Anyconnect Client to ASA with Use of DHCP for Address Assignment

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Introduction

This document describes how to configure the Cisco 5500-X Series Adaptive Security Appliance (ASA) to make the DHCP server provide the client IP address to all the Anyconnect clients with the use of the Adaptive Security Device Manager (ASDM) or CLI.

Prerequisites

Requirements

This document assumes that the ASA is fully operational and configured to allow the Cisco ASDM or CLI to make configuration changes.

> **Note**: Refer to Book 1: Cisco ASA Series General Operations CLI Configuration Guide, 9.2 to allow the device to be remotely configured by the ASDM or Secure Shell (SSH).

Components Used

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

- Cisco ASA 5500-X Next Generation Firewall Version 9.2(1)
- Adaptive Security Device Manager Version 7.1(6)

- Cisco Anyconnect Secure Mobility Client 3.1.05152

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

Related Products

This configuration can also be used with Cisco ASA Security Appliance 5500 Series Version 7.x and later.

Background Information

Remote access VPNs address the requirement of the mobile workforce to securely connect to the organization's network. Mobile users are able to set up a secure connection using the Cisco Anyconnect Secure Mobility Client software. The Cisco Anyconnect Secure Mobility Client initiates a connection to a central site device configured to accept these requests. In this example, the central site device is an ASA 5500-X Series Adaptive Security Appliance that uses dynamic crypto maps.

In security appliance address management, you have to configure IP addresses that connect a client with a resource on the private network, through the tunnel, and let the client function as if it were directly connected to the private network.

Furthermore, you are dealing only with the private IP addresses that are assigned to clients. The IP addresses assigned to other resources on your private network are part of your network administration responsibilities, not part of VPN management. Therefore, when IP addresses are discussed here, Cisco means those IP addresses available in your private network addressing scheme that let the client function as a tunnel endpoint.

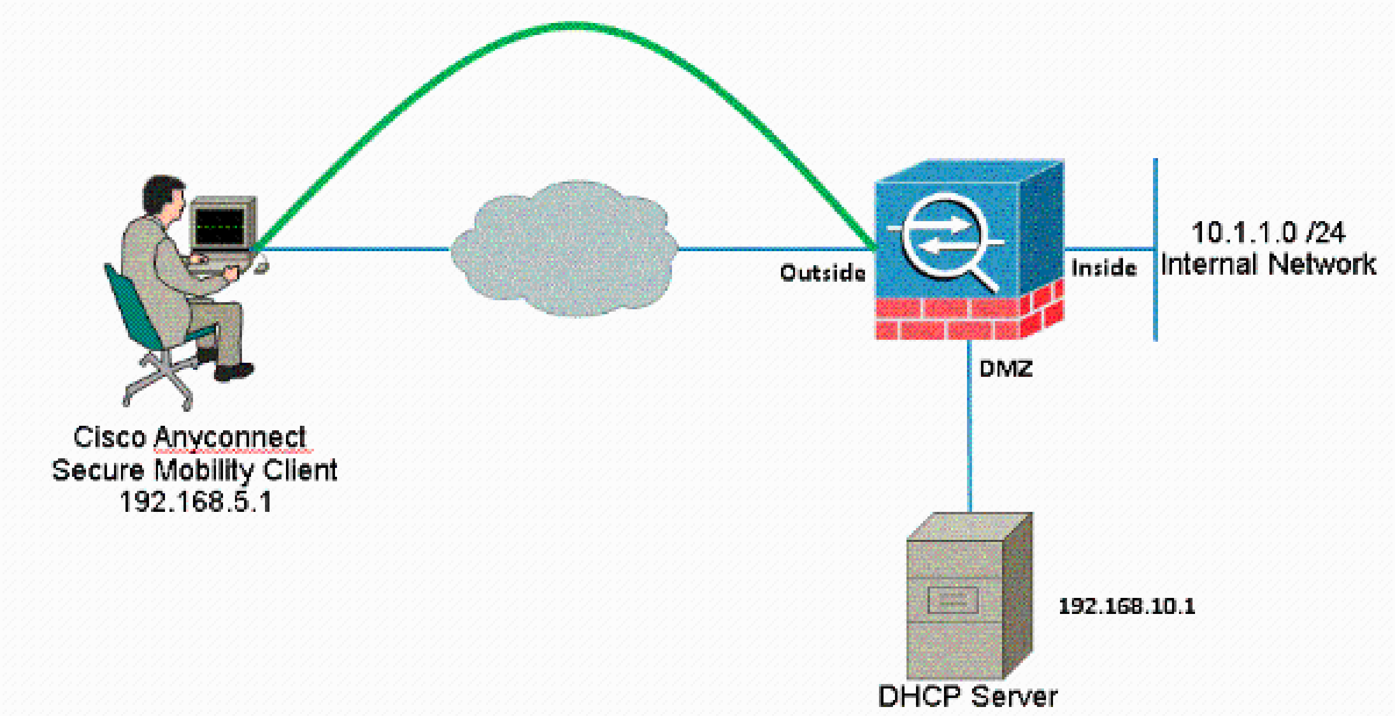
Configure

In this section, you are presented with the information to configure the features described in this document.

