증 기관)를** 선택하고 **Ok(확인)를** 클릭하고 **Next(다음)를 클릭한** 다음 Finish(마침)를 **클릭합니다.**

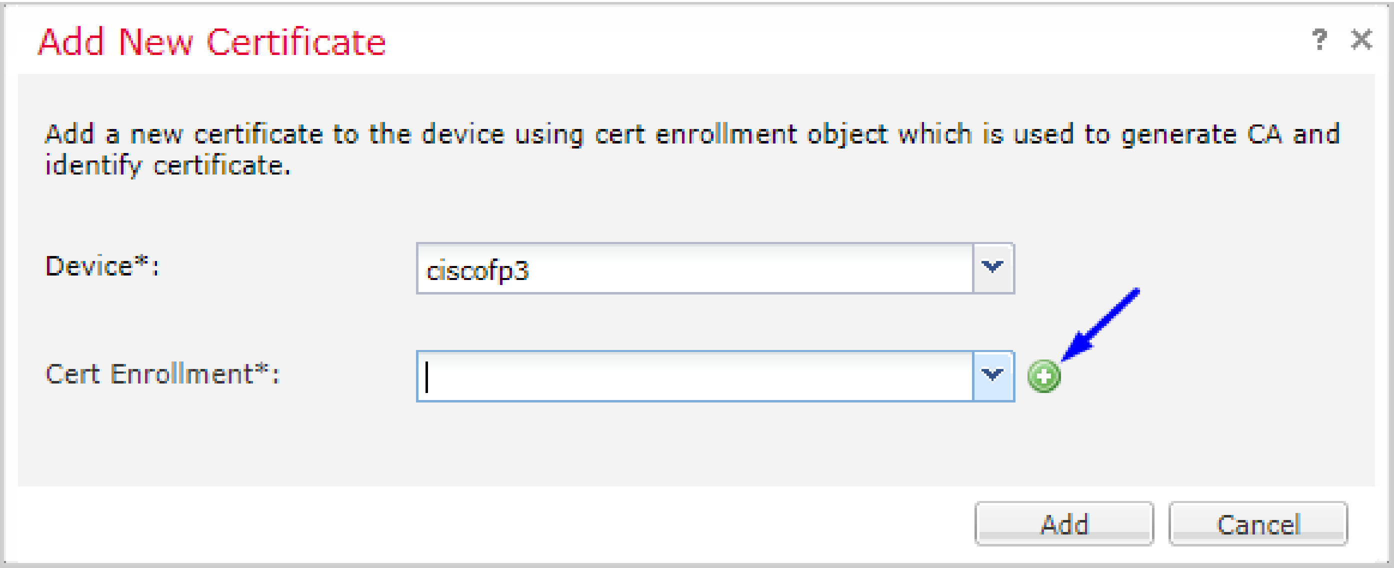

Certificate Import Wizard
Certificate Store
Certificate stores are system areas where certificates are kept.
Windows can automatically select a certificate store, or you can specify a location for the certificate.
○ Automatically select the certificate store based on the type of certificate
● Place all certificates in the following store
Certificate store:
Browse...
Select Certificate Store
Select the certificate store you want to use.
Personal
Trusted Root Certification Authorities
Enterprise Trust
Intermediate Certification Authorities
Active Directory User Object
Trusted Publishers
□ Show physical stores
OK
Cancel
Next
Cancel

FTD에서 CSR을 생성하고 Windows Server 루트 CA에서 서명한 CSR을 가져온 다음 서명된 인증서를 FTD에 설치합니다.

Objects(**개체) > Object Management(개체 관리)** > **PKI** > **Cert Enrollment(인증서 등록 추가)로 이동하여 Add Cert Enrollment(인증서 등록 추가)를 클릭합니다.**



Add **Cert Enrollment(인증서 등록 추가)** 버튼 클릭



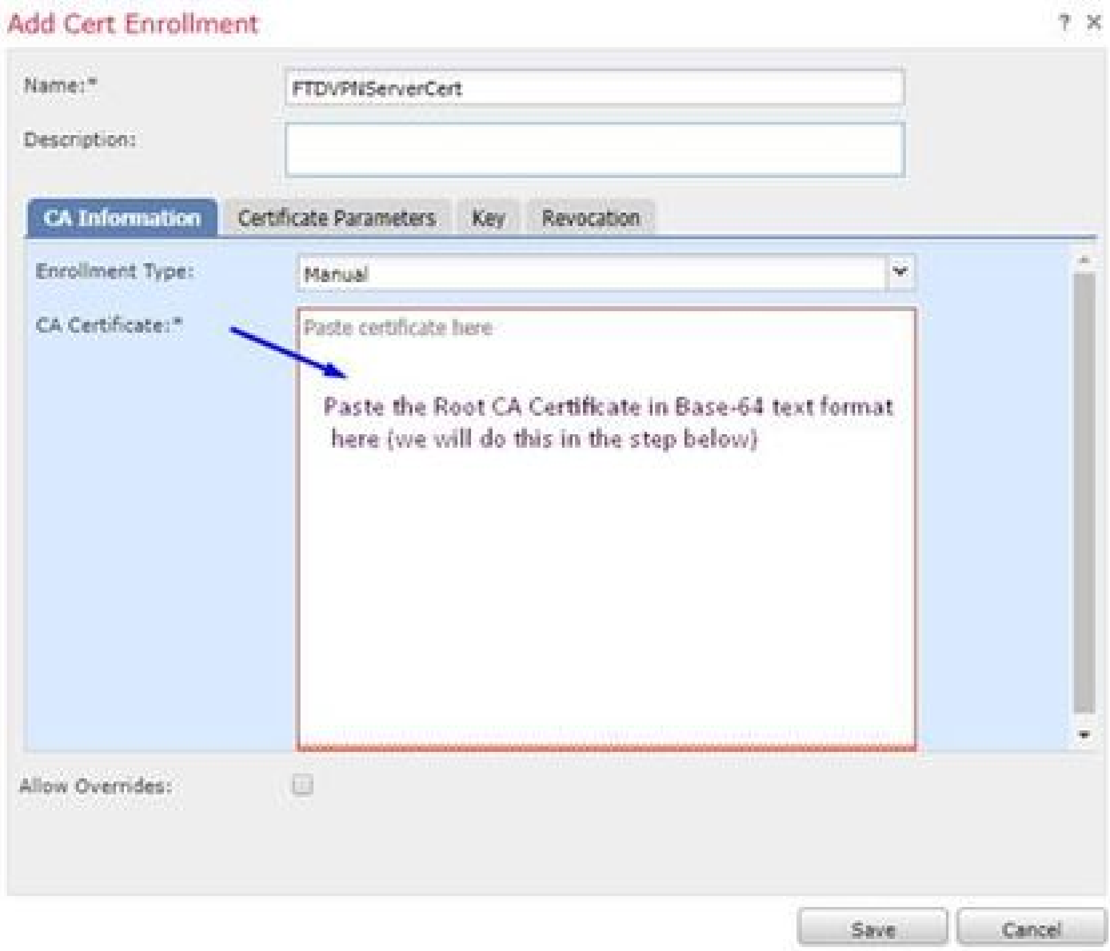
Add New Certificate

Add a new certificate to the device using cert enrollment object which is used to generate CA and identify certificate.

Device*: ciscofp3

Cert Enrollment*:

등록 **유형 선택 > 수동**
아래 그림에서 볼 수 있듯이 여기에 루트 CA 인증서를 붙여넣어야 합니다.



Add Cert Enrollment

Name:* FTDVPNServerCert

Description:

Enrollment Type: Manual

CA Certificate:* Paste certificate here

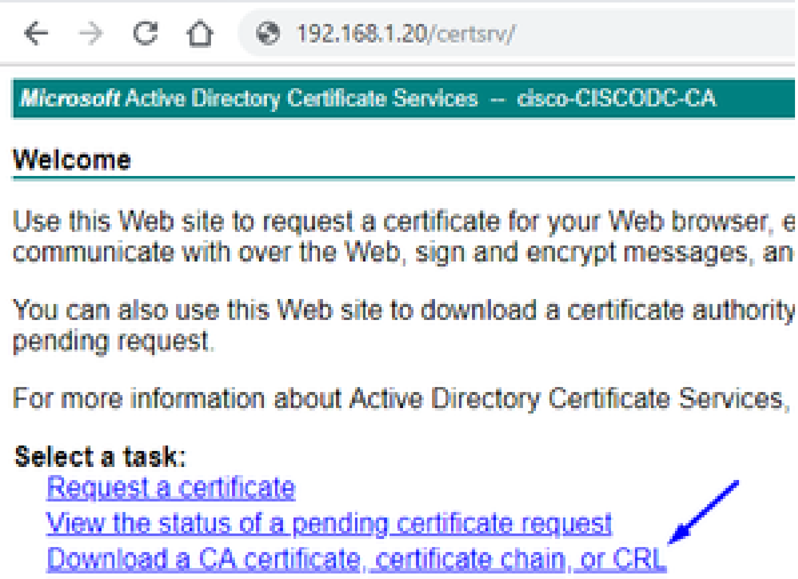
Paste the Root CA Certificate in Base-64 text format here (we will do this in the step below)

Allow Overrides: □

다음은 루트 CA 인증서를 다운로드하고 텍스트 형식으로 본 다음 위의 상자에 붙여넣는 방법입니다.

http://192.168.1.20/certsrv으로 이동

Download **a CA certificate, certificate chain or CRL(CA 인증서, 인증서 체인 또는 CRL 다운로드)을 클릭합니다.**


192.168.1.20/certsrv/

Microsoft Active Directory Certificate Services -- cisco-CISCODC-CA

Welcome

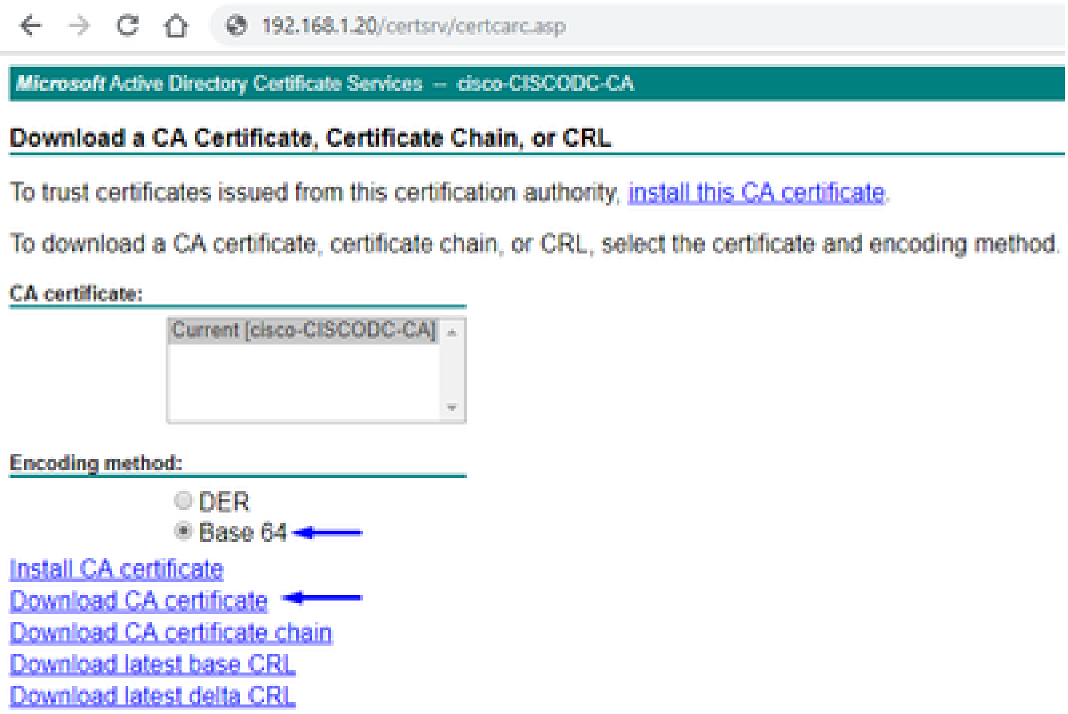
Use this Web site to request a certificate for your Web browser, e communicate with over the Web, sign and encrypt messages, an

You can also use this Web site to download a certificate authority pending request.

For more information about Active Directory Certificate Services,

Select a task:
Request a certificate
View the status of a pending certificate request
Download a CA certificate, certificate chain, or CRL

Base 64 버튼 클릭 > Download CA Certificate 클릭


192.168.1.20/certsrv/certcarc.asp

Microsoft Active Directory Certificate Services -- cisco-CISCODC-CA

Download a CA Certificate, Certificate Chain, or CRL

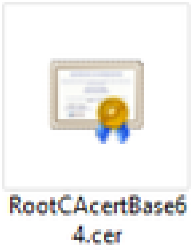
To trust certificates issued from this certification authority, install this CA certificate.

To download a CA certificate, certificate chain, or CRL, select the certificate and encoding method.

CA certificate:
Current [cisco-CISCODC-CA]

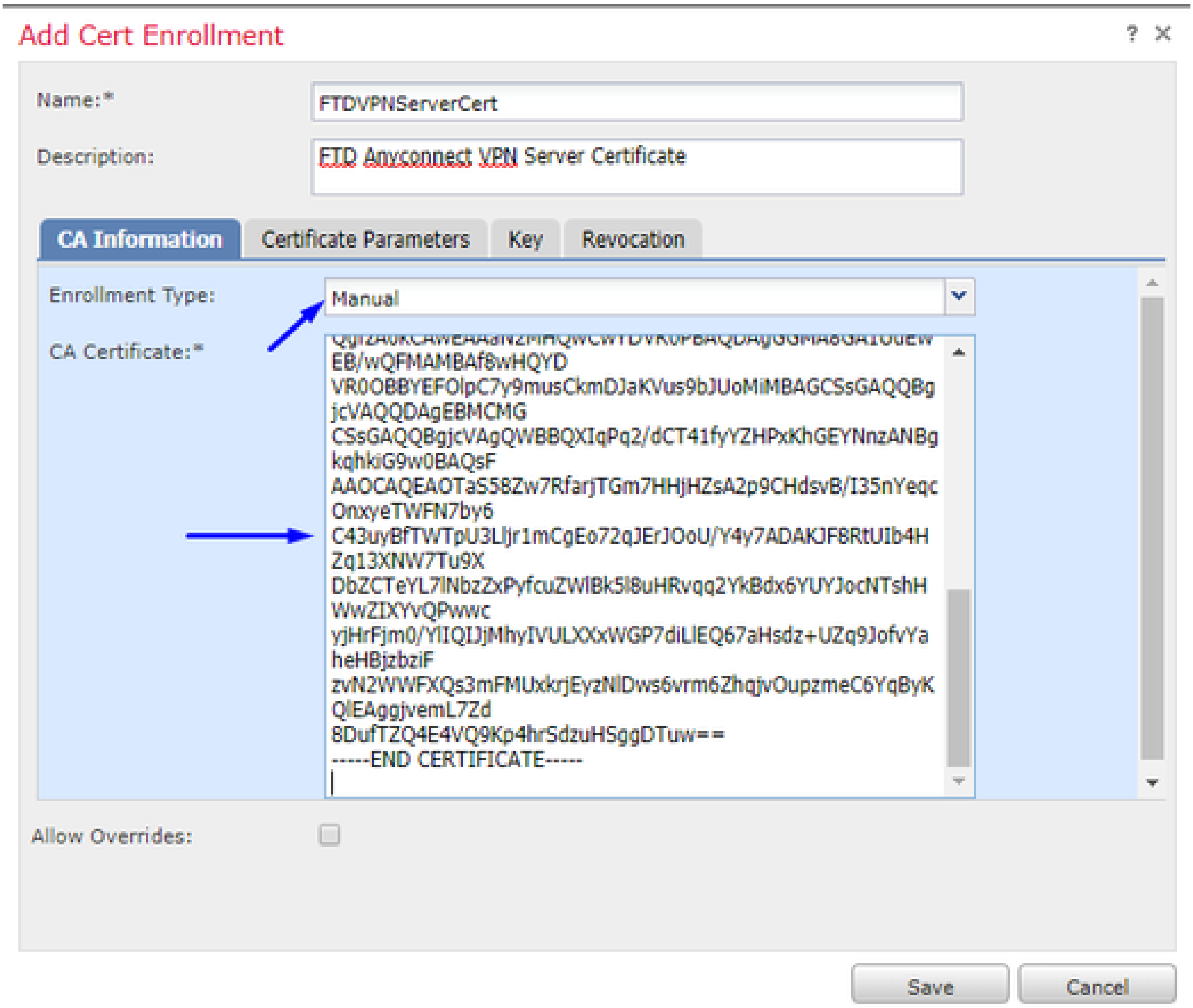
Encoding method:
○ DER
● Base 64

Install CA certificate
Download CA certificate
Download CA certificate chain
Download latest base CRL
Download latest delta CRL


RootCAcertBase64.cer

메모장에서 RootCAcertBase64.cer 파일을 엽니다.

Windows AD 서버에서 .cer 내용(루트 CA 인증서)을 복사하여 다음과 같이 붙여넣습니다.



Add Cert Enrollment

Name:* FTDVPNServerCert

Description: FTD Anyconnect VPN Server Certificate

Enrollment Type: Manual

CA Certificate:*

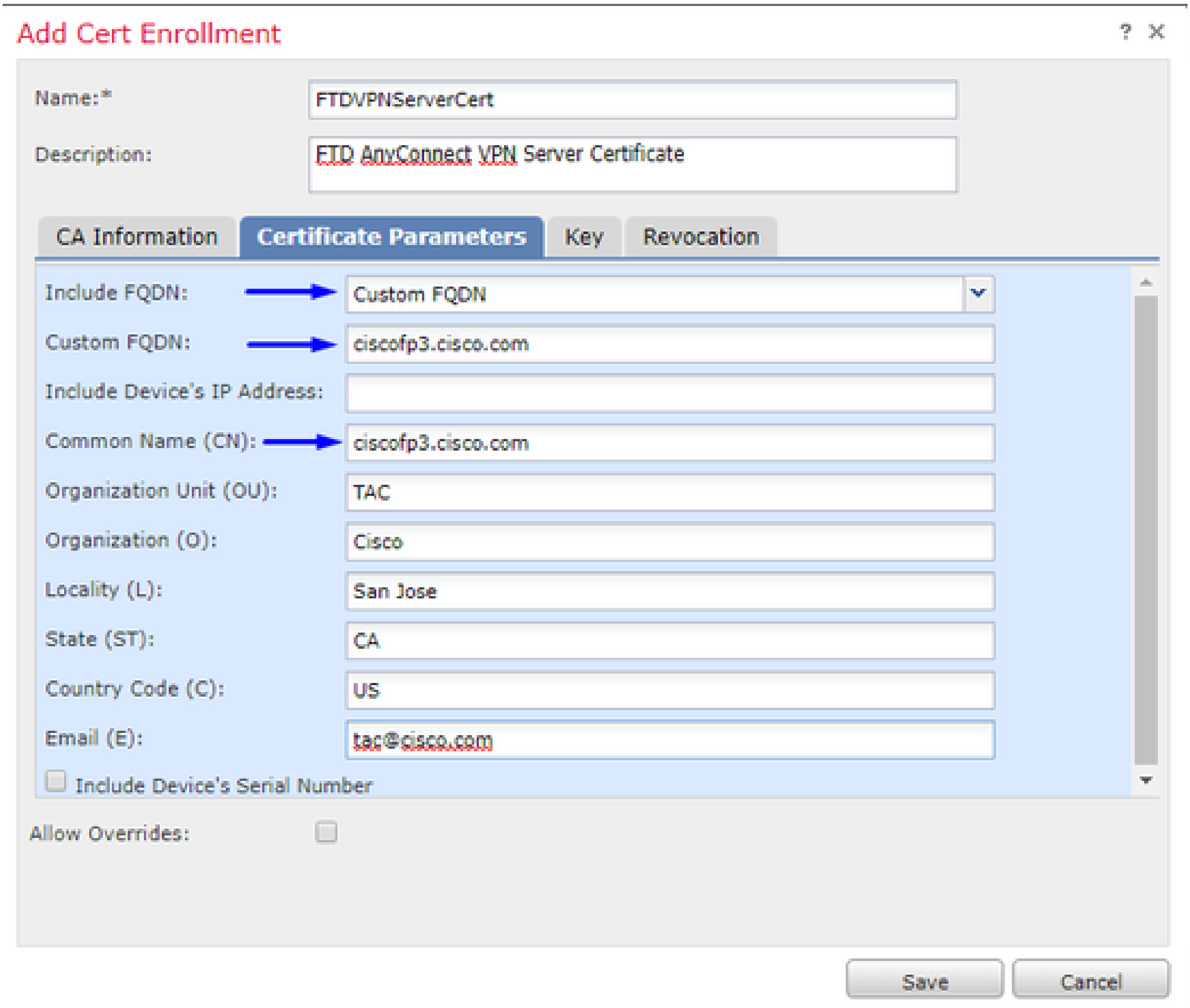
```
EB/wQFMAMBAf8wHQYD
VR0OBBYEFOlpC7y9musCkmDJaKVus9bJUoMiMBAGCSsGAQQBg
jcVAQQDAgEBMCMG
CSsGAQQBgjcVAgQWBBQXIqPq2/dCT41fyYZHPxKhGEYNnzANBg
kqhkiG9w0BAQsF
AAOCAQEAOTaS58Zw7RfarjTGm7HHjHZsA2p9CHdsvB/I35nYeqc
OnxyeTWFN7by6
C43uyBfTWTpU3LIjr1mCgEo72qJErJOoU/Y4y7ADAKJF8RtUIb4H
Zq13XNW7Tu9X
DbZCTeYL7lNbzZxPyfcuZWlBk5l8uHRvqq2YkBdx6YUYJocNTshH
WwZIXYvQPwwc
yjHrFjm0/YlIQIJjMhyIVULXXxWGP7diLlEQ67aHsdz+UZq9JofvYa
heHBjzbziF
zvN2WWFXQs3mFMUxkrjEyzNlDws6vrm6ZhqjvOupzmeC6YqByK
QlEAggjvemL7Zd
8DufTZQ4E4VQ9Kp4hrSdzuHSggDTuw==
-----END CERTIFICATE-----
```

Allow Overrides: □

Certificate **Parameters(인증서 매개변수**) 탭 >>을 클릭하여 인증서 정보를 입력합니다.

참고:
사용자 지정 FQDN 필드는 FTD의 FQDN이어야 합니다.

Common Name 필드는 FTD의 FQDN이어야 합니다.



Add Cert Enrollment

Name:* FTDVPNServerCert

Description: FTD AnyConnect VPN Server Certificate

Include FQDN: Custom FQDN

Custom FQDN: ciscofp3.cisco.com

Include Device's IP Address:

Common Name (CN): ciscofp3.cisco.com

Organization Unit (OU): TAC

Organization (O): Cisco

Locality (L): San Jose

State (ST): CA

Country Code (C): US

Email (E): tac@cisco.com

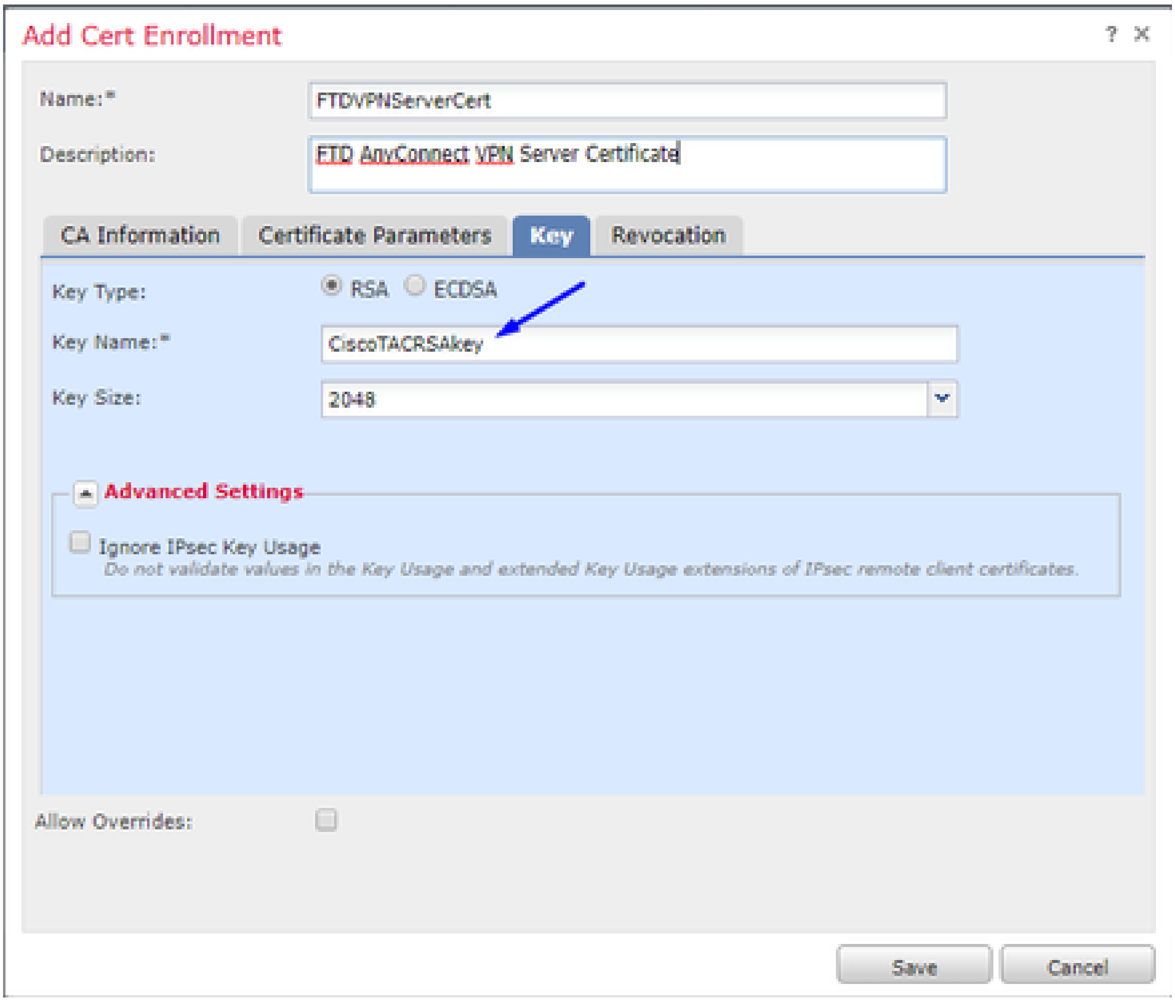
□ Include Device's Serial Number

Allow Overrides: □

팁:FTD CLI에서 다음 명령을 입력하여 FTD의 FQDN을 얻을 수 있습니다.

```
> show network
===============[ System Information ]===============
Hostname : ciscofp3.cisco.com
Domains : cisco
DNS Servers : 192.168.1.20
Management port : 8305
IPv4 Default route
Gateway : 192.168.1.1

======================[ br1 ]=======================
State : Enabled
Channels : Management & Events
Mode : Non-Autonegotiation
MDI/MDIX : Auto/MDIX
MTU : 1500
MAC Address : 00:0C:29:4F:AC:71
----------------------[ IPv4 ]----------------------
Configuration : Manual
Address : 192.168.1.2
Netmask : 255.255.255.0
```

Key(키) 탭을 클릭하고 **키 이름을 입력합니다.**



Name:* FTDVPNServerCert

Description: FTD AnyConnect VPN Server Certificate

Key Type: ● RSA ○ ECDSA

Key Name:* CiscoTACRSAkey

Key Size: 2048

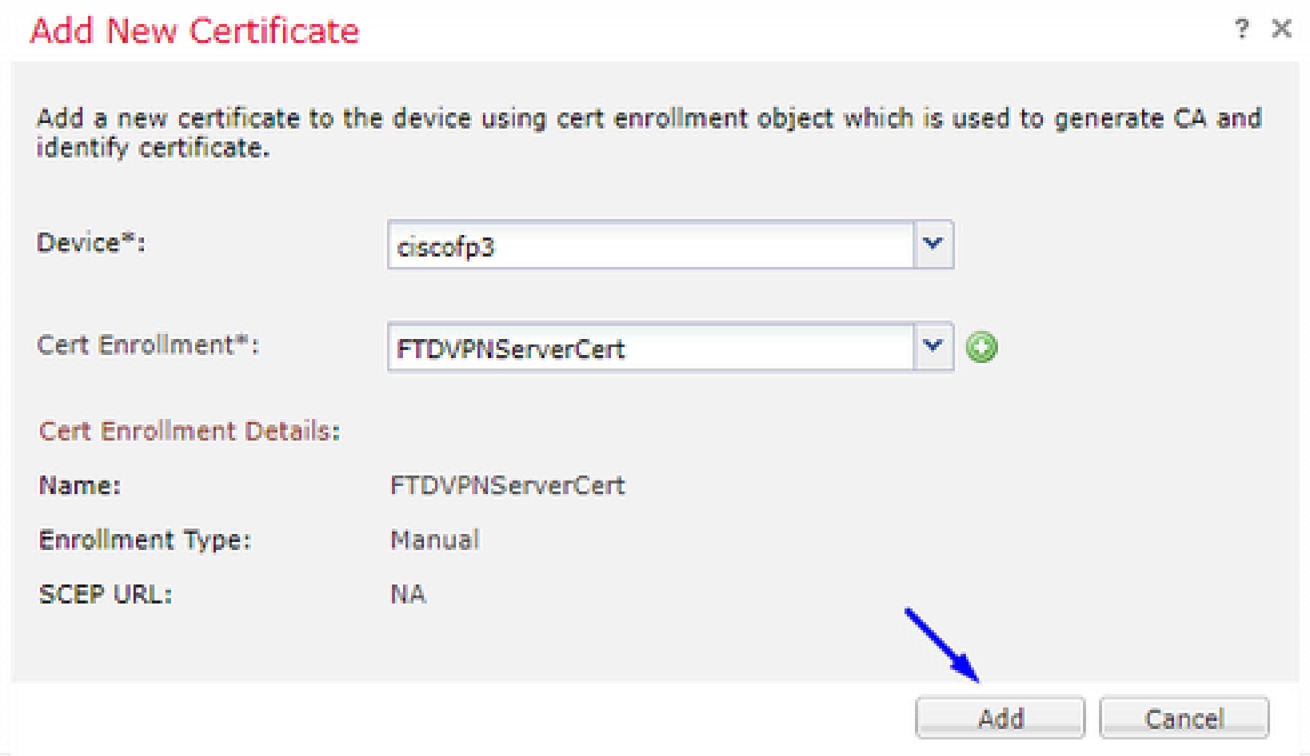
Advanced Settings

□ Ignore IPsec Key Usage
Do not validate values in the Key Usage and extended Key Usage extensions of IPsec remote client certificates.

Allow Overrides: □

Save(저장)를 **클릭합니다.**

위에서 방금 생성한 FTDVPNServerCert를 선택하고 Add(추가)를 클릭합니다.



Add a new certificate to the device using cert enrollment object which is used to generate CA and identify certificate.

Device*: ciscofp3

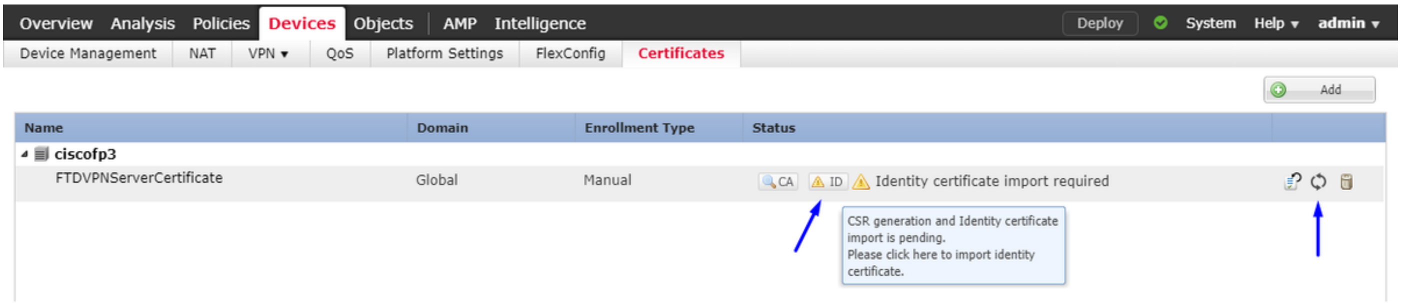
Cert Enrollment*: FTDVPNServerCert

Cert Enrollment Details:

Name:	FTDVPNServerCert
Enrollment Type:	Manual
SCEP URL:	NA

팁:FMC + FTD가 루트 CA 인증서를 확인하고 설치할 때까지 10-30초 정도 기다립니다(표시되지 않으면 Refresh 아이콘 클릭).

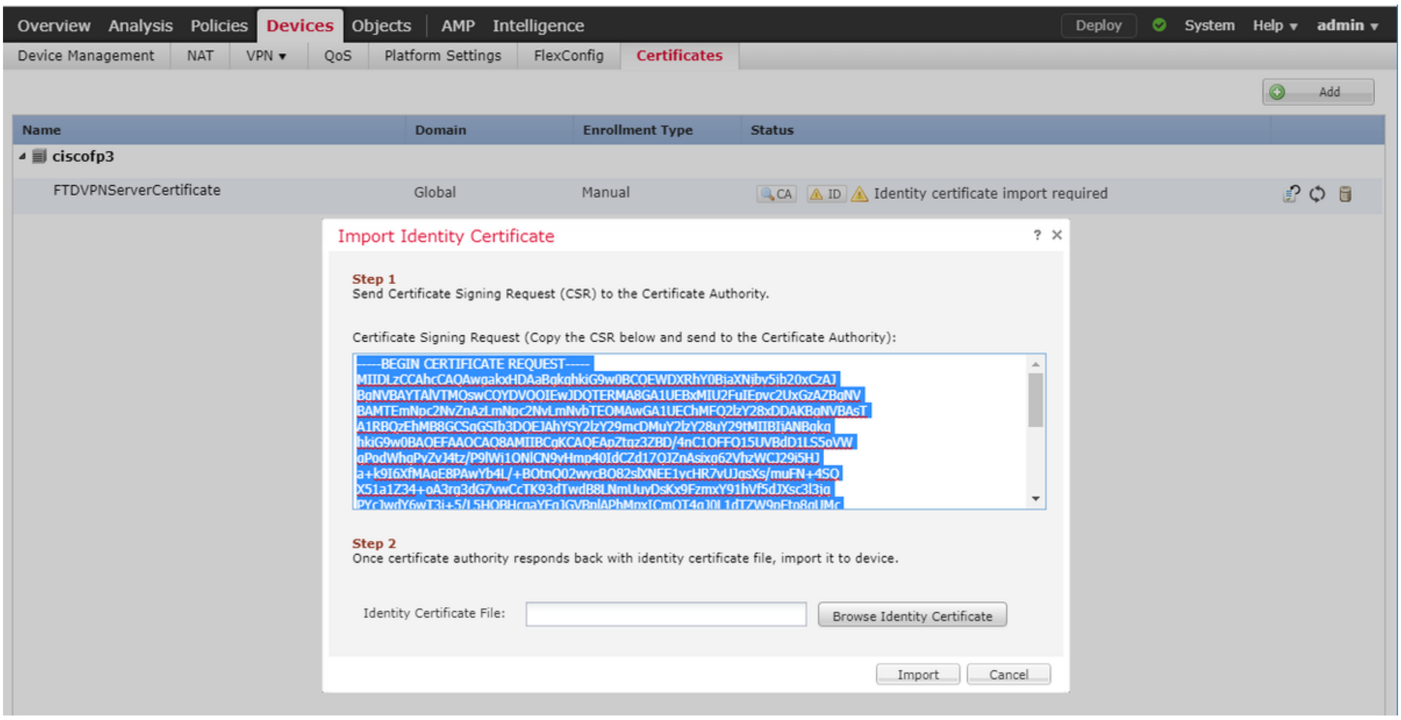
ID 버튼을 클릭합니다.



Name	Domain	Enrollment Type	Status
ciscofp3			
FTDVPNServerCertificate	Global	Manual	CA ⚠ ID ⚠ Identity certificate import required

CSR generation and Identity certificate import is pending.
Please click here to import identity certificate.

이 CSR을 복사하여 붙여 넣고 Windows Server 루트 CA로 가져옵니다.



Step 1
Send Certificate Signing Request (CSR) to the Certificate Authority.

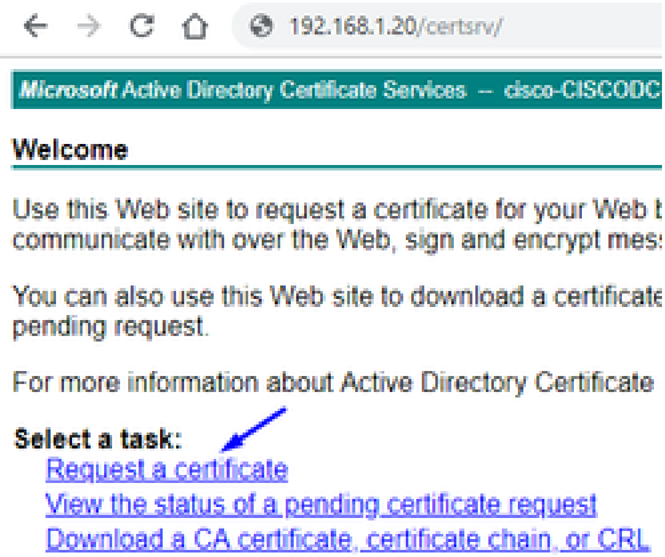
Certificate Signing Request (Copy the CSR below and send to the Certificate Authority):

```
-----BEGIN CERTIFICATE REQUEST-----
MIIDLzCCAhcCAQAwgakxHDAaBgkqhkiG9w0BCQEWDXRhY0BiaXNibv5ib20xCzAJ
BgNVBAYTAlVTMQswCQYDVQQIEwJDQTERMA8GA1UEBxMIU2FuIEpvc2UxGzAZBgNV
BAMTEmNpc2NvZnAzLmNpc2NvLmNvbTEOMAwGA1UEChMFQ2lzY28xDDAKBgNVBAsT
A1RBQzEhMB8GCSqGSIb3DQEJAhYSY2lzY29mcDMuY2lzY28uY29tMIIBIjANBgkq
hkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEApZtqz3ZBD/4nC1OFFQ15UVBdD1LS5oVW
qPodWhqPvZvJ4tz/P9lWi1ONlCN9vHmp40IdCZd17OJZnAsixq62VhzWCJ29i5HJ
a+k9I6XfMAqE8PAwYb4L/+BOtnQ02wvcBO82slXNEE1ycHR7vUJqsXs/muFN+4SQ
X51a1Z34+oA3rq3dG7vwCcTK93dTwdB8LNmUuyDsKx9FzmxY91hVf5dJXsc3l3iq
PYcJwdY6wT3i+5/L5HQBHcqaYEqJGVBnlAPhMpxICmQT4qJ0L1dTZW9nEto8qUMc
```

Step 2
Once certificate authority responds back with identity certificate file, import it to device.

Identity Certificate File:

http://192.168.1.20/certsrv으로 이동



Microsoft Active Directory Certificate Services -- cisco-CISCODC

Welcome

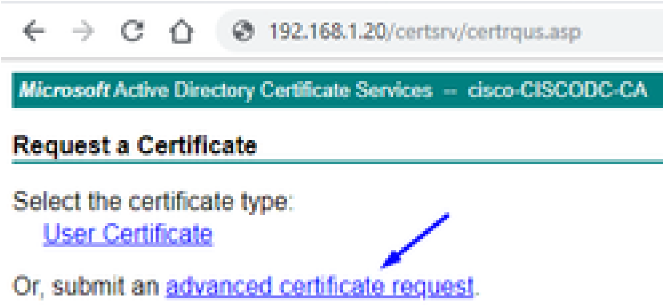
Use this Web site to request a certificate for your Web b
communicate with over the Web, sign and encrypt mes

You can also use this Web site to download a certificate
pending request.

