Newer Cisco SBA Guides Available

This guide is part of an older series of Cisco Smart Business Architecture designs. To access the latest Cisco SBA Guides, go to http://www.cisco.com/go/sba

Cisco strives to update and enhance SBA guides on a regular basis. As we develop a new series of SBA guides, we test them together, as a complete system. To ensure the mutual compatibility of designs in Cisco SBA guides, you should use guides that belong to the same series.

SBA

SBA

BORDERLESS NETWORKS

DEPLOYMENT GUIDE

Remote Access VPN Deployment Guide

SMART BUSINESS ARCHITECTURE

August 2012 Series

Preface

Who Should Read This Guide

This Cisco® Smart Business Architecture (SBA) guide is for people who fill a variety of roles:

- Systems engineers who need standard procedures for implementing solutions
- Project managers who create statements of work for Cisco SBA implementations
- Sales partners who sell new technology or who create implementation documentation
- Trainers who need material for classroom instruction or on-the-job training

In general, you can also use Cisco SBA guides to improve consistency among engineers and deployments, as well as to improve scoping and costing of deployment jobs.

Release Series

Cisco strives to update and enhance SBA guides on a regular basis. As we develop a series of SBA guides, we test them together, as a complete system. To ensure the mutual compatibility of designs in Cisco SBA guides, you should use guides that belong to the same series.

The Release Notes for a series provides a summary of additions and changes made in the series.

All Cisco SBA guides include the series name on the cover and at the bottom left of each page. We name the series for the month and year that we release them, as follows:

month year Series

For example, the series of guides that we released in August 2012 are the "August 2012 Series".

You can find the most recent series of SBA guides at the following sites:

Customer access: http://www.cisco.com/go/sba

Partner access: http://www.cisco.com/go/sbachannel

How to Read Commands

Many Cisco SBA guides provide specific details about how to configure Cisco network devices that run Cisco IOS, Cisco NX-OS, or other operating systems that you configure at a command-line interface (CLI). This section describes the conventions used to specify commands that you must enter.

Commands to enter at a CLI appear as follows:

```
configure terminal
```

Commands that specify a value for a variable appear as follows:

```
ntp server 10.10.48.17
```

Commands with variables that you must define appear as follows:

```
class-map [highest class name]
```

Commands shown in an interactive example, such as a script or when the command prompt is included, appear as follows:

```
Router# enable
```

Long commands that line wrap are underlined. Enter them as one command:

```
wrr-queue random-detect max-threshold 1 100 100 100 100 100
100 100 100
```

Noteworthy parts of system output or device configuration files appear highlighted, as follows:

```
interface Vlan64
  ip address 10.5.204.5 255.255.255.0
```

Comments and Questions

If you would like to comment on a guide or ask questions, please use the SBA feedback form.

If you would like to be notified when new comments are posted, an RSS feed is available from the SBA customer and partner pages.

Table of Contents

What's In This SBA Guide

Cisco SBA Borderless Networks

Cisco SBA helps you design and quickly deploy a full-service business network. A Cisco SBA deployment is prescriptive, out-of-the-box, scalable, and flexible.

Cisco SBA incorporates LAN, WAN, wireless, security, data center, application optimization, and unified communication technologies—tested together as a complete system. This component-level approach simplifies system integration of multiple technologies, allowing you to select solutions that solve your organization's problems—without worrying about the technical complexity.

Cisco SBA Borderless Networks is a comprehensive network design targeted at organizations with up to 10,000 connected users. The SBA Borderless Network architecture incorporates wired and wireless local area network (LAN) access, wide-area network (WAN) connectivity, WAN application optimization, and Internet edge security infrastructure.

Route to Success

To ensure your success when implementing the designs in this guide, you should first read any guides that this guide depends upon—shown to the left of this guide on the route below. As you read this guide, specific prerequisites are cited where they are applicable.

About This Guide

This *deployment guide* contains one or more deployment chapters, which each include the following sections:

- Business Overview—Describes the business use case for the design. Business decision makers may find this section especially useful.
- Technology Overview—Describes the technical design for the business use case, including an introduction to the Cisco products that make up the design. Technical decision makers can use this section to understand how the design works.
- Deployment Details—Provides step-by-step instructions for deploying and configuring the design. Systems engineers can use this section to get the design up and running quickly and reliably.