> **Note**: Use the Command Lookup Tool (registered customers only) in order to obtain more information on the commands used in this section.

Network Diagram

This document uses this network setup:



Note: The IP addressing schemes used in this configuration are not legally routable on the Internet. They are RFC 1918 addresses which were used in a lab environment.

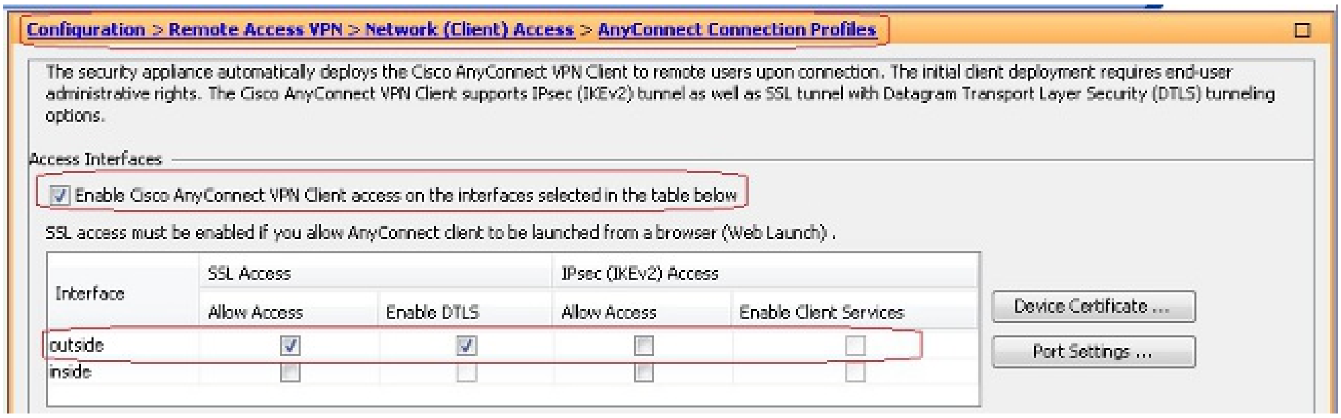
Configure Cisco Anyconnect Secure Mobility Client

ASDM Procedure

Complete these steps in order to configure the remote access VPN:

- Enable WebVPN.

  Choose **Configuration > Remote Access VPN > Network (Client) Access > SSL VPN Connection Profiles** and under **Access Interfaces**, click the check boxes **Allow Access** and **Enable DTLS** for the outside interface. Also, check the **Enable Cisco AnyConnect VPN Client or legacy SSL VPN Client access on the interface selected in this table** check box in order to enable SSL VPN on the outside interface.



Configuration > Remote Access VPN > Network (Client) Access > AnyConnect Connection Profiles

The security appliance automatically deploys the Cisco AnyConnect VPN Client to remote users upon connection. The initial client deployment requires end-user administrative rights. The Cisco AnyConnect VPN Client supports IPsec (IKEv2) tunnel as well as SSL tunnel with Datagram Transport Layer Security (DTLS) tunneling options.

Access Interfaces

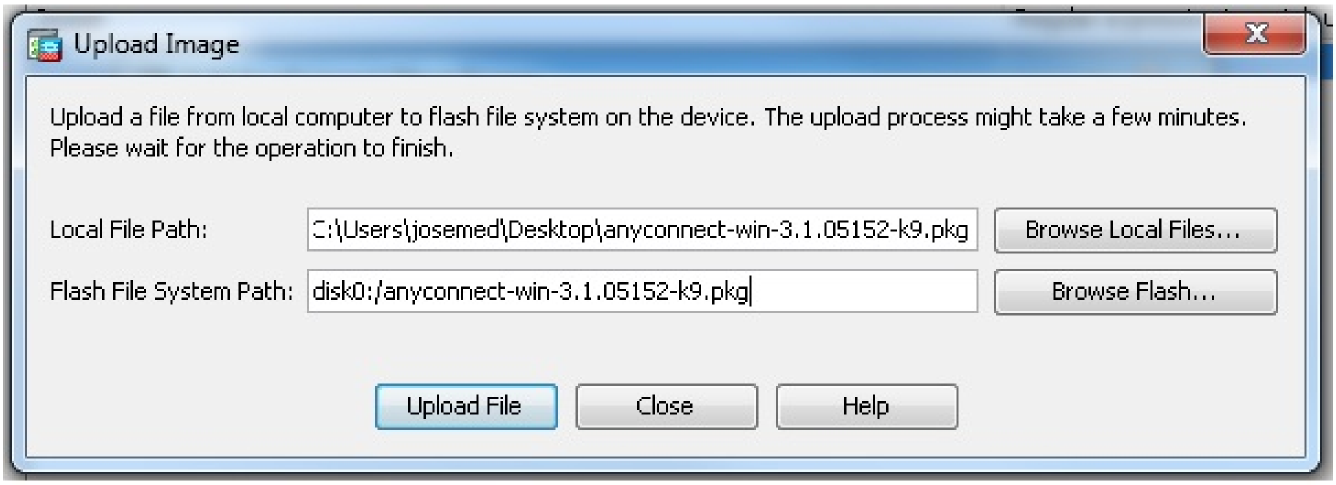
☑ Enable Cisco AnyConnect VPN Client access on the interfaces selected in the table below