For more information about Active Directory Certificate

Select a task:
Request a certificate
View the status of a pending certificate request
Download a CA certificate, certificate chain, or CRL

고급 인증서 요청 클릭



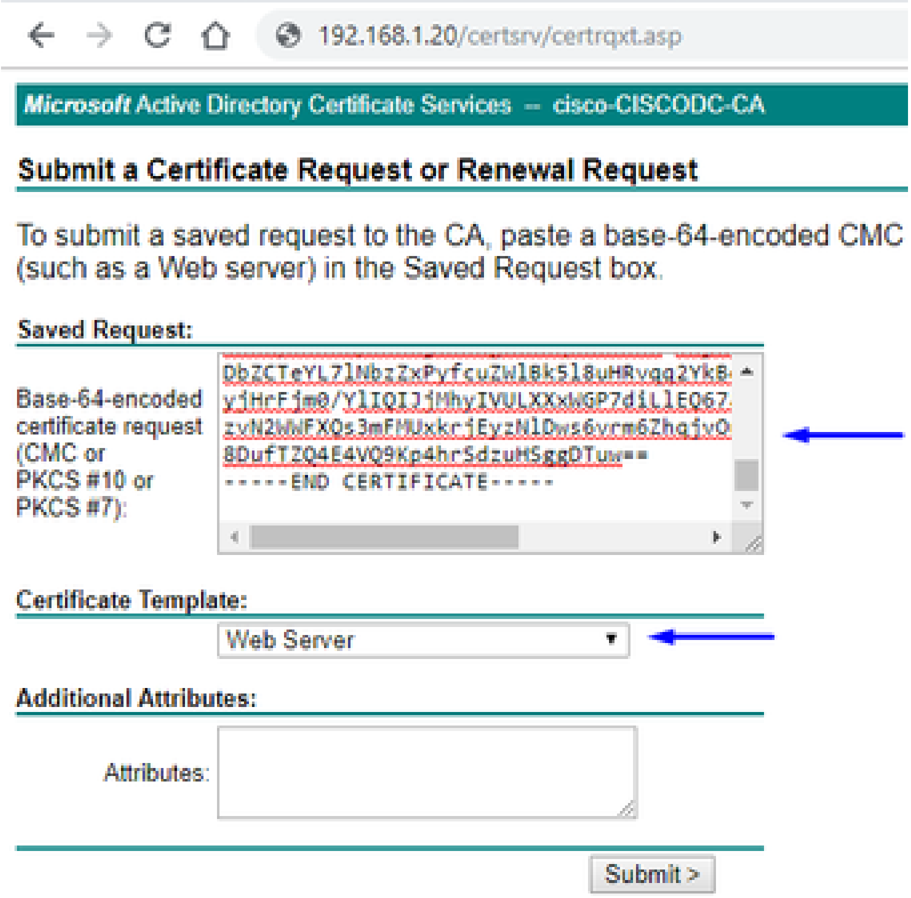
Microsoft Active Directory Certificate Services -- cisco-CISCODC-CA

Request a Certificate

Select the certificate type:
User Certificate

Or, submit an advanced certificate request.

아래 필드에 CSR(Certificate Signing Request)을 붙여넣고 **웹 서버를** 인증서 템플릿으로 선택합니다.



Microsoft Active Directory Certificate Services -- cisco-CISCODC-CA

Submit a Certificate Request or Renewal Request

To submit a saved request to the CA, paste a base-64-encoded CMC (such as a Web server) in the Saved Request box.

Saved Request:

Base-64-encoded certificate request (CMC or PKCS #10 or PKCS #7):

```
DbZCTeYL7lNbzZxPyfcuZWl8k5l8uHRvqq2YkB
yjHrFjm0/YlIQIJjMhyIVULXXxWGP7diLlEQ67
zvN2WWFXQs3mFMUxkrjEyzNlDws6vrm6ZhqjvO
8DufTZQ4E4VQ9Kp4hrSdzuMSggDTuw==
-----END CERTIFICATE-----
```

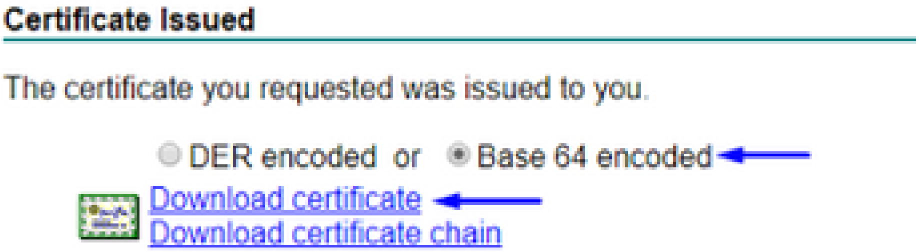
Certificate Template:

Web Server

Additional Attributes:

Attributes:

Submit(제출)을 **클릭합니다.**
Base **64 인코딩** 버튼을 **클릭하고 Download certificate를 클릭합니다.**

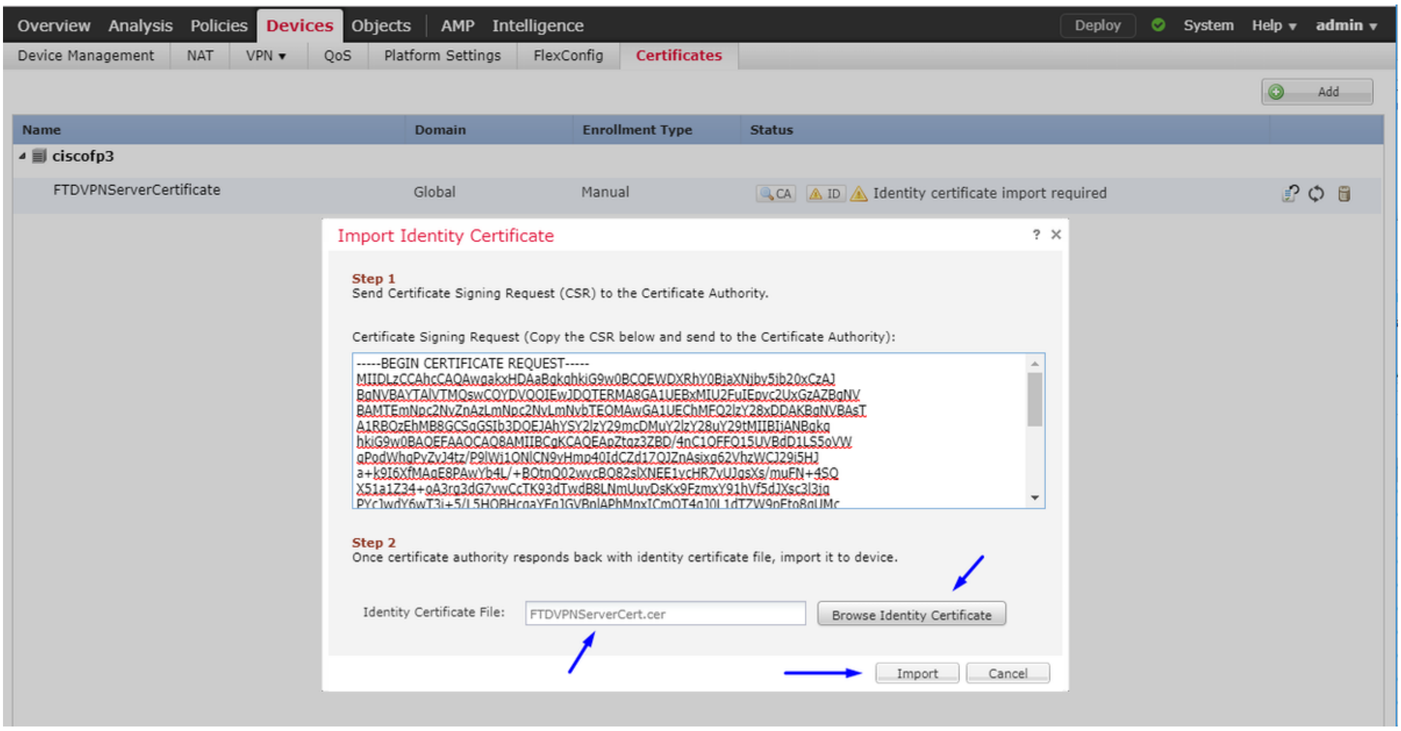

Certificate Issued

The certificate you requested was issued to you.

○ DER encoded or ● Base 64 encoded

Download certificate
Download certificate chain

Browse **Identity Certificate(ID 인증서 찾아보기)**를 클릭하고 방금 다운로드한 인증서를 선택합니다.



Name	Domain	Enrollment Type	Status
◢ ciscofp3			
FTDVPNServerCertificate	Global	Manual	CA ⚠ ID ⚠ Identity certificate import required

Import Identity Certificate

Step 1
Send Certificate Signing Request (CSR) to the Certificate Authority.

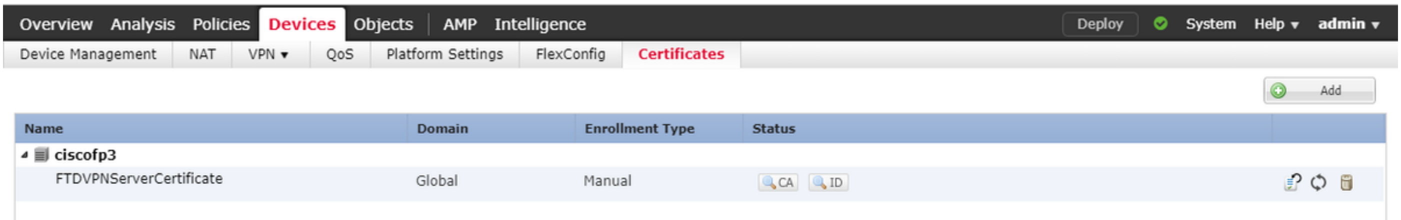
Certificate Signing Request (Copy the CSR below and send to the Certificate Authority):

```
-----BEGIN CERTIFICATE REQUEST-----
MIIDLzCCAhcCAQAwgakxHDAaBgkqhkiG9w0BCQEWDXRhY0BjaXNjby5jb20xCzAJ
BgNVBAYTAlVTMQswCQYDVQQIEwJDQTERMA8GA1UEBxMIU2FuIEpvc2UxGzAZBgNV
BAMTEmNpc2NvZnAzLmNpc2NvLmNvbTEOMAwGA1UEChMFQ2lzY28xDDAKBgNVBAsT
A1RBQzEhMB8GCSqGSIb3DQEJAhYSY2lzY29mcDMuY2lzY28uY29tMIIBIjANBgkq
hkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEApZtqz3ZBD/4nC1OFFO15UVBdD1LS5oVW
qPodWhgPyZvJ4tz/P9lWj1ONlCN9vHmp40IdCZd17QJZnAsixg62VhzWCJ29i5HJ
a+k9I6XfMAgE8PAwYb4L/+BOtnQ02wvcBO82slXNEE1vcHR7vUJgsXs/muFN+4SQ
X51a1Z34+oA3rg3dG7vwCcTK93dTwdB8LNmUuvDsKx9FzmxY91hVf5dJXsc3l3iq
PYcJwdY6wT3i+5/L5HOBHcqaYEqJGVBnlAPhMpxICmOT4qJ0L1dTZW9pFto8gUMc
```

Step 2
Once certificate authority responds back with identity certificate file, import it to device.

Identity Certificate File: FTDVPNServerCert.cer

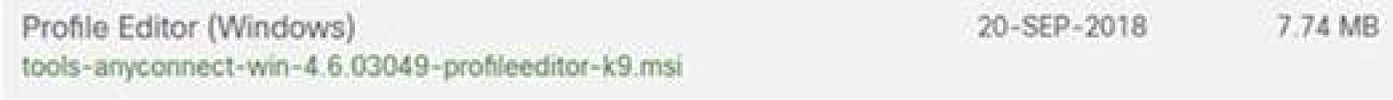
FTD VPN 서버 인증서(Windows Server 루트 CA에서 서명)가 설치되었습니다.



Name	Domain	Enrollment Type	Status
◢ ciscofp3			
FTDVPNServerCertificate	Global	Manual	CA ID

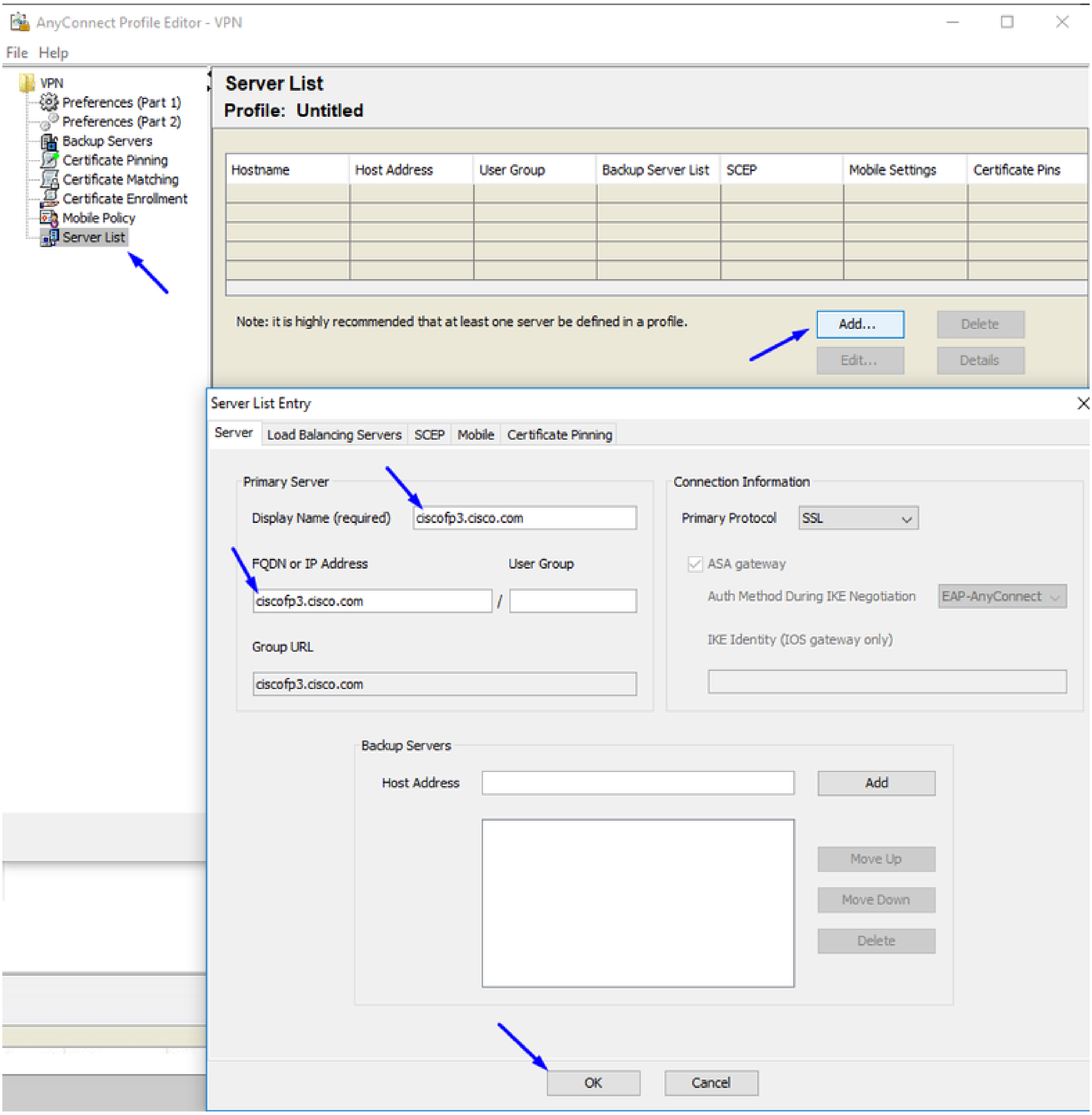
AnyConnect 이미지 + AnyConnect 프로파일 편집기를 다운로드하고 .xml 프로파일을 만듭니다.

[Cisco AnyConnect 프로파일 편집기] 다운로드 및 설치



Profile Editor (Windows) 20-SEP-2018 7.74 MB
tools-anyconnect-win-4.6.03049-profileeditor-k9.msi

AnyConnect 프로파일 편집기 열기
Server **List**(서버 **목록) > Add...를** 클릭합니다.
FTD**의** 외부 인터페이스 IP 주소의 FQDN 및 표시 이름을 입력합니다.서버 목록에 항목이 표시되어야 합니다.



Server List

Profile: Untitled

Hostname	Host Address	User Group	Backup Server List	SCEP	Mobile Settings	Certificate Pins

Note: it is highly recommended that at least one server be defined in a profile.

Server List Entry

Primary Server

Display Name (required): ciscofp3.cisco.com

FQDN or IP Address: ciscofp3.cisco.com / User Group:

Group URL: ciscofp3.cisco.com

Connection Information

Primary Protocol: SSL

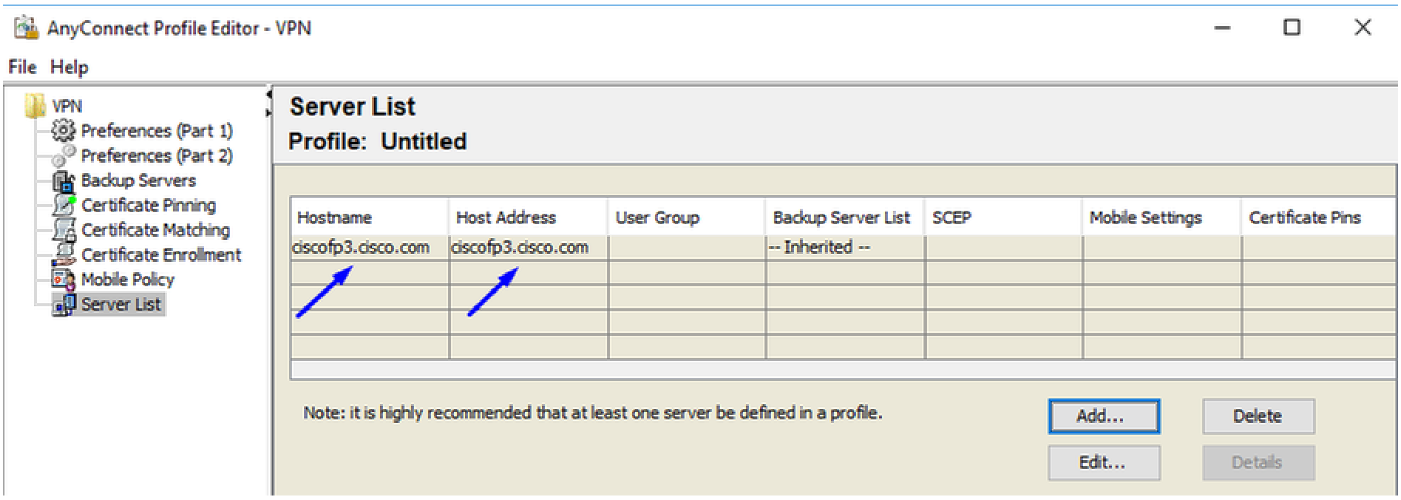
☑ ASA gateway

Auth Method During IKE Negotiation: EAP-AnyConnect

IKE Identity (IOS gateway only):

Backup Servers

Host Address:



Server List

Profile: Untitled

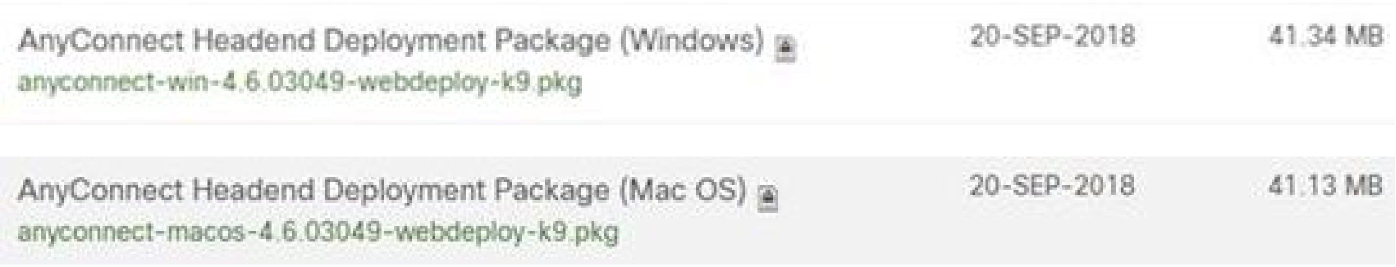
Hostname	Host Address	User Group	Backup Server List	SCEP	Mobile Settings	Certificate Pins
ciscofp3.cisco.com	ciscofp3.cisco.com		-- Inherited --			

Note: it is highly recommended that at least one server be defined in a profile.

확인 및 **파일** > **다른 이름으로 저장...**을 클릭합니다.

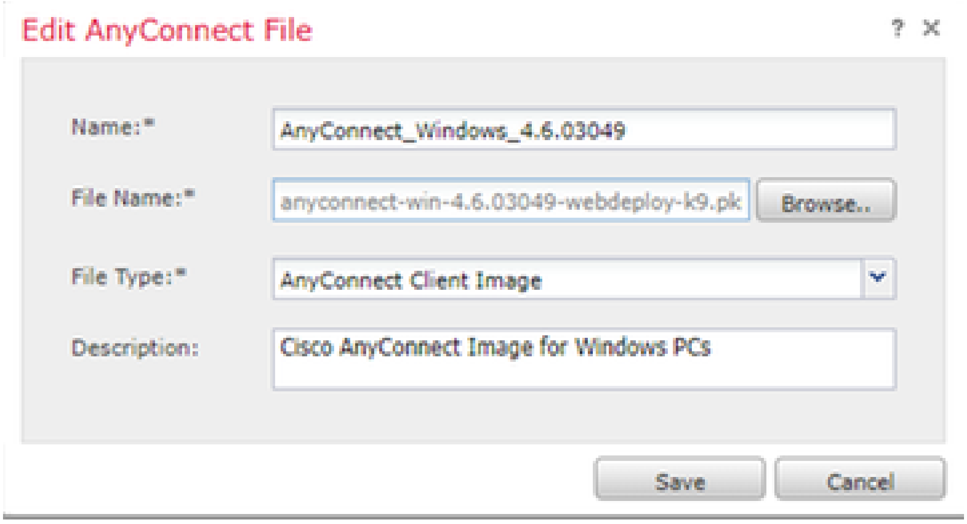
VPNprofile.xml

여기서 Windows 및 Mac .pkg 이미지 다운로드



AnyConnect Headend Deployment Package (Windows) anyconnect-win-4.6.03049-webdeploy-k9.pkg	20-SEP-2018	41.34 MB
AnyConnect Headend Deployment Package (Mac OS) anyconnect-macos-4.6.03049-webdeploy-k9.pkg	20-SEP-2018	41.13 MB

Objects(**개체**) > Object Management(개체 **관리)** > **VPN** > **AnyConnect File(AnyConnect 파일)으로 이동** > Add AnyConnect **File(AnyConnect 파일 추가)을 클릭합니다.**



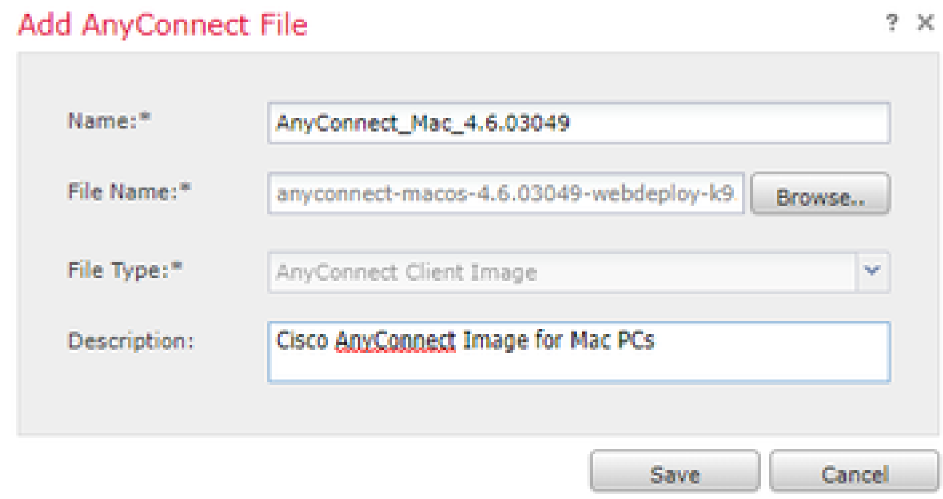
Edit AnyConnect File

Name:* AnyConnect_Windows_4.6.03049

File Name:* anyconnect-win-4.6.03049-webdeploy-k9.pk

File Type:* AnyConnect Client Image

Description: Cisco AnyConnect Image for Windows PCs



Add AnyConnect File

Name:* AnyConnect_Mac_4.6.03049

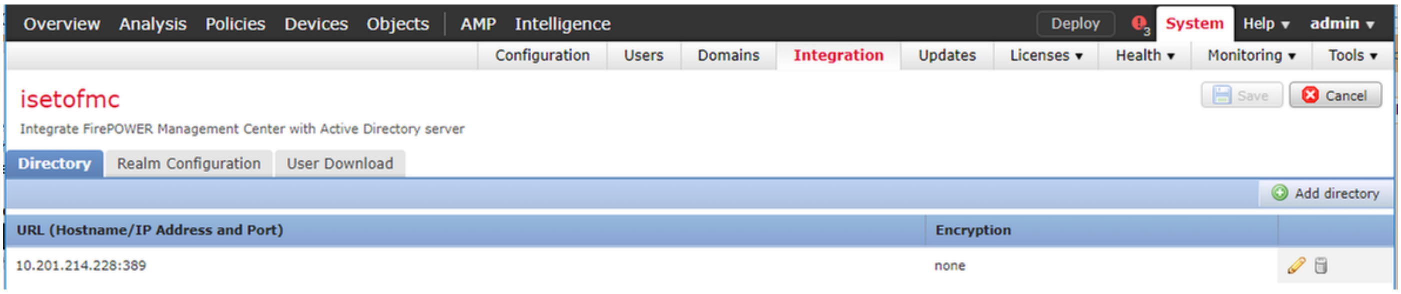
File Name:* anyconnect-macos-4.6.03049-webdeploy-k9

File Type:* AnyConnect Client Image

Description: Cisco AnyConnect Image for Mac PCs

FTD에서 Anyconnect VPN 구성(루트 CA 인증서 사용)

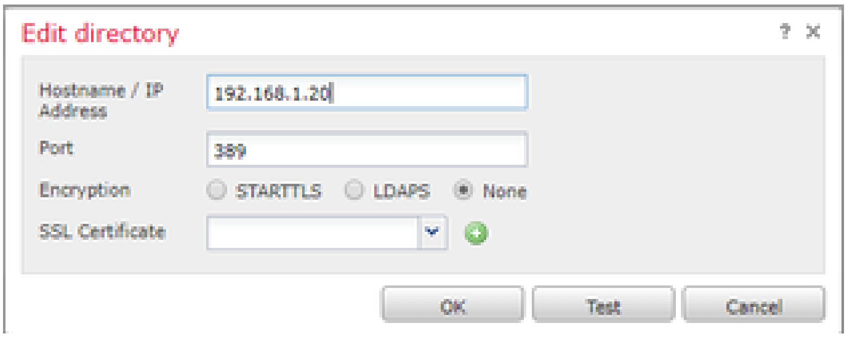
FirePOWER **Management Center에 로그인합니다.**
System(**시스템**) > Integration(**통합**) > Realms(영역)를 **클릭합니다** > **New Realm(새 영역)** >> Directory(디렉토리) **탭 > Add directory(디렉토리 추가)를 클릭합니다.**



isetofmc

Integrate FirePOWER Management Center with Active Directory server

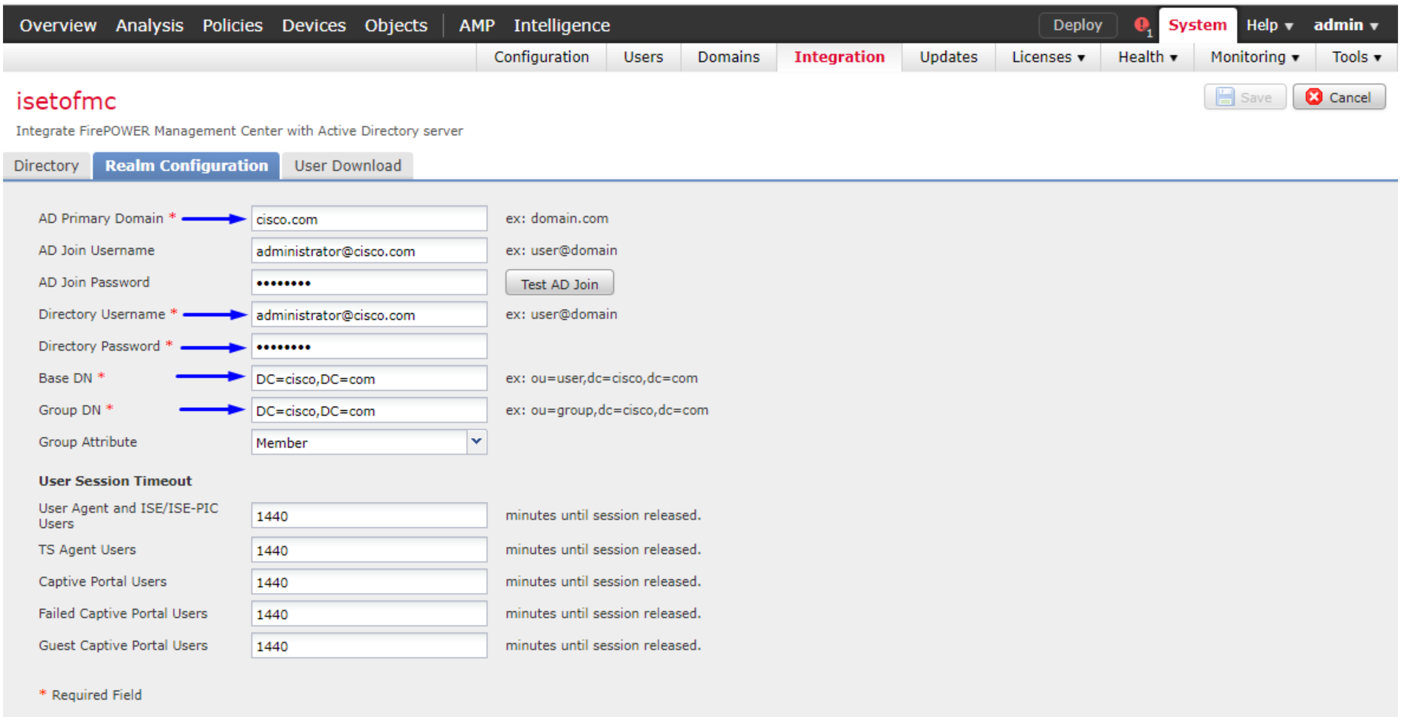
URL (Hostname/IP Address and Port)	Encryption
10.201.214.228:389	none



Edit directory

Hostname / IP Address	192.168.1.20
Port	389
Encryption	○ STARTTLS ○ LDAPS ● None
SSL Certificate	

Realm **Configuration(영역 컨피그레이션**) 탭 - 여기에서 도메인 컨트롤러 정보를 구성합니다.



isetofmc

Integrate FirePOWER Management Center with Active Directory server

AD Primary Domain *	cisco.com	ex: domain.com
AD Join Username	administrator@cisco.com	ex: user@domain
AD Join Password	••••••••	Test AD Join
Directory Username *	administrator@cisco.com	ex: user@domain
Directory Password *	••••••••	
Base DN *	DC=cisco,DC=com	ex: ou=user,dc=cisco,dc=com
Group DN *	DC=cisco,DC=com	ex: ou=group,dc=cisco,dc=com
Group Attribute	Member	

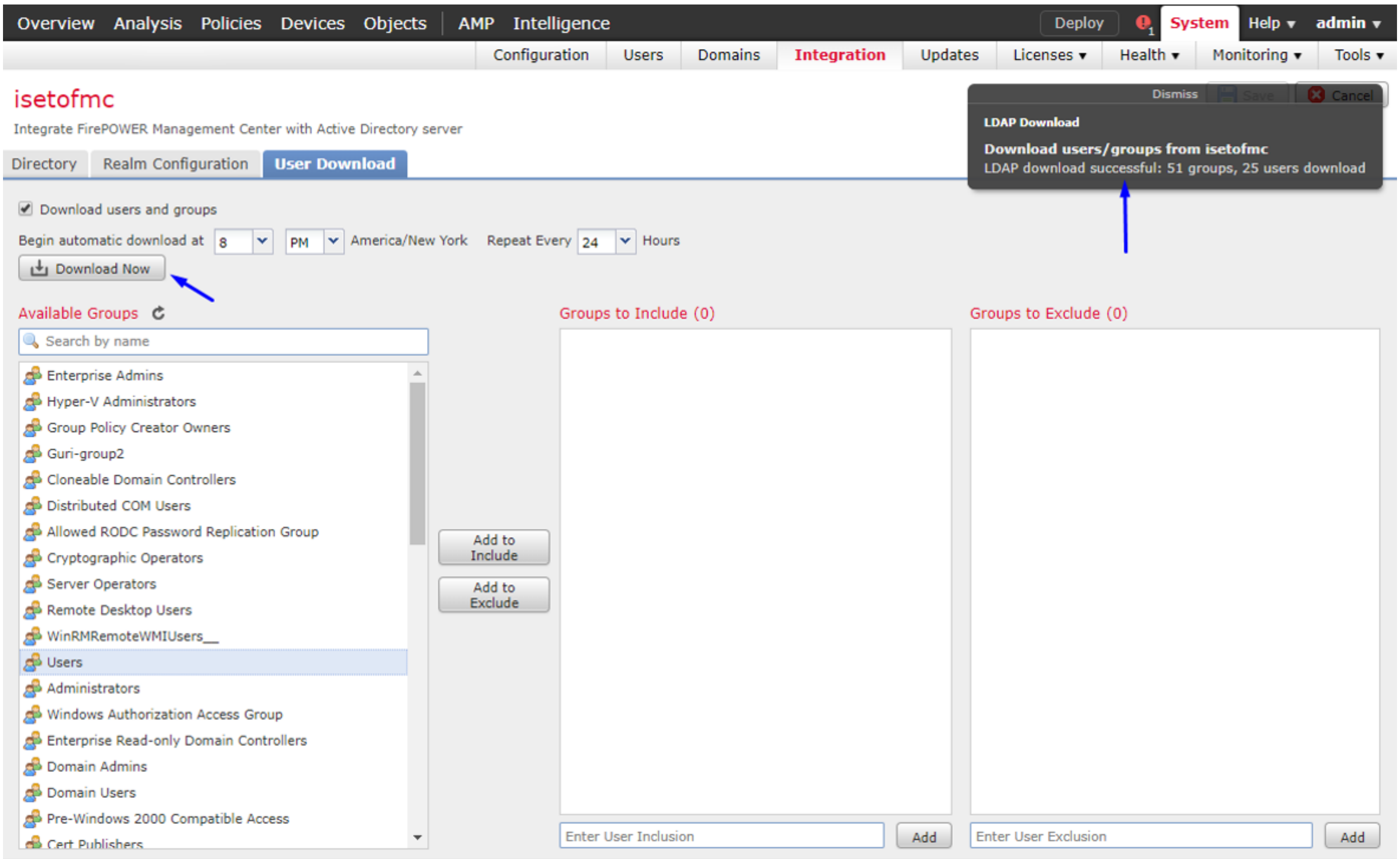
User Session Timeout

User Agent and ISE/ISE-PIC Users	1440	minutes until session released.
TS Agent Users	1440	minutes until session released.
Captive Portal Users	1440	minutes until session released.
Failed Captive Portal Users	1440	minutes until session released.
Guest Captive Portal Users	1440	minutes until session released.

* Required Field

참고:위 예에서는 Windows AD 서버에서 'Domain Admin' 권한을 가진 AD 사용자 이름을 사용합니다.FMC가 영역 컨피그레이션을 위해 Active Directory 도메인에 가입할 수 있는 최소 권한을 가진 사용자를 구성하려면 여기에서 단계를 볼 수 있습니다.

User **Download(사용자 다운로드**) 탭 클릭 - 사용자 다운로드가 성공했는지 확인



isetofmc

Integrate FirePOWER Management Center with Active Directory server

LDAP Download

Download users/groups from isetofmc

LDAP download successful: 51 groups, 25 users download

☑ Download users and groups

Begin automatic download at 8 PM America/New York Repeat Every 24 Hours

Available Groups

Search by name

- Enterprise Admins
- Hyper-V Administrators
- Group Policy Creator Owners
- Guri-group2
- Cloneable Domain Controllers
- Distributed COM Users
- Allowed RODC Password Replication Group
- Cryptographic Operators
- Server Operators
- Remote Desktop Users
- WinRMRemoteWMIUsers__
- Users
- Administrators
- Windows Authorization Access Group
- Enterprise Read-only Domain Controllers
- Domain Admins
- Domain Users
- Pre-Windows 2000 Compatible Access
- Cert Publishers

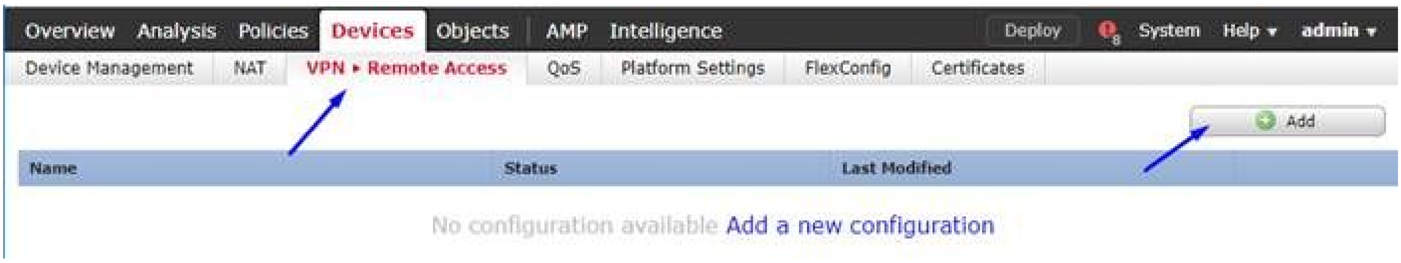
Groups to Include (0)

Groups to Exclude (0)

Enter User Inclusion

Enter User Exclusion

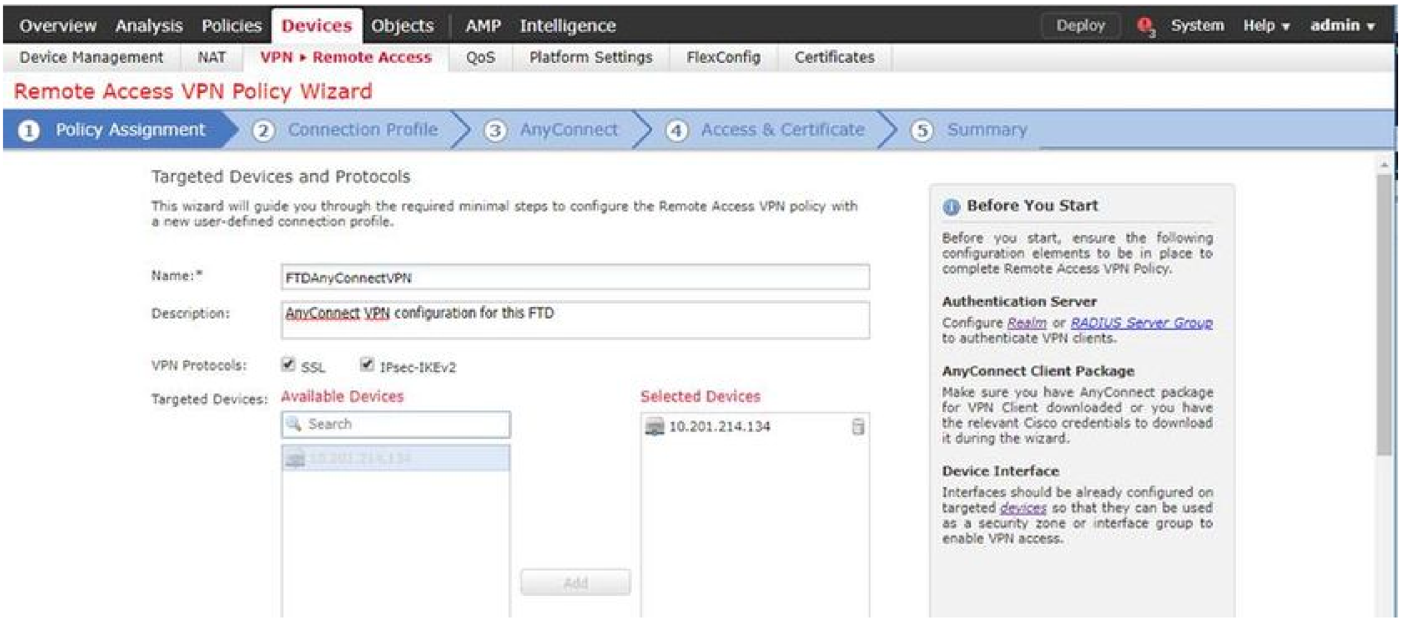
Devices(**디바이스**) > **VPN** > **Remote Access(원격 액세스)를** > Add(**추가**)를 클릭합니다.