You can find the most recent series of Cisco SBA guides at the following sites:

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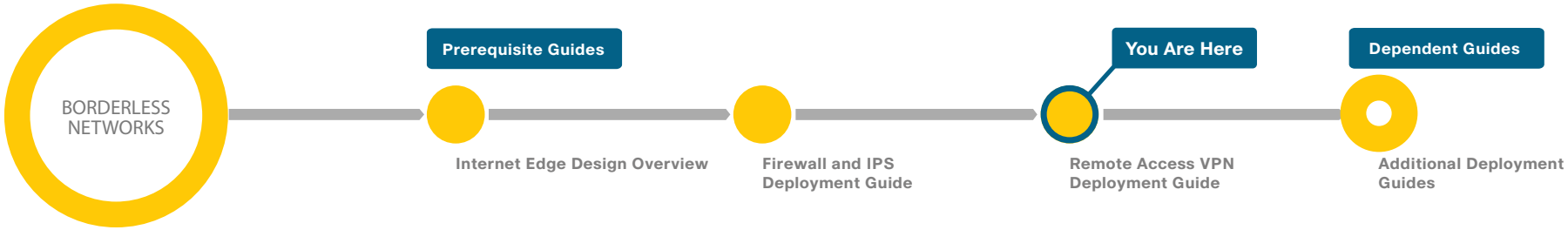


Introduction

Cisco SBA Borderless Networks is a solid network foundation designed to provide networks with up to 10,000 connected users the flexibility to support new users and network services without re-engineering the network. We created a prescriptive, out-of-the-box deployment guide that is based on best-practice design principles and that delivers flexibility and scalability.

The *Cisco SBA—Borderless Networks Remote Access VPN Deployment Guide* supports the remote user with secure remote access (RA). This guide covers the deployment of RA VPN services to either the primary Internet edge firewall or to a standalone RA VPN-specific device.

Related Reading

The *Cisco SBA—Borderless Networks Internet Edge Design Overview* orients you to the overall Cisco SBA design and explains the requirements that were considered when selecting specific products.

The *Cisco SBA—Borderless Networks Firewall and IPS Deployment Guide* focuses on the Internet edge firewall and intrusion prevention system (IPS) security services that protect your organization's gateway to the Internet.

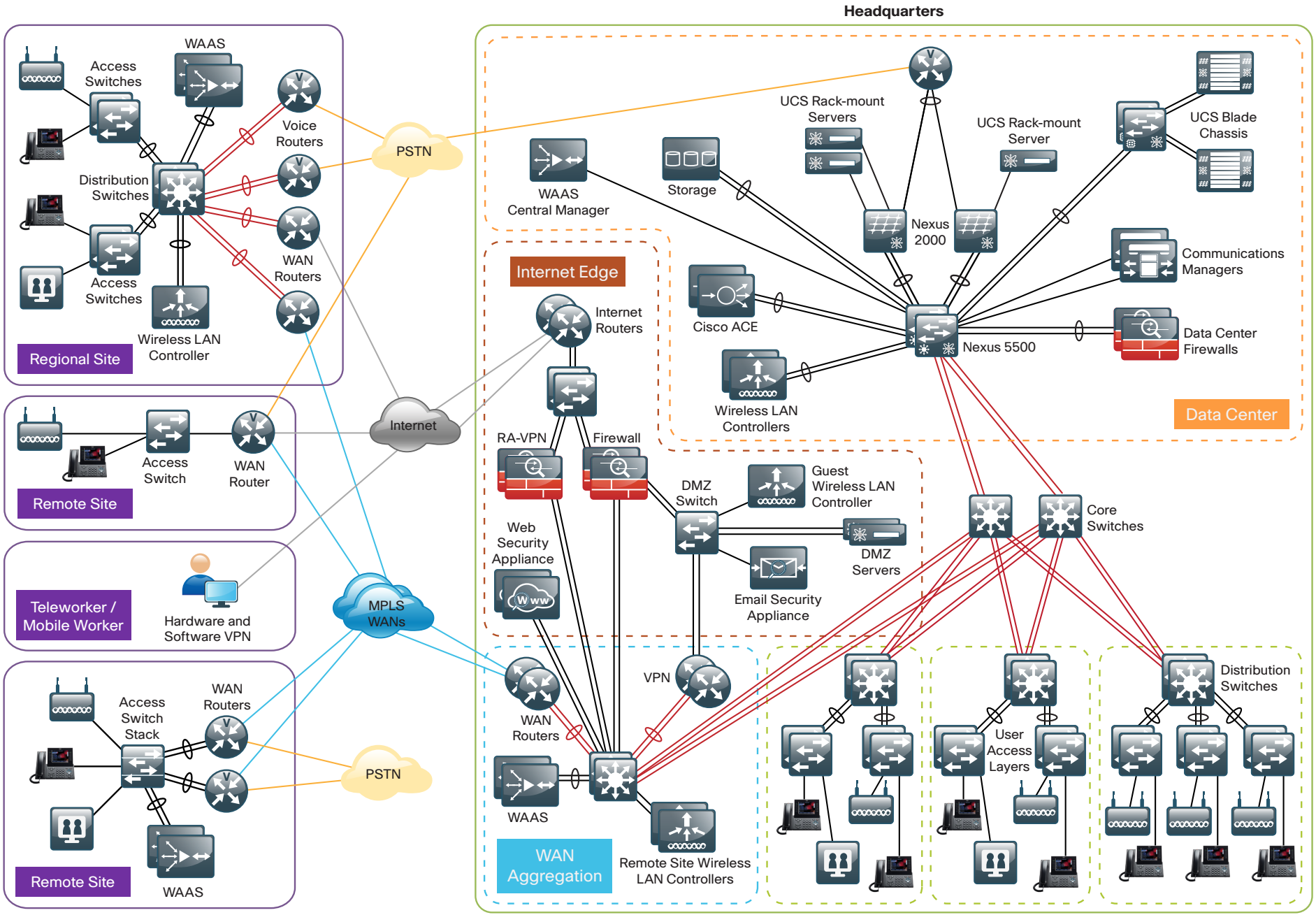
The *Cisco SBA—Borderless Networks Remote Mobile Access Deployment Guide* extends the remote access solution for mobile devices, such as phones and tablets, and for traditional devices, it offers expanded connection options, such as Cisco ScanSafe Cloud Web Security, Always-on VPN, and other features.