SSL access must be enabled if you allow AnyConnect client to be launched from a browser (Web Launch) .

Interface	SSL Access		IPsec (IKEv2) Access	
	Allow Access	Enable DTLS	Allow Access	Enable Client Services
outside	☑	☑	□	□
inside	□	□	□	□

Click **Apply**.

Choose **Configuration > Remote Access VPN > Network (Client) Access > Anyconnect Client Software > Add** in order to add the Cisco AnyConnect VPN client image from the flash memory of ASA as shown.

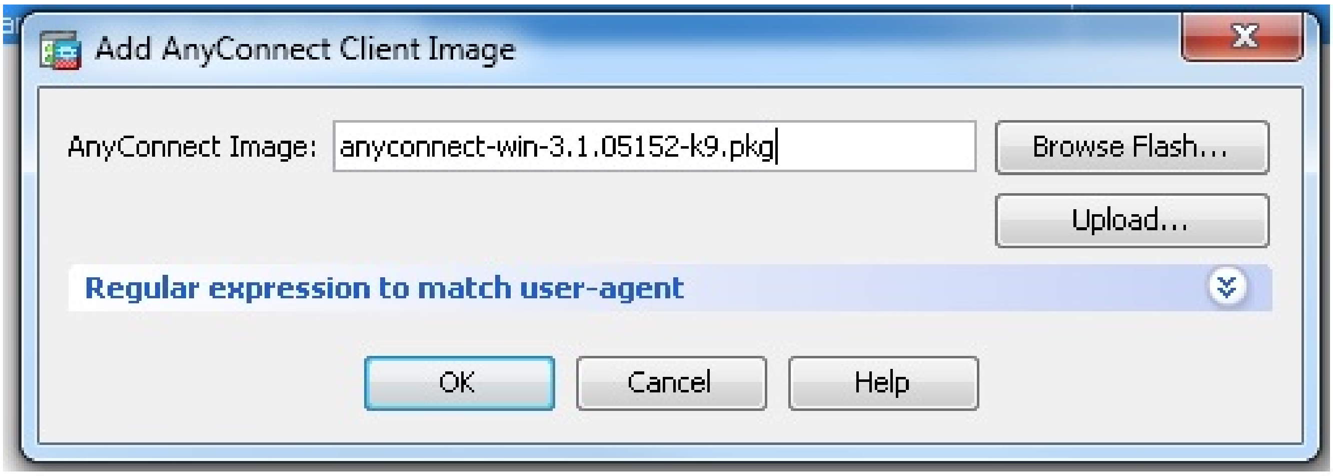


Upload Image

Upload a file from local computer to flash file system on the device. The upload process might take a few minutes. Please wait for the operation to finish.

Local File Path: C:\Users\josemed\Desktop\anyconnect-win-3.1.05152-k9.pkg

Flash File System Path: disk0:/anyconnect-win-3.1.05152-k9.pkg



Add AnyConnect Client Image

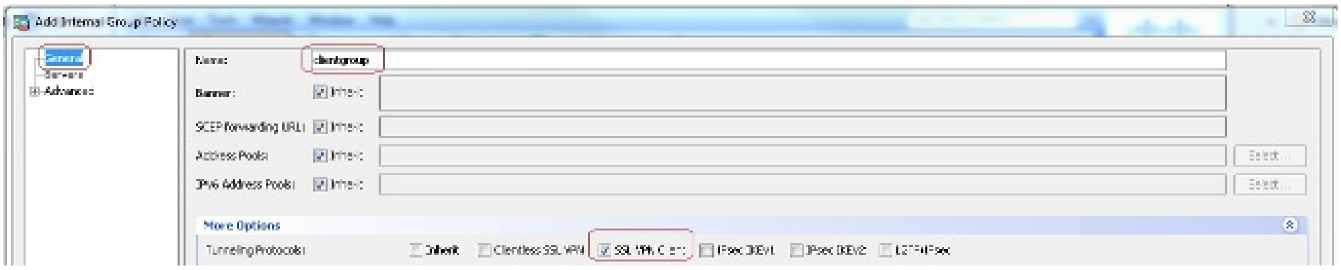
AnyConnect Image: anyconnect-win-3.1.05152-k9.pkg

Equivalent CLI Configuration:

```
ciscoasa(config)#webvpn
ciscoasa(config-webvpn)#enable outside
ciscoasa(config-webvpn)#anyconnect image disk0:/anyconnect-win-3.1.05152-k9.pkg 1
ciscoasa(config-webvpn)#tunnel-group-list enable
ciscoasa(config-webvpn)#anyconnect enable
```

- Configure Group Policy.