Name	Status	Last Modified

No configuration available Add a new configuration

AnyConnect VPN을 구성할 FTD 디바이스를 선택하려면 **Name**, **Description**(이름)을 입력하고 Add(**추가**)를 클릭합니다.



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:* FTDAnyConnectVPN

Description: AnyConnect VPN configuration for this FTD

VPN Protocols: ☑ SSL ☑ IPsec-IKEv2

Targeted Devices: Available Devices

Search

10.201.214.134

Selected Devices

10.201.214.134

Before You Start

Before you start, ensure the following configuration elements to be in place to complete Remote Access VPN Policy.

Authentication Server

Configure Realm or RADIUS Server Group to authenticate VPN clients.

AnyConnect Client Package

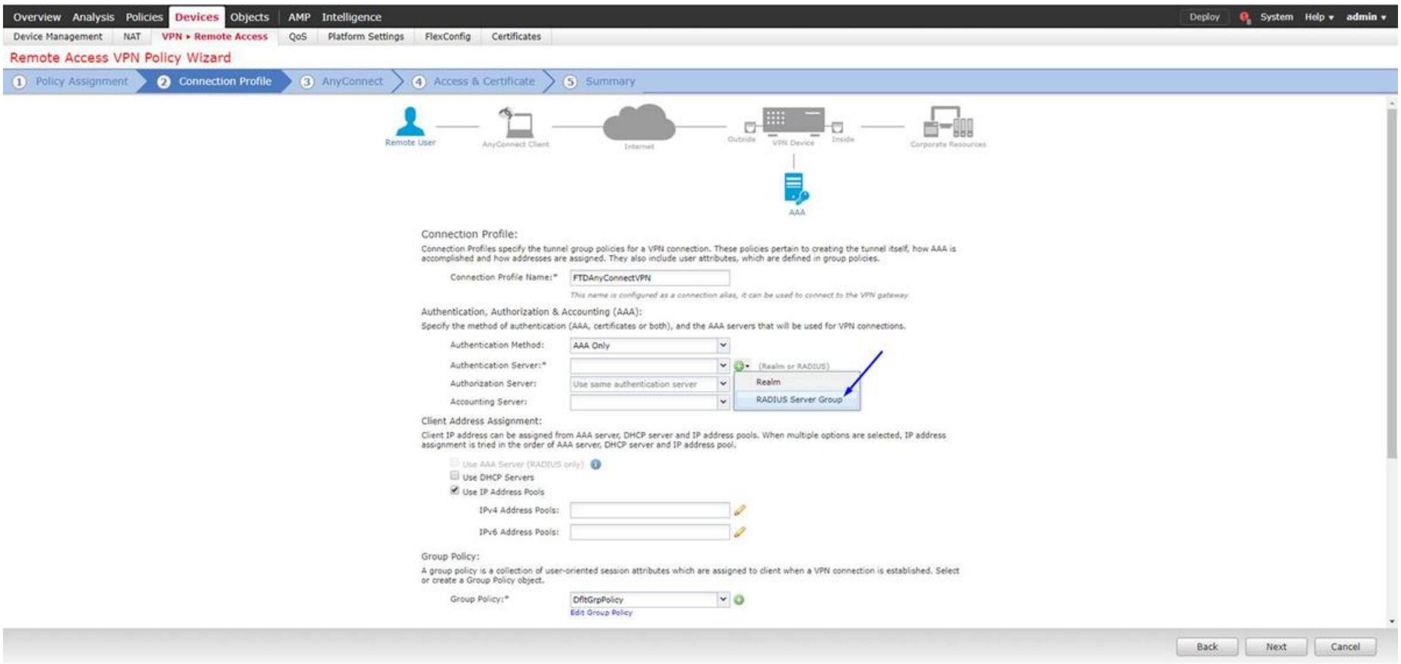
Make sure you have AnyConnect package for VPN Client downloaded or you have the relevant Cisco credentials to download it during the wizard.

Device Interface

Interfaces should be already configured on targeted devices so that they can be used as a security zone or interface group to enable VPN access.

Add **for the Authentication** Server(인증 서버에 대해 추가)를 클릭하고 **RADIUS Server**

Group(RADIUS 서버 그룹)을 선택합니다. 이 그룹은 Cisco Identity Services Engine PSN(Policy Services Node)입니다.



Remote Access VPN Policy Wizard

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:* FTDAnyConnectVPN

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:* (Realm or RADIUS)

- Realm
- RADIUS Server Group

Authorization Server: Use same authentication server

Accounting Server:

Client Address Assignment:

Client IP address can be assigned from AAA server, DHCP server and IP address pools. When multiple options are selected, IP address assignment is tried in the order of AAA server, DHCP server and IP address pool.

□ Use AAA Server (RADIUS only)

□ Use DHCP Servers

☑ Use IP Address Pools

IPv4 Address Pools:

IPv6 Address Pools:

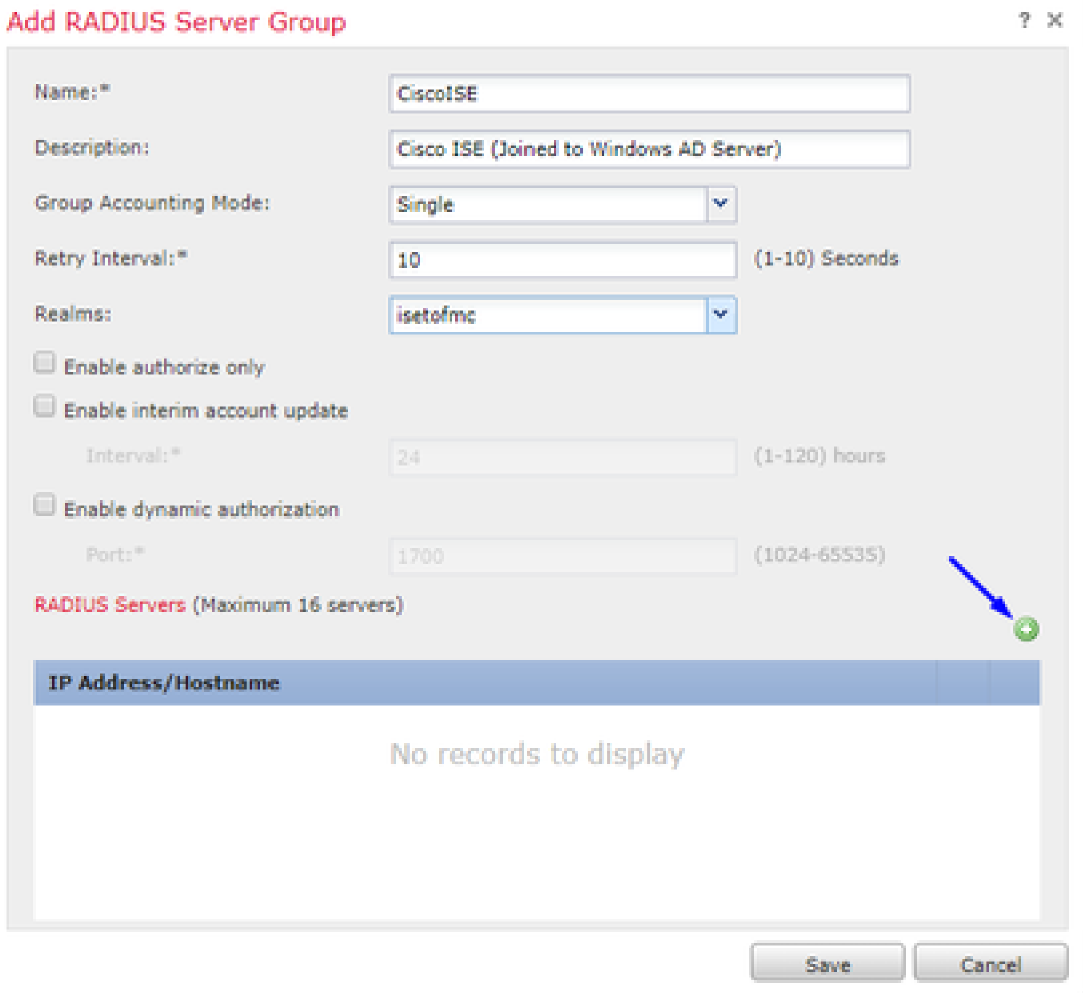
Group Policy:

A group policy is a collection of user-oriented session attributes which are assigned to client when a VPN connection is established. Select or create a Group Policy object.

Group Policy:* DfltGrpPolicy

Edit Group Policy

RADIUS 서버의 **이름**을 입력합니다.
위에서 구성한 **영역** 선택
Add(추가)를 **클릭합니다.**



Add RADIUS Server Group

Name:* CiscoISE

Description: Cisco ISE (Joined to Windows AD Server)

Group Accounting Mode: Single

Retry Interval:* 10 (1-10) Seconds

Realms: isetofmc

□ Enable authorize only

□ Enable interim account update

Interval:* 24 (1-120) hours

□ Enable dynamic authorization

Port:* 1700 (1024-65535)

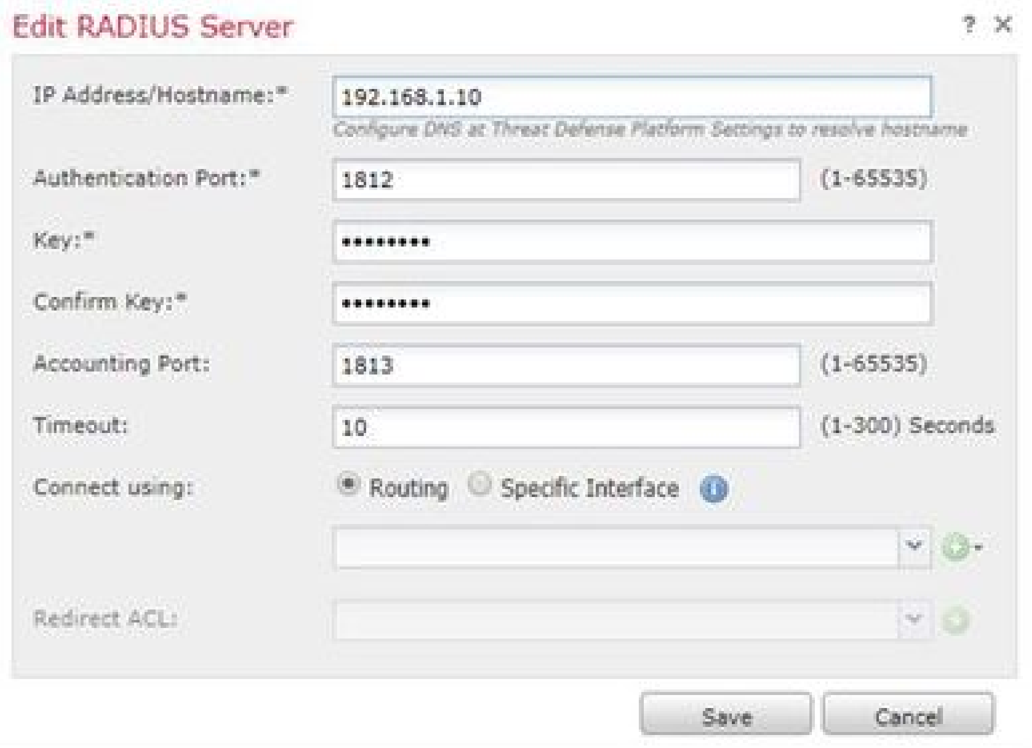
RADIUS Servers (Maximum 16 servers)

IP Address/Hostname
No records to display

Cisco ISE 노드에 대해 다음 정보를 입력합니다.

IP 주소/호스트 이름:Cisco ISE PSN의 IP 주소(정책 서비스 노드) - 인증 요청이 이동하는 위치입니다.
키:cisco123
키 확인:cisco123

주의:위의 키는 RADIUS 공유 비밀 키입니다. 이 키는 나중에 사용합니다.



Edit RADIUS Server

IP Address/Hostname:* 192.168.1.10
Configure DNS at Threat Defense Platform Settings to resolve hostname

Authentication Port:* 1812 (1-65535)

Key:* *********

Confirm Key:* *********

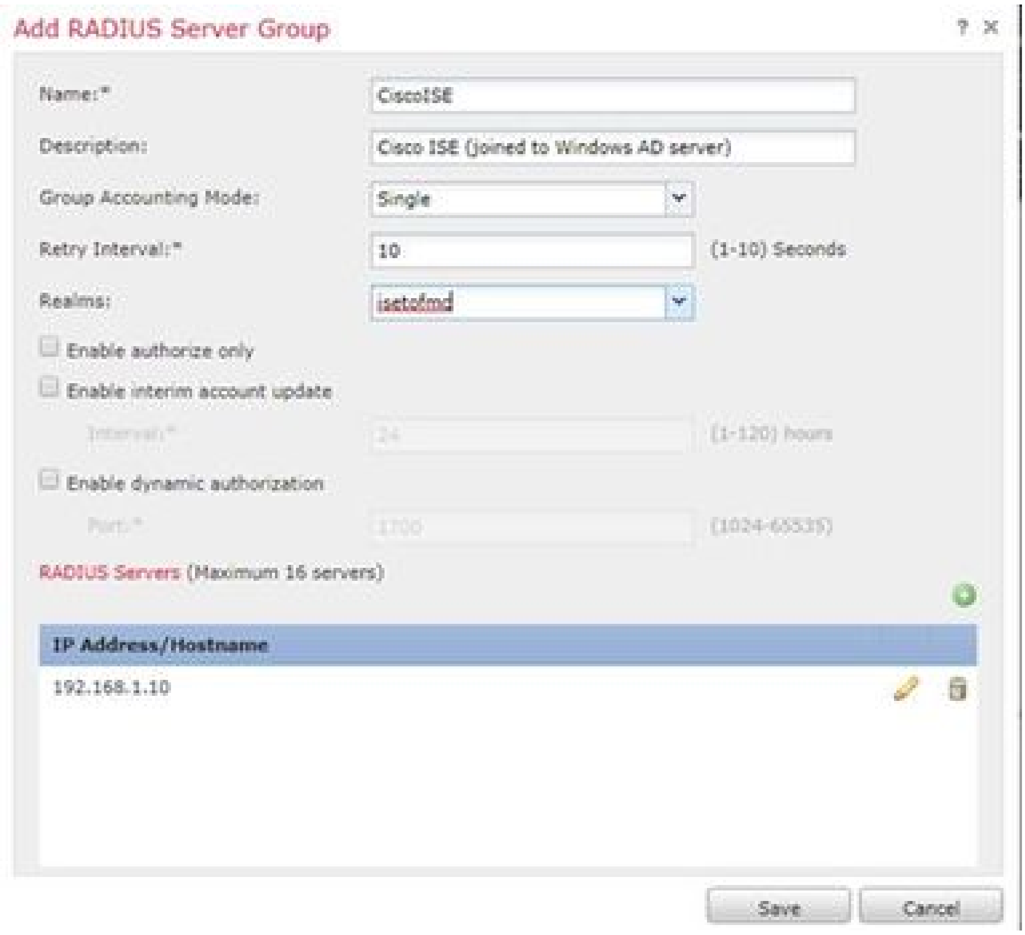
Accounting Port: 1813 (1-65535)

Timeout: 10 (1-300) Seconds

Connect using: ● Routing ○ Specific Interface

Redirect ACL:

참고:최종 사용자가 AnyConnect VPN을 통해 FTD에 연결하려고 시도할 때, 사용자가 입력하는 사용자 이름 + 비밀번호는 이 FTD에 인증 요청으로 전송됩니다.FTD는 인증을 위해 Cisco ISE PSN 노드에 요청을 전달합니다(Cisco ISE는 Windows Active Directory에서 해당 사용자 이름 및 비밀번호를 확인하고 Cisco ISE에서 현재 구성한 조건에 따라 액세스 제어/네트워크 액세스를 적용합니다).



Add RADIUS Server Group

Name:* CiscoISE

Description: Cisco ISE (joined to Windows AD server)

Group Accounting Mode: Single

Retry Interval:* 10 (1-10) Seconds

Realms: isetofmd

□ Enable authorize only

□ Enable interim account update

Interval:* 24 (1-120) hours

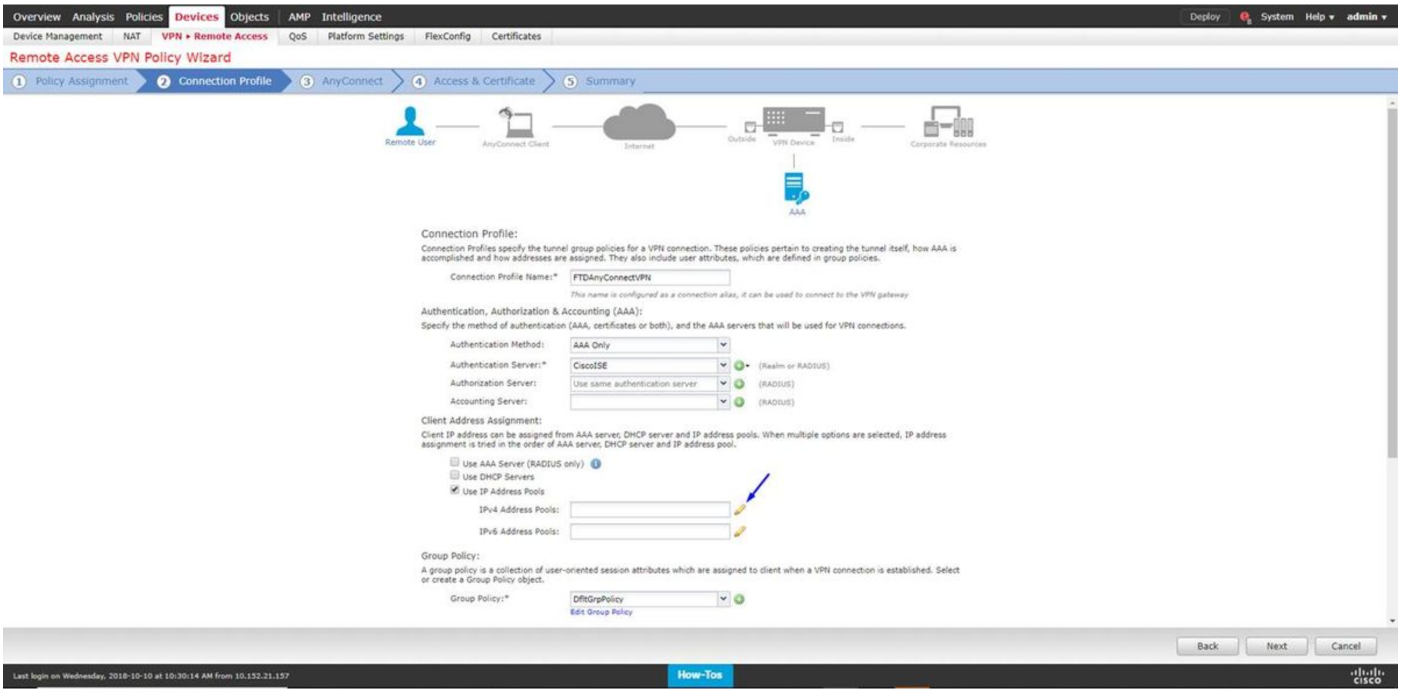
□ Enable dynamic authorization

Port:* 1700 (1024-65535)

RADIUS Servers (Maximum 16 servers)

IP Address/Hostname
192.168.1.10

Save(저장)를 **클릭합니다.**
IPv4 **Address Pool**(IPv4 **주소 풀)에 대한 Edit(수정)를 클릭합니다.**



Remote Access VPN Policy Wizard

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:* FTDAnyConnectVPN

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:* CiscoISE (Realm or RADIUS)

Authorization Server: Use same authentication server (RADIUS)

Accounting Server: (RADIUS)

Client Address Assignment:

Client IP address can be assigned from AAA server, DHCP server and IP address pools. When multiple options are selected, IP address assignment is tried in the order of AAA server, DHCP server and IP address pool.

□ Use AAA Server (RADIUS only)

□ Use DHCP Servers

☑ Use IP Address Pools

IPv4 Address Pools:

IPv6 Address Pools:

Group Policy:

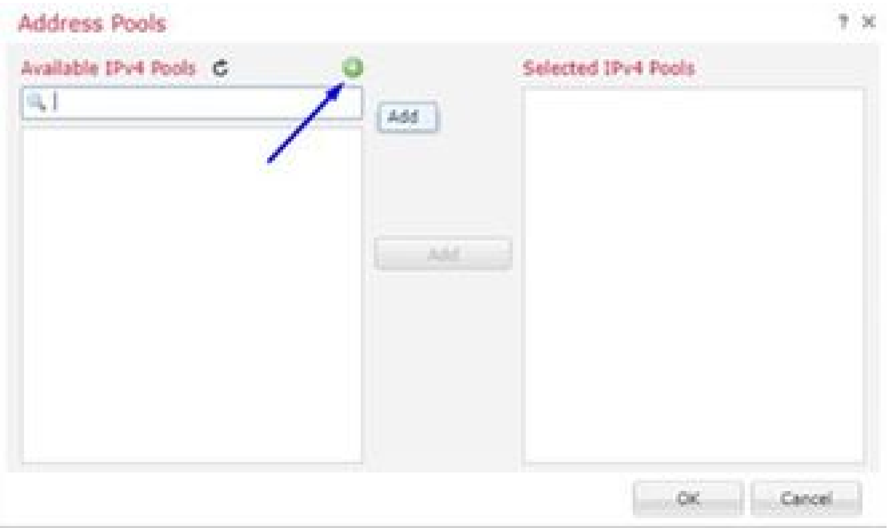
A group policy is a collection of user-oriented session attributes which are assigned to client when a VPN connection is established. Select or create a Group Policy object.

Group Policy:* DfltGrpPolicy

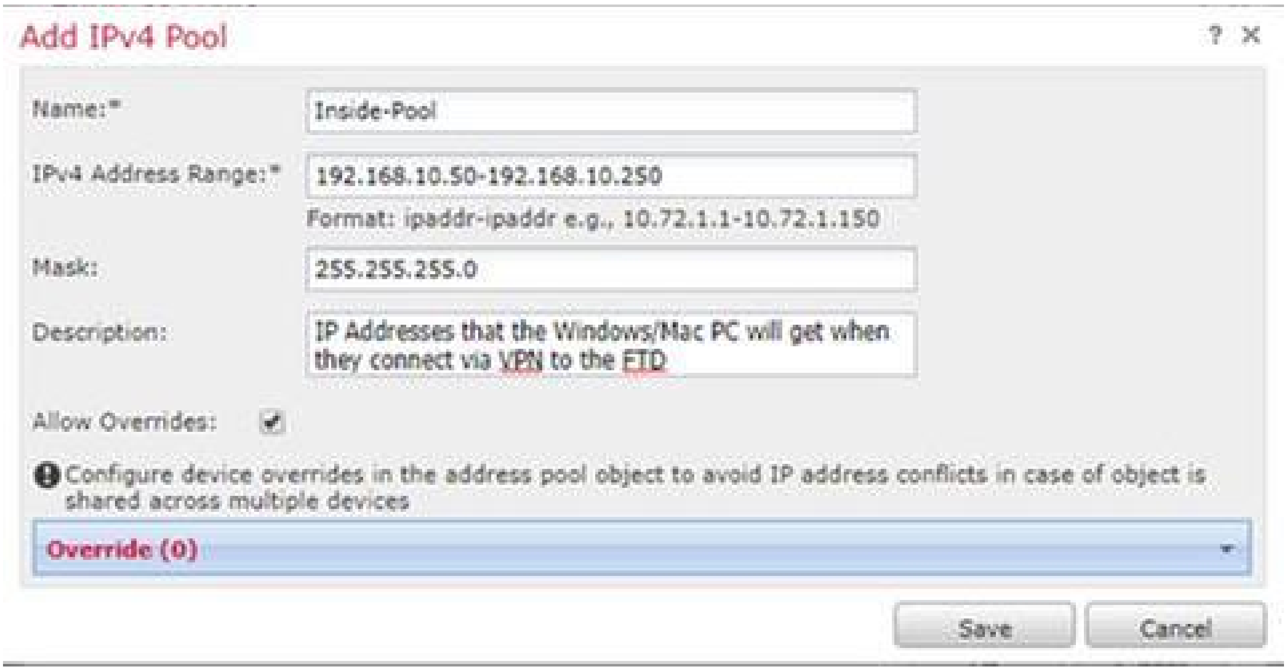
Edit Group Policy

Last login on Wednesday, 2018-10-10 at 10:30:14 AM from 10.152.21.157

Add(추가)를 **클릭합니다.**



이름, IPv4 **주소 범위** 및 서브넷 **마스크를 입력합니다.**



Add IPv4 Pool

Name:* Inside-Pool

IPv4 Address Range:* 192.168.10.50-192.168.10.250

Format: ipaddr-ipaddr e.g., 10.72.1.1-10.72.1.150

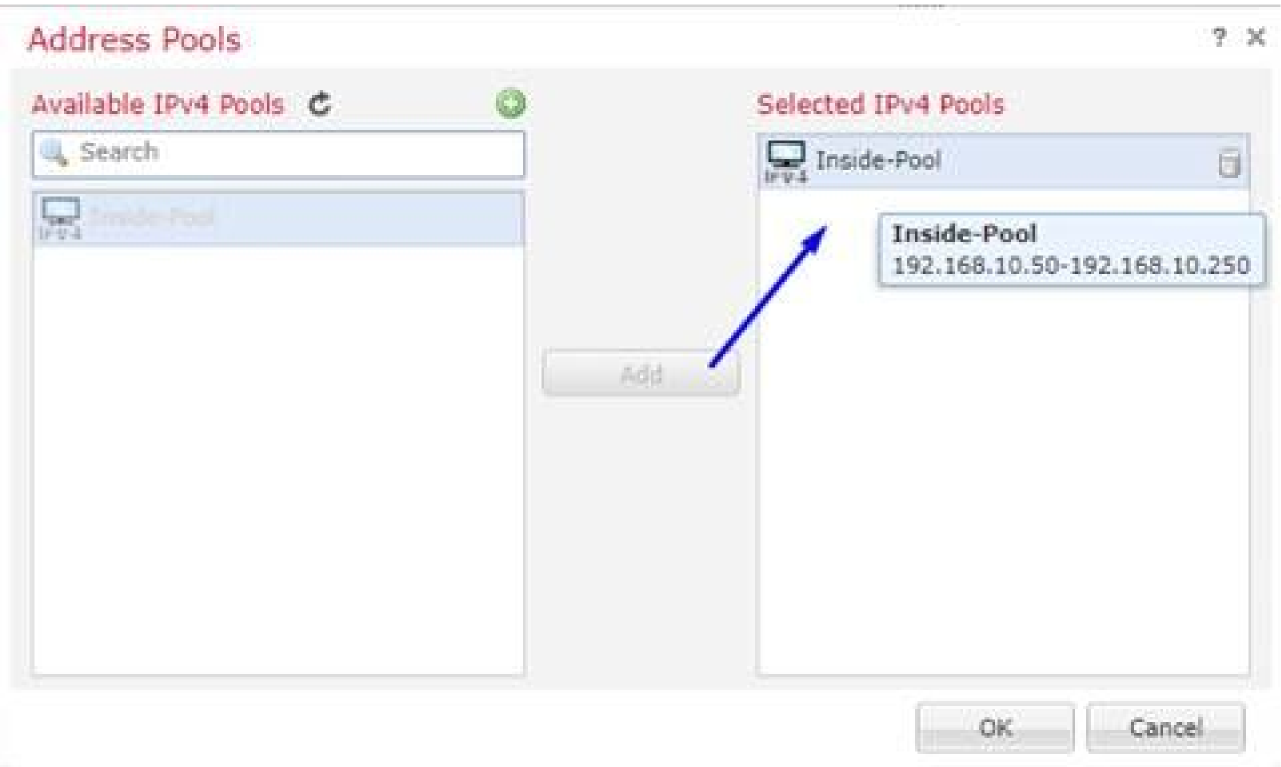
Mask: 255.255.255.0

Description: IP Addresses that the Windows/Mac PC will get when they connect via VPN to the FTD

Allow Overrides: ☑

Configure device overrides in the address pool object to avoid IP address conflicts in case of object is shared across multiple devices

IP 주소 풀을 선택하고 Ok(확인)를 클릭합니다.



Address Pools

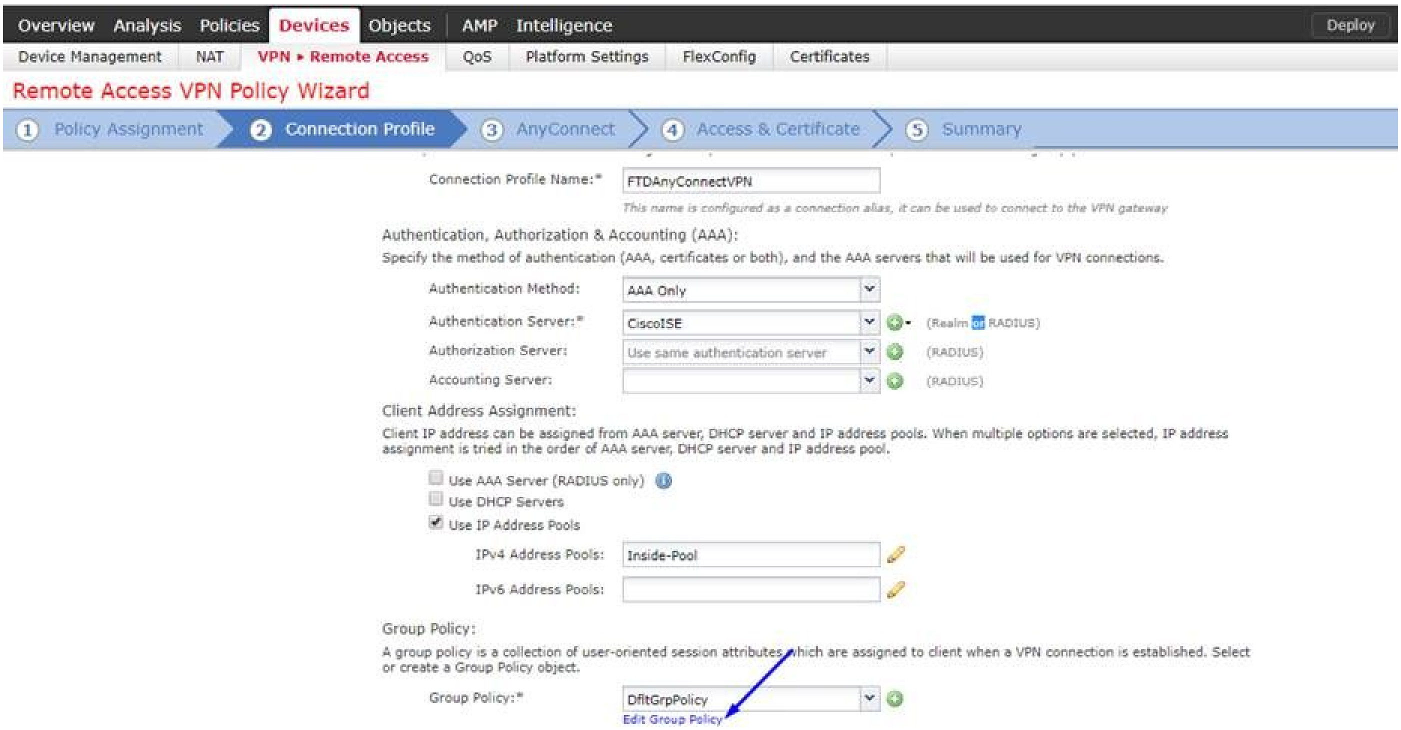
Available IPv4 Pools

Selected IPv4 Pools

Inside-Pool

Inside-Pool
192.168.10.50-192.168.10.250

Edit **Group** Policy(**그룹** 정책 수정)를 **클릭합니다.**



Remote Access VPN Policy Wizard

Connection Profile Name:* FTDAnyConnectVPN

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:* CiscoISE (Realm or RADIUS)

Authorization Server: Use same authentication server (RADIUS)

Accounting Server: (RADIUS)

Client Address Assignment:

Client IP address can be assigned from AAA server, DHCP server and IP address pools. When multiple options are selected, IP address assignment is tried in the order of AAA server, DHCP server and IP address pool.

☐ Use AAA Server (RADIUS only)
☐ Use DHCP Servers
☑ Use IP Address Pools

IPv4 Address Pools: Inside-Pool

IPv6 Address Pools:

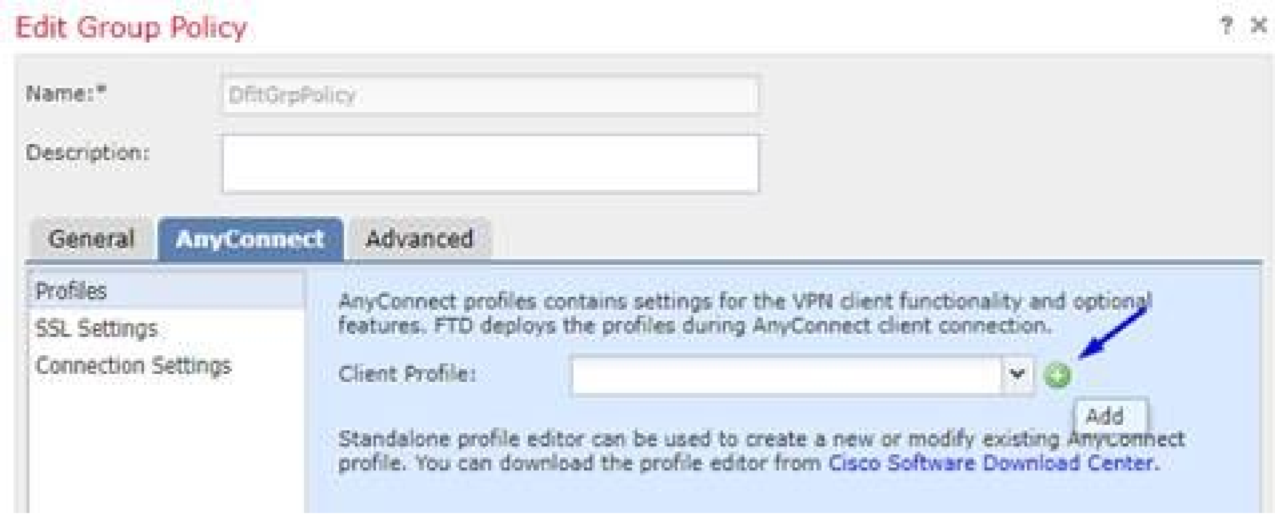
Group Policy:

A group policy is a collection of user-oriented session attributes which are assigned to client when a VPN connection is established. Select or create a Group Policy object.

Group Policy:* DfltGrpPolicy

Edit Group Policy

AnyConnect 탭 > **Profiles** > Add를 **클릭합니다**



Edit Group Policy

Name:* DfltGrpPolicy

Description:

General | AnyConnect | Advanced

Profiles

SSL Settings

Connection Settings

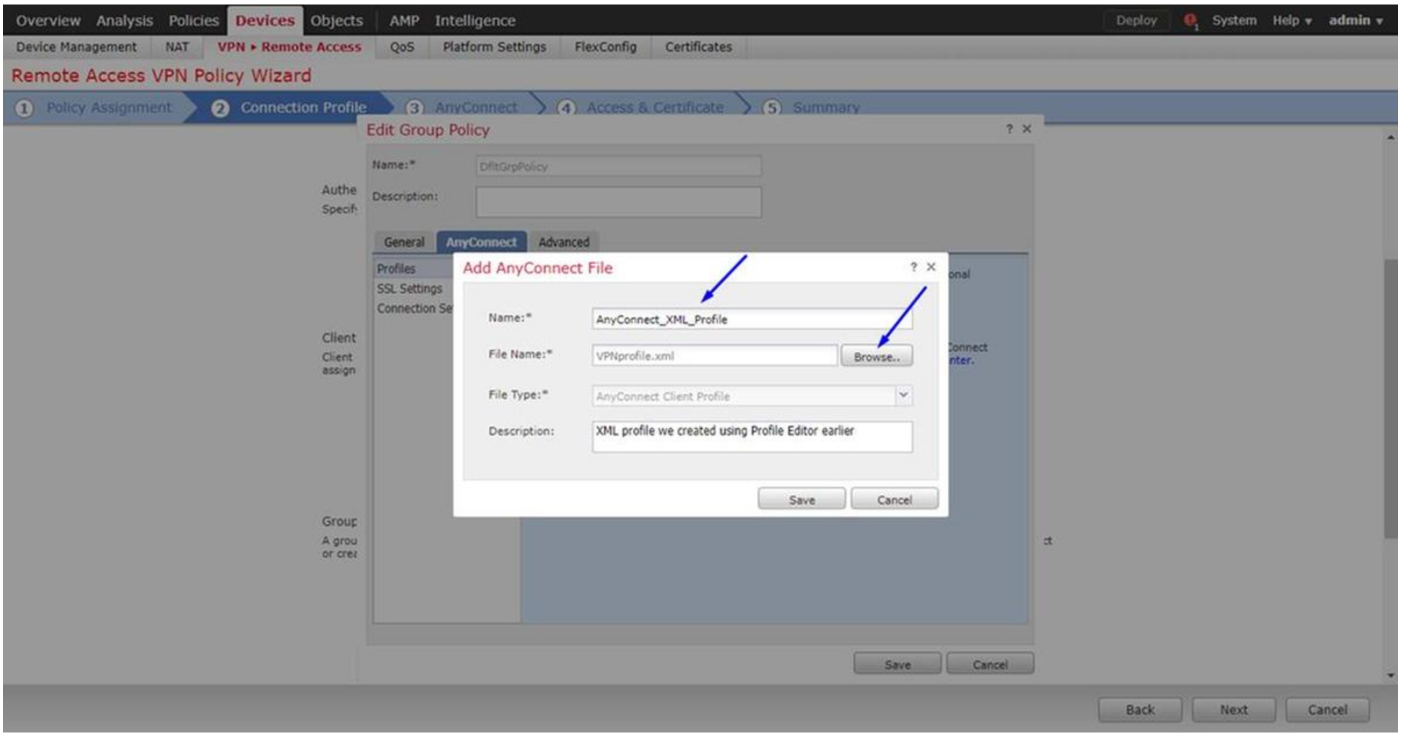
AnyConnect profiles contains settings for the VPN client functionality and optional features. FTD deploys the profiles during AnyConnect client connection.

Client Profile:

Add

Standalone profile editor can be used to create a new or modify existing AnyConnect profile. You can download the profile editor from Cisco Software Download Center.

이름을 입력하고 **Browse...**를 클릭하고 위의 4단계에서 VPNprofile.xml 파일을 선택합니다.


Overview Analysis Policies Devices Objects AMP Intelligence
Deploy System Help admin
Device Management NAT VPN ▸ Remote Access QoS Platform Settings FlexConfig Certificates
Remote Access VPN Policy Wizard
1 Policy Assignment
2 Connection Profile
3 AnyConnect
4 Access & Certificate
5 Summary
Back
Next
Cancel

Edit Group Policy

Name:* DfltGrpPolicy

Description:

General | AnyConnect | Advanced

Add AnyConnect File

Name:* AnyConnect_XML_Profile

File Name:* VPNprofile.xml Browse..