Design Goals

This architecture is based on requirements gathered from customers, partners, and Cisco field personnel for organizations with up to 10,000 connected users. When designing the architecture, we considered the gathered requirements and the following design goals.

Notes

Figure 1 - Borderless Networks overview



Ease of Deployment, Flexibility, and Scalability

Organizations with up to 10,000 users are often spread out among different geographical locations, making flexibility and scalability a critical requirement of the network. This design uses several methods to create and maintain a scalable network:

- By keeping a small number of standard designs for common portions of the network, support staff is able to design services for, implement, and support the network more effectively.
- Our modular design approach enhances scalability. Beginning with a set of standard, global building blocks, we can assemble a scalable network to meet requirements.
- Many of the plug-in modules look identical for several service areas; this common look provides consistency and scalability in that the same support methods can be used to maintain multiple areas of the network. These modules follow standard core-distribution-access network design models and use layer separation to ensure that interfaces between the plug-ins are well defined.

Resiliency and Security

One of the keys to maintaining a highly available network is building appropriate redundancy in order to guard against failure in the network. The redundancy in our architecture is carefully balanced with the complexity inherent in redundant systems.

With the addition of a significant amount of delay-sensitive and drop-sensitive traffic such as voice and video conferencing, we also place a strong emphasis on recovery times. Choosing designs that reduce the time between failure detection and recovery is important for ensuring that the network stays available even in the face of a minor component failure.

Network security is also a strong component of the architecture. In a large network, there are many entry points, and we ensure that they are as secure as possible without making the network too difficult to use. Securing the network not only helps keep the network safe from attacks but is also a key component to network-wide resiliency.

Ease of Management

While this guide focuses on the deployment of the network foundation, the design takes next-phase management and operation into consideration. The configurations in the deployment guides are designed to allow the devices to be managed via normal device-management connections, such as Secure Shell (SSH) Protocol and HTTPS, as well as via Network Management System (NMS). The configuration of the NMS is not covered in this guide.

Advanced Technology–Ready

Flexibility, scalability, resiliency, and security all are characteristics of an advanced technology-ready network. The modular design of the architecture means that technologies can be added when the organization is ready to deploy them. However, the deployment of advanced technologies, such as collaboration, is eased because the architecture includes products and configurations that are ready to support collaboration from day one. For example:

- Access switches provide Power over Ethernet (PoE) for phone deployments without the need for a local power outlet
- The entire network is preconfigured with quality of service (QoS) to support high-quality voice.
- Multicast is configured in the network to support efficient voice and broadcast-video delivery.
- The wireless network is preconfigured for devices that send voice over the wireless LAN, providing IP telephony over 802.11 Wi-Fi (referred to as mobility) at all locations.

The Internet edge is ready to provide soft phones via VPN, as well as traditional hard or desk phones.

Remote Access VPN

Business Overview

Many organizations need to offer network connectivity to their data resources for users, regardless of the user's location. Employees, contractors, and partners may need to access the network when traveling or working from home or from other off-site locations. The remote-access connectivity should support:

- A wide variety of endpoint devices.
- Seamless access to networked data resources.
- Authentication and policy control that integrates with the authentication resources in use by the organization.
- Cryptographic security to prevent the exposure of sensitive data to unauthorized parties who accidentally or intentionally intercept the data.

Technology Overview

The Cisco ASA family supports IP Security (IPsec), web portal, full-tunnel Secure Sockets Layer (SSL) VPNs for client-based remote access, and IPsec for site-to-site VPN. This section describes the basic configuration of SSL VPNs for remote access.

The Cisco AnyConnect Secure Mobility Client is recommended for remote users who require full network connectivity. The Cisco AnyConnect client uses SSL and is designed for automated download and installation. SSL access can be more flexible and is likely to be accessible from more locations than IPsec, as few companies block HTTPS access out of their networks.