Choose **Configuration > Remote Access VPN > Network (Client) Access > Group Policies** in order to create an internal group policy **clientgroup**. Under the **General** tab, select the **SSL VPN Client** check box in order to enable the SSL as tunneling protocol.



Add Internal Group Policy

Name: clientgroup

Banner: ☑ Inherit

SCEP forwarding URL: ☑ Inherit

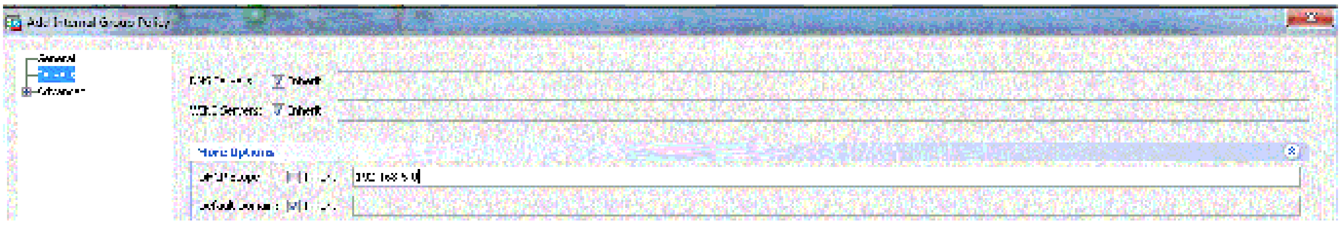
Address Pools: ☑ Inherit

IPv6 Address Pools: ☑ Inherit

More Options

Tunneling Protocols: □ Inherit □ Clientless SSL VPN ☑ SSL VPN Client □ IPsec IKEv1 □ IPsec IKEv2 □ L2TP/IPsec

Configure the DHCP Network-Scope in the **Servers** tab, choose **More Options** in order to configure the DHCP Scope for the users to be assigned automatically.



Add Internal Group Policy

DNS Servers: ☑ Inherit

WINS Servers: ☑ Inherit

More Options

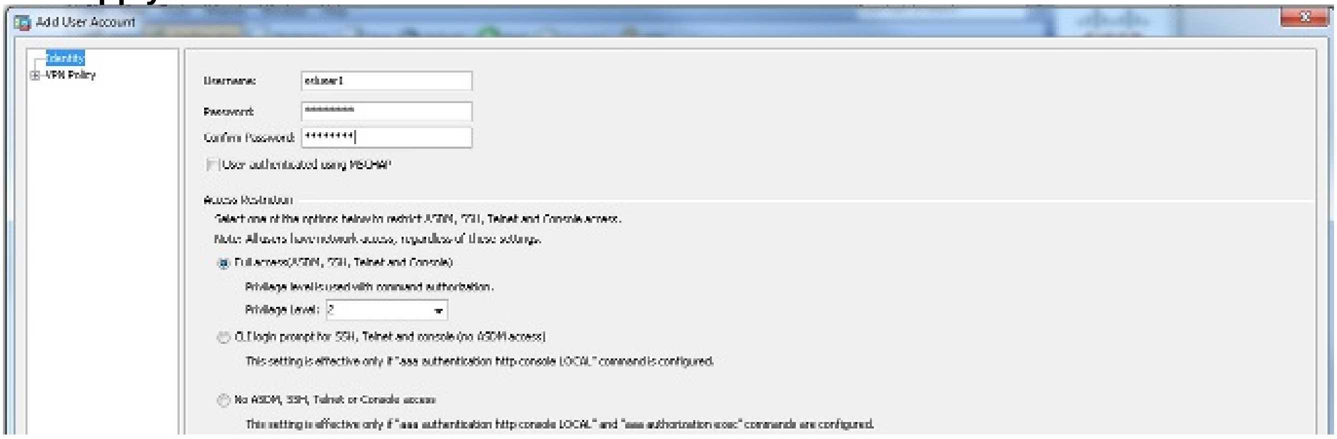
DHCP Scope: ☐ Inherit 192.168.5.0

Default Domain: ☑ Inherit

Equivalent CLI Configuration:

```
ciscoasa(config)#group-policy clientgroup internal
ciscoasa(config)#group-policy clientgroup attributes
ciscoasa(config-group-policy)#vpn-tunnel-protocol ssl-client
ciscoasa(config-group-policy)#
```

- Choose **Configuration > Remote Access VPN > AAA/Local Users > Local Users > Add** in order to create a new user account **ssluser1**. Click **OK** and then **Apply**.