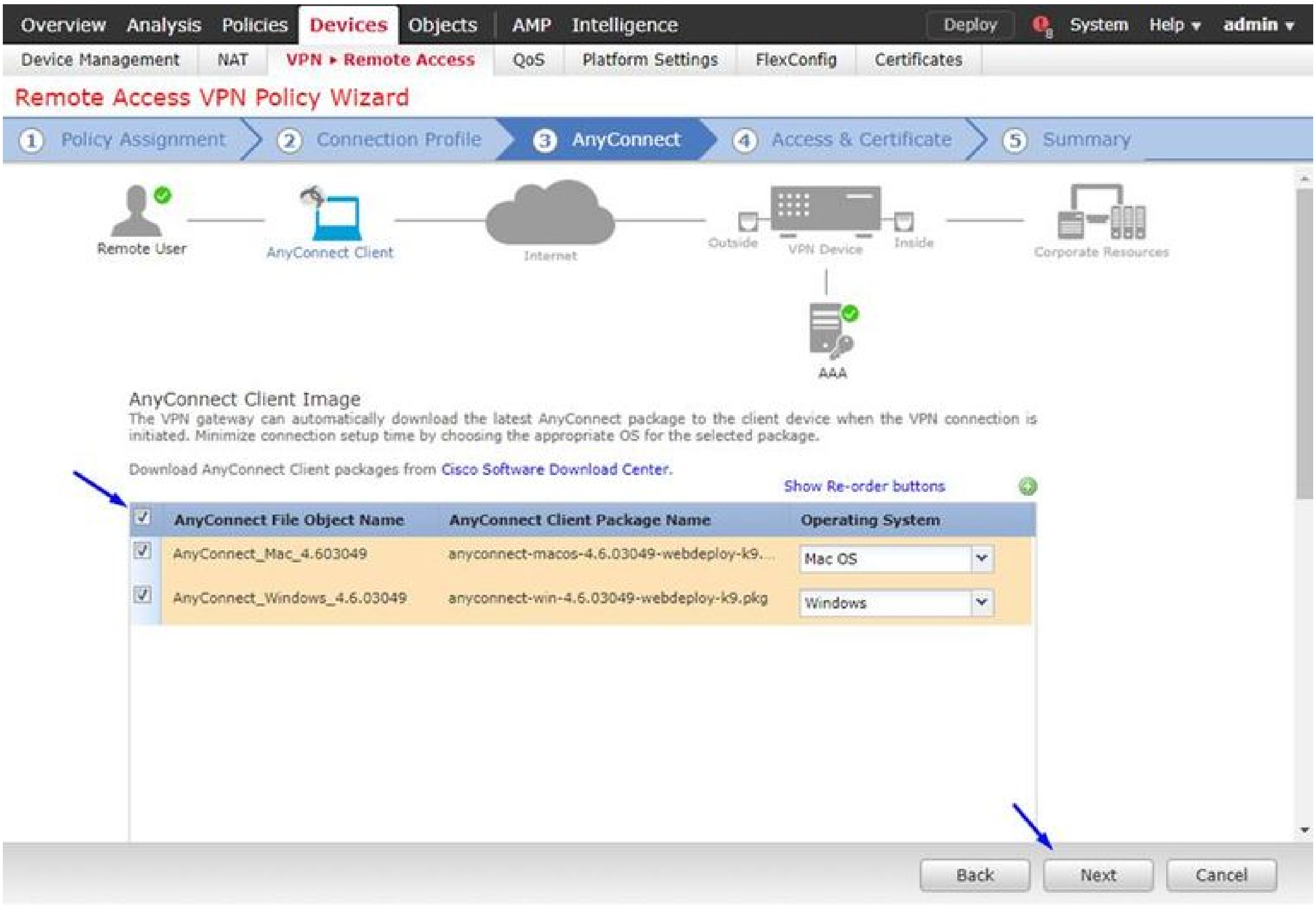
File Type:* AnyConnect Client Profile

Description: XML profile we created using Profile Editor earlier

Save Cancel

Save(**저장**)를 클릭하고 **Next(다음**)를 클릭합니다.

위의 4단계에서 AnyConnect Windows/Mac 파일의 확인란을 선택합니다.



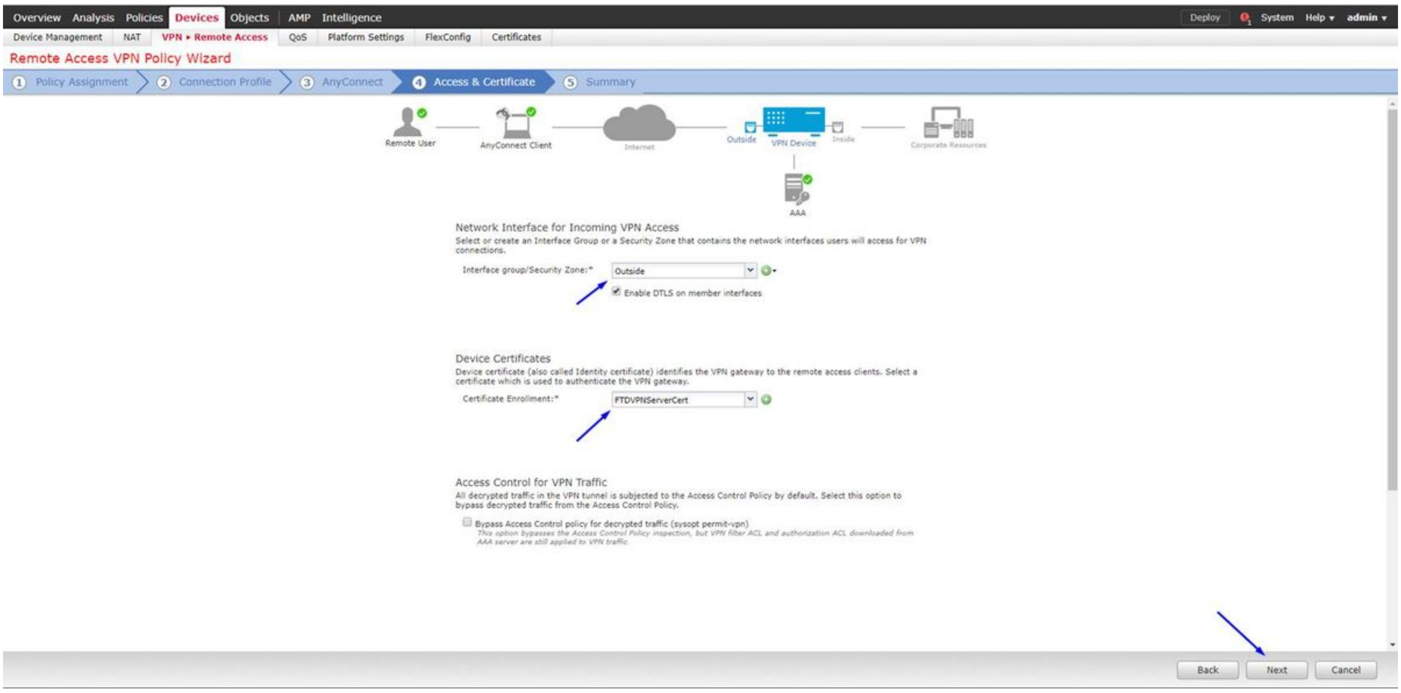
AnyConnect Client Image

The VPN gateway can automatically download the latest AnyConnect 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 AnyConnect Client packages from Cisco Software Download Center.

☑	AnyConnect File Object Name	AnyConnect Client Package Name	Operating System
☑	AnyConnect_Mac_4.603049	anyconnect-macos-4.6.03049-webdeploy-k9...	Mac OS
☑	AnyConnect_Windows_4.6.03049	anyconnect-win-4.6.03049-webdeploy-k9.pkg	Windows

다음을 클릭합니다.
Interface **Group/Security Zone(인터페이스 그룹/보안 영역)**을 **Outside(외부**)로 **선택 Certificate Enrollment를** 위의 3단계에서 작성한 인증서로 선택합니다.



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:* Outside

☑ Enable DTLS on member interfaces

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:* FTDVPNServerCert

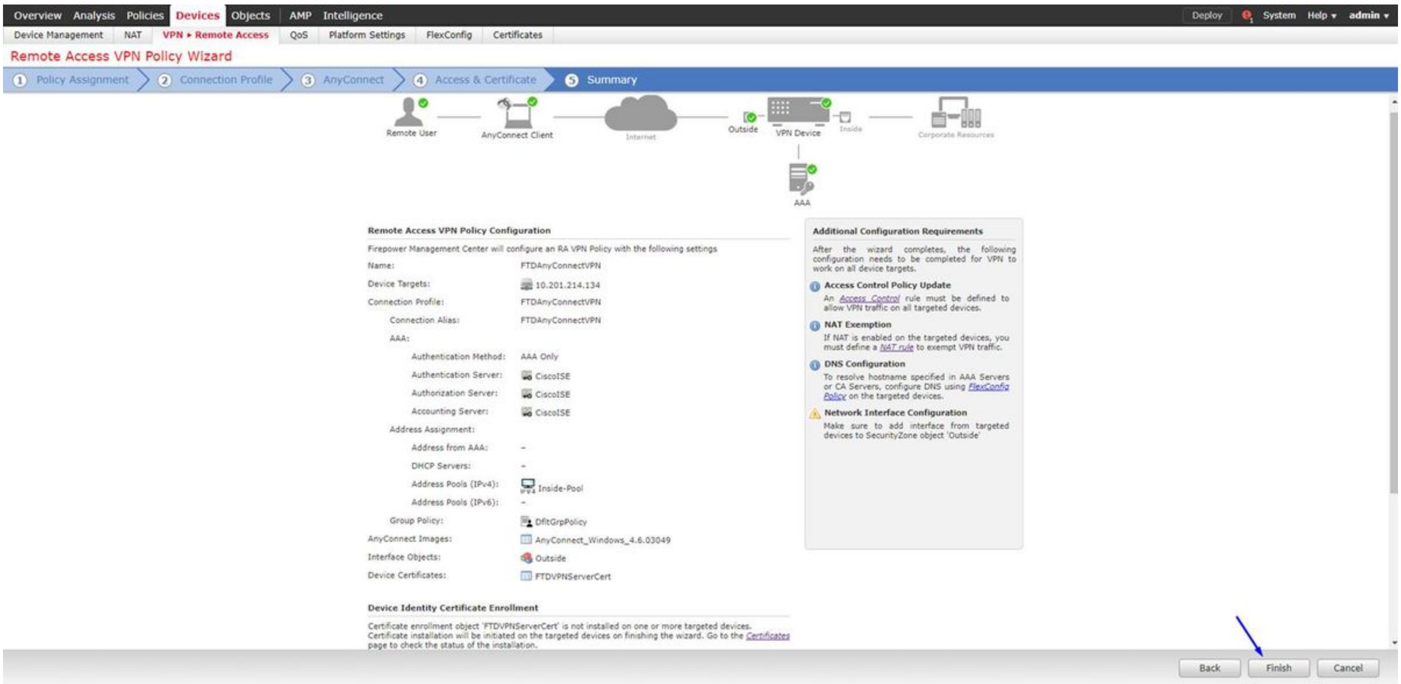
Access Control for VPN Traffic

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.

구성을 검토하고 **Next**(다음)를 클릭합니다.


Overview Analysis Policies Devices Objects AMP Intelligence
Deploy System Help ▾ admin ▾
Device Management NAT VPN ▸ Remote Access QoS Platform Settings FlexConfig Certificates
Remote Access VPN Policy Wizard
① Policy Assignment ② Connection Profile ③ AnyConnect ④ Access & Certificate ⑤ Summary
Remote User
AnyConnect Client
Internet
Outside
VPN Device
Inside
Corporate Resources
AAA
Back
Finish
Cancel

Remote Access VPN Policy Configuration

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

Name:	FTDAnyConnectVPN
Device Targets:	10.201.214.134
Connection Profile:	FTDAnyConnectVPN
Connection Alias:	FTDAnyConnectVPN
AAA:	
Authentication Method:	AAA Only
Authentication Server:	CiscoISE
Authorization Server:	CiscoISE
Accounting Server:	CiscoISE
Address Assignment:	
Address from AAA:	-
DHCP Servers:	-
Address Pools (IPv4):	Inside-Pool
Address Pools (IPv6):	-
Group Policy:	DfltGrpPolicy
AnyConnect Images:	AnyConnect_Windows_4.6.03049
Interface Objects:	Outside
Device Certificates:	FTDVPNServerCert

Device Identity Certificate Enrollment

Certificate enrollment object 'FTDVPNServerCert' is not installed on one or more targeted devices. Certificate installation will be initiated on the targeted devices on finishing the wizard. Go to the Certificates page to check the status of the installation.

Additional Configuration Requirements

After the wizard completes, the following configuration needs to be completed for VPN to work on all device targets.

Access Control Policy Update

An Access Control rule must be defined to allow VPN traffic on all targeted devices.

NAT Exemption

If NAT is enabled on the targeted devices, you must define a NAT rule to exempt VPN traffic.

DNS Configuration

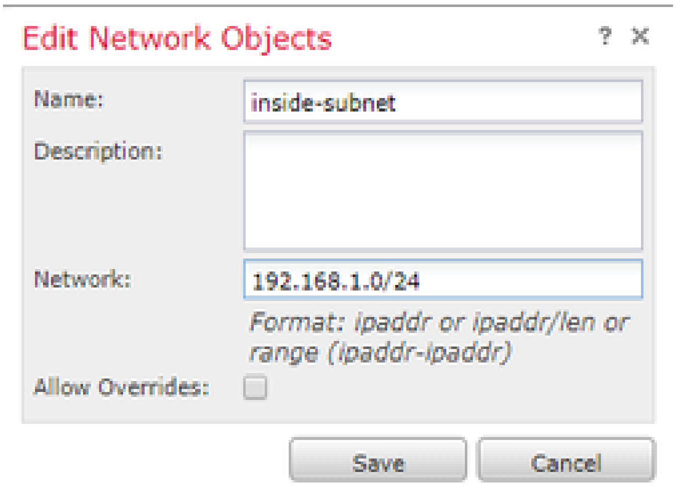
To resolve hostname specified in AAA Servers or CA Servers, configure DNS using FlexConfig Policy on the targeted devices.

Network Interface Configuration

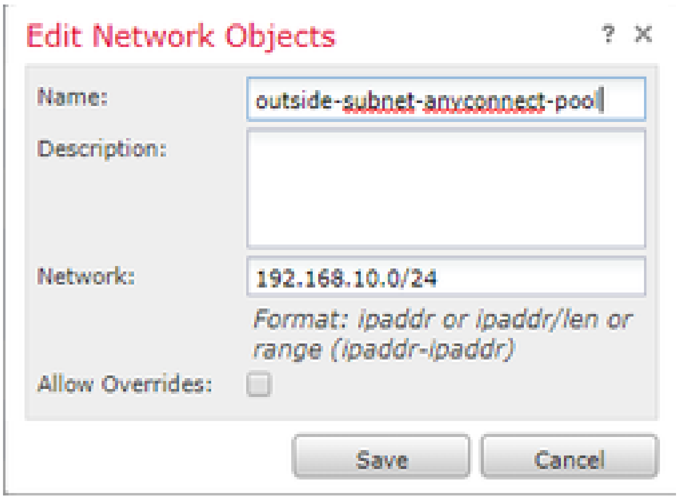
Make sure to add interface from targeted devices to SecurityZone object 'Outside'

NAT에서 VPN 트래픽이 해독되므로 VPN 트래픽을 제외하도록 FTD NAT 규칙을 구성하고 액세스 제어 정책/규칙을 생성합니다.

고정 **NAT 규칙**을 생성하여 VPN 트래픽이 NAT를 받지 않도록 합니다(FTD는 외부 인터페이스로 이동할 때 AnyConnect 패킷을 이미 해독하므로 PC가 이미 내부 인터페이스 뒤에 있고 *이미* 사설 IP 주소가 있는 것처럼 보입니다. VPN 트래픽에 대해 NAT-Exempt(No-NAT) 규칙을 구성해야 합니다.
Objects(**개체**)로 이동 > Add Network(네트워크 추가)**를** 클릭하고 > Add Object(개체 추가)를 **클릭합니다.**



Name:	inside-subnet
Description:	
Network:	192.168.1.0/24 Format: ipaddr or ipaddr/len or range (ipaddr-ipaddr)
Allow Overrides:	□



Edit Network Objects

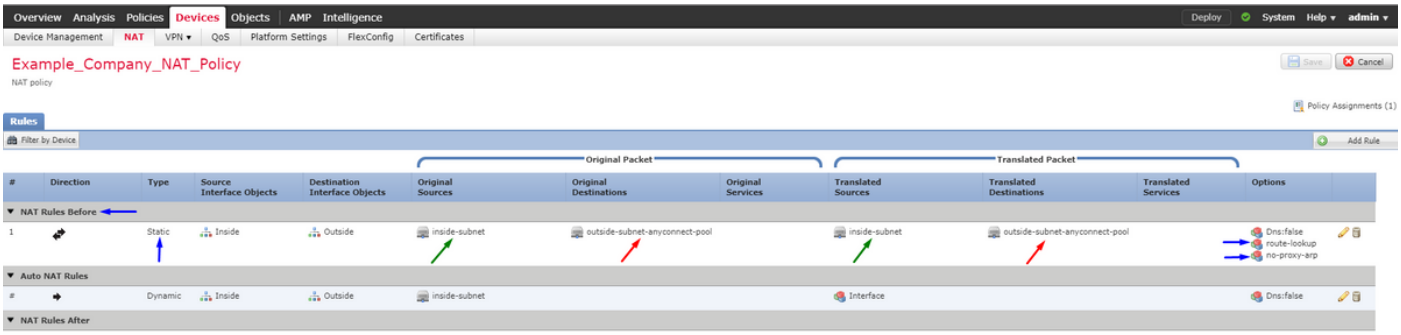
Name: outside-subnet-anyconnect-pool

Description:

Network: 192.168.10.0/24

Format: ipaddr or ipaddr/len or range (ipaddr-ipaddr)

Allow Overrides: □



Example_Company_NAT_Policy

NAT policy

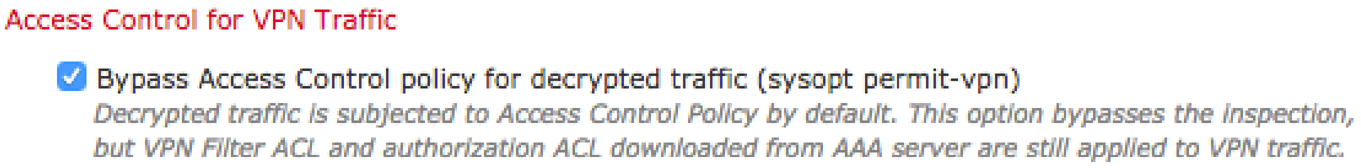
					Original Packet			Translated Packet			
#	Direction	Type	Source Interface Objects	Destination Interface Objects	Original Sources	Original Destinations	Original Services	Translated Sources	Translated Destinations	Translated Services	Options
▼ NAT Rules Before											
1	⇄	Static	Inside	Outside	inside-subnet	outside-subnet-anyconnect-pool		inside-subnet	outside-subnet-anyconnect-pool		Dns:false route-lookup no-proxy-arp
▼ Auto NAT Rules											
#	→	Dynamic	Inside	Outside	inside-subnet			Interface			Dns:false
▼ NAT Rules After											

또한 사용자 VPN이 들어온 후 데이터 트래픽이 흐르도록 허용해야 합니다.두 가지 선택 사항이 있습니다.

a.VPN 사용자가 특정 리소스에 액세스하도록 허용 또는 거부 규칙을 만듭니다.

b.'암호 해독된 트래픽에 대한 액세스 제어 정책 우회' 활성화 - VPN 우회 ACL을 통해 FTD에 성공적으로 연결할 수 있는 모든 사용자가 액세스 제어 정책의 허용 또는 거부 규칙을 거치지 않고 FTD 뒤에 있는 모든 것에 액세스할 수 있습니다.

암호 **해독된 트래픽에 대한 Bypass Access Control Policy를** 다음**에서** 활성화합니다. **장치 > VPN > 원격 액세스 > VPN 프로파일 > 액세스 인터페이스**:



Access Control for VPN Traffic

☑ Bypass Access Control policy for decrypted traffic (sysopt permit-vpn)

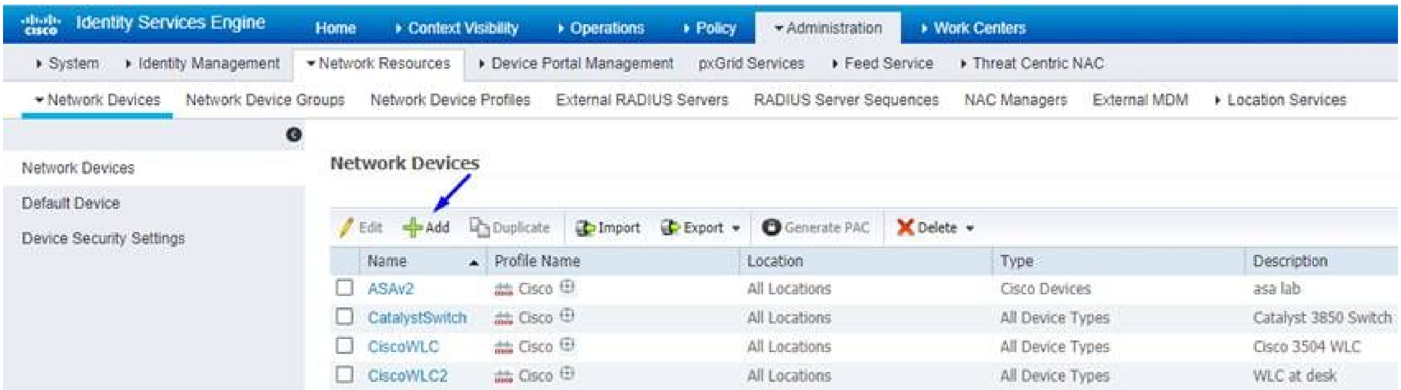
Decrypted traffic is subjected to Access Control Policy by default. This option bypasses the inspection, but VPN Filter ACL and authorization ACL downloaded from AAA server are still applied to VPN traffic.

참고:이 옵션을 활성화하지 않으면 Policies(**정책) > Access Control Policy(액세스 제어 정책**)로 이동하여 VPN 사용자가 내부 또는 dmz에 있는 항목에 액세스할 수 있도록 허용 규칙을 생성해야 합니다.

FirePOWER Management Center의 오른쪽 상단에서 Deployment(구축)를 클릭합니다.

FTD를 네트워크 디바이스로 추가하고 Cisco ISE에서 정책 설정을 구성합니다(RADIUS 공유 암호 사용).

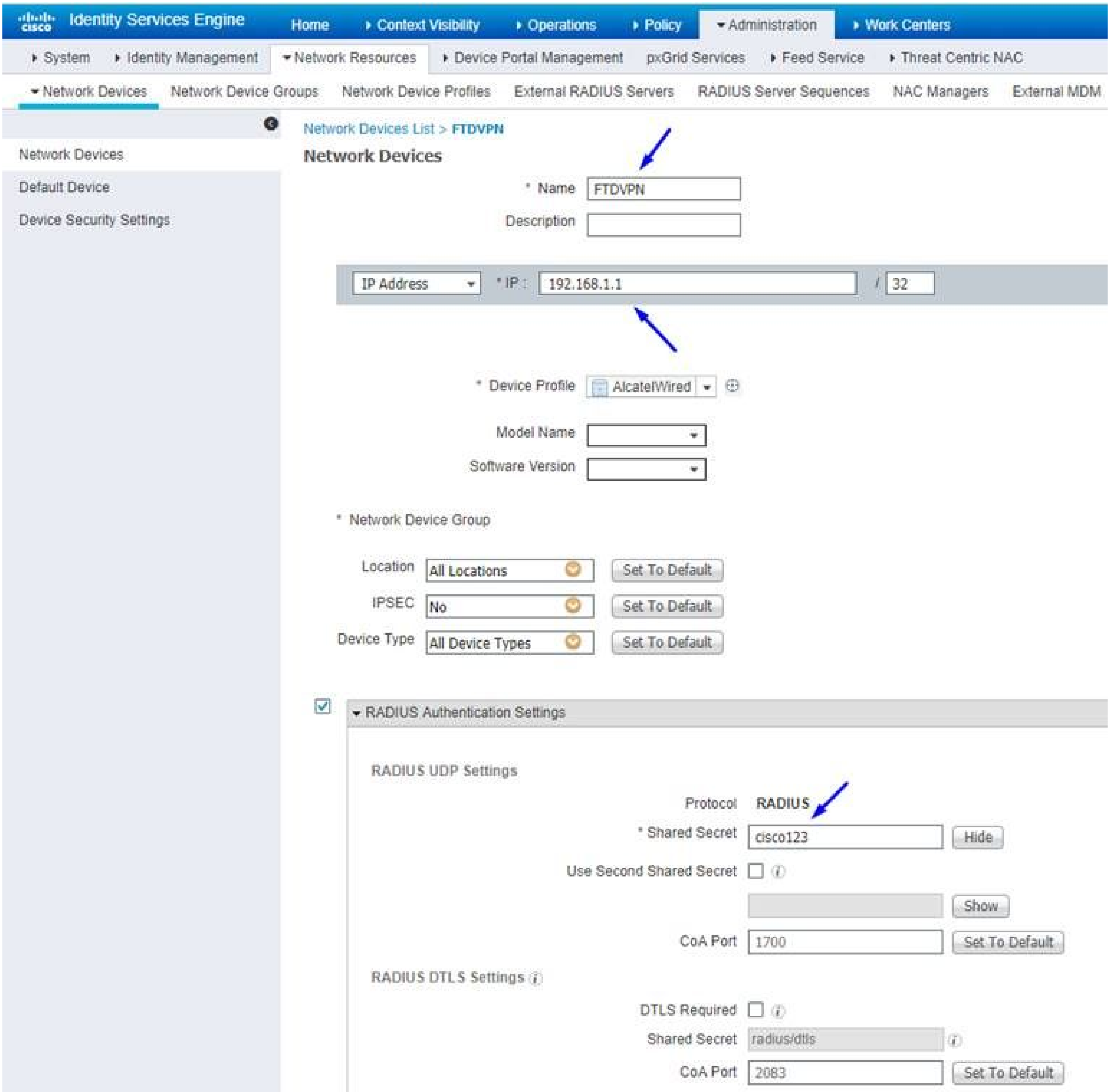
Cisco Identity Services Engine에 로그인하고 Administration(관리) > **Network** Devices(**네트워크** 디바이스) > Add(**추가)를** 클릭합니다.



Network Devices

	Name	Profile Name	Location	Type	Description
□	ASAv2	Cisco	All Locations	Cisco Devices	asa lab
□	CatalystSwitch	Cisco	All Locations	All Device Types	Catalyst 3850 Switch
□	CiscoWLC	Cisco	All Locations	All Device Types	Cisco 3504 WLC
□	CiscoWLC2	Cisco	All Locations	All Device Types	WLC at desk

이름을 입력하고 FTD의 **IP 주소**를 입력하고 위 단계**에서 RADIUS 공유 암호**를 입력합니다.
주의:FTD가 Cisco ISE(RADIUS 서버), 즉 Cisco ISE가 FTD를 통해 연결할 수 있는 FTD 인터페이스에 연결할 수 있는 인터페이스/ip 주소여야 합니다.



Network Devices

* Name: FTDVPN

Description:

IP Address * IP : 192.168.1.1 / 32

* Device Profile: AlcatelWired

Model Name:

Software Version:

* Network Device Group

Location: All Locations — Set To Default

IPSEC: No — Set To Default

Device Type: All Device Types — Set To Default

☑ RADIUS Authentication Settings

RADIUS UDP Settings

Protocol: RADIUS

* Shared Secret: cisco123 — Hide

Use Second Shared Secret: □

Show

CoA Port: 1700 — Set To Default

RADIUS DTLS Settings

DTLS Required: □

Shared Secret: radius/dtls

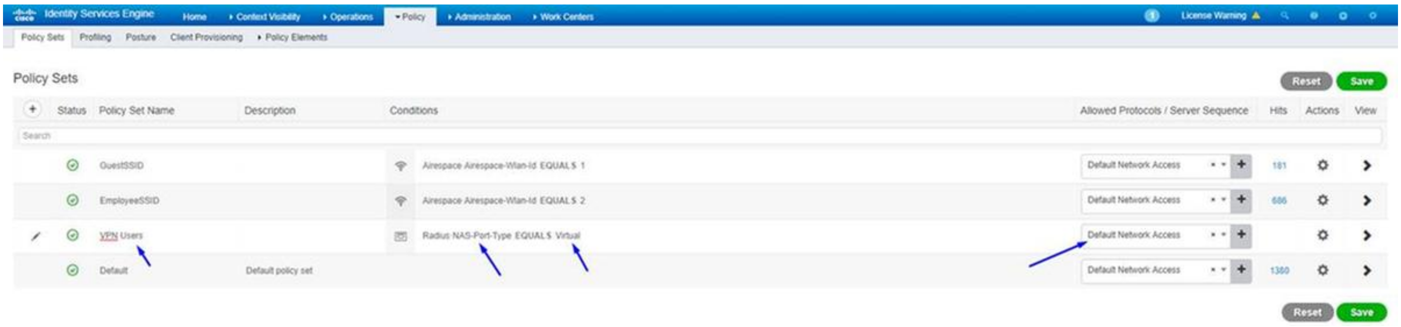
CoA Port: 2083 — Set To Default

Policy(**정책**) > **Policy** Set(**정책** 세트) > create a **Policy** Set for a **Authentication requests(다음 유형**

의 인증 요청에 대해 정책 집합 **생성)를 클릭합니다.**

Radius-NAS-Port-Type EQUALS Virtual

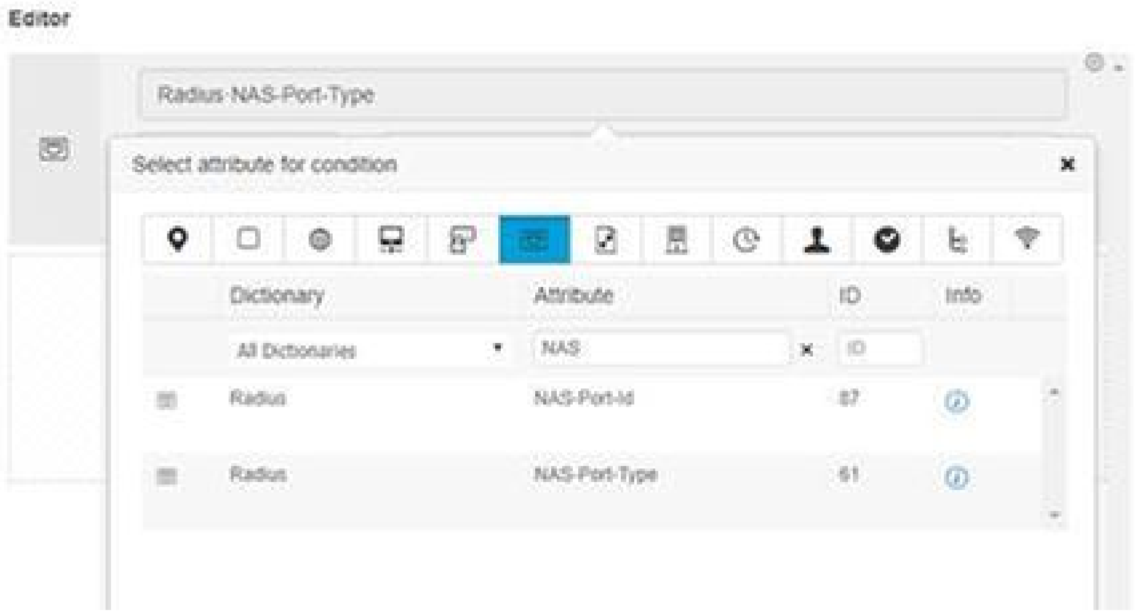
즉, VPN 연결처럼 보이는 ISE로 들어오는 RADIUS 요청이 이 정책 세트에 도달합니다



Policy Sets

Status	Policy Set Name	Description	Conditions	Allowed Protocols / Server Sequence	Hits	Actions	View
✓	GuestSSID		Airespace Airespace-Wlan-Id EQUALS 1	Default Network Access	181	⚙	>
✓	EmployeeSSID		Airespace Airespace-Wlan-Id EQUALS 2	Default Network Access	686	⚙	>
✓	VPN Users		Radius NAS-Port-Type EQUALS Virtual	Default Network Access		⚙	>
✓	Default	Default policy set		Default Network Access	1380	⚙	>

다음은 Cisco ISE에서 해당 조건을 찾을 수 있는 곳입니다.



Editor

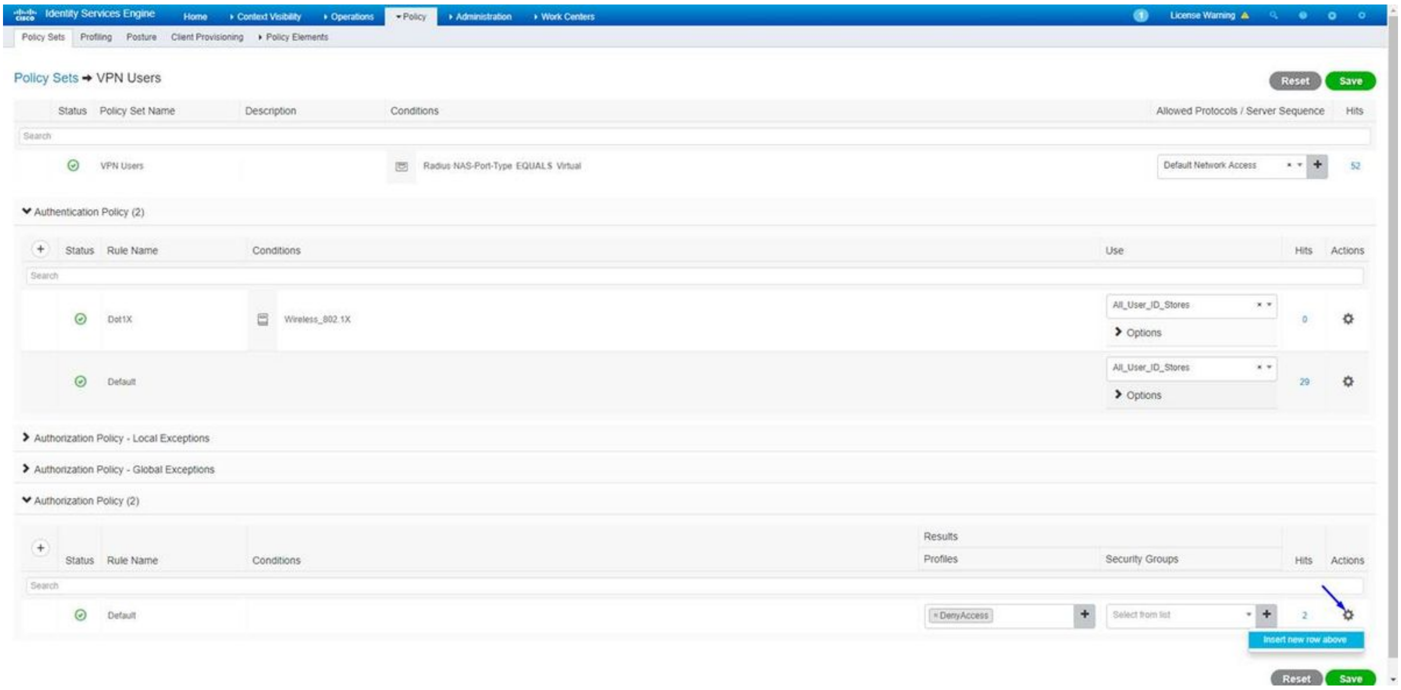
Radius·NAS-Port-Type

Select attribute for condition

	Dictionary	Attribute	ID	Info
	All Dictionaries	NAS	ID	
	Radius	NAS-Port-Id	87	ⓘ
	Radius	NAS-Port-Type	61	ⓘ

위에서 생성한 **정책** 세트 수정

사용자가 'Employees'라는 Active Directory 그룹에 있는 경우에만 **'Permit Access'** 권한 부여 프로필을 제공하기 위해 기본 차단 규칙 위에 규칙**을** 추가합니다.



Policy Sets → VPN Users

Status	Policy Set Name	Description	Conditions	Allowed Protocols / Server Sequence	Hits
✓	VPN Users		Radius·NAS-Port-Type EQUALS Virtual	Default Network Access	52

Authentication Policy (2)

Status	Rule Name	Conditions	Use	Hits	Actions
✓	Dot1X	Wireless_802.1X	All_User_ID_Stores Options	0	⚙
✓	Default		All_User_ID_Stores Options	29	⚙

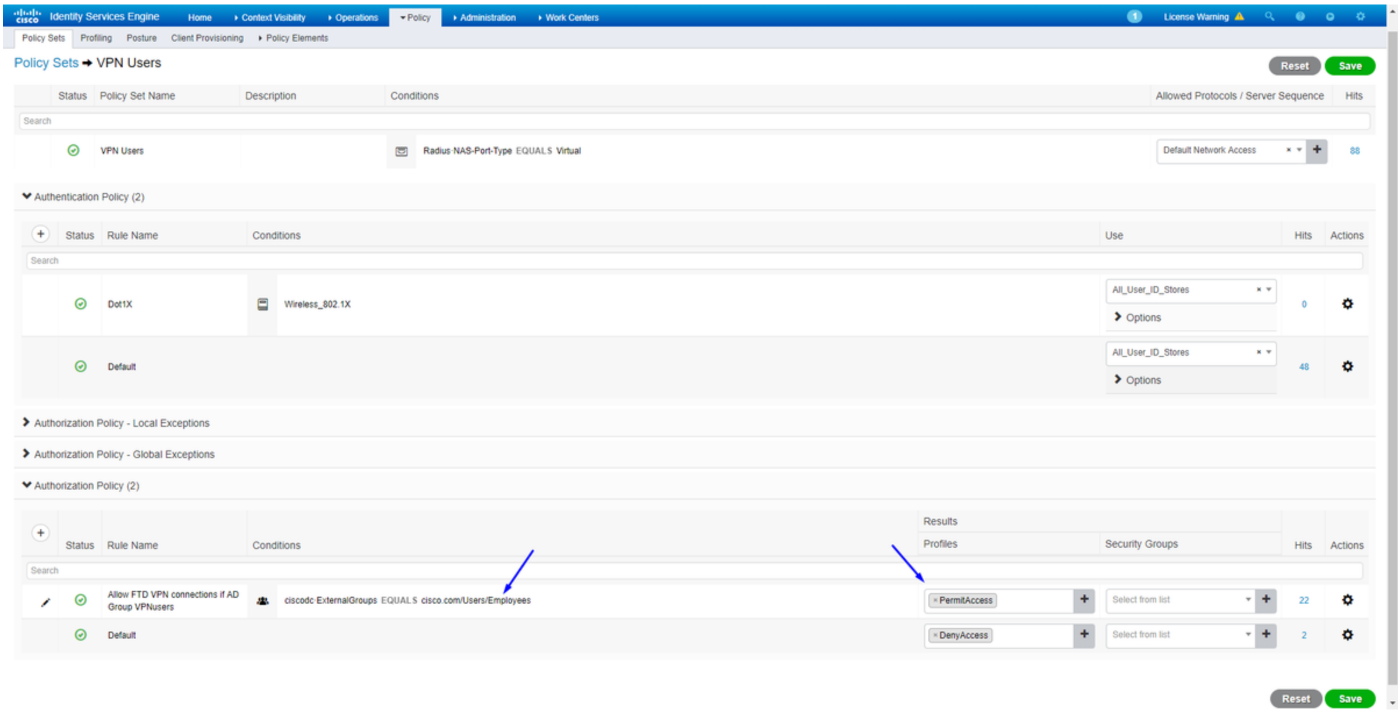
Authorization Policy - Local Exceptions

Authorization Policy - Global Exceptions

Authorization Policy (2)

Status	Rule Name	Conditions	Results Profiles	Security Groups	Hits	Actions
✓	Default		DenyAccess	Select from list	2	⚙

다음은 규칙이 완료되면 표시되는 방식입니다.