Add User Account

Username: ssluser1

Password: ********

Confirm Password: ********

□ User authenticated using MSCHAP

Access Restriction

Select one of the options below to restrict ASDM, SSH, Telnet and Console access.

Note: All users have network access, regardless of these settings.

● Full access(ASDM, SSH, Telnet and Console)

Privilege level is used with command authorization.

Privilege Level: 2

○ CLI login prompt for SSH, Telnet and console (no ASDM access)

This setting is effective only if "aaa authentication http console LOCAL" command is configured.

○ No ASDM, SSH, Telnet or Console access

This setting is effective only if "aaa authentication http console LOCAL" and "aaa authorization exec" commands are configured.

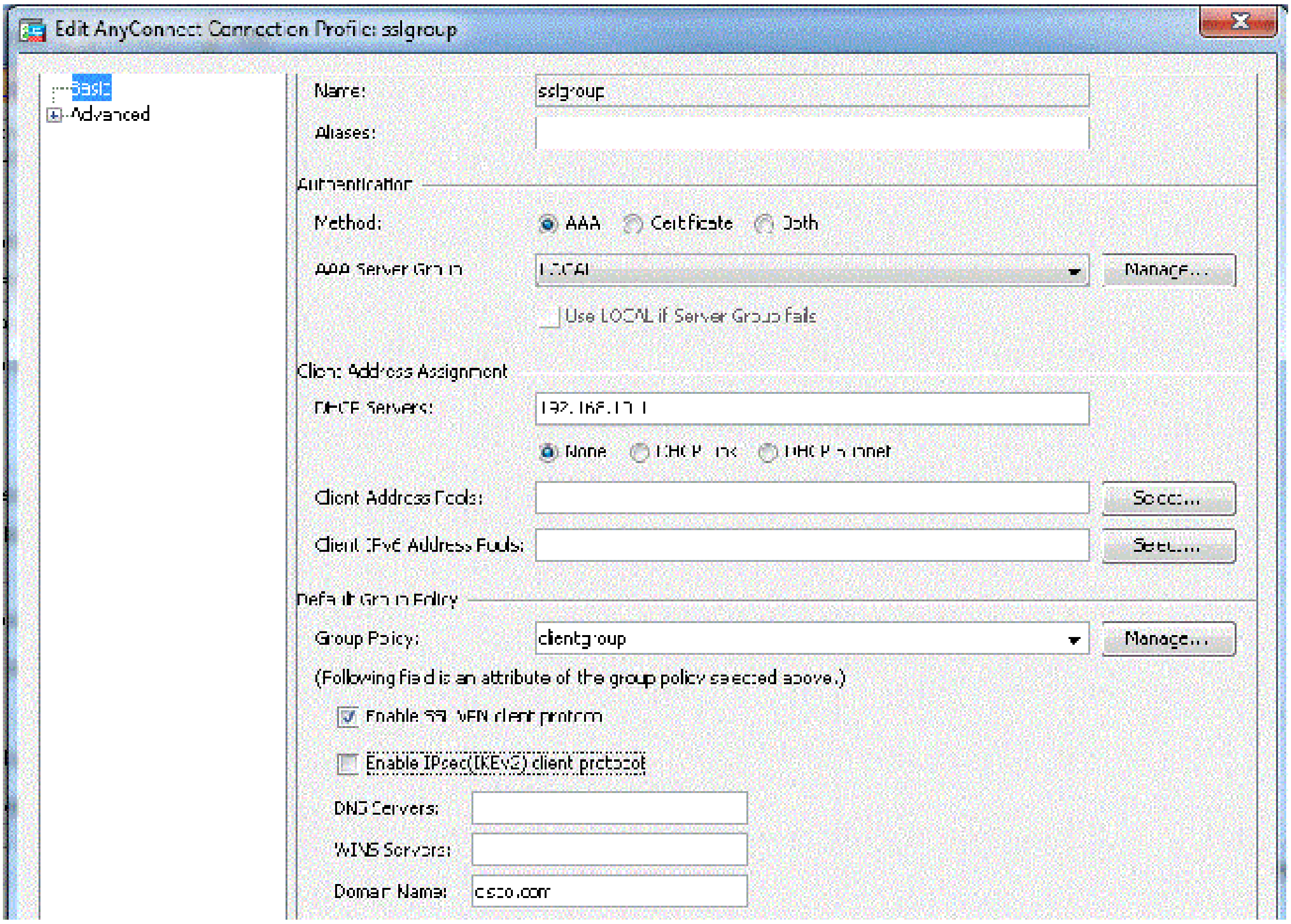
Equivalent CLI Configuration:`ciscoasa(config)#`**`username ssluser1 password asdmASA`**

- Configure Tunnel Group.

Choose **Configuration > Remote Access VPN > Network (Client) Access > Anyconnect Connection Profiles > Add** in order to create a new tunnel group **sslgroup**.

In the **Basic** tab, you can perform the list of configurations as shown:

Name the Tunnel group as **sslgroup**.Provide the DHCP server IP address in the space provided for **DHCP Servers**.Under Default Group Policy, choose the group policy **clientgroup** from the Group Policy drop-down list.Configure DHCP Link or DHCP Subnet.



Edit AnyConnect Connection Profile: sslgroup

Basic

Advanced

Name: sslgroup

Aliases:

Authentication

Method: ● AAA ○ Certificate ○ Both

AAA Server Group: LOCAL

□ Use LOCAL if Server Group fails

Client Address Assignment

DHCP Servers: 192.168.10.1

● None ○ DHCP Link ○ DHCP Subnet

Client Address Pools:

Client IPv6 Address Pools:

Default Group Policy

Group Policy: clientgroup

(Following field is an attribute of the group policy selected above.)

☑ Enable SSL VPN client protocol

□ Enable IPsec(IKEv2) client protocol

DNS Servers:

WINS Servers:

Domain Name: cisco.com

Under the **Advanced > Group Alias/Group URL** tab, specify the group alias name as **sslgroup_users** and click **OK**.

Equivalent CLI Configuration:

```
ciscoasa(config)#tunnel-group sslgroup type remote-access
ciscoasa(config)#tunnel-group sslgroup general-attributes
ciscoasa(config-tunnel-general)#dhcp-server 192.168.10.1
ciscoasa(config-tunnel-general)#default-group-policy clientgroup
ciscoasa(config-tunnel-general)#exit
ciscoasa(config)#tunnel-group sslgroup webvpn-attributes
ciscoasa(config-tunnel-webvpn)#group-alias sslgroup_users enable
```

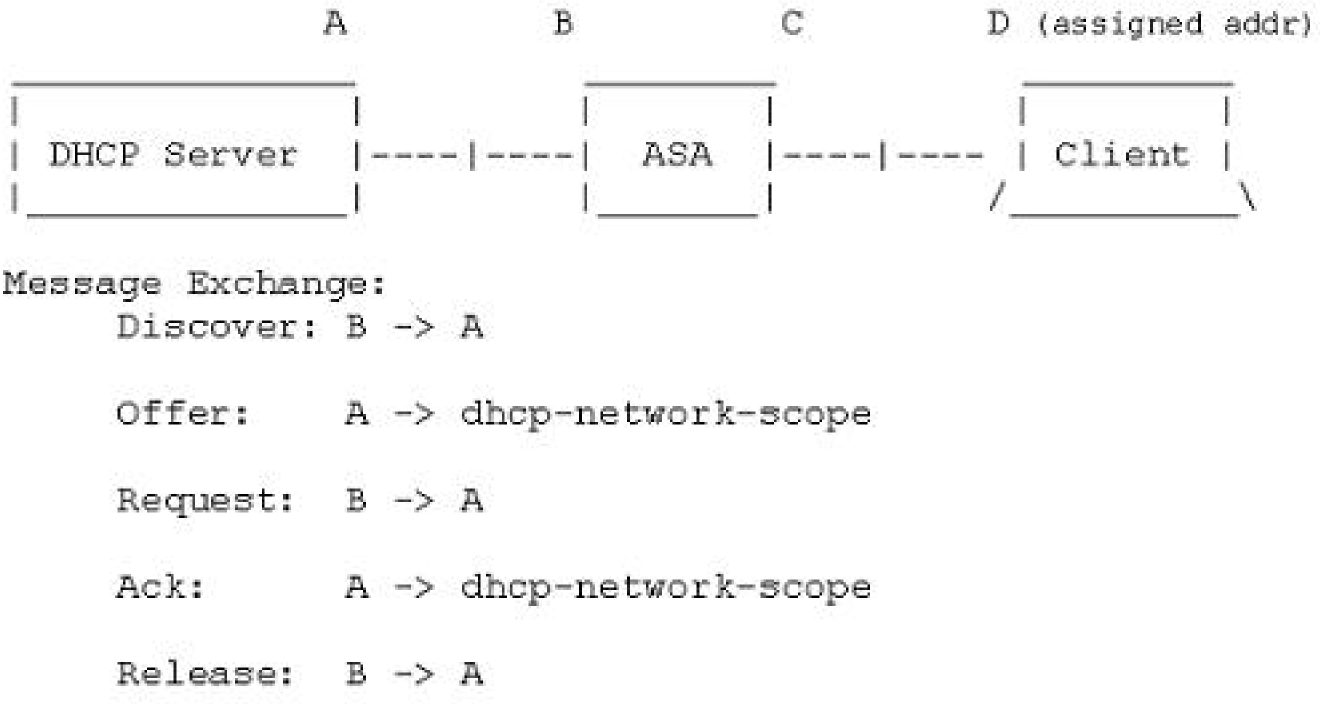
Subnet-Selection or Link-Selection

DHCP Proxy support for RFC 3011 and RFC 3527 is a feature introduced in the 8.0.5 and 8.2.2 and it has been supported in onward releases.