Policy Sets → VPN Users

Status	Policy Set Name	Description	Conditions	Allowed Protocols / Server Sequence	Hits
✓	VPN Users		Radius·NAS-Port-Type EQUALS Virtual	Default Network Access	88

Authentication Policy (2)

Status	Rule Name	Conditions	Use	Hits	Actions
✓	Dot1X	Wireless_802.1X	All_User_ID_Stores Options	0	⚙
✓	Default		All_User_ID_Stores Options	48	⚙

Authorization Policy - Local Exceptions

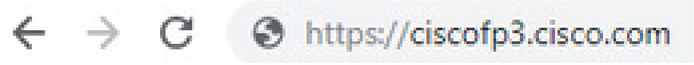
Authorization Policy - Global Exceptions

Authorization Policy (2)

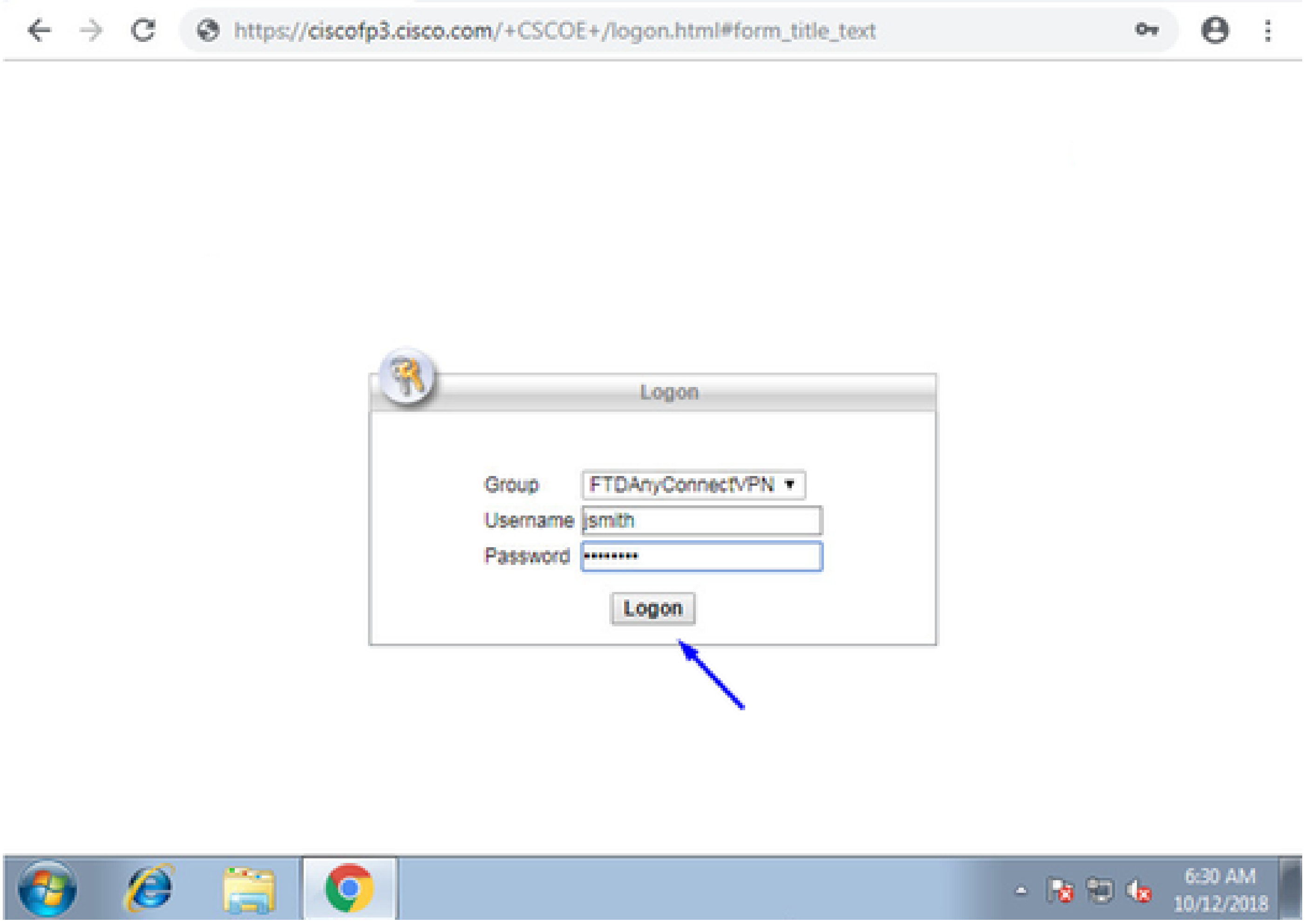
Status	Rule Name	Conditions	Results Profiles	Security Groups	Hits	Actions
✓	Allow FTD VPN connections if AD Group VPNusers	ciscodc·ExternalGroups EQUALS cisco.com/Users/Employees	PermitAccess	Select from list	22	⚙
✓	Default		DenyAccess	Select from list	2	⚙

직원 Windows/Mac PC에서 AnyConnect VPN 클라이언트를 사용하여 FTD에 다운로드, 설치 및 연결

직원 Windows/Mac PC에서 브라우저를 열고 브라우저에서 FTD의 외부 주소로 이동합니다.


https://ciscofp3.cisco.com

Active Directory 사용자 이름 및 암호 입력



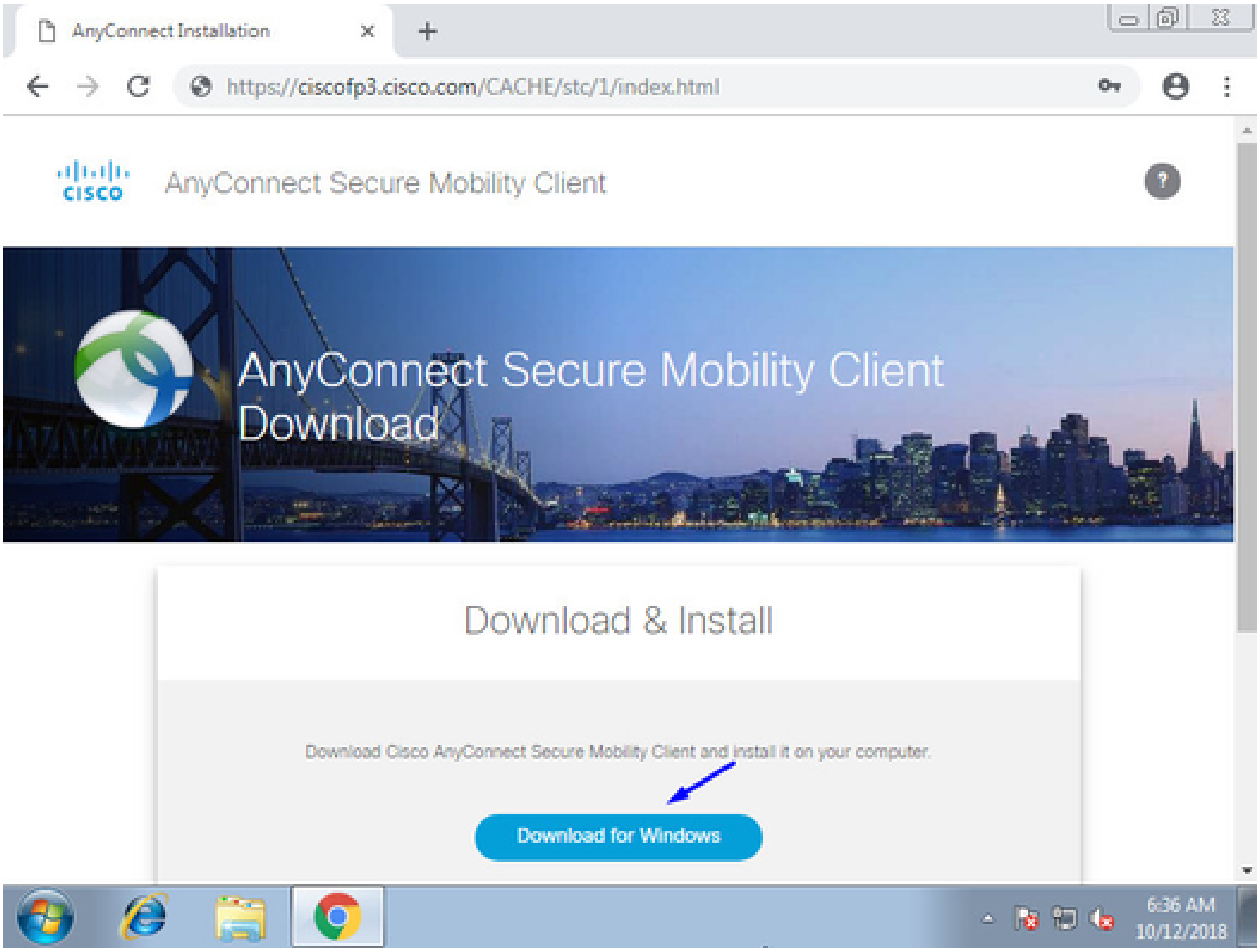
https://ciscofp3.cisco.com/+CSCOE+/logon.html#form_title_text

Group FTDAnyConnectVPN

Username jsmith

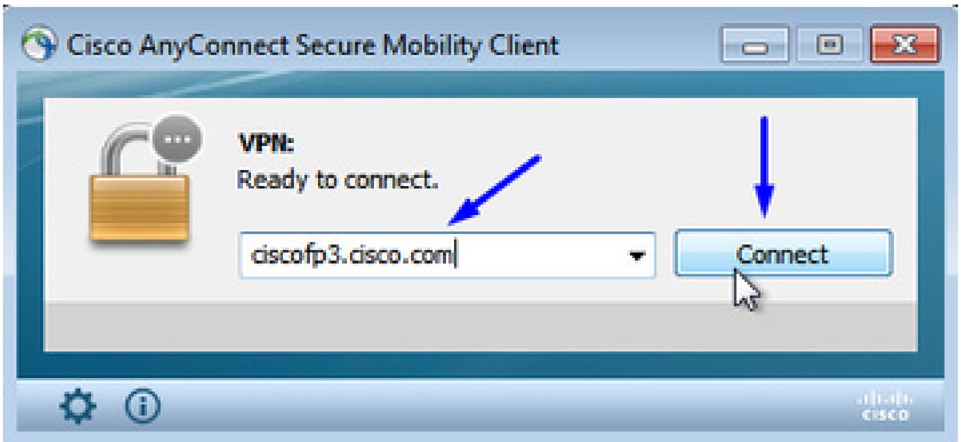
Password •••••••••

Download(다운로드)를 **클릭합니다.**



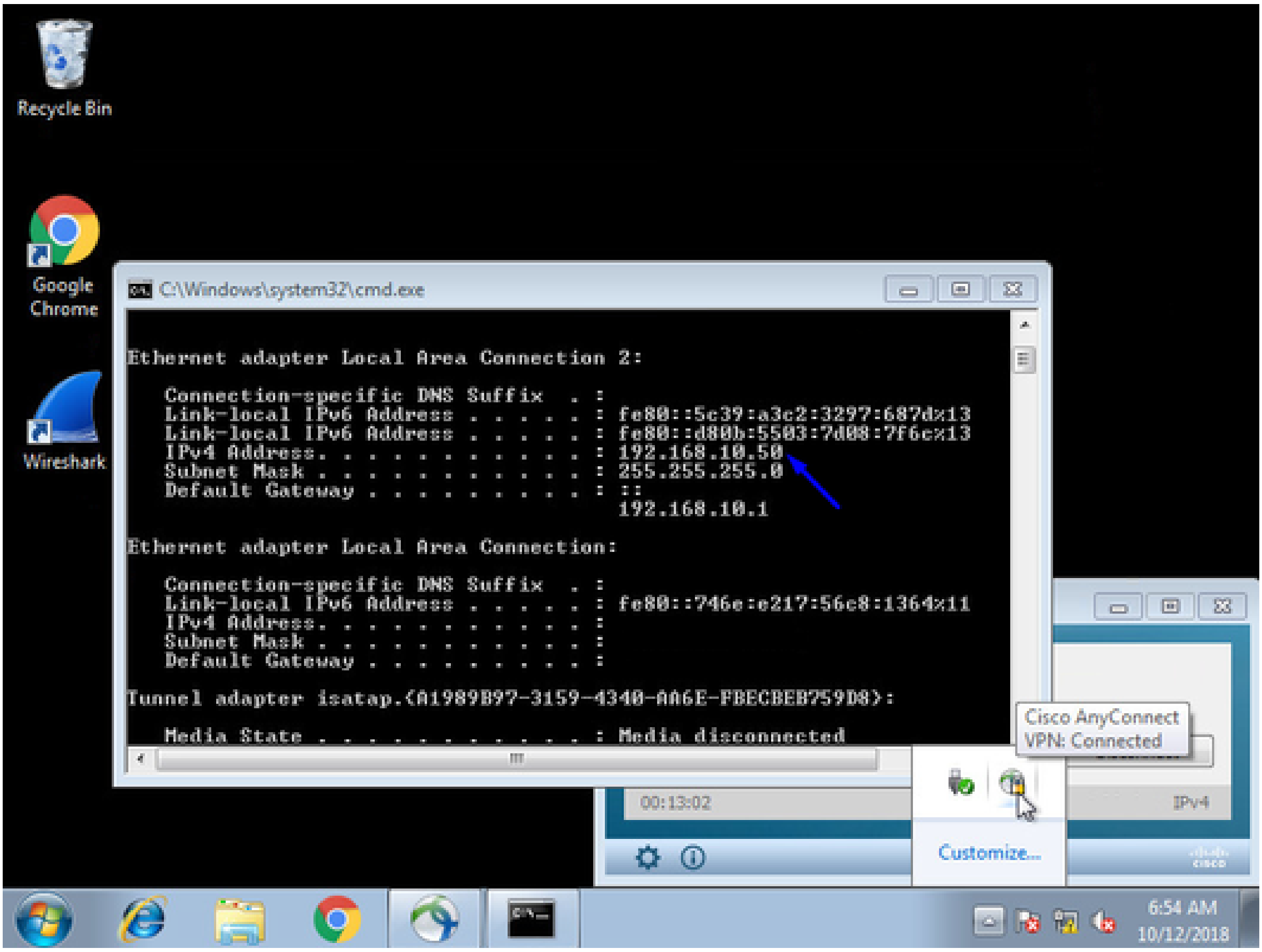
AnyConnect Installation
https://ciscofp3.cisco.com/CACHE/stc/1/index.html
AnyConnect Secure Mobility Client
AnyConnect Secure Mobility Client Download
Download & Install
Download Cisco AnyConnect Secure Mobility Client and install it on your computer.
Download for Windows
6:36 AM
10/12/2018

Windows/Mac PC에서 AnyConnect VPN Secure Mobility Client 설치 및 실행



프롬프트가 표시되면 Active Directory 사용자 이름 및 비밀번호를 입력합니다.

5단계에서 생성한 IP 주소 풀의 IP 주소와 해당 서브넷의 .1의 기본 게이트웨이가 제공됩니다.



```
Ethernet adapter Local Area Connection 2:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::5c39:a3c2:3297:687d%13
   Link-local IPv6 Address . . . . . : fe80::d80b:5503:7d08:7f6c%13
   IPv4 Address. . . . . . . . . . . : 192.168.10.50
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : ::
                                       192.168.10.1

Ethernet adapter Local Area Connection:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::746e:e217:56c8:1364%11
   IPv4 Address. . . . . . . . . . . :
   Subnet Mask . . . . . . . . . . . :
   Default Gateway . . . . . . . . . :

Tunnel adapter isatap.{A1989B97-3159-4340-AA6E-FBECBEB759D8}:

   Media State . . . . . . . . . . . : Media disconnected
```

다음을 확인합니다.

FTD

명령 표시

FTD에서 최종 사용자가 AnyConnect VPN에 연결되어 있는지 확인합니다.

```
> show ip
System IP Addresses:
Interface          Name    IP address  Subnet mask     Method
GigabitEthernet0/0 inside 192.168.1.1 255.255.255.240 CONFIG
GigabitEthernet0/1 outside 203.0.113.2   255.255.255.240 CONFIG
Current IP Addresses:
Interface          Name    IP address  Subnet mask     Method
GigabitEthernet0/0 inside 192.168.1.1 255.255.255.240 CONFIG
GigabitEthernet0/1 outside 203.0.113.2   255.255.255.240 CONFIG

> show vpn-sessiondb detail anyconnect
Session Type: AnyConnect Detailed
Username : jsmith Index : 2
Assigned IP : 192.168.10.50 Public IP : 198.51.100.2
Protocol : AnyConnect-Parent SSL-Tunnel DTLS-Tunnel
License : AnyConnect Premium
Encryption : AnyConnect-Parent: (1)none SSL-Tunnel: (1)AES-GCM-256 DTLS-Tunnel: (1)AES256
```

```
Hashing : AnyConnect-Parent: (1)none SSL-Tunnel: (1)SHA384 DTLS-Tunnel: (1)SHA1
Bytes Tx : 18458 Bytes Rx : 2706024
Pkts Tx : 12 Pkts Rx : 50799
Pkts Tx Drop : 0 Pkts Rx Drop : 0
Group Policy : DfltGrpPolicy Tunnel Group : FTDAnyConnectVPN
Login Time : 15:08:19 UTC Wed Oct 10 2018
Duration : 0h:30m:11s
Inactivity : 0h:00m:00s
VLAN Mapping : N/A VLAN : none
Audt Sess ID : 0ac9d68a000020005bbe15e3
Security Grp : none Tunnel Zone : 0

AnyConnect-Parent Tunnels: 1
SSL-Tunnel Tunnels: 1
DTLS-Tunnel Tunnels: 1

AnyConnect-Parent:
Tunnel ID : 2.1
Public IP : 198.51.100.2
Encryption : none Hashing : none
TCP Src Port : 53956 TCP Dst Port : 443
Auth Mode : userPassword
Idle Time Out: 30 Minutes Idle TO Left : 0 Minutes
Client OS : win
Client OS Ver: 6.1.7601 Service Pack 1
Client Type : AnyConnect
Client Ver : Cisco AnyConnect VPN Agent for Windows 4.6.03049
Bytes Tx : 10572 Bytes Rx : 289
Pkts Tx : 6 Pkts Rx : 0
Pkts Tx Drop : 0 Pkts Rx Drop : 0

SSL-Tunnel:
Tunnel ID : 2.2
Assigned IP : 192.168.10.50 Public IP : 198.51.100.2
Encryption : AES-GCM-256 Hashing : SHA384
Ciphersuite : ECDHE-RSA-AES256-GCM-SHA384
Encapsulation: TLSv1.2 TCP Src Port : 54634
TCP Dst Port : 443 Auth Mode : userPassword
Idle Time Out: 30 Minutes Idle TO Left : 29 Minutes
Client OS : Windows
Client Type : SSL VPN Client
Client Ver : Cisco AnyConnect VPN Agent for Windows 4.6.03049
Bytes Tx : 7886 Bytes Rx : 2519
Pkts Tx : 6 Pkts Rx : 24
Pkts Tx Drop : 0 Pkts Rx Drop : 0

DTLS-Tunnel:
Tunnel ID : 2.3
Assigned IP : 192.168.10.50 Public IP : 198.51.100.2
Encryption : AES256 Hashing : SHA1
Ciphersuite : DHE-RSA-AES256-SHA
Encapsulation: DTLSv1.0 UDP Src Port : 61113
UDP Dst Port : 443 Auth Mode : userPassword
Idle Time Out: 30 Minutes Idle TO Left : 30 Minutes
Client OS : Windows
Client Type : DTLS VPN Client
Client Ver : Cisco AnyConnect VPN Agent for Windows 4.6.03049
Bytes Tx : 0 Bytes Rx : 2703216
Pkts Tx : 0 Pkts Rx : 50775
Pkts Tx Drop : 0 Pkts Rx Drop : 0
```

Windows 7 PC에서 Cisco AnyConnect 클라이언트에서 '연결 끊기'를 클릭하면 다음과 같은 메시지가 표시됩니다.

```
> show vpn-sessiondb detail anyconnect
INFO: There are presently no active sessions
```

캡처

AnyConnect Client에서 연결을 누르면 외부 인터페이스에서 작업 캡처가 어떻게 나타나는지

예:
예를 들어 최종 사용자의 공용 IP는 홈 라우터의 공용 IP가 됩니다.

```
ciscofp3# capture capin interface outside trace detail trace-count 100 match ip any host
```

```
<now hit Connect on AnyConnect Client from employee PC>
ciscofp3# show cap
capture capin type raw-data trace detail trace-count 100 interface outside [Buffer Full - 524153
bytes]
match ip any host 198.51.100.2
```

최종 사용자의 PC에서 FTD의 외부 인터페이스로 전송된 패킷을 보고 Outside FTD 인터페이스에 도착하는지 확인합니다.

```
ciscofp3# show cap capin
2375 packets captured
1: 17:05:56.580994       198.51.100.2.55928 > 203.0.113.2.443: S 2933933902:2933933902(0) win
8192 <mss 1460,nop,wscale 8,nop,nop,sackOK>
2: 17:05:56.581375       203.0.113.2.443 > 198.51.100.2.55928: S 430674106:430674106(0) ack
2933933903 win 32768 <mss 1460>
3: 17:05:56.581757       198.51.100.2.55928 > 203.0.113.2.443: . ack 430674107 win 64240
4: 17:05:56.582382       198.51.100.2.55928 > 203.0.113.2.443: P 2933933903:2933934036(133) ack
430674107 win 64240
5: 17:05:56.582458       203.0.113.2.443 > 198.51.100.2.55928: . ack 2933934036 win 32768
6: 17:05:56.582733       203.0.113.2.443 > 198.51.100.2.55928: P 430674107:430675567(1460) ack
2933934036 win 32768
7: 17:05:56.790211       198.51.100.2.55928 > 203.0.113.2.443: . ack 430675567 win 64240
8: 17:05:56.790349       203.0.113.2.443 > 198.51.100.2.55928: P 430675567:430676672(1105) ack
2933934036 win 32768
9: 17:05:56.791691       198.51.100.2.55928 > 203.0.113.2.443: P 2933934036:2933934394(358) ack
430676672 win 63135
10: 17:05:56.794911       203.0.113.2.443 > 198.51.100.2.55928: P 430676672:430676763(91) ack
2933934394 win 32768
11: 17:05:56.797077       198.51.100.2.55928 > 203.0.113.2.443: P 2933934394:2933934703(309) ack
430676763 win 63044
12: 17:05:56.797169       203.0.113.2.443 > 198.51.100.2.55928: . ack 2933934703 win 32768
13: 17:05:56.797199       198.51.100.2.55928 > 203.0.113.2.443: P 2933934703:2933935524(821) ack
430676763 win 63044
14: 17:05:56.797276       203.0.113.2.443 > 198.51.100.2.55928: . ack 2933935524 win 32768
15: 17:05:56.798634       203.0.113.2.443 > 198.51.100.2.55928: P 430676763:430677072(309) ack
2933935524 win 32768
16: 17:05:56.798786       203.0.113.2.443 > 198.51.100.2.55928: P 430677072:430677829(757) ack
2933935524 win 32768
17: 17:05:56.798817       203.0.113.2.443 > 198.51.100.2.55928: P 430677829:430677898(69) ack
2933935524 win 32768
18: 17:05:56.799397       198.51.100.2.55928 > 203.0.113.2.443: . ack 430677898 win 64240
19: 17:05:56.810215       198.51.100.2.55928 > 203.0.113.2.443: P 2933935524:2933935593(69) ack
430677898 win 64240
20: 17:05:56.810398       203.0.113.2.443 > 198.51.100.2.55928: . ack 2933935593 win 32768
```

```
21: 17:05:56.810428       198.51.100.2.55928 > 203.0.113.2.443: F 2933935593:2933935593(0) ack
430677898 win 64240
22: 17:05:56.810489       203.0.113.2.443 > 198.51.100.2.55928: . ack 2933935594 win 32768
23: 17:05:56.810627       203.0.113.2.443 > 198.51.100.2.55928: FP 430677898:430677898(0) ack
2933935594 win 32768
24: 17:05:56.811008       198.51.100.2.55928 > 203.0.113.2.443: . ack 430677899 win 64240
25: 17:05:59.250566       198.51.100.2.56228 > 203.0.113.2.443: S 2614357960:2614357960(0) win
8192 <mss 1460,nop,wscale 8,nop,nop,sackOK>
26: 17:05:59.250963       203.0.113.2.443 > 198.51.100.2.56228: S 3940915253:3940915253(0) ack
2614357961 win 32768 <mss 1460>
27: 17:05:59.251406       198.51.100.2.56228 > 203.0.113.2.443: . ack 3940915254 win 64240
28: 17:05:59.252062       198.51.100.2.56228 > 203.0.113.2.443: P 2614357961:2614358126(165) ack
3940915254 win 64240
29: 17:05:59.252138       203.0.113.2.443 > 198.51.100.2.56228: . ack 2614358126 win 32768
30: 17:05:59.252458       203.0.113.2.443 > 198.51.100.2.56228: P 3940915254:3940915431(177) ack
2614358126 win 32768
31: 17:05:59.253450       198.51.100.2.56228 > 203.0.113.2.443: P 2614358126:2614358217(91) ack
3940915431 win 64063
32: 17:05:59.253679       203.0.113.2.443 > 198.51.100.2.56228: . ack 2614358217 win 32768
33: 17:05:59.255235       198.51.100.2.56228 > 203.0.113.2.443: P 2614358217:2614358526(309) ack
3940915431 win 64063
34: 17:05:59.255357       203.0.113.2.443 > 198.51.100.2.56228: . ack 2614358526 win 32768
35: 17:05:59.255388       198.51.100.2.56228 > 203.0.113.2.443: P 2614358526:2614359555(1029)
ack 3940915431 win 64063
36: 17:05:59.255495       203.0.113.2.443 > 198.51.100.2.56228: . ack 2614359555 win 32768
37: 17:05:59.400110       203.0.113.2.443 > 198.51.100.2.56228: P 3940915431:3940915740(309) ack
2614359555 win 32768
38: 17:05:59.400186       203.0.113.2.443 > 198.51.100.2.56228: P 3940915740:3940917069(1329)
ack 2614359555 win 32768
39: 17:05:59.400675       198.51.100.2.56228 > 203.0.113.2.443: . ack 3940917069 win 64240
40: 17:05:59.400736       203.0.113.2.443 > 198.51.100.2.56228: P 3940917069:3940918529(1460)
ack 2614359555 win 32768
41: 17:05:59.400751       203.0.113.2.443 > 198.51.100.2.56228: P 3940918529:3940919979(1450)
ack 2614359555 win 32768
42: 17:05:59.401544       198.51.100.2.56228 > 203.0.113.2.443: . ack 3940919979 win 64240
43: 17:05:59.401605       203.0.113.2.443 > 198.51.100.2.56228: P 3940919979:3940921439(1460)
ack 2614359555 win 32768
44: 17:05:59.401666       203.0.113.2.443 > 198.51.100.2.56228: P 3940921439:3940922899(1460)
ack 2614359555 win 32768
45: 17:05:59.401727       203.0.113.2.443 > 198.51.100.2.56228: P 3940922899:3940923306(407) ack
2614359555 win 32768
46: 17:05:59.401743       203.0.113.2.443 > 198.51.100.2.56228: P 3940923306:3940923375(69) ack
2614359555 win 32768
47: 17:05:59.402185       198.51.100.2.56228 > 203.0.113.2.443: . ack 3940923375 win 64240
48: 17:05:59.402475       198.51.100.2.56228 > 203.0.113.2.443: P 2614359555:2614359624(69) ack
3940923375 win 64240
49: 17:05:59.402597       203.0.113.2.443 > 198.51.100.2.56228: . ack 2614359624 win 32768
50: 17:05:59.402628       198.51.100.2.56228 > 203.0.113.2.443: F 2614359624:2614359624(0) ack
3940923375 win 64240
51: 17:05:59.402673       203.0.113.2.443 > 198.51.100.2.56228: . ack 2614359625 win 32768
52: 17:05:59.402765       203.0.113.2.443 > 198.51.100.2.56228: FP 3940923375:3940923375(0) ack
2614359625 win 32768
53: 17:05:59.413384       198.51.100.2.56228 > 203.0.113.2.443: . ack 3940923376 win 64240
54: 17:05:59.555665       198.51.100.2.56280 > 203.0.113.2.443: S 1903869753:1903869753(0) win
8192 <mss 1460,nop,wscale 8,nop,nop,sackOK>
55: 17:05:59.556154       203.0.113.2.443 > 198.51.100.2.56280: S 2583094766:2583094766(0) ack
1903869754 win 32768 <mss 1460>
56: 17:05:59.556627       198.51.100.2.56280 > 203.0.113.2.443: . ack 2583094767 win 64240
57: 17:05:59.560502       198.51.100.2.56280 > 203.0.113.2.443: P 1903869754:1903869906(152) ack
2583094767 win 64240
58: 17:05:59.560578       203.0.113.2.443 > 198.51.100.2.56280: . ack 1903869906 win 32768
59: 17:05:59.563996       203.0.113.2.443 > 198.51.100.2.56280: P 2583094767:2583096227(1460)
ack 1903869906 win 32768
60: 17:05:59.780034       198.51.100.2.56280 > 203.0.113.2.443: . ack 2583096227 win 64240
```

```
61: 17:05:59.780141       203.0.113.2.443 > 198.51.100.2.56280: P 2583096227:2583097673(1446)
ack 1903869906 win 32768
62: 17:05:59.998376       198.51.100.2.56280 > 203.0.113.2.443: . ack 2583097673 win 62794
63: 17:06:14.809253       198.51.100.2.56280 > 203.0.113.2.443: P 1903869906:1903870032(126) ack
2583097673 win 62794
64: 17:06:14.809970       203.0.113.2.443 > 198.51.100.2.56280: P 2583097673:2583097724(51) ack
1903870032 win 32768
65: 17:06:14.815768       198.51.100.2.56280 > 203.0.113.2.443: P 1903870032:1903870968(936) ack
2583097724 win 64240
66: 17:06:14.815860       203.0.113.2.443 > 198.51.100.2.56280: . ack 1903870968 win 32768
67: 17:06:14.816913       203.0.113.2.443 > 198.51.100.2.56280: P 2583097724:2583099184(1460)
ack 1903870968 win 32768
68: 17:06:14.816928       203.0.113.2.443 > 198.51.100.2.56280: P 2583099184:2583099306(122) ack
1903870968 win 32768
69: 17:06:14.816959       203.0.113.2.443 > 198.51.100.2.56280: P 2583099306:2583100766(1460)
ack 1903870968 win 32768
70: 17:06:14.816974       203.0.113.2.443 > 198.51.100.2.56280: P 2583100766:2583100888(122) ack
1903870968 win 32768
71: 17:06:14.816989       203.0.113.2.443 > 198.51.100.2.56280: P 2583100888:2583102142(1254)
ack 1903870968 win 32768
72: 17:06:14.817554       198.51.100.2.56280 > 203.0.113.2.443: . ack 2583102142 win 64240
73: 17:06:14.817615       203.0.113.2.443 > 198.51.100.2.56280: P 2583102142:2583103602(1460)
ack 1903870968 win 32768
74: 17:06:14.817630       203.0.113.2.443 > 198.51.100.2.56280: P 2583103602:2583103930(328) ack
1903870968 win 32768
75: 17:06:14.817630       203.0.113.2.443 > 198.51.100.2.56280: P 2583103930:2583104052(122) ack
1903870968 win 32768
76: 17:06:14.817645       203.0.113.2.443 > 198.51.100.2.56280: P 2583104052:2583105512(1460)
ack 1903870968 win 32768
77: 17:06:14.817645       203.0.113.2.443 > 198.51.100.2.56280: P 2583105512:2583105634(122) ack
1903870968 win 32768
78: 17:06:14.817660       203.0.113.2.443 > 198.51.100.2.56280: P 2583105634:2583105738(104) ack
1903870968 win 32768
79: 17:06:14.818088       198.51.100.2.56280 > 203.0.113.2.443: . ack 2583105512 win 64240
80: 17:06:14.818530       198.51.100.2.56280 > 203.0.113.2.443: . ack 2583105738 win 64014
81: 17:06:18.215122       198.51.100.2.58944 > 203.0.113.2.443:  udp 99
82: 17:06:18.215610       203.0.113.2.443 > 198.51.100.2.58944:  udp 48
83: 17:06:18.215671       198.51.100.2.56280 > 203.0.113.2.443: P 1903870968:1903872025(1057)
ack 2583105738 win 64014
84: 17:06:18.215763       203.0.113.2.443 > 198.51.100.2.56280: . ack 1903872025 win 32768
85: 17:06:18.247011       198.51.100.2.58944 > 203.0.113.2.443:  udp 119
86: 17:06:18.247728       203.0.113.2.443 > 198.51.100.2.58944:  udp 188
87: 17:06:18.249285       198.51.100.2.58944 > 203.0.113.2.443:  udp 93
88: 17:06:18.272309       198.51.100.2.58944 > 203.0.113.2.443:  udp 93
89: 17:06:18.277680       198.51.100.2.58944 > 203.0.113.2.443:  udp 93
90: 17:06:18.334501       198.51.100.2.58944 > 203.0.113.2.443:  udp 221
91: 17:06:18.381541       198.51.100.2.58944 > 203.0.113.2.443:  udp 109
92: 17:06:18.443565       198.51.100.2.58944 > 203.0.113.2.443:  udp 109
93: 17:06:18.786702       198.51.100.2.58944 > 203.0.113.2.443:  udp 157
94: 17:06:18.786870       198.51.100.2.58944 > 203.0.113.2.443:  udp 157
95: 17:06:18.786931       198.51.100.2.58944 > 203.0.113.2.443:  udp 157
96: 17:06:18.952755       198.51.100.2.58944 > 203.0.113.2.443:  udp 109
97: 17:06:18.968272       198.51.100.2.58944 > 203.0.113.2.443:  udp 109
98: 17:06:18.973902       198.51.100.2.58944 > 203.0.113.2.443:  udp 109
99: 17:06:18.973994       198.51.100.2.58944 > 203.0.113.2.443:  udp 109
100: 17:06:18.989267       198.51.100.2.58944 > 203.0.113.2.443:  udp 109
```

방화벽 내의 최종 사용자로부터 들어오는 패킷에 대한 세부 사항 보기

```
ciscofp3# show cap capin packet-number 1 trace detail
2943 packets captured
```

```
1: 17:05:56.580994 006b.f1e7.6c5e 000c.294f.ac84 0x0800 Length: 66
198.51.100.2.55928 > 203.0.113.2.443: S [tcp sum ok] 2933933902:2933933902(0) win 8192 <mss
1460,nop,wscale 8,nop,nop,sackOK> (DF) (ttl 127, id 31008)

Phase: 1
Type: CAPTURE
Subtype:
Result: ALLOW
Config:
Additional Information:
Forward Flow based lookup yields rule:
in id=0x2ace13beec90, priority=13, domain=capture, deny=false
hits=2737, user_data=0x2ace1232af40, cs_id=0x0, l3_type=0x0
src mac=0000.0000.0000, mask=0000.0000.0000
dst mac=0000.0000.0000, mask=0000.0000.0000
input_ifc=outside, output_ifc=any

Phase: 2
Type: ACCESS-LIST
Subtype:
Result: ALLOW
Config:
Implicit Rule
Additional Information:
Forward Flow based lookup yields rule:
in id=0x2ace107c8480, priority=1, domain=permit, deny=false
hits=183698, user_data=0x0, cs_id=0x0, l3_type=0x8
src mac=0000.0000.0000, mask=0000.0000.0000
dst mac=0000.0000.0000, mask=0100.0000.0000
input_ifc=outside, output_ifc=any

Phase: 3
Type: ROUTE-LOOKUP
Subtype: Resolve Egress Interface
Result: ALLOW
Config:
Additional Information:
found next-hop 203.0.113.2 using egress ifc identity

Phase: 4
Type: ACCESS-LIST
Subtype:
Result: ALLOW
Config:
Implicit Rule
Additional Information:
Forward Flow based lookup yields rule:
in id=0x2ace1199f680, priority=119, domain=permit, deny=false
hits=68, user_data=0x0, cs_id=0x0, flags=0x0, protocol=6
src ip/id=0.0.0.0, mask=0.0.0.0, port=0, tag=any
dst ip/id=0.0.0.0, mask=0.0.0.0, port=443, tag=any, dscp=0x0
input_ifc=outside, output_ifc=identity

Phase: 5
Type: CONN-SETTINGS
Subtype:
Result: ALLOW
Config:
Additional Information:
Forward Flow based lookup yields rule:
in id=0x2ace1199efd0, priority=8, domain=conn-set, deny=false
hits=68, user_data=0x2ace1199e5d0, cs_id=0x0, reverse, flags=0x0, protocol=6
src ip/id=0.0.0.0, mask=0.0.0.0, port=0, tag=any
```

```
dst ip/id=0.0.0.0, mask=0.0.0.0, port=443, tag=any, dscp=0x0
input_ifc=outside, output_ifc=identity

Phase: 6
Type: NAT
Subtype: per-session
Result: ALLOW
Config:
Additional Information:
Forward Flow based lookup yields rule:
in id=0x2ace0fa81330, priority=0, domain=nat-per-session, deny=false
hits=178978, user_data=0x0, cs_id=0x0, reverse, use_real_addr, flags=0x0, protocol=6
src ip/id=0.0.0.0, mask=0.0.0.0, port=0, tag=any
dst ip/id=0.0.0.0, mask=0.0.0.0, port=0, tag=any, dscp=0x0
input_ifc=any, output_ifc=any

Phase: 7
Type: IP-OPTIONS
Subtype:
Result: ALLOW
Config:
Additional Information:
Forward Flow based lookup yields rule:
in id=0x2ace107cdb00, priority=0, domain=inspect-ip-options, deny=true
hits=174376, user_data=0x0, cs_id=0x0, reverse, flags=0x0, protocol=0
src ip/id=0.0.0.0, mask=0.0.0.0, port=0, tag=any
dst ip/id=0.0.0.0, mask=0.0.0.0, port=0, tag=any, dscp=0x0
input_ifc=outside, output_ifc=any

Phase: 8
Type: CLUSTER-REDIRECT
Subtype: cluster-redirect
Result: ALLOW
Config:
Additional Information:
Forward Flow based lookup yields rule:
in id=0x2ace107c90c0, priority=208, domain=cluster-redirect, deny=false
hits=78, user_data=0x0, cs_id=0x0, flags=0x0, protocol=0
src ip/id=0.0.0.0, mask=0.0.0.0, port=0, tag=any
dst ip/id=0.0.0.0, mask=0.0.0.0, port=0, tag=any, dscp=0x0
input_ifc=outside, output_ifc=identity

Phase: 9
Type: TCP-MODULE
Subtype: webvpn
Result: ALLOW
Config:
Additional Information:
Forward Flow based lookup yields rule:
in id=0x2ace1199df20, priority=13, domain=soft-np-tcp-module, deny=false
hits=58, user_data=0x2ace061efb00, cs_id=0x0, reverse, flags=0x0, protocol=6
src ip/id=0.0.0.0, mask=0.0.0.0, port=0, tag=any
dst ip/id=0.0.0.0, mask=0.0.0.0, port=443, tag=any, dscp=0x0
input_ifc=outside, output_ifc=identity

Phase: 10
Type: VPN
Subtype: ipsec-tunnel-flow
Result: ALLOW
Config:
Additional Information:
Forward Flow based lookup yields rule:
in id=0x2ace11d455e0, priority=13, domain=ipsec-tunnel-flow, deny=true
hits=87214, user_data=0x0, cs_id=0x0, flags=0x0, protocol=0
```

```
src ip/id=0.0.0.0, mask=0.0.0.0, port=0, tag=any
dst ip/id=0.0.0.0, mask=0.0.0.0, port=0, tag=any, dscp=0x0
input_ifc=outside, output_ifc=any

Phase: 11
Type: CAPTURE
Subtype:
Result: ALLOW
Config:
Additional Information:
Forward Flow based lookup yields rule:
in id=0x2ace11da7000, priority=13, domain=capture, deny=false
hits=635, user_data=0x2ace1232af40, cs_id=0x2ace11f21620, reverse, flags=0x0, protocol=0
src ip/id=198.51.100.2, mask=255.255.255.255, port=0, tag=any
dst ip/id=0.0.0.0, mask=0.0.0.0, port=0, tag=any, dscp=0x0
input_ifc=outside, output_ifc=any

Phase: 12
Type: CAPTURE
Subtype:
Result: ALLOW
Config:
Additional Information:
Reverse Flow based lookup yields rule:
out id=0x2ace10691780, priority=13, domain=capture, deny=false
hits=9, user_data=0x2ace1232af40, cs_id=0x2ace11f21620, reverse, flags=0x0, protocol=0
src ip/id=0.0.0.0, mask=0.0.0.0, port=0, tag=any
dst ip/id=198.51.100.2, mask=255.255.255.255, port=0, tag=any, dscp=0x0
input_ifc=any, output_ifc=outside

Phase: 13
Type: FLOW-CREATION
Subtype:
Result: ALLOW
Config:
Additional Information:
New flow created with id 87237, packet dispatched to next module
Module information for forward flow ...
snp_fp_inspect_ip_options
snp_fp_tcp_normalizer
snp_fp_tcp_mod
snp_fp_adjacency
snp_fp_fragment
snp_fp_drop

Module information for reverse flow ...
snp_fp_inspect_ip_options
snp_fp_tcp_normalizer
snp_fp_adjacency
snp_fp_fragment
snp_ifc_stat

Result:
input-interface: outside
input-status: up
input-line-status: up
output-interface: NP Identity Ifc
Action: allow

1 packet shown
ciscofp3#
```