- RFC 3011 defines a new DHCP option, the subnet selection option, which allows the DHCP client to specify the subnet on which to allocate an address. This option takes precedence over the method that the DHCP server uses to determine the subnet on which to select an address.
- RFC 3527 defines a new DHCP suboption, the link selection suboption, which allows the DHCP client to specify the address to which the DHCP Server should respond.

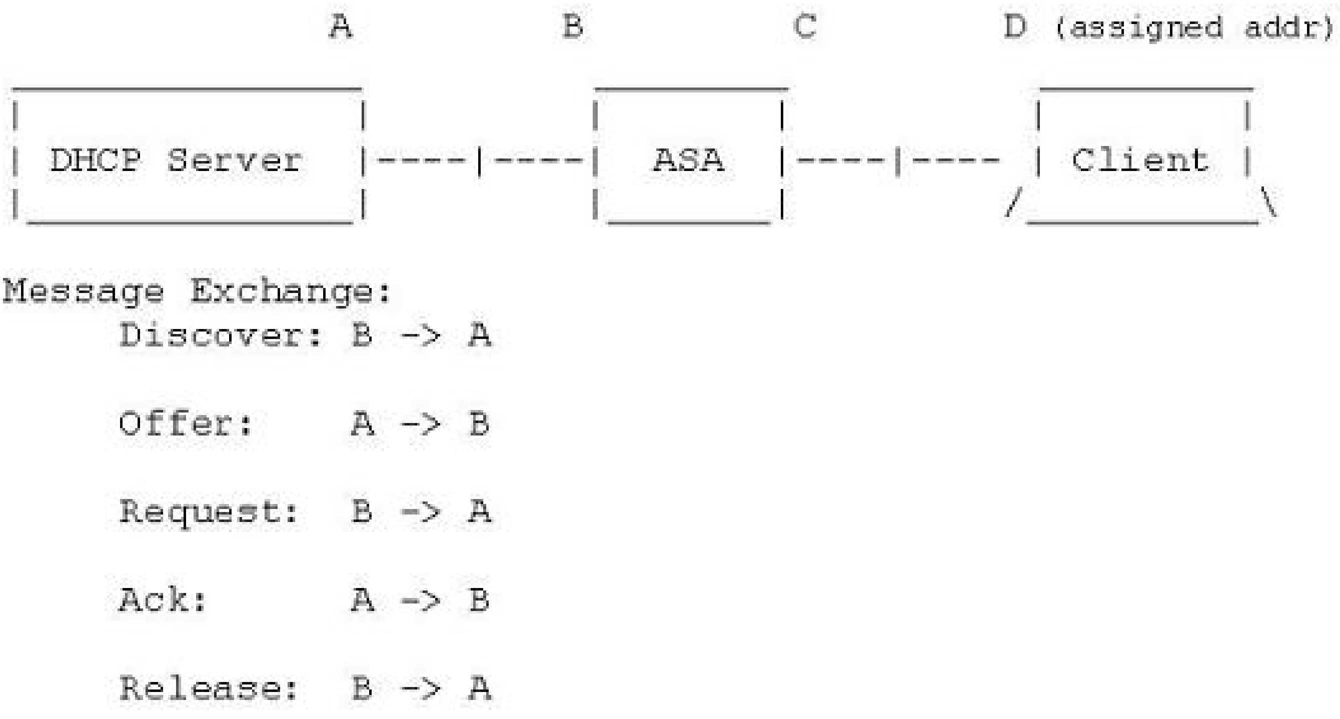
In terms of the ASA, these RFCs will allow a user to specify a dhcp-network-scope for DHCP Address Assignment that is not local to the ASA, and the DHCP Server will still be able to reply directly to the interface of the ASA. The diagrams below should help to illustrate the new behavior. This will allow the use non-local scopes without having to create a static route for that scope in their network.