캡처를 disk0에 복사합니다.있습니다그런 다음 SCP, FTP 또는 TFTP를 통해 다운로드할 수 있습니다

(또는 FirePOWER Management Center 웹 UI >> System >> Health >> Health Monitor >> Advanced Troubleshooting >> Download File 탭 클릭)

```
ciscofp3# copy /pcap capture:capin disk0:/capin.pcap
Source capture name [capin]? <hit Enter>
Destination filename [capin.pcap]? <hit Enter>
!!!!!!!!!!!!!!!
207 packets copied in 0.0 secs

ciscofp3# dir
Directory of disk0:/
122 -rwx 198 05:13:44 Apr 01 2018 lina_phase1.log
49 drwx 4096 21:42:20 Jun 30 2018 log
53 drwx 4096 21:42:36 Jun 30 2018 coredumpinfo
110 drwx 4096 14:59:51 Oct 10 2018 csm
123 -rwx 21074 01:26:44 Oct 10 2018 backup-config.cfg
124 -rwx 21074 01:26:44 Oct 10 2018 startup-config
125 -rwx 20354 01:26:44 Oct 10 2018 modified-config.cfg
160 -rwx 60124 17:06:22 Oct 10 2018 capin.pcap

ciscofp3# copy disk0:/capin.pcap tftp:/
Source filename [capin.pcap]? <hit Enter>
Address or name of remote host []? 192.168.1.25 (your TFTP server IP address (your PC if using
tftpd32 or Solarwinds TFTP Server))
Destination filename [capin.pcap]? <hit Enter>
113645 bytes copied in 21.800 secs (5411 bytes/sec)
ciscofp3#

(or from FirePOWER Management Center Web GUI >> System >> Health >> Health Monitor >> click
Advanced Troubleshooting >> click Download File tab)
```

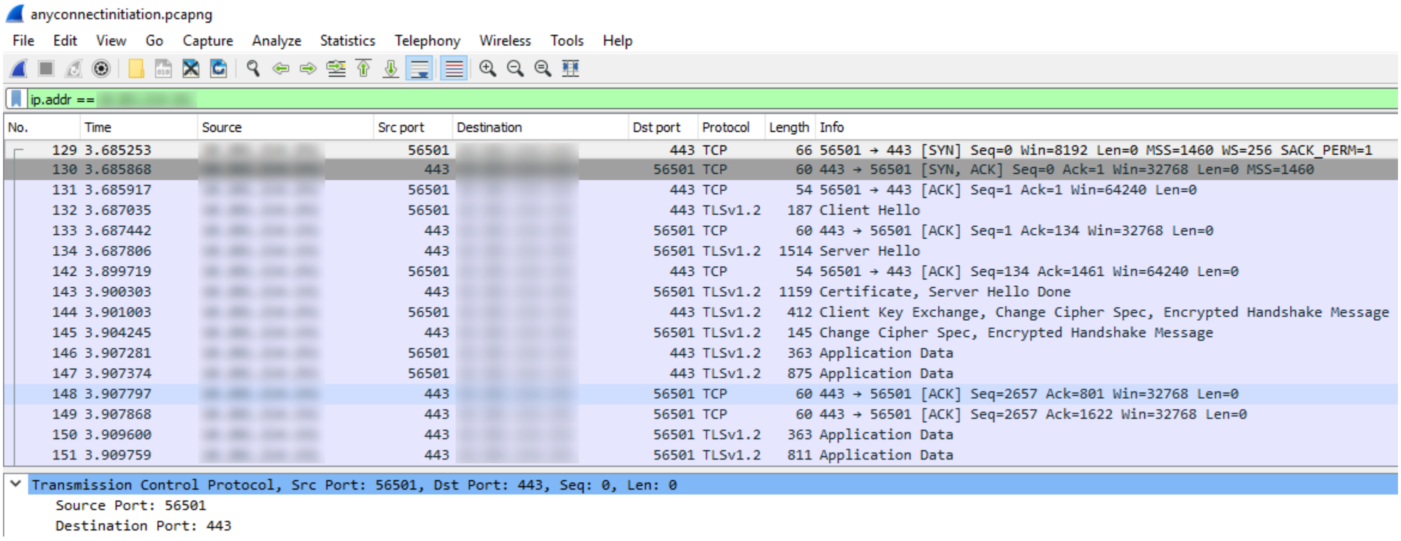
NAT 규칙이 올바르게 구성되었는지 확인합니다.

```
ciscofp3# packet-tracer input outside tcp 192.168.10.50 1234 192.168.1.30 443 detailed

Phase: 1
Type: CAPTURE
Subtype:
Result: ALLOW
Config:
Additional Information:
Forward Flow based lookup yields rule:
in id=0x2ace0fa90e70, priority=13, domain=capture, deny=false
hits=11145169, user_data=0x2ace120c4910, cs_id=0x0, l3_type=0x0
src mac=0000.0000.0000, mask=0000.0000.0000
dst mac=0000.0000.0000, mask=0000.0000.0000
input_ifc=outside, output_ifc=any

Phase: 2
Type: ACCESS-LIST
Subtype:
Result: ALLOW
Config:
Implicit Rule
Additional Information:
Forward Flow based lookup yields rule:
in id=0x2ace107c8480, priority=1, domain=permit, deny=false
hits=6866095, user_data=0x0, cs_id=0x0, l3_type=0x8
src mac=0000.0000.0000, mask=0000.0000.0000
dst mac=0000.0000.0000, mask=0100.0000.0000
input_ifc=outside, output_ifc=any
```

```
Phase: 3
Type: ROUTE-LOOKUP
Subtype: Resolve Egress Interface
Result: ALLOW
Config:
Additional Information:
found next-hop 192.168.1.30 using egress ifc inside

Phase: 4
Type: UN-NAT
Subtype: static
Result: ALLOW
Config:
nat (inside,outside) source static inside-subnet inside-subnet destination static outside-
subnet-anyconnect-po ol outside-subnet-anyconnect-pool no-proxy-arp route-lookup
Additional Information:
NAT divert to egress interface inside
Untranslate 192.168.1.30/443 to 192.168.1.30/443

Phase: 5
Type: ACCESS-LIST
Subtype: log
Result: ALLOW
Config:
access-group CSM_FW_ACL_ global
access-list CSM_FW_ACL_ advanced trust ip ifc outside any any rule-id 268436481 event-log flow-
end
access-list CSM_FW_ACL_ remark rule-id 268436481: PREFILTER POLICY:
Example_Company_Prefilter_Policy
access-list CSM_FW_ACL_ remark rule-id 268436481: RULE: AllowtoVPNOutsideinterface
Additional Information:
Forward Flow based lookup yields rule:
in id=0x2ace0fa8f4e0, priority=12, domain=permit, trust
hits=318637, user_data=0x2ace057b9a80, cs_id=0x0, use_real_addr, flags=0x0, protocol=0
src ip/id=0.0.0.0, mask=0.0.0.0, port=0, tag=any, ifc=outside
dst ip/id=0.0.0.0, mask=0.0.0.0, port=0, tag=any, ifc=any, vlan=0, dscp=0x0
input_ifc=any, output_ifc=any

...

Phase: 7
Type: NAT
Subtype:
Result: ALLOW
Config:
nat (inside,outside) source static inside-subnet inside-subnet destination static outside-
subnet-anyconnect-po ol outside-subnet-anyconnect-pool no-proxy-arp route-lookup
Additional Information:
Static translate 192.168.10.50/1234 to 192.168.10.50/1234
Forward Flow based lookup yields rule:
in id=0x2ace11975cb0, priority=6, domain=nat, deny=false
hits=120, user_data=0x2ace0f29c4a0, cs_id=0x0, flags=0x0, protocol=0
src ip/id=192.168.10.0, mask=255.255.255.0, port=0, tag=any
dst ip/id=10.201.214.128, mask=255.255.255.240, port=0, tag=any, dscp=0x0
input_ifc=outside, output_ifc=inside

...
Phase: 10 Type: VPN Subtype: ipsec-tunnel-flow Result: ALLOW Config: Additional Information:
Forward Flow based lookup yields rule: in id=0x2ace11d455e0, priority=13, domain=ipsec-tunnel-
flow, deny=true hits=3276174, user_data=0x0, cs_id=0x0, flags=0x0, protocol=0 src ip/id=0.0.0.0,
mask=0.0.0.0, port=0, tag=any dst ip/id=0.0.0.0, mask=0.0.0.0, port=0, tag=any, dscp=0x0
input_ifc=outside, output_ifc=any Phase: 11 Type: NAT Subtype: rpf-check Result: ALLOW Config:
nat (inside,outside) source static inside-subnet inside-subnet destination static outside-
```

```
subnet-anyconnect-po ol outside-subnet-anyconnect-pool no-proxy-arp route-lookup
Additional Information:
Forward Flow based lookup yields rule:
out id=0x2ace0d5a9800, priority=6, domain=nat-reverse, deny=false
hits=121, user_data=0x2ace1232a4c0, cs_id=0x0, use_real_addr, flags=0x0, protocol=0
src ip/id=192.168.10.0, mask=255.255.255.0, port=0, tag=any
dst ip/id=10.201.214.128, mask=255.255.255.240, port=0, tag=any, dscp=0x0
input_ifc=outside, output_ifc=inside

...

Phase: 14
Type: FLOW-CREATION
Subtype:
Result: ALLOW
Config:
Additional Information:
New flow created with id 3279248, packet dispatched to next module

Module information for reverse flow ...
...

Phase: 15
Type: ROUTE-LOOKUP
Subtype: Resolve Egress Interface
Result: ALLOW
Config:
Additional Information:
found next-hop 192.168.1.30 using egress ifc inside

Result:
input-interface: outside
input-status: up
input-line-status: up
output-interface: inside
output-status: up
output-line-status: up
Action: allow

ciscofp3#
```

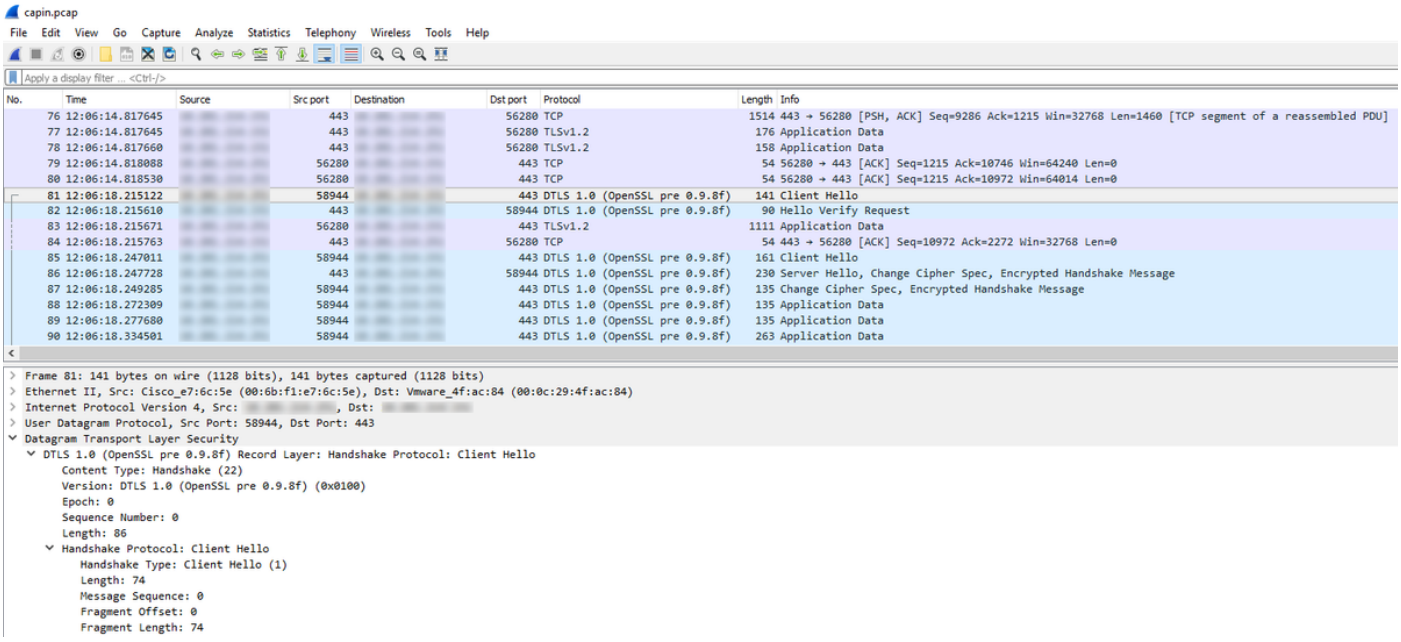
AnyConnect VPN을 통해 FTD에 성공적으로 연결하는 PC의 직원 PC에서 캡처



ip.addr == [redacted]

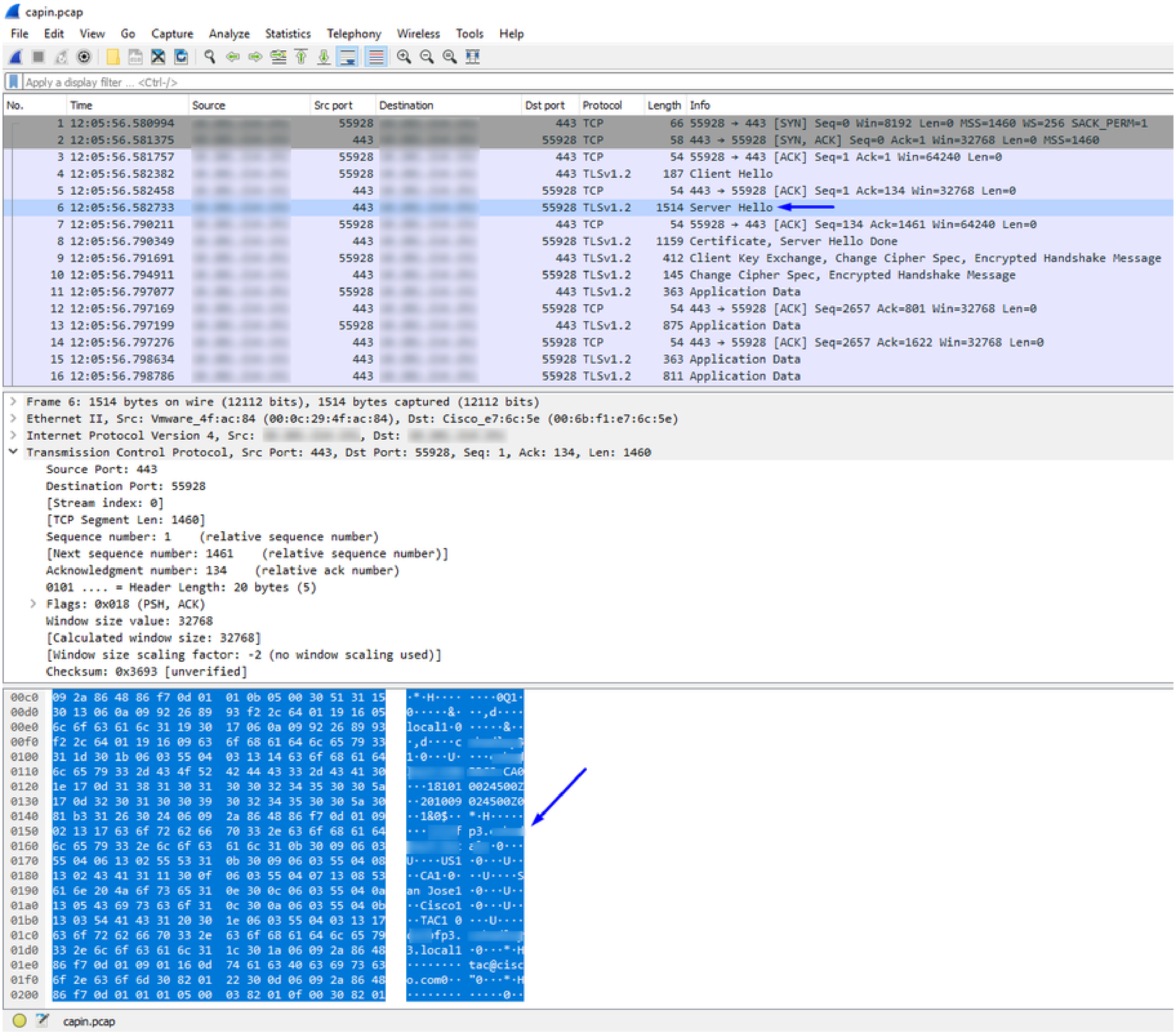
```
No.  Time      Source      Src port Destination Dst port Protocol Length Info
129 3.685253  [redacted]  56501    [redacted]   443 TCP      66 56501 → 443 [SYN] Seq=0 Win=8192 Len=0 MSS=1460 WS=256 SACK_PERM=1
130 3.685868  [redacted]    443    [redacted] 56501 TCP      60 443 → 56501 [SYN, ACK] Seq=0 Ack=1 Win=32768 Len=0 MSS=1460
131 3.685917  [redacted]  56501    [redacted]   443 TCP      54 56501 → 443 [ACK] Seq=1 Ack=1 Win=64240 Len=0
132 3.687035  [redacted]  56501    [redacted]   443 TLSv1.2 187 Client Hello
133 3.687442  [redacted]    443    [redacted] 56501 TCP      60 443 → 56501 [ACK] Seq=1 Ack=134 Win=32768 Len=0
134 3.687806  [redacted]    443    [redacted] 56501 TLSv1.2 1514 Server Hello
142 3.899719  [redacted]  56501    [redacted]   443 TCP      54 56501 → 443 [ACK] Seq=134 Ack=1461 Win=64240 Len=0
143 3.900303  [redacted]    443    [redacted] 56501 TLSv1.2 1159 Certificate, Server Hello Done
144 3.901003  [redacted]  56501    [redacted]   443 TLSv1.2 412 Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
145 3.904245  [redacted]    443    [redacted] 56501 TLSv1.2 145 Change Cipher Spec, Encrypted Handshake Message
146 3.907281  [redacted]  56501    [redacted]   443 TLSv1.2 363 Application Data
147 3.907374  [redacted]  56501    [redacted]   443 TLSv1.2 875 Application Data
148 3.907797  [redacted]    443    [redacted] 56501 TCP      60 443 → 56501 [ACK] Seq=2657 Ack=801 Win=32768 Len=0
149 3.907868  [redacted]    443    [redacted] 56501 TCP      60 443 → 56501 [ACK] Seq=2657 Ack=1622 Win=32768 Len=0
150 3.909600  [redacted]    443    [redacted] 56501 TLSv1.2 363 Application Data
151 3.909759  [redacted]    443    [redacted] 56501 TLSv1.2 811 Application Data

Transmission Control Protocol, Src Port: 56501, Dst Port: 443, Seq: 0, Len: 0
    Source Port: 56501
    Destination Port: 443
```

이 동일한 캡처의 뒷부분에서 DTLS 터널이 형성되는 것을 볼 수도 있습니다



```
capin.pcap
File  Edit  View  Go  Capture  Analyze  Statistics  Telephony  Wireless  Tools  Help
Apply a display filter ... <Ctrl-/>

No. Time             Source      Src port Destination Dst port Protocol                       Length Info
 76 12:06:14.817645  [redacted]       443 [redacted]     56280 TCP                              1514 443 → 56280 [PSH, ACK] Seq=9286 Ack=1215 Win=32768 Len=1460 [TCP segment of a reassembled PDU]
 77 12:06:14.817645  [redacted]       443 [redacted]     56280 TLSv1.2                           176 Application Data
 78 12:06:14.817660  [redacted]       443 [redacted]     56280 TLSv1.2                           158 Application Data
 79 12:06:14.818088  [redacted]     56280 [redacted]       443 TCP                                54 56280 → 443 [ACK] Seq=1215 Ack=10746 Win=64240 Len=0
 80 12:06:14.818530  [redacted]     56280 [redacted]       443 TCP                                54 56280 → 443 [ACK] Seq=1215 Ack=10972 Win=64014 Len=0
 81 12:06:18.215122  [redacted]     58944 [redacted]       443 DTLS 1.0 (OpenSSL pre 0.9.8f)     141 Client Hello
 82 12:06:18.215610  [redacted]       443 [redacted]     58944 DTLS 1.0 (OpenSSL pre 0.9.8f)      90 Hello Verify Request
 83 12:06:18.215671  [redacted]     56280 [redacted]       443 TLSv1.2                          1111 Application Data
 84 12:06:18.215763  [redacted]       443 [redacted]     56280 TCP                                54 443 → 56280 [ACK] Seq=10972 Ack=2272 Win=32768 Len=0
 85 12:06:18.247011  [redacted]     58944 [redacted]       443 DTLS 1.0 (OpenSSL pre 0.9.8f)     161 Client Hello
 86 12:06:18.247728  [redacted]       443 [redacted]     58944 DTLS 1.0 (OpenSSL pre 0.9.8f)     230 Server Hello, Change Cipher Spec, Encrypted Handshake Message
 87 12:06:18.249285  [redacted]     58944 [redacted]       443 DTLS 1.0 (OpenSSL pre 0.9.8f)     135 Change Cipher Spec, Encrypted Handshake Message
 88 12:06:18.272309  [redacted]     58944 [redacted]       443 DTLS 1.0 (OpenSSL pre 0.9.8f)     135 Application Data
 89 12:06:18.277680  [redacted]     58944 [redacted]       443 DTLS 1.0 (OpenSSL pre 0.9.8f)     135 Application Data
 90 12:06:18.334501  [redacted]     58944 [redacted]       443 DTLS 1.0 (OpenSSL pre 0.9.8f)     263 Application Data

> Frame 81: 141 bytes on wire (1128 bits), 141 bytes captured (1128 bits)
> Ethernet II, Src: Cisco_e7:6c:5e (00:6b:f1:e7:6c:5e), Dst: Vmware_4f:ac:84 (00:0c:29:4f:ac:84)
> Internet Protocol Version 4, Src: [redacted], Dst: [redacted]
> User Datagram Protocol, Src Port: 58944, Dst Port: 443
v Datagram Transport Layer Security
  v DTLS 1.0 (OpenSSL pre 0.9.8f) Record Layer: Handshake Protocol: Client Hello
      Content Type: Handshake (22)
      Version: DTLS 1.0 (OpenSSL pre 0.9.8f) (0x0100)
      Epoch: 0
      Sequence Number: 0
      Length: 86
    v Handshake Protocol: Client Hello
        Handshake Type: Client Hello (1)
        Length: 74
        Message Sequence: 0
        Fragment Offset: 0
        Fragment Length: 74
```

AnyConnect PC가 VPN에 성공적으로 연결되었음을 보여 주는 FTD의 외부 인터페이스에서 캡처

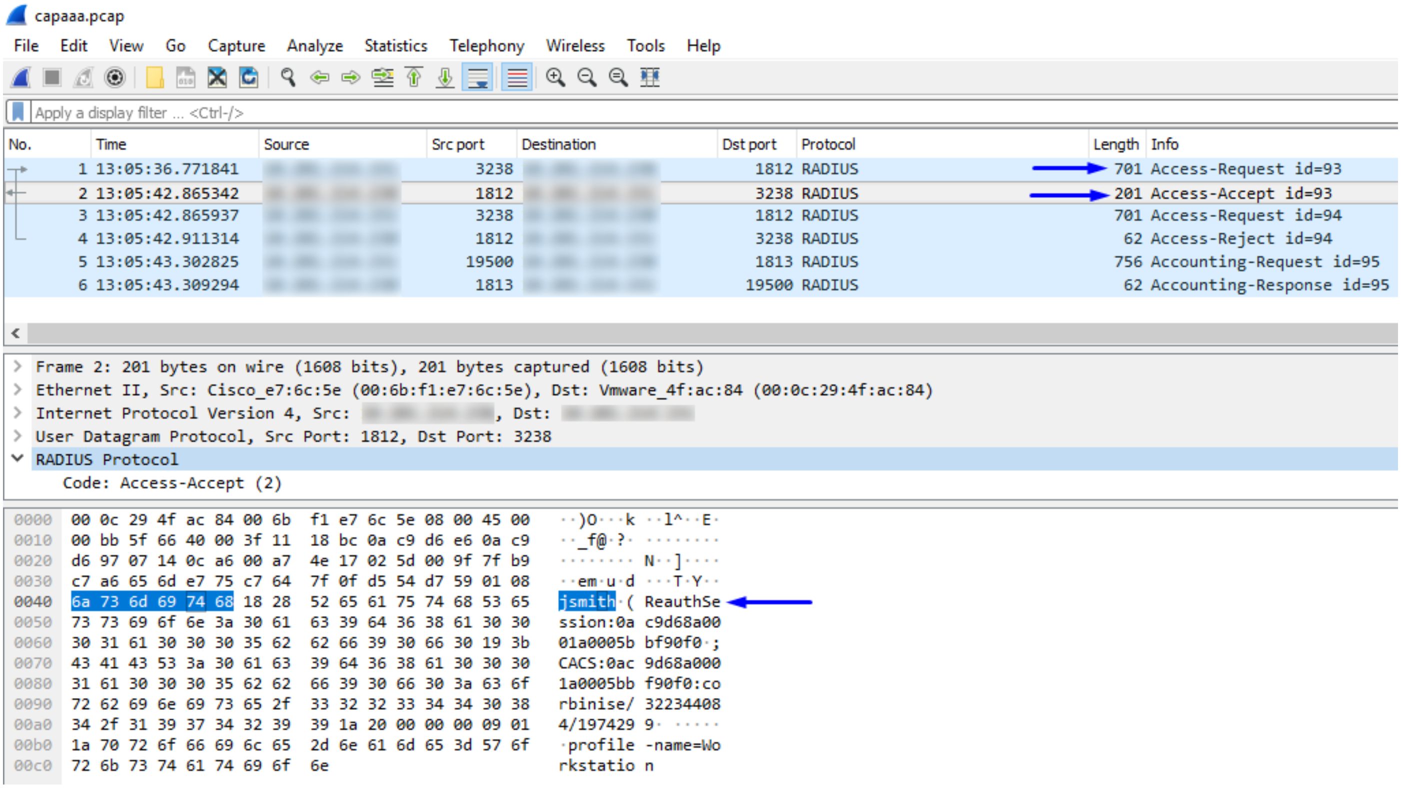


```
capin.pcap
File  Edit  View  Go  Capture  Analyze  Statistics  Telephony  Wireless  Tools  Help
Apply a display filter ... <Ctrl-/>

No. Time             Source      Src port Destination Dst port Protocol Length Info
  1 12:05:56.580994  [redacted]     55928 [redacted]       443 TCP          66 55928 → 443 [SYN] Seq=0 Win=8192 Len=0 MSS=1460 WS=256 SACK_PERM=1
  2 12:05:56.581375  [redacted]       443 [redacted]     55928 TCP          58 443 → 55928 [SYN, ACK] Seq=0 Ack=1 Win=32768 Len=0 MSS=1460
  3 12:05:56.581757  [redacted]     55928 [redacted]       443 TCP          54 55928 → 443 [ACK] Seq=1 Ack=1 Win=64240 Len=0
  4 12:05:56.582382  [redacted]     55928 [redacted]       443 TLSv1.2     187 Client Hello
  5 12:05:56.582458  [redacted]       443 [redacted]     55928 TCP          54 443 → 55928 [ACK] Seq=1 Ack=134 Win=32768 Len=0
  6 12:05:56.582733  [redacted]       443 [redacted]     55928 TLSv1.2    1514 Server Hello
  7 12:05:56.790211  [redacted]     55928 [redacted]       443 TCP          54 55928 → 443 [ACK] Seq=134 Ack=1461 Win=64240 Len=0
  8 12:05:56.790349  [redacted]       443 [redacted]     55928 TLSv1.2    1159 Certificate, Server Hello Done
  9 12:05:56.791691  [redacted]     55928 [redacted]       443 TLSv1.2     412 Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
 10 12:05:56.794911  [redacted]       443 [redacted]     55928 TLSv1.2     145 Change Cipher Spec, Encrypted Handshake Message
 11 12:05:56.797077  [redacted]     55928 [redacted]       443 TLSv1.2     363 Application Data
 12 12:05:56.797169  [redacted]       443 [redacted]     55928 TCP          54 443 → 55928 [ACK] Seq=2657 Ack=801 Win=32768 Len=0
 13 12:05:56.797199  [redacted]     55928 [redacted]       443 TLSv1.2     875 Application Data
 14 12:05:56.797276  [redacted]       443 [redacted]     55928 TCP          54 443 → 55928 [ACK] Seq=2657 Ack=1622 Win=32768 Len=0
 15 12:05:56.798634  [redacted]       443 [redacted]     55928 TLSv1.2     363 Application Data
 16 12:05:56.798786  [redacted]       443 [redacted]     55928 TLSv1.2     811 Application Data

> Frame 6: 1514 bytes on wire (12112 bits), 1514 bytes captured (12112 bits)
> Ethernet II, Src: Vmware_4f:ac:84 (00:0c:29:4f:ac:84), Dst: Cisco_e7:6c:5e (00:6b:f1:e7:6c:5e)
> Internet Protocol Version 4, Src: [redacted], Dst: [redacted]
v Transmission Control Protocol, Src Port: 443, Dst Port: 55928, Seq: 1, Ack: 134, Len: 1460
    Source Port: 443
    Destination Port: 55928
    [Stream index: 0]
    [TCP Segment Len: 1460]
    Sequence number: 1    (relative sequence number)
    [Next sequence number: 1461    (relative sequence number)]
    Acknowledgment number: 134    (relative ack number)
    0101 .... = Header Length: 20 bytes (5)
  > Flags: 0x018 (PSH, ACK)
    Window size value: 32768
    [Calculated window size: 32768]
    [Window size scaling factor: -2 (no window scaling used)]
    Checksum: 0x3693 [unverified]

00c0  09 2a 86 48 86 f7 0d 01  01 0b 05 00 30 51 31 15   ·*·H····  ····0Q1·
00d0  30 13 06 0a 09 92 26 89  93 f2 2c 64 01 19 16 05   0·····&·  ··,d····
00e0  6c 6f 63 61 6c 31 19 30  17 06 0a 09 92 26 89 93   local1·0  ·····&··
00f0  f2 2c 64 01 19 16 09 63  6f 68 61 64 6c 65 79 33   ·,d····c  [redacted]
0100  31 1d 30 1b 06 03 55 04  03 13 14 63 6f 68 61 64   1·0···U·  ····[redacted]
0110  6c 65 79 33 2d 43 4f 52  42 44 43 33 2d 43 41 30   [redacted] CA0
0120  1e 17 0d 31 38 31 30 31  30 30 32 34 35 30 30 5a   ···18101  0024500Z
0130  17 0d 32 30 31 30 30 39  30 32 34 35 30 30 5a 30   ··201009  024500Z0
0140  81 b3 31 26 30 24 06 09  2a 86 48 86 f7 0d 01 09   ··1&0$··  *·H·····
0150  02 13 17 63 6f 72 62 66  70 33 2e 63 6f 68 61 64   ···[redacted]f  p3.[redacted]
0160  6c 65 79 33 2e 6c 6f 63  61 6c 31 0b 30 09 06 03   [redacted]  a[redacted]·0···
0170  55 04 06 13 02 55 53 31  0b 30 09 06 03 55 04 08   U····US1  ·0···U··
0180  13 02 43 41 31 11 30 0f  06 03 55 04 07 13 08 53   ··CA1·0·  ··U····S
0190  61 6e 20 4a 6f 73 65 31  0e 30 0c 06 03 55 04 0a   an Jose1  ·0···U··
01a0  13 05 43 69 73 63 6f 31  0c 30 0a 06 03 55 04 0b   ··Cisco1  ·0···U··
01b0  13 03 54 41 43 31 20 30  1e 06 03 55 04 03 13 17   ··TAC1 0  ···U····
01c0  63 6f 72 62 66 70 33 2e  63 6f 68 61 64 6c 65 79   [redacted]fp3.  [redacted]
01d0  33 2e 6c 6f 63 61 6c 31  1c 30 1a 06 09 2a 86 48   3.local1  ·0···*·H
01e0  86 f7 0d 01 09 01 16 0d  74 61 63 40 63 69 73 63   ········  tac@cisc
01f0  6f 2e 63 6f 6d 30 82 01  22 30 0d 06 09 2a 86 48   o.com0··  "0···*·H
0200  86 f7 0d 01 01 01 05 00  03 82 01 0f 00 30 82 01   ········  ·····0··

capin.pcap
```

참고:VPN을 통해 FTD의 외부 인터페이스에 연결할 때 'Server Hello' 패킷에서 FTD VPN 서버 인증

서를 볼 수 있습니다.직원 PC는 이 인증서를 신뢰합니다. 직원 PC에 루트 CA 인증서가 있고 FTD VPN 서버 인증서가 동일한 루트 CA에 의해 서명되었기 때문입니다.

FTD의 FTD에서 사용자 이름 + 비밀번호가 정확한지 RADIUS 서버에 요청하는 캡처(Cisco ISE)



capaaa.pcap

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Apply a display filter ... <Ctrl-/>

No.	Time	Source	Src port	Destination	Dst port	Protocol	Length	Info
1	13:05:36.771841	[redacted]	3238	[redacted]	1812	RADIUS	701	Access-Request id=93
2	13:05:42.865342	[redacted]	1812	[redacted]	3238	RADIUS	201	Access-Accept id=93
3	13:05:42.865937	[redacted]	3238	[redacted]	1812	RADIUS	701	Access-Request id=94
4	13:05:42.911314	[redacted]	1812	[redacted]	3238	RADIUS	62	Access-Reject id=94
5	13:05:43.302825	[redacted]	19500	[redacted]	1813	RADIUS	756	Accounting-Request id=95
6	13:05:43.309294	[redacted]	1813	[redacted]	19500	RADIUS	62	Accounting-Response id=95

```
> Frame 2: 201 bytes on wire (1608 bits), 201 bytes captured (1608 bits)
> Ethernet II, Src: Cisco_e7:6c:5e (00:6b:f1:e7:6c:5e), Dst: Vmware_4f:ac:84 (00:0c:29:4f:ac:84)
> Internet Protocol Version 4, Src: [redacted], Dst: [redacted]
> User Datagram Protocol, Src Port: 1812, Dst Port: 3238
v RADIUS Protocol
    Code: Access-Accept (2)
```

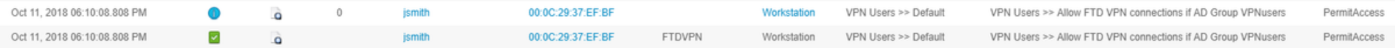
```
0000  00 0c 29 4f ac 84 00 6b  f1 e7 6c 5e 08 00 45 00   ··)O···k ··l^··E·
0010  00 bb 5f 66 40 00 3f 11  18 bc 0a c9 d6 e6 0a c9   ··_f@·?· ········
0020  d6 97 07 14 0c a6 00 a7  4e 17 02 5d 00 9f 7f b9   ········ N··]····
0030  c7 a6 65 6d e7 75 c7 64  7f 0f d5 54 d7 59 01 08   ··em·u·d ···T·Y··
0040  6a 73 6d 69 74 68 18 28  52 65 61 75 74 68 53 65   jsmith·( ReauthSe
0050  73 73 69 6f 6e 3a 30 61  63 39 64 36 38 61 30 30   ssion:0a c9d68a00
0060  30 31 61 30 30 30 35 62  62 66 39 30 66 30 19 3b   01a0005b bf90f0·;
0070  43 41 43 53 3a 30 61 63  39 64 36 38 61 30 30 30   CACS:0ac 9d68a000
0080  31 61 30 30 30 35 62 62  66 39 30 66 30 3a 63 6f   1a0005bb f90f0:co
0090  72 62 69 6e 69 73 65 2f  33 32 32 33 34 34 30 38   rbinise/ 32234408
00a0  34 2f 31 39 37 34 32 39  39 1a 20 00 00 00 09 01   4/197429 9· ·····
00b0  1a 70 72 6f 66 69 6c 65  2d 6e 61 6d 65 3d 57 6f   ·profile -name=Wo
00c0  72 6b 73 74 61 74 69 6f  6e                        rkstatio n
```

위에서 볼 수 있듯이, VPN 연결은 Access-Accept를 가져오고 AnyConnect VPN 클라이언트는 VPN을 통해 FTD에 성공적으로 연결됩니다.

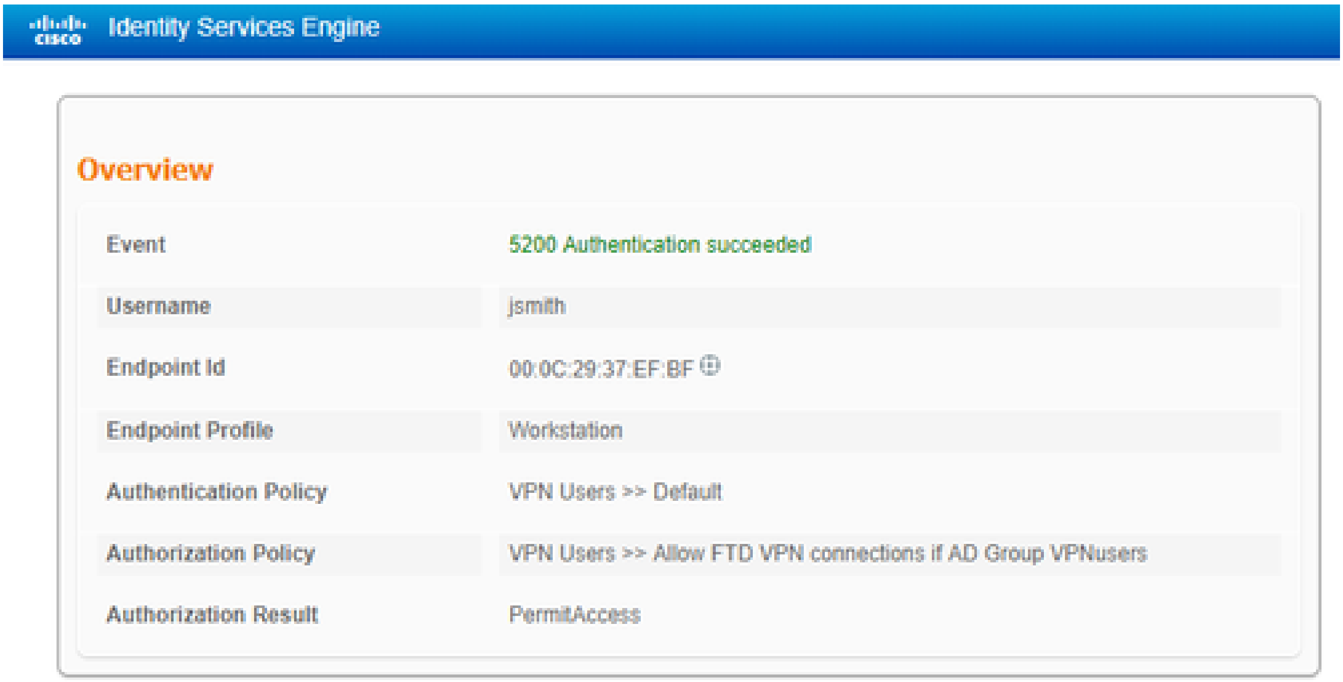
사용자 이름 + 비밀번호가 유효한지 Cisco ISE에 묻는 FTD의 캡처(CLI)(예: RADIUS 요청이 FTD와 ISE 간에 성공적으로 진행되고 있는지 확인하고 어떤 인터페이스를 남기고 있는지 확인)

```
ciscofp3# capture capout interface inside trace detail trace-count 100 [Capturing - 35607 bytes]
ciscofp3# show cap
ciscofp3# show cap capout | i 192.168.1.10
37: 01:23:52.264512 192.168.1.1.3238 > 192.168.1.10.1812: udp 659
38: 01:23:52.310210 192.168.1.10.1812 > 192.168.1.1.3238: udp 159
39: 01:23:52.311064 192.168.1.1.3238 > 192.168.1.10.1812: udp 659
40: 01:23:52.326734 192.168.1.10.1812 > 192.168.1.1.3238: udp 20
82: 01:23:52.737663 192.168.1.1.19500 > 192.168.1.10.1813: udp 714
85: 01:23:52.744483 192.168.1.10.1813 > 192.168.1.1.19500: udp 20
```

Cisco ISE RADIUS 서버 아래에 성공적인 인증을 보여줍니다.성공적인 인증에 대한 세부 정보를 보려면 돋보기를 클릭합니다.



Oct 11, 2018 06:10:08.808 PM	●	🔍	0	jsmith	00:0C:29:37:EF:BF		Workstation	VPN Users >> Default	VPN Users >> Allow FTD VPN connections if AD Group VPNusers	PermitAccess
Oct 11, 2018 06:10:08.808 PM	✓	🔍		jsmith	00:0C:29:37:EF:BF	FTDVPN	Workstation	VPN Users >> Default	VPN Users >> Allow FTD VPN connections if AD Group VPNusers	PermitAccess

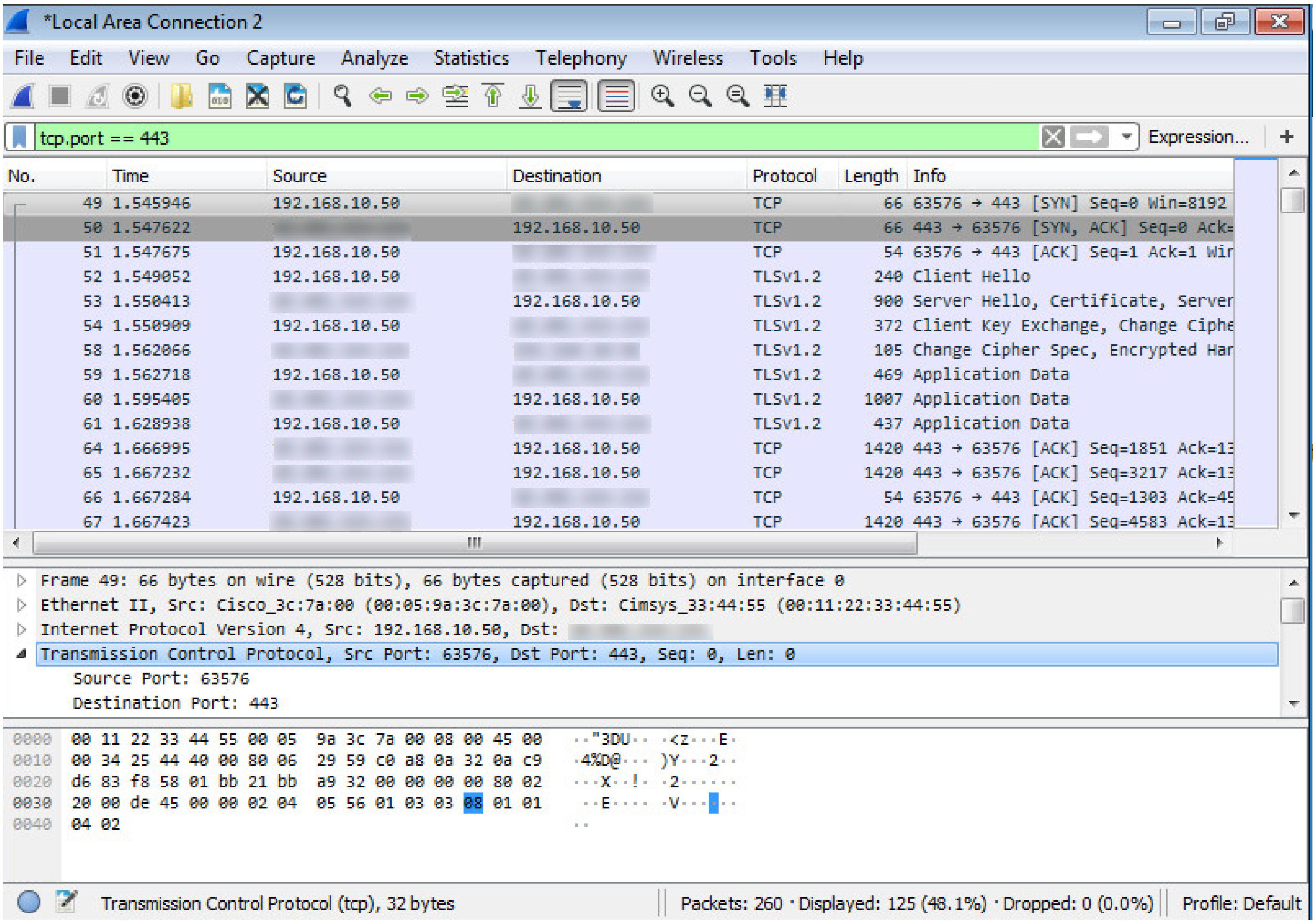


Identity Services Engine

Overview

Event	5200 Authentication succeeded
Username	jsmith
Endpoint Id	00:0C:29:37:EF:BF
Endpoint Profile	Workstation
Authentication Policy	VPN Users >> Default
Authorization Policy	VPN Users >> Allow FTD VPN connections if AD Group VPNusers
Authorization Result	PermitAccess

직원 PC의 직원 PC의 AnyConnect 어댑터에서 HTTPS를 통해 Inside 웹 사이트로 이동합니다(즉, 성공적으로 VPN을 실행하는 동안).



*Local Area Connection 2
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Expression... +

tcp.port == 443

```
No.   Time       Source           Destination      Protocol  Length Info
   49 1.545946   192.168.10.50    [redacted]       TCP         66 63576 → 443 [SYN] Seq=0 Win=8192
   50 1.547622   [redacted]       192.168.10.50    TCP         66 443 → 63576 [SYN, ACK] Seq=0 Ack=
   51 1.547675   192.168.10.50    [redacted]       TCP         54 63576 → 443 [ACK] Seq=1 Ack=1 Wir
   52 1.549052   192.168.10.50    [redacted]       TLSv1.2    240 Client Hello
   53 1.550413   [redacted]       192.168.10.50    TLSv1.2    900 Server Hello, Certificate, Server
   54 1.550909   192.168.10.50    [redacted]       TLSv1.2    372 Client Key Exchange, Change Ciphe
   58 1.562066   [redacted]       [redacted]       TLSv1.2    105 Change Cipher Spec, Encrypted Har
   59 1.562718   192.168.10.50    [redacted]       TLSv1.2    469 Application Data
   60 1.595405   [redacted]       192.168.10.50    TLSv1.2   1007 Application Data
   61 1.628938   192.168.10.50    [redacted]       TLSv1.2    437 Application Data
   64 1.666995   [redacted]       192.168.10.50    TCP       1420 443 → 63576 [ACK] Seq=1851 Ack=13
   65 1.667232   [redacted]       192.168.10.50    TCP       1420 443 → 63576 [ACK] Seq=3217 Ack=13
   66 1.667284   192.168.10.50    [redacted]       TCP         54 63576 → 443 [ACK] Seq=1303 Ack=45
   67 1.667423   [redacted]       192.168.10.50    TCP       1420 443 → 63576 [ACK] Seq=4583 Ack=13
```

```
▷ Frame 49: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface 0
▷ Ethernet II, Src: Cisco_3c:7a:00 (00:05:9a:3c:7a:00), Dst: Cimsys_33:44:55 (00:11:22:33:44:55)
▷ Internet Protocol Version 4, Src: 192.168.10.50, Dst: [redacted]
◢ Transmission Control Protocol, Src Port: 63576, Dst Port: 443, Seq: 0, Len: 0
     Source Port: 63576
     Destination Port: 443
```

```
0000  00 11 22 33 44 55 00 05  9a 3c 7a 00 08 00 45 00   .."3DU.. .<z...E.
0010  00 34 25 44 40 00 80 06  29 59 c0 a8 0a 32 0a c9   .4%D@... )Y...2..
0020  d6 83 f8 58 01 bb 21 bb  a9 32 00 00 00 00 80 02   ...X..!. .2......
0030  20 00 de 45 00 00 02 04  05 56 01 03 03 08 01 01    ..E.... .V......
0040  04 02                                              ..
```

Transmission Control Protocol (tcp), 32 bytes | Packets: 260 · Displayed: 125 (48.1%) · Dropped: 0 (0.0%) | Profile: Default

디버깅

디버그 radius 모두

debug webvpn anyconnect 255

FTD 진단 CLI에서 'debug radius all' 명령을 실행하고(>system support diagnostic-cli) Cisco Anyconnect Client의 Windows/Mac PC에서 'Connect'를 누르십시오.

```
> system support diagnostic-cli
Attaching to Diagnostic CLI ... Press 'Ctrl+a then d' to detach.
ciscofp3> enable
Password: <hit enter>
ciscofp3# terminal monitor
ciscofp3# debug radius all
<hit Connect on Anyconnect client on PC>

radius mkreq: 0x15
alloc_rip 0x00002ace10875428
new request 0x15 --> 16 (0x00002ace10875428)
got user 'jsmith'
got password
add_req 0x00002ace10875428 session 0x15 id 16
RADIUS_REQUEST
radius.c: rad_mkpkt
rad_mkpkt: ip:source-ip=198.51.100.2

RADIUS packet decode (authentication request)

--------------------------------------
Raw packet data (length = 659).....
01 10 02 93 fb 19 19 df f6 b1 c7 3e 34 fc 88 ce | ...........>4...
75 38 2d 55 01 08 6a 73 6d 69 74 68 02 12 a0 83 | u8-U..jsmith....
c9 bd ad 72 07 d1 bc 24 34 9e 63 a1 f5 93 05 06 | ...r...$4.c.....
00 00 50 00 1e 10 31 30 2e 32 30 31 2e 32 31 34 | ..P...198.51.100.2
2e 31 35 31 1f 10 31 30 2e 32 30 31 2e 32 31 34 | .151..198.51.100.2
2e 32 35 31 3d 06 00 00 00 05 42 10 31 30 2e 32 | .4=.....B.198.
30 31 2e 32 31 34 2e 32 35 31 1a 23 00 00 00 09 | 51.100.2#....
01 1d 6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 | ..mdm-tlv=device
2d 70 6c 61 74 66 6f 72 6d 3d 77 69 6e 1a 2c 00 | -platform=win.,.
00 00 09 01 26 6d 64 6d 2d 74 6c 76 3d 64 65 76 | ....&mdm-tlv=dev
69 63 65 2d 6d 61 63 3d 30 30 2d 30 63 2d 32 39 | ice-mac=00-0c-29
2d 33 37 2d 65 66 2d 62 66 1a 33 00 00 00 09 01 | -37-ef-bf.3.....
2d 6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d | -mdm-tlv=device-
70 75 62 6c 69 63 2d 6d 61 63 3d 30 30 2d 30 63 | public-mac=00-0c
2d 32 39 2d 33 37 2d 65 66 2d 62 66 1a 3a 00 00 | -29-37-ef-bf.:..
00 09 01 34 6d 64 6d 2d 74 6c 76 3d 61 63 2d 75 | ...4mdm-tlv=ac-u
73 65 72 2d 61 67 65 6e 74 3d 41 6e 79 43 6f 6e | ser-agent=AnyCon
6e 65 63 74 20 57 69 6e 64 6f 77 73 20 34 2e 36 | nect Windows 4.6
2e 30 33 30 34 39 1a 3f 00 00 00 09 01 39 6d 64 | .03049.?.....9md
6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 70 6c 61 | m-tlv=device-pla
74 66 6f 72 6d 2d 76 65 72 73 69 6f 6e 3d 36 2e | tform-version=6.
31 2e 37 36 30 31 20 53 65 72 76 69 63 65 20 50 | 1.7601 Service P
61 63 6b 20 31 1a 40 00 00 00 09 01 3a 6d 64 6d | ack 1.@.....:mdm
2d 74 6c 76 3d 64 65 76 69 63 65 2d 74 79 70 65 | -tlv=device-type
3d 56 4d 77 61 72 65 2c 20 49 6e 63 2e 20 56 4d | =VMware, Inc. VM
77 61 72 65 20 56 69 72 74 75 61 6c 20 50 6c 61 | ware Virtual Pla
74 66 6f 72 6d 1a 5b 00 00 00 09 01 55 6d 64 6d | tform.[.....Umdm
2d 74 6c 76 3d 64 65 76 69 63 65 2d 75 69 64 3d | -tlv=device-uid=
33 36 39 33 43 36 34 30 37 43 39 32 35 32 35 31 | 3693C6407C925251
46 46 37 32 42 36 34 39 33 42 44 44 38 37 33 31 | FF72B6493BDD8731
38 41 42 46 43 39 30 43 36 32 31 35 34 32 43 33 | 8ABFC90C621542C3
38 46 41 46 38 37 38 45 46 34 39 36 31 34 41 31 | 8FAF878EF49614A1
04 06 00 00 00 00 1a 31 00 00 00 09 01 2b 61 75 | .......1.....+au
64 69 74 2d 73 65 73 73 69 6f 6e 2d 69 64 3d 30 | dit-session-id=0
61 63 39 64 36 38 61 30 30 30 30 35 30 30 30 35 | ac9d68a000050005
62 62 65 31 66 39 31 1a 23 00 00 00 09 01 1d 69 | bbe1f91.#......i
70 3a 73 6f 75 72 63 65 2d 69 70 3d 31 30 2e 32 | p:source-ip=192.1
```

```
30 31 2e 32 31 34 2e 32 35 31 1a 18 00 00 0c 04 | 68.10.50........
92 12 46 54 44 41 6e 79 43 6f 6e 6e 65 63 74 56 | ..FTDAnyConnectV
50 4e 1a 0c 00 00 0c 04 96 06 00 00 00 02 1a 15 | PN..............
00 00 00 09 01 0f 63 6f 61 2d 70 75 73 68 3d 74 | ......coa-push=t
72 75 65 | rue

Parsed packet data.....
Radius: Code = 1 (0x01)
Radius: Identifier = 16 (0x10)
Radius: Length = 659 (0x0293)
Radius: Vector: FB1919DFF6B1C73E34FC88CE75382D55
Radius: Type = 1 (0x01) User-Name
Radius: Length = 8 (0x08)
Radius: Value (String) =
6a 73 6d 69 74 68 | jsmith
Radius: Type = 2 (0x02) User-Password
Radius: Length = 18 (0x12)
Radius: Value (String) =
a0 83 c9 bd ad 72 07 d1 bc 24 34 9e 63 a1 f5 93 | .....r...$4.c...
Radius: Type = 5 (0x05) NAS-Port
Radius: Length = 6 (0x06)
Radius: Value (Hex) = 0x5000
Radius: Type = 30 (0x1E) Called-Station-Id
Radius: Length = 16 (0x10)
Radius: Value (String) =
31 30 2e 32 30 31 2e 32 31 34 2e 31 35 31 | 203.0.113.2
Radius: Type = 31 (0x1F) Calling-Station-Id
Radius: Length = 16 (0x10)
Radius: Value (String) =
31 30 2e 32 30 31 2e 32 31 34 2e 32 35 31 | 198.51.100.2
Radius: Type = 61 (0x3D) NAS-Port-Type
Radius: Length = 6 (0x06)
Radius: Value (Hex) = 0x5
Radius: Type = 66 (0x42) Tunnel-Client-Endpoint
Radius: Length = 16 (0x10)
Radius: Value (String) =
31 30 2e 32 30 31 2e 32 31 34 2e 32 35 31 | 198.51.100.2
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 35 (0x23)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 29 (0x1D)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 70 | mdm-tlv=device-p
6c 61 74 66 6f 72 6d 3d 77 69 6e | latform=win
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 44 (0x2C)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 38 (0x26)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 6d | mdm-tlv=device-m
61 63 3d 30 30 2d 30 63 2d 32 39 2d 33 37 2d 65 | ac=00-0c-29-37-e
66 2d 62 66 | f-bf
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 51 (0x33)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 45 (0x2D)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 70 | mdm-tlv=device-p
75 62 6c 69 63 2d 6d 61 63 3d 30 30 2d 30 63 2d | ublic-mac=00-0c-
32 39 2d 33 37 2d 65 66 2d 62 66 | 29-37-ef-bf
Radius: Type = 26 (0x1A) Vendor-Specific
```

```
Radius: Length = 58 (0x3A)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 52 (0x34)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 61 63 2d 75 73 65 72 2d | mdm-tlv=ac-user-
61 67 65 6e 74 3d 41 6e 79 43 6f 6e 6e 65 63 74 | agent=AnyConnect
20 57 69 6e 64 6f 77 73 20 34 2e 36 2e 30 33 30 | Windows 4.6.030
34 39 | 49
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 63 (0x3F)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 57 (0x39)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 70 | mdm-tlv=device-p
6c 61 74 66 6f 72 6d 2d 76 65 72 73 69 6f 6e 3d | latform-version=
36 2e 31 2e 37 36 30 31 20 53 65 72 76 69 63 65 | 6.1.7601 Service
20 50 61 63 6b 20 31 | Pack 1
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 64 (0x40)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 58 (0x3A)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 74 | mdm-tlv=device-t
79 70 65 3d 56 4d 77 61 72 65 2c 20 49 6e 63 2e | ype=VMware, Inc.
20 56 4d 77 61 72 65 20 56 69 72 74 75 61 6c 20 | VMware Virtual
50 6c 61 74 66 6f 72 6d | Platform
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 91 (0x5B)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 85 (0x55)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 75 | mdm-tlv=device-u
69 64 3d 33 36 39 33 43 36 34 30 37 43 39 32 35 | id=3693C6407C925
32 35 31 46 46 37 32 42 36 34 39 33 42 44 44 38 | 251FF72B6493BDD8
37 33 31 38 41 42 46 43 39 30 43 36 32 31 35 34 | 7318ABFC90C62154
32 43 33 38 46 41 46 38 37 38 45 46 34 39 36 31 | 2C38FAF878EF4961
34 41 31 | 4A1
Radius: Type = 4 (0x04) NAS-IP-Address
Radius: Length = 6 (0x06)
Radius: Value (IP Address) = 0.0.0.0 (0x00000000)
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 49 (0x31)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 43 (0x2B)
Radius: Value (String) =
61 75 64 69 74 2d 73 65 73 73 69 6f 6e 2d 69 64 | audit-session-id
3d 30 61 63 39 64 36 38 61 30 30 30 30 35 30 30 | =0ac9d68a0000500
30 35 62 62 65 31 66 39 31 | 05bbe1f91
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 35 (0x23)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 29 (0x1D)
Radius: Value (String) =
69 70 3a 73 6f 75 72 63 65 2d 69 70 3d 31 30 2e | ip:source-ip=192.
32 30 31 2e 32 31 34 2e 32 35 31 | 168.10.50
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 24 (0x18)
Radius: Vendor ID = 3076 (0x00000C04)
```

```
Radius: Type = 146 (0x92) Tunnel-Group-Name
Radius: Length = 18 (0x12)
Radius: Value (String) =
46 54 44 41 6e 79 43 6f 6e 6e 65 63 74 56 50 4e | FTDAnyConnectVPN
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 12 (0x0C)
Radius: Vendor ID = 3076 (0x00000C04)
Radius: Type = 150 (0x96) Client-Type
Radius: Length = 6 (0x06)
Radius: Value (Integer) = 2 (0x0002)
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 21 (0x15)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 15 (0x0F)
Radius: Value (String) =
63 6f 61 2d 70 75 73 68 3d 74 72 75 65 | coa-push=true
send pkt 192.168.1.10/1812
rip 0x00002ace10875428 state 7 id 16
rad_vrfy() : response message verified
rip 0x00002ace10875428
: chall_state ''
: state 0x7
: reqauth:
fb 19 19 df f6 b1 c7 3e 34 fc 88 ce 75 38 2d 55
: info 0x00002ace10875568
session_id 0x15
request_id 0x10
user 'jsmith'
response '***'
app 0
reason 0
skey 'cisco123'
sip 192.168.1.10
type 1

RADIUS packet decode (response)

--------------------------------------
Raw packet data (length = 159).....
02 10 00 9f 39 45 43 cf 05 be df 2f 24 d5 d7 05 | ....9EC..../$...
47 67 b4 fd 01 08 6a 73 6d 69 74 68 18 28 52 65 | Gg....jsmith.(Re
61 75 74 68 53 65 73 73 69 6f 6e 3a 30 61 63 39 | authSession:0ac9
64 36 38 61 30 30 30 30 35 30 30 30 35 62 62 65 | d68a000050005bbe
31 66 39 31 19 3b 43 41 43 53 3a 30 61 63 39 64 | 1f91.;CACS:0ac9d
36 38 61 30 30 30 30 35 30 30 30 35 62 62 65 31 | 68a000050005bbe1
66 39 31 3a 63 6f 72 62 69 6e 69 73 65 2f 33 32 | f91:corbinise/32
32 33 34 34 30 38 34 2f 31 39 33 31 36 38 32 1a | 2344084/1931682.
20 00 00 00 09 01 1a 70 72 6f 66 69 6c 65 2d 6e | ......profile-n
61 6d 65 3d 57 6f 72 6b 73 74 61 74 69 6f 6e | ame=Workstation

Parsed packet data.....
Radius: Code = 2 (0x02)
Radius: Identifier = 16 (0x10)
Radius: Length = 159 (0x009F)
Radius: Vector: 394543CF05BEDF2F24D5D7054767B4FD
Radius: Type = 1 (0x01) User-Name
Radius: Length = 8 (0x08)
Radius: Value (String) =
6a 73 6d 69 74 68 | jsmith
Radius: Type = 24 (0x18) State
Radius: Length = 40 (0x28)
Radius: Value (String) =
52 65 61 75 74 68 53 65 73 73 69 6f 6e 3a 30 61 | ReauthSession:0a
```

```
63 39 64 36 38 61 30 30 30 30 35 30 30 30 35 62 | c9d68a000050005b
62 65 31 66 39 31 | be1f91
Radius: Type = 25 (0x19) Class
Radius: Length = 59 (0x3B)
Radius: Value (String) =
43 41 43 53 3a 30 61 63 39 64 36 38 61 30 30 30 | CACS:0ac9d68a000
30 35 30 30 30 35 62 62 65 31 66 39 31 3a 63 6f | 050005bbe1f91:co
72 62 69 6e 69 73 65 2f 33 32 32 33 34 34 30 38 | rbinise/32234408
34 2f 31 39 33 31 36 38 32 | 4/1931682
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 32 (0x20)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 26 (0x1A)
Radius: Value (String) =
70 72 6f 66 69 6c 65 2d 6e 61 6d 65 3d 57 6f 72 | profile-name=Wor
6b 73 74 61 74 69 6f 6e | kstation
rad_procpkt: ACCEPT
Got AV-Pair with value profile-name=Workstation
RADIUS_ACCESS_ACCEPT: normal termination
radius mkreq: 0x16
alloc_rip 0x00002ace10874b80
new request 0x16 --> 17 (0x00002ace10874b80)
got user 'jsmith'
got password
add_req 0x00002ace10874b80 session 0x16 id 17
RADIUS_DELETE
remove_req 0x00002ace10875428 session 0x15 id 16
free_rip 0x00002ace10875428
RADIUS_REQUEST
radius.c: rad_mkpkt
rad_mkpkt: ip:source-ip=198.51.100.2

RADIUS packet decode (authentication request)

--------------------------------------
Raw packet data (length = 659).....
01 11 02 93 c6 fc 11 c1 0e c4 81 ac 09 a7 85 a8 | ................
83 c1 e4 88 01 08 6a 73 6d 69 74 68 02 12 79 41 | ......jsmith..yA
0e 71 13 38 ae 9f 49 be 3c a9 e4 81 65 93 05 06 | .q.8..I.<...e...
00 00 50 00 1e 10 31 30 2e 32 30 31 2e 32 31 34 | ..P...203.0.113
2e 31 35 31 1f 10 31 30 2e 32 30 31 2e 32 31 34 | .2..203.0.113
2e 32 35 31 3d 06 00 00 00 05 42 10 31 30 2e 32 | .2=.....<ip addr
30 31 2e 32 31 34 2e 32 35 31 1a 23 00 00 00 09 | ess>.#....
01 1d 6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 | ..mdm-tlv=device
2d 70 6c 61 74 66 6f 72 6d 3d 77 69 6e 1a 2c 00 | -platform=win.,.
00 00 09 01 26 6d 64 6d 2d 74 6c 76 3d 64 65 76 | ....&mdm-tlv=dev
69 63 65 2d 6d 61 63 3d 30 30 2d 30 63 2d 32 39 | ice-mac=00-0c-29
2d 33 37 2d 65 66 2d 62 66 1a 33 00 00 00 09 01 | -37-ef-bf.3.....
2d 6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d | -mdm-tlv=device-
70 75 62 6c 69 63 2d 6d 61 63 3d 30 30 2d 30 63 | public-mac=00-0c
2d 32 39 2d 33 37 2d 65 66 2d 62 66 1a 3a 00 00 | -29-37-ef-bf.:..
00 09 01 34 6d 64 6d 2d 74 6c 76 3d 61 63 2d 75 | ...4mdm-tlv=ac-u
73 65 72 2d 61 67 65 6e 74 3d 41 6e 79 43 6f 6e | ser-agent=AnyCon
6e 65 63 74 20 57 69 6e 64 6f 77 73 20 34 2e 36 | nect Windows 4.6
2e 30 33 30 34 39 1a 3f 00 00 00 09 01 39 6d 64 | .03049.?.....9md
6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 70 6c 61 | m-tlv=device-pla
74 66 6f 72 6d 2d 76 65 72 73 69 6f 6e 3d 36 2e | tform-version=6.
31 2e 37 36 30 31 20 53 65 72 76 69 63 65 20 50 | 1.7601 Service P
61 63 6b 20 31 1a 40 00 00 00 09 01 3a 6d 64 6d | ack 1.@.....:mdm
2d 74 6c 76 3d 64 65 76 69 63 65 2d 74 79 70 65 | -tlv=device-type
3d 56 4d 77 61 72 65 2c 20 49 6e 63 2e 20 56 4d | =VMware, Inc. VM
77 61 72 65 20 56 69 72 74 75 61 6c 20 50 6c 61 | ware Virtual Pla
74 66 6f 72 6d 1a 5b 00 00 00 09 01 55 6d 64 6d | tform.[.....Umdm
```

```
2d 74 6c 76 3d 64 65 76 69 63 65 2d 75 69 64 3d | -tlv=device-uid=
33 36 39 33 43 36 34 30 37 43 39 32 35 32 35 31 | 3693C6407C925251
46 46 37 32 42 36 34 39 33 42 44 44 38 37 33 31 | FF72B6493BDD8731
38 41 42 46 43 39 30 43 36 32 31 35 34 32 43 33 | 8ABFC90C621542C3
38 46 41 46 38 37 38 45 46 34 39 36 31 34 41 31 | 8FAF878EF49614A1
04 06 00 00 00 00 1a 31 00 00 00 09 01 2b 61 75 | .......1.....+au
64 69 74 2d 73 65 73 73 69 6f 6e 2d 69 64 3d 30 | dit-session-id=0
61 63 39 64 36 38 61 30 30 30 30 35 30 30 30 35 | ac9d68a000050005
62 62 65 31 66 39 31 1a 23 00 00 00 09 01 1d 69 | bbe1f91.#......i
70 3a 73 6f 75 72 63 65 2d 69 70 3d 31 30 2e 32 | p:source-ip=192.1
30 31 2e 32 31 34 2e 32 35 31 1a 18 00 00 0c 04 | 68.10.50......
92 12 46 54 44 41 6e 79 43 6f 6e 6e 65 63 74 56 | ..FTDAnyConnectV
50 4e 1a 0c 00 00 0c 04 96 06 00 00 00 02 1a 15 | PN..............
00 00 00 09 01 0f 63 6f 61 2d 70 75 73 68 3d 74 | ......coa-push=t
72 75 65 | rue

Parsed packet data.....
Radius: Code = 1 (0x01)
Radius: Identifier = 17 (0x11)
Radius: Length = 659 (0x0293)
Radius: Vector: C6FC11C10EC481AC09A785A883C1E488
Radius: Type = 1 (0x01) User-Name
Radius: Length = 8 (0x08)
Radius: Value (String) =
6a 73 6d 69 74 68 | jsmith
Radius: Type = 2 (0x02) User-Password
Radius: Length = 18 (0x12)
Radius: Value (String) =
79 41 0e 71 13 38 ae 9f 49 be 3c a9 e4 81 65 93 | yA.q.8..I.<...e.
Radius: Type = 5 (0x05) NAS-Port
Radius: Length = 6 (0x06)
Radius: Value (Hex) = 0x5000
Radius: Type = 30 (0x1E) Called-Station-Id
Radius: Length = 16 (0x10)
Radius: Value (String) =
31 30 2e 32 30 31 2e 32 31 34 2e 31 35 31 | 203.0.113.2
Radius: Type = 31 (0x1F) Calling-Station-Id
Radius: Length = 16 (0x10)
Radius: Value (String) =
31 30 2e 32 30 31 2e 32 31 34 2e 32 35 31 | 198.51.100.2
Radius: Type = 61 (0x3D) NAS-Port-Type
Radius: Length = 6 (0x06)
Radius: Value (Hex) = 0x5
Radius: Type = 66 (0x42) Tunnel-Client-Endpoint
Radius: Length = 16 (0x10)
Radius: Value (String) =
31 30 2e 32 30 31 2e 32 31 34 2e 32 35 31 | 198.51.100.2
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 35 (0x23)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 29 (0x1D)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 70 | mdm-tlv=device-p
6c 61 74 66 6f 72 6d 3d 77 69 6e | latform=win
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 44 (0x2C)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 38 (0x26)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 6d | mdm-tlv=device-m
61 63 3d 30 30 2d 30 63 2d 32 39 2d 33 37 2d 65 | ac=00-0c-29-37-e
66 2d 62 66 | f-bf
```

```
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 51 (0x33)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 45 (0x2D)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 70 | mdm-tlv=device-p
75 62 6c 69 63 2d 6d 61 63 3d 30 30 2d 30 63 2d | ublic-mac=00-0c-
32 39 2d 33 37 2d 65 66 2d 62 66 | 29-37-ef-bf
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 58 (0x3A)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 52 (0x34)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 61 63 2d 75 73 65 72 2d | mdm-tlv=ac-user-
61 67 65 6e 74 3d 41 6e 79 43 6f 6e 6e 65 63 74 | agent=AnyConnect
20 57 69 6e 64 6f 77 73 20 34 2e 36 2e 30 33 30 | Windows 4.6.030
34 39 | 49
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 63 (0x3F)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 57 (0x39)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 70 | mdm-tlv=device-p
6c 61 74 66 6f 72 6d 2d 76 65 72 73 69 6f 6e 3d | latform-version=
36 2e 31 2e 37 36 30 31 20 53 65 72 76 69 63 65 | 6.1.7601 Service
20 50 61 63 6b 20 31 | Pack 1
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 64 (0x40)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 58 (0x3A)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 74 | mdm-tlv=device-t
79 70 65 3d 56 4d 77 61 72 65 2c 20 49 6e 63 2e | ype=VMware, Inc.
20 56 4d 77 61 72 65 20 56 69 72 74 75 61 6c 20 | VMware Virtual
50 6c 61 74 66 6f 72 6d | Platform
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 91 (0x5B)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 85 (0x55)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 75 | mdm-tlv=device-u
69 64 3d 33 36 39 33 43 36 34 30 37 43 39 32 35 | id=3693C6407C925
32 35 31 46 46 37 32 42 36 34 39 33 42 44 44 38 | 251FF72B6493BDD8
37 33 31 38 41 42 46 43 39 30 43 36 32 31 35 34 | 7318ABFC90C62154
32 43 33 38 46 41 46 38 37 38 45 46 34 39 36 31 | 2C38FAF878EF4961
34 41 31 | 4A1
Radius: Type = 4 (0x04) NAS-IP-Address
Radius: Length = 6 (0x06)
Radius: Value (IP Address) = 0.0.0.0 (0x00000000)
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 49 (0x31)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 43 (0x2B)
Radius: Value (String) =
61 75 64 69 74 2d 73 65 73 73 69 6f 6e 2d 69 64 | audit-session-id
3d 30 61 63 39 64 36 38 61 30 30 30 30 35 30 30 | =0ac9d68a0000500
30 35 62 62 65 31 66 39 31 | 05bbe1f91
Radius: Type = 26 (0x1A) Vendor-Specific
```

```
Radius: Length = 35 (0x23)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 29 (0x1D)
Radius: Value (String) =
69 70 3a 73 6f 75 72 63 65 2d 69 70 3d 31 30 2e | ip:source-ip=192.
32 30 31 2e 32 31 34 2e 32 35 31 | 168.10.50
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 24 (0x18)
Radius: Vendor ID = 3076 (0x00000C04)
Radius: Type = 146 (0x92) Tunnel-Group-Name
Radius: Length = 18 (0x12)
Radius: Value (String) =
46 54 44 41 6e 79 43 6f 6e 6e 65 63 74 56 50 4e | FTDAnyConnectVPN
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 12 (0x0C)
Radius: Vendor ID = 3076 (0x00000C04)
Radius: Type = 150 (0x96) Client-Type
Radius: Length = 6 (0x06)
Radius: Value (Integer) = 2 (0x0002)
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 21 (0x15)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 15 (0x0F)
Radius: Value (String) =
63 6f 61 2d 70 75 73 68 3d 74 72 75 65 | coa-push=true
send pkt 192.168.1.10/1812
rip 0x00002ace10874b80 state 7 id 17
rad_vrfy() : response message verified
rip 0x00002ace10874b80
: chall_state ''
: state 0x7
: reqauth:
c6 fc 11 c1 0e c4 81 ac 09 a7 85 a8 83 c1 e4 88
: info 0x00002ace10874cc0
session_id 0x16
request_id 0x11
user 'jsmith'
response '***'
app 0
reason 0
skey 'cisco123'
sip 192.168.1.10
type 1

RADIUS packet decode (response)

--------------------------------------
Raw packet data (length = 20).....
03 11 00 14 15 c3 44 44 7d a6 07 0d 7b 92 f2 3b | ......DD}...{..;
0b 06 ba 74 | ...t

Parsed packet data.....
Radius: Code = 3 (0x03)
Radius: Identifier = 17 (0x11)
Radius: Length = 20 (0x0014)
Radius: Vector: 15C344447DA6070D7B92F23B0B06BA74
rad_procpkt: REJECT
RADIUS_DELETE
remove_req 0x00002ace10874b80 session 0x16 id 17
free_rip 0x00002ace10874b80
radius: send queue empty
radius mkreq: 0x18
```

```
alloc_rip 0x00002ace10874b80
new request 0x18 --> 18 (0x00002ace10874b80)
add_req 0x00002ace10874b80 session 0x18 id 18
ACCT_REQUEST
radius.c: rad_mkpkt

RADIUS packet decode (accounting request)

--------------------------------------
Raw packet data (length = 714).....
04 12 02 ca be a0 6e 46 71 af 5c 65 82 77 c7 b5 | ......nFq.\e.w..
50 78 61 d7 01 08 6a 73 6d 69 74 68 05 06 00 00 | Pxa...jsmith....
50 00 06 06 00 00 00 02 07 06 00 00 00 01 08 06 | P...............
c0 a8 0a 32 19 3b 43 41 43 53 3a 30 61 63 39 64 | ...2.;CACS:0ac9d
36 38 61 30 30 30 30 35 30 30 30 35 62 62 65 31 | 68a000050005bbe1
66 39 31 3a 63 6f 72 62 69 6e 69 73 65 2f 33 32 | f91:corbinise/32
32 33 34 34 30 38 34 2f 31 39 33 31 36 38 32 1e | 2344084/1931682.
10 31 30 2e 32 30 31 2e 32 31 34 2e 31 35 31 1f | .203.0.113.2.
10 31 30 2e 32 30 31 2e 32 31 34 2e 32 35 31 28 | .198.51.100.2(
06 00 00 00 01 29 06 00 00 00 00 2c 0a 43 31 46 | .....).....,.C1F
30 30 30 30 35 2d 06 00 00 00 01 3d 06 00 00 00 | 00005-.....=....
05 42 10 31 30 2e 32 30 31 2e 32 31 34 2e 32 35 | .B.203.0.113.2
31 1a 18 00 00 0c 04 92 12 46 54 44 41 6e 79 43 | ........FTDAnyC
6f 6e 6e 65 63 74 56 50 4e 1a 0c 00 00 0c 04 96 | onnectVPN.......
06 00 00 00 02 1a 0c 00 00 0c 04 97 06 00 00 00 | ................
01 1a 0c 00 00 0c 04 98 06 00 00 00 03 1a 23 00 | ..............#.
00 00 09 01 1d 6d 64 6d 2d 74 6c 76 3d 64 65 76 | .....mdm-tlv=dev
69 63 65 2d 70 6c 61 74 66 6f 72 6d 3d 77 69 6e | ice-platform=win
1a 2c 00 00 00 09 01 26 6d 64 6d 2d 74 6c 76 3d | .,.....&mdm-tlv=
64 65 76 69 63 65 2d 6d 61 63 3d 30 30 2d 30 63 | device-mac=00-0c
2d 32 39 2d 33 37 2d 65 66 2d 62 66 1a 31 00 00 | -29-37-ef-bf.1..
00 09 01 2b 61 75 64 69 74 2d 73 65 73 73 69 6f | ...+audit-sessio
6e 2d 69 64 3d 30 61 63 39 64 36 38 61 30 30 30 | n-id=0ac9d68a000
30 35 30 30 30 35 62 62 65 31 66 39 31 1a 33 00 | 050005bbe1f91.3.
00 00 09 01 2d 6d 64 6d 2d 74 6c 76 3d 64 65 76 | ....-mdm-tlv=dev
69 63 65 2d 70 75 62 6c 69 63 2d 6d 61 63 3d 30 | ice-public-mac=0
30 2d 30 63 2d 32 39 2d 33 37 2d 65 66 2d 62 66 | 0-0c-29-37-ef-bf
1a 3a 00 00 00 09 01 34 6d 64 6d 2d 74 6c 76 3d | .:.....4mdm-tlv=
61 63 2d 75 73 65 72 2d 61 67 65 6e 74 3d 41 6e | ac-user-agent=An
79 43 6f 6e 6e 65 63 74 20 57 69 6e 64 6f 77 73 | yConnect Windows
20 34 2e 36 2e 30 33 30 34 39 1a 3f 00 00 00 09 | 4.6.03049.?....
01 39 6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 | .9mdm-tlv=device
2d 70 6c 61 74 66 6f 72 6d 2d 76 65 72 73 69 6f | -platform-versio
6e 3d 36 2e 31 2e 37 36 30 31 20 53 65 72 76 69 | n=6.1.7601 Servi
63 65 20 50 61 63 6b 20 31 1a 40 00 00 00 09 01 | ce Pack 1.@.....
3a 6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d | :mdm-tlv=device-
74 79 70 65 3d 56 4d 77 61 72 65 2c 20 49 6e 63 | type=VMware, Inc
2e 20 56 4d 77 61 72 65 20 56 69 72 74 75 61 6c | . VMware Virtual
20 50 6c 61 74 66 6f 72 6d 1a 5b 00 00 00 09 01 | Platform.[.....
55 6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d | Umdm-tlv=device-
75 69 64 3d 33 36 39 33 43 36 34 30 37 43 39 32 | uid=3693C6407C92
35 32 35 31 46 46 37 32 42 36 34 39 33 42 44 44 | 5251FF72B6493BDD
38 37 33 31 38 41 42 46 43 39 30 43 36 32 31 35 | 87318ABFC90C6215
34 32 43 33 38 46 41 46 38 37 38 45 46 34 39 36 | 42C38FAF878EF496
31 34 41 31 04 06 00 00 00 00 | 14A1......

Parsed packet data.....
Radius: Code = 4 (0x04)
Radius: Identifier = 18 (0x12)
Radius: Length = 714 (0x02CA)
Radius: Vector: BEA06E4671AF5C658277C7B5507861D7
Radius: Type = 1 (0x01) User-Name
Radius: Length = 8 (0x08)
Radius: Value (String) =
6a 73 6d 69 74 68 | jsmith
Radius: Type = 5 (0x05) NAS-Port
Radius: Length = 6 (0x06)
Radius: Value (Hex) = 0x5000
Radius: Type = 6 (0x06) Service-Type
Radius: Length = 6 (0x06)
Radius: Value (Hex) = 0x2
Radius: Type = 7 (0x07) Framed-Protocol
Radius: Length = 6 (0x06)
Radius: Value (Hex) = 0x1
Radius: Type = 8 (0x08) Framed-IP-Address
Radius: Length = 6 (0x06)
Radius: Value (IP Address) = 192.168.10.50 (0xC0A80A32)
Radius: Type = 25 (0x19) Class
Radius: Length = 59 (0x3B)
Radius: Value (String) =
43 41 43 53 3a 30 61 63 39 64 36 38 61 30 30 30 | CACS:0ac9d68a000
30 35 30 30 30 35 62 62 65 31 66 39 31 3a 63 6f | 050005bbe1f91:co
72 62 69 6e 69 73 65 2f 33 32 32 33 34 34 30 38 | rbinise/32234408
34 2f 31 39 33 31 36 38 32 | 4/1931682
Radius: Type = 30 (0x1E) Called-Station-Id
Radius: Length = 16 (0x10)
Radius: Value (String) =
31 30 2e 32 30 31 2e 32 31 34 2e 31 35 31 | 203.0.113.2
Radius: Type = 31 (0x1F) Calling-Station-Id
Radius: Length = 16 (0x10)
Radius: Value (String) =
31 30 2e 32 30 31 2e 32 31 34 2e 32 35 31 | 198.51.100.2
Radius: Type = 40 (0x28) Acct-Status-Type
Radius: Length = 6 (0x06)
Radius: Value (Hex) = 0x1
Radius: Type = 41 (0x29) Acct-Delay-Time
Radius: Length = 6 (0x06)
Radius: Value (Hex) = 0x0
Radius: Type = 44 (0x2C) Acct-Session-Id
Radius: Length = 10 (0x0A)
Radius: Value (String) =
43 31 46 30 30 30 30 35 | C1F00005
Radius: Type = 45 (0x2D) Acct-Authentic
Radius: Length = 6 (0x06)
Radius: Value (Hex) = 0x1
Radius: Type = 61 (0x3D) NAS-Port-Type
Radius: Length = 6 (0x06)
Radius: Value (Hex) = 0x5
Radius: Type = 66 (0x42) Tunnel-Client-Endpoint
Radius: Length = 16 (0x10)
Radius: Value (String) =
31 30 2e 32 30 31 2e 32 31 34 2e 32 35 31 | 198.51.100.2
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 24 (0x18)
Radius: Vendor ID = 3076 (0x00000C04)
Radius: Type = 146 (0x92) Tunnel-Group-Name
Radius: Length = 18 (0x12)
Radius: Value (String) =
46 54 44 41 6e 79 43 6f 6e 6e 65 63 74 56 50 4e | FTDAnyConnectVPN
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 12 (0x0C)
Radius: Vendor ID = 3076 (0x00000C04)
Radius: Type = 150 (0x96) Client-Type
Radius: Length = 6 (0x06)
Radius: Value (Integer) = 2 (0x0002)
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 12 (0x0C)
Radius: Vendor ID = 3076 (0x00000C04)
```

```
Radius: Type = 151 (0x97) VPN-Session-Type
Radius: Length = 6 (0x06)
Radius: Value (Integer) = 1 (0x0001)
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 12 (0x0C)
Radius: Vendor ID = 3076 (0x00000C04)
Radius: Type = 152 (0x98) VPN-Session-Subtype
Radius: Length = 6 (0x06)
Radius: Value (Integer) = 3 (0x0003)
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 35 (0x23)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 29 (0x1D)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 70 | mdm-tlv=device-p
6c 61 74 66 6f 72 6d 3d 77 69 6e | latform=win
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 44 (0x2C)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 38 (0x26)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 6d | mdm-tlv=device-m
61 63 3d 30 30 2d 30 63 2d 32 39 2d 33 37 2d 65 | ac=00-0c-29-37-e
66 2d 62 66 | f-bf
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 49 (0x31)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 43 (0x2B)
Radius: Value (String) =
61 75 64 69 74 2d 73 65 73 73 69 6f 6e 2d 69 64 | audit-session-id
3d 30 61 63 39 64 36 38 61 30 30 30 30 35 30 30 | =0ac9d68a0000500
30 35 62 62 65 31 66 39 31 | 05bbe1f91
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 51 (0x33)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 45 (0x2D)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 70 | mdm-tlv=device-p
75 62 6c 69 63 2d 6d 61 63 3d 30 30 2d 30 63 2d | ublic-mac=00-0c-
32 39 2d 33 37 2d 65 66 2d 62 66 | 29-37-ef-bf
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 58 (0x3A)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 52 (0x34)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 61 63 2d 75 73 65 72 2d | mdm-tlv=ac-user-
61 67 65 6e 74 3d 41 6e 79 43 6f 6e 6e 65 63 74 | agent=AnyConnect
20 57 69 6e 64 6f 77 73 20 34 2e 36 2e 30 33 30 | Windows 4.6.030
34 39 | 49
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 63 (0x3F)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 57 (0x39)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 70 | mdm-tlv=device-p
6c 61 74 66 6f 72 6d 2d 76 65 72 73 69 6f 6e 3d | latform-version=
36 2e 31 2e 37 36 30 31 20 53 65 72 76 69 63 65 | 6.1.7601 Service
20 50 61 63 6b 20 31 | Pack 1
```

```
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 64 (0x40)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 58 (0x3A)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 74 | mdm-tlv=device-t
79 70 65 3d 56 4d 77 61 72 65 2c 20 49 6e 63 2e | ype=VMware, Inc.
20 56 4d 77 61 72 65 20 56 69 72 74 75 61 6c 20 | VMware Virtual
50 6c 61 74 66 6f 72 6d | Platform
Radius: Type = 26 (0x1A) Vendor-Specific
Radius: Length = 91 (0x5B)
Radius: Vendor ID = 9 (0x00000009)
Radius: Type = 1 (0x01) Cisco-AV-pair
Radius: Length = 85 (0x55)
Radius: Value (String) =
6d 64 6d 2d 74 6c 76 3d 64 65 76 69 63 65 2d 75 | mdm-tlv=device-u
69 64 3d 33 36 39 33 43 36 34 30 37 43 39 32 35 | id=3693C6407C925
32 35 31 46 46 37 32 42 36 34 39 33 42 44 44 38 | 251FF72B6493BDD8
37 33 31 38 41 42 46 43 39 30 43 36 32 31 35 34 | 7318ABFC90C62154
32 43 33 38 46 41 46 38 37 38 45 46 34 39 36 31 | 2C38FAF878EF4961
34 41 31 | 4A1
Radius: Type = 4 (0x04) NAS-IP-Address
Radius: Length = 6 (0x06)
Radius: Value (IP Address) = 0.0.0.0 (0x00000000)
send pkt 192.168.1.10/1813
rip 0x00002ace10874b80 state 6 id 18
rad_vrfy() : response message verified
rip 0x00002ace10874b80
: chall_state ''
: state 0x6
: reqauth:
be a0 6e 46 71 af 5c 65 82 77 c7 b5 50 78 61 d7
: info 0x00002ace10874cc0
session_id 0x18
request_id 0x12
user 'jsmith'
response '***'
app 0
reason 0
skey 'cisco123'
sip 192.168.1.10
type 3

RADIUS packet decode (response)

--------------------------------------
Raw packet data (length = 20).....
05 12 00 14 e5 fd b1 6d fb ee 58 f0 89 79 73 8e | .......m..X..ys.
90 dc a7 20 | ...

Parsed packet data.....
Radius: Code = 5 (0x05)
Radius: Identifier = 18 (0x12)
Radius: Length = 20 (0x0014)
Radius: Vector: E5FDB16DFBEE58F08979738E90DCA720
rad_procpkt: ACCOUNTING_RESPONSE
RADIUS_DELETE
remove_req 0x00002ace10874b80 session 0x18 id 18
free_rip 0x00002ace10874b80
radius: send queue empty
ciscofp3#
```