When RFC 3011 or RFC 3527 is not enabled, the DHCP Proxy exchange looks similar to this:



```
                 A          B          C         D (assigned addr)
 _______________             ________          _________
|               |           |        |         |         |
| DHCP Server   |----|----| ASA      |----|---- | Client |
|_______________|           |________|        /_________\

Message Exchange:
     Discover: B -> A

     Offer:    A -> dhcp-network-scope

     Request:  B -> A

     Ack:      A -> dhcp-network-scope

     Release:  B -> A
```

With either of these RFCs enabled, the exchange looks similar to this instead, and the VPN client is still assigned an address in the correct subnet:



```
                 A          B          C         D (assigned addr)
 _______________             ________          _________
|               |           |        |         |         |
| DHCP Server   |----|----| ASA      |----|---- | Client |
|_______________|           |________|        /_________\

Message Exchange:
     Discover: B -> A

     Offer:    A -> B

     Request:  B -> A

     Ack:      A -> B

     Release:  B -> A
```

Configure the ASA with Use of the CLI

Complete these steps in order to configure the DHCP server to provide IP address to the VPN clients from the command line. Refer to Cisco ASA 5500 Series Adaptive Security Appliances-

Command References for more information on each command that is used.

```
ASA#show run
ASA Version 9.2(1)
!

!--- Specify the hostname for the Security Appliance.

hostname ASA
enable password 8Ry2YjIyt7RRXU24 encrypted
names
!


!--- Configure the outside and inside interfaces.

interface GigabitEthernet0/0
nameif inside
security-level 100
ip address 10.1.1.1 255.255.255.0
!
interface GigabitEthernet0/1
nameif outside
security-level 0
ip address 192.168.1.1 255.255.255.0
!
interface GigabitEthernet0/2
nameif DMZ
security-level 50
ip address 192.168.10.2 255.255.255.0


!--- Output is suppressed.


passwd 2KFQnbNIdI.2KYOU encrypted
boot system disk0:/asa802-k8.bin
ftp mode passive

object network obj-10.1.1.0
subnet 10.1.1.0 255.255.255.0
object network obj-192.168.5.0
subnet 192.168.5.0 255.255.255.0

pager lines 24
logging enable
logging asdm informational
mtu inside 1500
mtu outside 1500
mtu dmz 1500
no failover
icmp unreachable rate-limit 1 burst-size 1


!--- Specify the location of the ASDM image for ASA to fetch the image
for ASDM access.

asdm image disk0:/asdm-716.bin
no asdm history enable
arp timeout 14400

nat (inside,outside) source static obj-10.1.1.0 obj-10.1.1.0 destination static
obj-192.168.5.0 obj-192.168.5.0
```

```
!
object network obj-10.1.1.0
nat (inside,outside) dynamic interface
route outside 0.0.0.0 0.0.0.0 192.168.1.2 1
timeout xlate 3:00:00
timeout conn 1:00:00 half-closed 0:10:00 udp 0:02:00 icmp 0:00:02
timeout sunrpc 0:10:00 h323 0:05:00 h225 1:00:00 mgcp 0:05:00 mgcp-pat 0:05:00
timeout sip 0:30:00 sip_media 0:02:00 sip-invite 0:03:00 sip-disconnect 0:02:00
timeout uauth 0:05:00 absolute
dynamic-access-policy-record DfltAccessPolicy
http server enable
http 0.0.0.0 0.0.0.0 inside
no snmp-server location
no snmp-server contact
snmp-server enable traps snmp authentication linkup linkdown coldstart
telnet timeout 5
ssh timeout 5
console timeout 0
threat-detection basic-threat
threat-detection statistics access-list
!
class-map inspection_default
match default-inspection-traffic
!
!
policy-map type inspect dns preset_dns_map
parameters
message-length maximum 512
policy-map global_policy
class inspection_default
inspect dns preset_dns_map
inspect ftp
inspect h323 h225
inspect h323 ras
inspect netbios
inspect rsh
inspect rtsp
inspect skinny
inspect esmtp
inspect sqlnet
inspect sunrpc
inspect tftp
inspect sip
inspect xdmcp
!
service-policy global_policy global
!
!--- Enable webvpn and specify an Anyconnect image

webvpn
enable outside
anyconnect image disk0:/anyconnect-win-3.1.05152-k9.pkg 1
anyconnect enable
tunnel-group-list enable


group-policy clientgroup internal
group-policy clientgroup attributes


!--- define the DHCP network scope in the group policy.This configuration is Optional

dhcp-network-scope 192.168.5.0
```

```
!--- In order to identify remote access users to the Security Appliance,
!--- you can also configure usernames and passwords on the device.

username ssluser1 password ffIRPGpDSOJh9YLq encrypted


!--- Create a new tunnel group and set the connection
!--- type to remote-access.

tunnel-group sslgroup type remote-access


!--- Define the DHCP server address to the tunnel group.

tunnel-group sslgroup general-attributes
default-group-policy clientgroup
dhcp-server 192.168.10.1

!--- If the use of RFC 3011 or RFC 3527 is required then the following command will
enable support for them

tunnel-group sslgroup general-attributes
dhcp-server subnet-selection (server ip) (3011)
hcp-server link-selection (server ip) (3527)

!--- Configure a group-alias for the tunnel-group

tunnel-group sslgroup webvpn-attributes
group-alias sslgroup_users enable

prompt hostname context
Cryptochecksum:e0725ca9ccc28af488ded9ee36b7822d
: end
ASA#
```