FTD 진단 CLI에서 'debug webvpn anyconnect 255' 명령(>system support diagnostic-cli)을 실행하

고 Cisco Anyconnect Client의 Windows/Mac PC에서 'Connect'를 누릅니다.

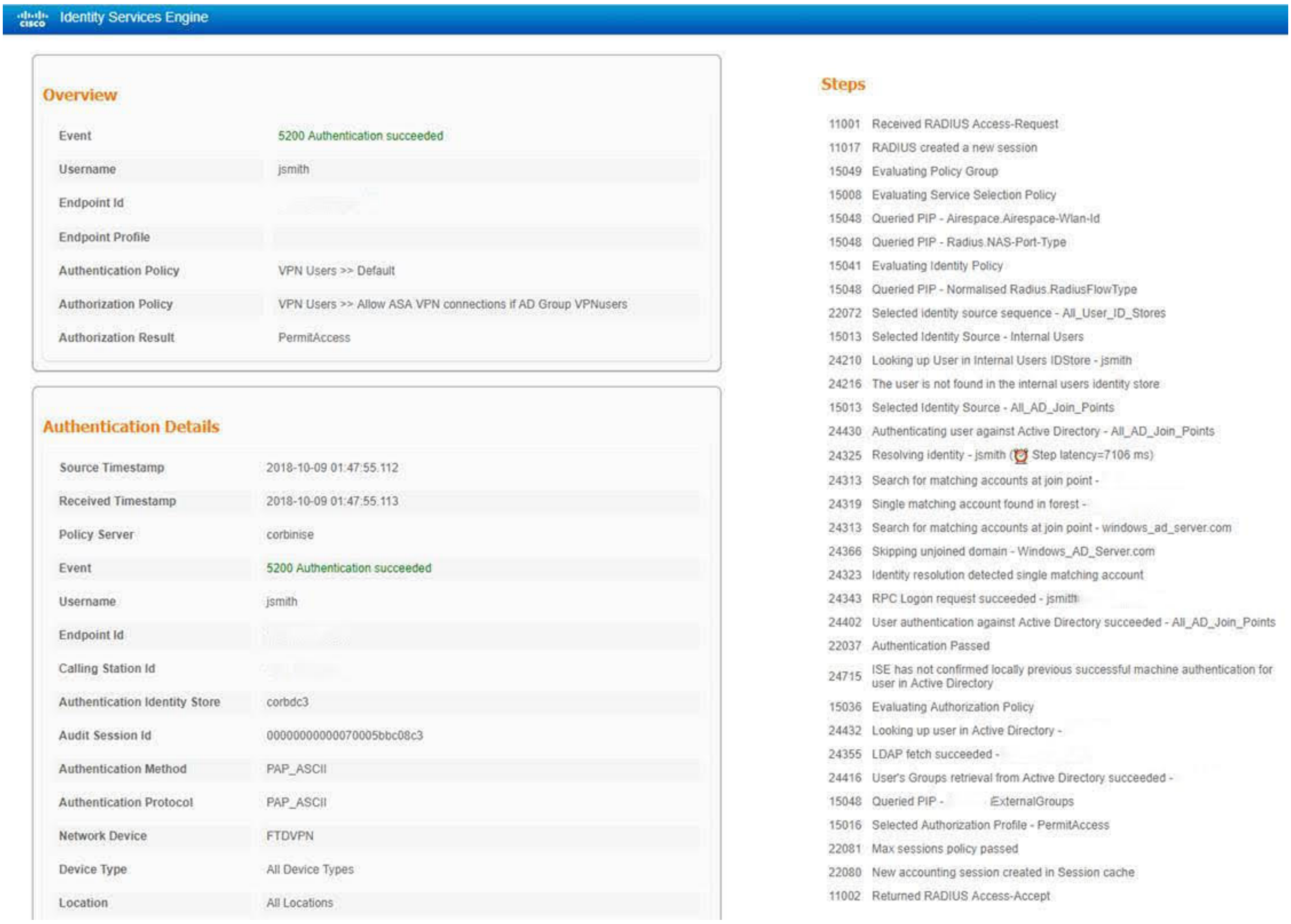
```
> system support diagnostic-cli
Attaching to Diagnostic CLI ... Press 'Ctrl+a then d' to detach.
ciscofp3> enable
Password: <hit enter>
ciscofp3# terminal monitor
ciscofp3# debug webvpn anyconnect 255
<hit Connect on Anyconnect client on PC>

http_parse_cstp_method()
...input: 'CONNECT /CSCOSSLC/tunnel HTTP/1.1'
webvpn_cstp_parse_request_field()
...input: 'Host: ciscofp3.cisco.com'
Processing CSTP header line: 'Host: ciscofp3.cisco.com'
webvpn_cstp_parse_request_field()
...input: 'User-Agent: Cisco AnyConnect VPN Agent for Windows 4.6.03049'
Processing CSTP header line: 'User-Agent: Cisco AnyConnect VPN Agent for Windows 4.6.03049'
Setting user-agent to: 'Cisco AnyConnect VPN Agent for Windows 4.6.03049'
webvpn_cstp_parse_request_field()
...input: 'Cookie: webvpn=2B0E85@28672@6501@2FF4AE4D1F69B98F26E8CAD62D5496E5E6AE5282'
Processing CSTP header line: 'Cookie:
webvpn=2B0E85@28672@6501@2FF4AE4D1F69B98F26E8CAD62D5496E5E6AE5282'
Found WebVPN cookie: 'webvpn=2B0E85@28672@6501@2FF4AE4D1F69B98F26E8CAD62D5496E5E6AE5282'
WebVPN Cookie: 'webvpn=2B0E85@28672@6501@2FF4AE4D1F69B98F26E8CAD62D5496E5E6AE5282'
webvpn_cstp_parse_request_field()
...input: 'X-CSTP-Version: 1'
Processing CSTP header line: 'X-CSTP-Version: 1'
webvpn_cstp_parse_request_field()
...input: 'X-CSTP-Hostname: jsmith-PC'
Processing CSTP header line: 'X-CSTP-Hostname: jsmith-PC'
Setting hostname to: 'jsmith-PC'
webvpn_cstp_parse_request_field()
...input: 'X-CSTP-MTU: 1399'
Processing CSTP header line: 'X-CSTP-MTU: 1399'
webvpn_cstp_parse_request_field()
...input: 'X-CSTP-Address-Type: IPv6,IPv4'
Processing CSTP header line: 'X-CSTP-Address-Type: IPv6,IPv4'
webvpn_cstp_parse_request_field()
...input: 'X-CSTP-Local-Address-IP4: 198.51.100.2'
Processing CSTP header line: 'X-CSTP-Local-Address-IP4: 198.51.100.2'
webvpn_cstp_parse_request_field()
...input: 'X-CSTP-Base-MTU: 1500'
Processing CSTP header line: 'X-CSTP-Base-MTU: 1500'
webvpn_cstp_parse_request_field()
...input: 'X-CSTP-Remote-Address-IP4: 203.0.113.2'
Processing CSTP header line: 'X-CSTP-Remote-Address-IP4: 203.0.113.2'
webvpn_cstp_parse_request_field()
...input: 'X-CSTP-Full-IPv6-Capability: true'
Processing CSTP header line: 'X-CSTP-Full-IPv6-Capability: true'
webvpn_cstp_parse_request_field()
...input: 'X-DTLS-Master-Secret:
1FA92A96D5E82C13CB3A5758F11371EE6B54C6F36F0A8DCE8F4DECB73A034EEF4FE95DA614A5872E1EE5557C3BF4765A
'
Processing CSTP header line: 'X-DTLS-Master-Secret:
1FA92A96D5E82C13CB3A5758F11371EE6B54C6F36F0A8DCE8F4DECB73A034EEF4FE95DA614A5872E1EE5557C3BF4765A
'
webvpn_cstp_parse_request_field()
...input: 'X-DTLS-CipherSuite: DHE-RSA-AES256-GCM-SHA384:DHE-RSA-AES256-SHA256:DHE-RSA-AES256-
SHA:DHE-RSA-AES128-GCM-SHA256:DHE-RSA-AES128-SHA256:DHE-RSA-AES128-SHA:AES256-SHA:AES128-
SHA:DES-CBC3-SHA'
Processing CSTP header line: 'X-DTLS-CipherSuite: DHE-RSA-AES256-GCM-SHA384:DHE-RSA-AES256-
```

```
SHA256:DHE-RSA-AES256-SHA:DHE-RSA-AES128-GCM-SHA256:DHE-RSA-AES128-SHA256:DHE-RSA-AES128-
SHA:AES256-SHA:AES128-SHA:DES-CBC3-SHA'
webvpn_cstp_parse_request_field()
...input: 'X-DTLS-Accept-Encoding: lzs'
Processing CSTL header line: 'X-DTLS-Accept-Encoding: lzs'
webvpn_cstp_parse_request_field()
...input: 'X-DTLS-Header-Pad-Length: 0'
webvpn_cstp_parse_request_field()
...input: 'X-CSTP-Accept-Encoding: lzs,deflate'
Processing CSTP header line: 'X-CSTP-Accept-Encoding: lzs,deflate'
webvpn_cstp_parse_request_field()
...input: 'X-CSTP-Protocol: Copyright (c) 2004 Cisco Systems, Inc.'
Processing CSTP header line: 'X-CSTP-Protocol: Copyright (c) 2004 Cisco Systems, Inc.'
cstp_util_address_ipv4_accept: address asigned: 192.168.10.50
cstp_util_address_ipv6_accept: No IPv6 Address
np_svc_create_session(0x7000, 0x00002acdff1d6440, TRUE)
webvpn_svc_np_setup
SVC ACL Name: NULL
SVC ACL ID: -1
vpn_put_uauth success for ip 192.168.10.50!
No SVC ACL
Iphdr=20 base-mtu=1500 def-mtu=1500 conf-mtu=1406
tcp-mss = 1460
path-mtu = 1460(mss)
TLS Block size = 16, version = 0x303
mtu = 1460(path-mtu) - 0(opts) - 5(ssl) - 16(iv) = 1439
mod-mtu = 1439(mtu) & 0xfff0(complement) = 1424
tls-mtu = 1424(mod-mtu) - 8(cstp) - 48(mac) - 1(pad) = 1367
DTLS Block size = 16
mtu = 1500(base-mtu) - 20(ip) - 8(udp) - 13(dtlshdr) - 16(dtlsiv) = 1443
mod-mtu = 1443(mtu) & 0xfff0(complement) = 1440
dtls-mtu = 1440(mod-mtu) - 1(cdtp) - 20(mac) - 1(pad) = 1418
computed tls-mtu=1367 dtls-mtu=1418 conf-mtu=1406
DTLS enabled for intf=3 (outside)
overide computed dtls-mtu=1418 with conf-mtu=1406
tls-mtu=1367 dtls-mtu=1406
SVC: adding to sessmgmt
Sending X-CSTP-MTU: 1367
Sending X-DTLS-MTU: 1406
Sending X-CSTP-FW-RULE msgs: Start
Sending X-CSTP-FW-RULE msgs: Done
Sending X-CSTP-Quarantine: false
Sending X-CSTP-Disable-Always-On-VPN: false
Sending X-CSTP-Client-Bypass-Protocol: false
```

Cisco ISE

Cisco ISE > Operations > RADIUS > Live Logs > 각 인증 세부 정보를 클릭 합니다

Cisco ISE에서 VPN 로그인 및 ACL 결과 'PermitAccess'가 제공되는지 확인
라이브 로그에 jsmith가 VPN을 통해 FTD에 인증된 것으로 표시됨



Identity Services Engine

Overview

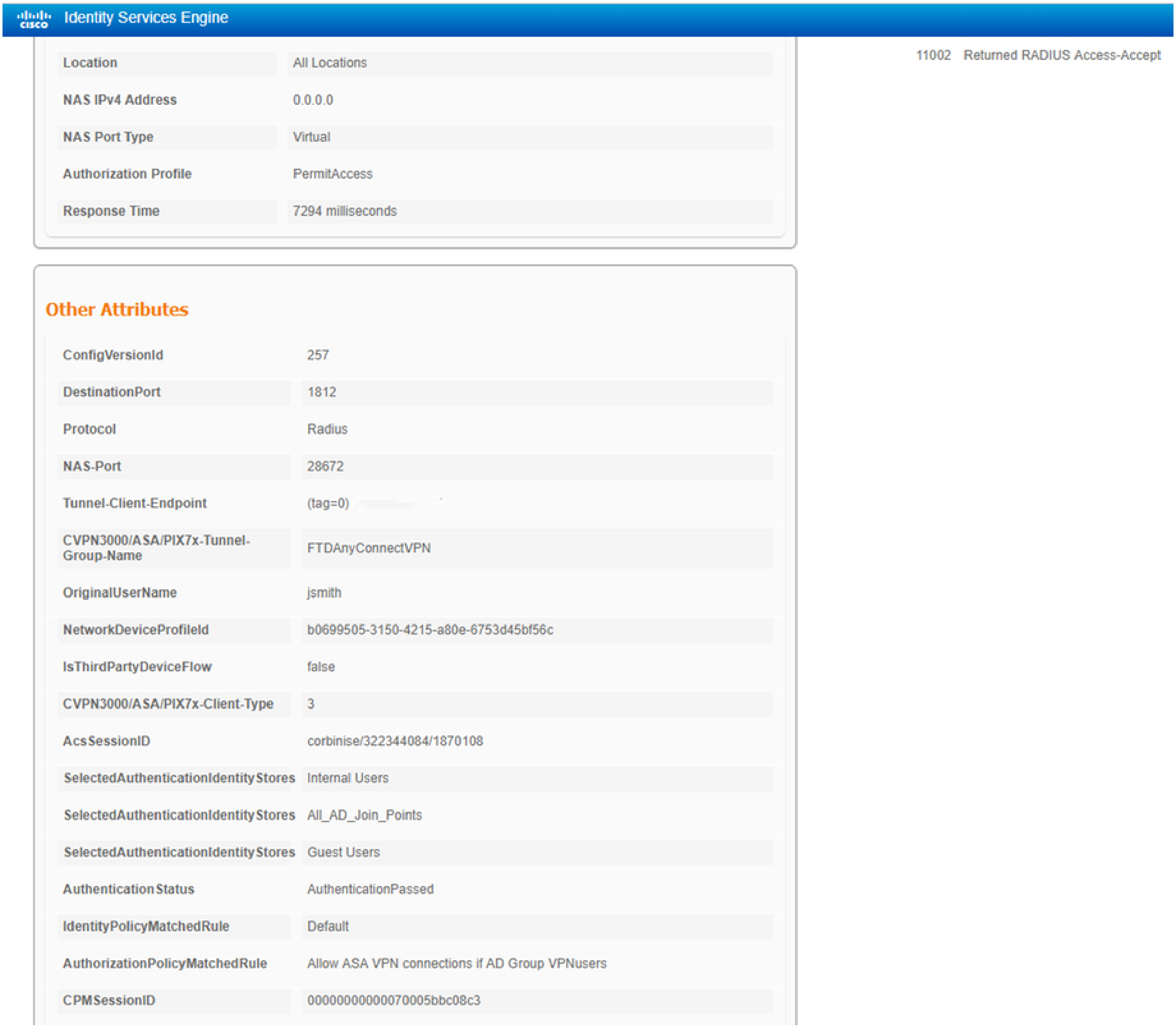
Event	5200 Authentication succeeded
Username	jsmith
Endpoint Id	
Endpoint Profile	
Authentication Policy	VPN Users >> Default
Authorization Policy	VPN Users >> Allow ASA VPN connections if AD Group VPNusers
Authorization Result	PermitAccess

Authentication Details

Source Timestamp	2018-10-09 01:47:55.112
Received Timestamp	2018-10-09 01:47:55.113
Policy Server	corbinise
Event	5200 Authentication succeeded
Username	jsmith
Endpoint Id	
Calling Station Id	
Authentication Identity Store	corbdc3
Audit Session Id	00000000000070005bbc08c3
Authentication Method	PAP_ASCII
Authentication Protocol	PAP_ASCII
Network Device	FTDVPN
Device Type	All Device Types
Location	All Locations

Steps

11001	Received RADIUS Access-Request
11017	RADIUS created a new session
15049	Evaluating Policy Group
15008	Evaluating Service Selection Policy
15048	Queried PIP - Airespace.Airespace-Wlan-Id
15048	Queried PIP - Radius.NAS-Port-Type
15041	Evaluating Identity Policy
15048	Queried PIP - Normalised Radius.RadiusFlowType
22072	Selected identity source sequence - All_User_ID_Stores
15013	Selected Identity Source - Internal Users
24210	Looking up User in Internal Users IDStore - jsmith
24216	The user is not found in the internal users identity store
15013	Selected Identity Source - All_AD_Join_Points
24430	Authenticating user against Active Directory - All_AD_Join_Points
24325	Resolving identity - jsmith (⏰ Step latency=7106 ms)
24313	Search for matching accounts at join point -
24319	Single matching account found in forest -
24313	Search for matching accounts at join point - windows_ad_server.com
24366	Skipping unjoined domain - Windows_AD_Server.com
24323	Identity resolution detected single matching account
24343	RPC Logon request succeeded - jsmith
24402	User authentication against Active Directory succeeded - All_AD_Join_Points
22037	Authentication Passed
24715	ISE has not confirmed locally previous successful machine authentication for user in Active Directory
15036	Evaluating Authorization Policy
24432	Looking up user in Active Directory -
24355	LDAP fetch succeeded -
24416	User's Groups retrieval from Active Directory succeeded -
15048	Queried PIP - ExternalGroups
15016	Selected Authorization Profile - PermitAccess
22081	Max sessions policy passed
22080	New accounting session created in Session cache
11002	Returned RADIUS Access-Accept



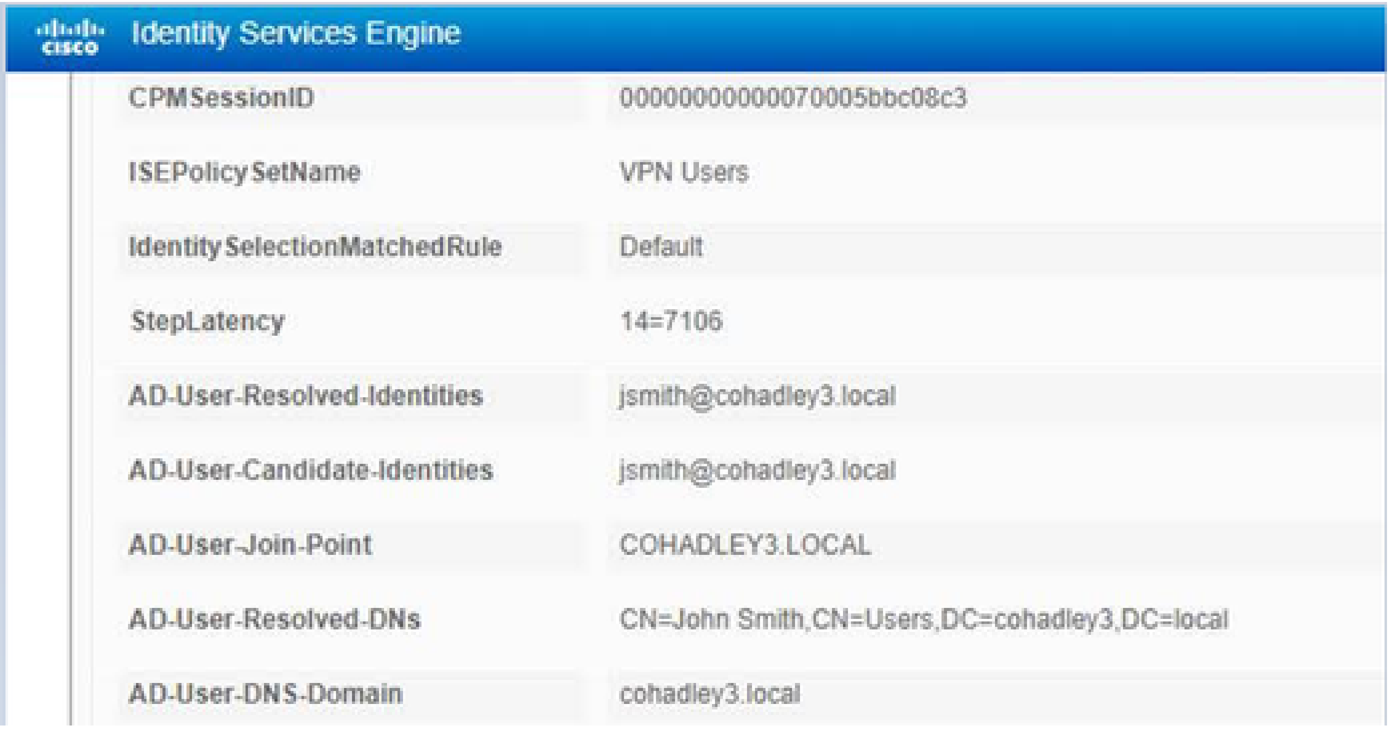
Identity Services Engine

Location	All Locations
NAS IPv4 Address	0.0.0.0
NAS Port Type	Virtual
Authorization Profile	PermitAccess
Response Time	7294 milliseconds

11002 Returned RADIUS Access-Accept

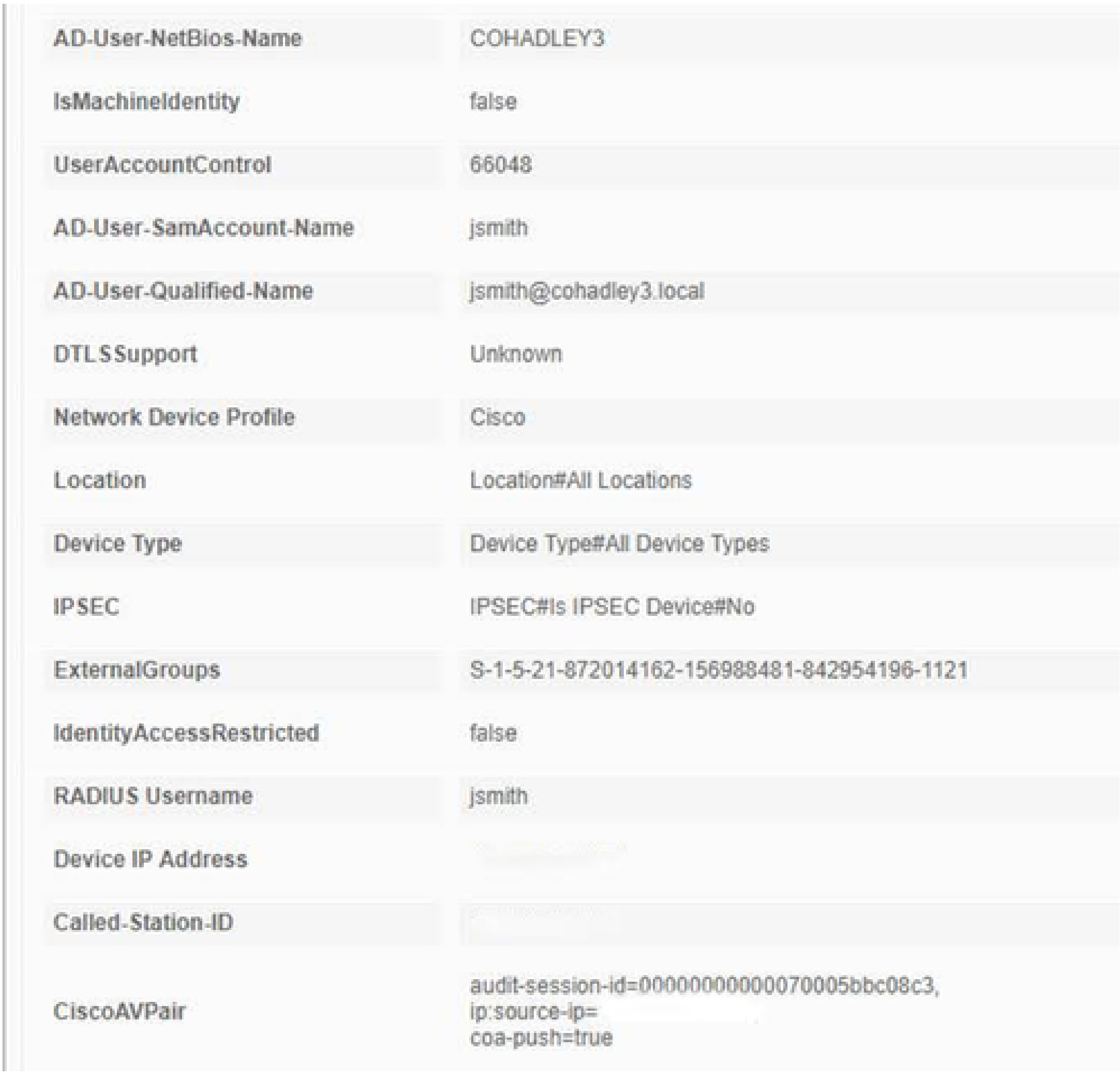
Other Attributes

ConfigVersionId	257
DestinationPort	1812
Protocol	Radius
NAS-Port	28672
Tunnel-Client-Endpoint	(tag=0) [redacted]
CVPN3000/ASA/PIX7x-Tunnel-Group-Name	FTDAnyConnectVPN
OriginalUserName	jsmith
NetworkDeviceProfileId	b0699505-3150-4215-a80e-6753d45bf56c
IsThirdPartyDeviceFlow	false
CVPN3000/ASA/PIX7x-Client-Type	3
AcsSessionID	corbinise/322344084/1870108
SelectedAuthenticationIdentityStores	Internal Users
SelectedAuthenticationIdentityStores	All_AD_Join_Points
SelectedAuthenticationIdentityStores	Guest Users
AuthenticationStatus	AuthenticationPassed
IdentityPolicyMatchedRule	Default
AuthorizationPolicyMatchedRule	Allow ASA VPN connections if AD Group VPNusers
CPMSessionID	00000000000070005bbc08c3



Identity Services Engine

CPMSessionID	00000000000070005bbc08c3
ISEPolicySetName	VPN Users
IdentitySelectionMatchedRule	Default
StepLatency	14=7106
AD-User-Resolved-Identities	jsmith@cohadley3.local
AD-User-Candidate-Identities	jsmith@cohadley3.local
AD-User-Join-Point	COHADLEY3.LOCAL
AD-User-Resolved-DNs	CN=John Smith,CN=Users,DC=cohadley3,DC=local
AD-User-DNS-Domain	cohadley3.local



AD-User-NetBios-Name	COHADLEY3
IsMachineIdentity	false
UserAccountControl	66048
AD-User-SamAccount-Name	jsmith
AD-User-Qualified-Name	jsmith@cohadley3.local
DTLSSupport	Unknown
Network Device Profile	Cisco
Location	Location#All Locations
Device Type	Device Type#All Device Types
IPSEC	IPSEC#Is IPSEC Device#No
ExternalGroups	S-1-5-21-872014162-156988481-842954196-1121
IdentityAccessRestricted	false
RADIUS Username	jsmith
Device IP Address	[redacted]
Called-Station-ID	[redacted]

CiscoAVPair	audit-session-id=00000000000070005bbc08c3,
	ip:source-ip= [redacted]
	coa-push=true

AnyConnect VPN 클라이언트

DART 번들

AnyConnect용 DART 번들을 수집하는 방법

문제 해결

DNS

Cisco ISE, FTD, Windows Server 2012 및 Windows/Mac PC가 모두 정방향 및 역방향(모든 디바이스에서 DNS 확인)을 해결할 수 있는지 확인

Windows PC
명령 프롬프트를 시작하고 FTD의 호스트 이름에 대해 'nslookup'을 수행할 수 있는지 확인합니다.

FTD CLI

```
>show network

> nslookup 192.168.1.10
Server: 192.168.1.10
Address: 192.168.1.10#53
10.1.168.192.in-addr.arpa name = ciscoise.cisco.com
```

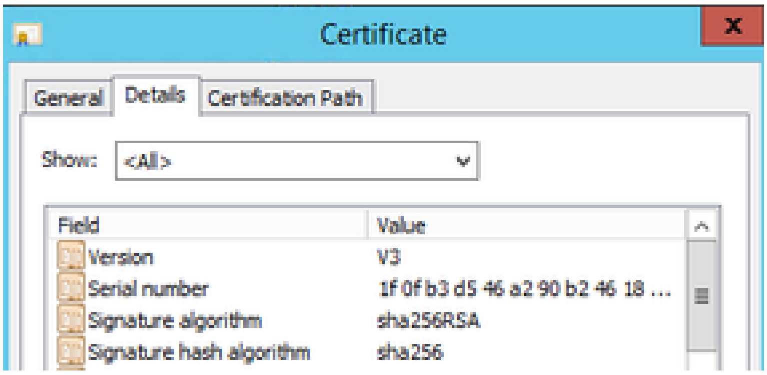
ISE CLI:

```
ciscoise/admin# nslookup 192.168.1.20
Trying "20.1.168.192.in-addr.arpa"
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 56529
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;20.1.168.192.in-addr.arpa. IN PTR

;; ANSWER SECTION:
20.1.168.192.in-addr.arpa. 1200 IN PTR ciscodc.cisco.com
```

Windows Server 2012
명령 프롬프트를 시작하고 FTD의 호스트 이름/FQDN에 대해 'nslookup'을 수행할 수 있는지 확인합니다.

인증서 강도(브라우저 호환성)

Windows Server 2012가 SHA256 이상으로 인증서에 서명하는지 확인합니다.Windows에서 루트 CA 인증서를 두 번 클릭하고 '서명 알고리즘' 필드를 확인합니다.



Show: <All>

Field	Value
Version	V3
Serial number	1f 0f b3 d5 46 a2 90 b2 46 18 ...
Signature algorithm	sha256RSA
Signature hash algorithm	sha256

SHA1인 경우 대부분의 브라우저에서는 해당 인증서에 대한 브라우저 경고를 표시합니다.변경하려면 여기에서 확인할 수 있습니다.

[Windows Server 인증 기관을 SHA256으로 업그레이드하는 방법]

FTD VPN 서버 인증서에 다음 필드가 올바른지 확인합니다(브라우저에서 FTD에 연결할 경우).

일반 이름 = <FTDFQDN>

SAN(Subject Alternative Name) = <FTDFQDN>

예:

일반 이름:**ciscofp3.cisco.com**

SAN(주체 대체 이름):**DNS 이름=cicscofp3.cisco.com**

연결 및 방화벽 구성

FTD CLI에서 캡처를 사용하여 확인하고 Wireshark를 사용하여 직원 PC에서 캡처를 사용하여 패킷이 TCP+UDP 443을 통해 FTD의 외부 IP로 전송되는지 확인합니다.해당 패킷이 직원의 홈 라우터의 공용 IP 주소에서 제공되는지 확인합니다.

```
ciscofp3# capture capin interface outside trace detail trace-count 100 match ip any host



<now hit Connect on AnyConnect Client from employee PC>
ciscofp3# show cap
capture capin type raw-data trace detail trace-count 100 interface outside [Buffer Full - 524153
bytes]
match ip any host 198.51.100.2

ciscofp3# show cap capin
2375 packets captured
1: 17:05:56.580994 198.51.100.2.55928 > 203.0.113.2.443: S 2933933902:2933933902(0) win 8192



2: 17:05:56.581375 203.0.113.2.443 > 198.51.100.2.55928: S 430674106:430674106(0) ack 2933933903
win 32768



3: 17:05:56.581757 198.51.100.2.55928 > 203.0.113.2.443: . ack 430674107 win 64240
...
```