Cisco SBA Borderless Networks offer two different remote-access VPN designs:

- **Remote-access (RA) VPN integrated with Cisco ASA Series firewall, in the integrated design module**—This offers lower capital investment and reduces the number of devices the network engineering staff must manage.
- **Remote-access VPN deployed on a pair of standalone Cisco ASAs, in the standalone design module**—This design offers greater operational flexibility and scalability while providing a simple migration path from an existing RA VPN installation.

This document describes the configuration for remote-access VPN via Cisco AnyConnect for SSL connections. The configuration is broken into sections for each of the various access methods, and it begins with a configuration that is common to all of the access methods. Configurations for both the integrated and standalone design modules offer identical functionality and capability so that regardless of the design chosen, the user experience is unchanged from one design to the other. Unless specifically noted, the configuration described in this document is common to both the integrated and standalone designs.

Hardware applied in this design is selected based on the following performance values.

Table 1 - Hardware performance

Cisco ASA family product	Maximum SSL VPN sessions
Cisco ASA 5512-X	250
Cisco ASA 5515-X	250
Cisco ASA 5525-X	750
Cisco ASA 5545-X	2500

A different VPN group is required for each remote-access policy. This design includes three VPN groups:

- **Administrative users**—These users are authenticated by Cisco Secure Access Control System (ACS) using the RADIUS protocol and also have a local username and password fallback option. This ensures that VPN access is available when the Cisco Secure ACS or Microsoft Active Directory server is unavailable. Administrative users have full access to the entire network.
- **Employees**—These users are authenticated by Cisco Secure ACS and have open access to the entire network
- **Partners**—These users are authenticated by Cisco Secure ACS and, although they use a tunnel-all VPN policy, there is an access-list applied to the tunnels in order to restrict access to specific hosts.

Deployment Details

Reader Tip

For more information about the baseline configuration of the appliance (including availability, routing, Internet and inside connectivity, and management or administration access), see the *Cisco SBA—Borderless Networks Firewall and IPS Deployment Guide*.

Cisco ASA's remote-access VPN termination capabilities can be configured from the command line or from the graphical user interface Cisco Adaptive Security Device Manager (ASDM). Cisco ASDM provides a guided step-by-step approach to the configuration of RA VPN and reduces the likelihood of configuration errors.

Process (Optional)

Configuring Cisco Secure ACS

1. Define external groups
2. Create the device-type group
3. Create the network device
4. Create authorization profiles
5. Configure the access service
6. Create authorization rules

Authentication is the portion of the configuration that verifies that users' credentials (username and password) match those stored within the organization's database of users that are allowed to access electronic resources. Cisco Smart Business Architecture designs use either Cisco Secure ACS or Microsoft Active Directory for authentication of remote access VPN users. Cisco Secure ACS gives an organization enhanced ability to control the access that VPN users receive. For those organizations not interested in using Cisco Secure ACS, Microsoft Active Directory by itself will be used, and this process can be skipped.

When the Cisco ASA firewall queries the Cisco Secure ACS server (which then proxies the request to the Active Directory database) to determine whether a user's name and password is valid, Cisco Secure ACS also retrieves other Active Directory attributes, such as group membership, that Cisco Secure ACS may use when making an authorization decision. Based on the group membership, Cisco Secure ACS sends back a group policy name to the appliance, along with the success or failure of the login. Cisco ASA uses the group policy name in order to assign the user to the appropriate VPN group policy.

In this process, Active Directory is the primary directory container for user credentials and group membership. Before you begin this process, your Active Directory must have three groups defined: **vpn-administrator**, **vpn-employee**, and **vpn-partner.** These groups map users to the respective VPN access policies.

Procedure 1 Define external groups

Step 1: Navigate to the Cisco Secure ACS Administration Page. (Example: https://acs.cisco.local)

Step 2: In **Users and Identity Stores** > **External Identity Stores** > **Active Directory**, click the **Directory Groups** tab.

Step 3: Click **Select**.

Step 4: On the **External User Groups** pane, select the three vpn groups, and then click **OK**.

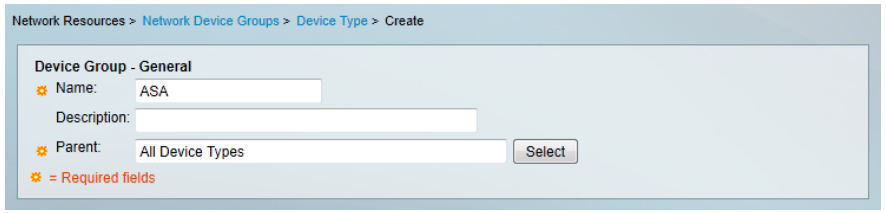
Step 5: On the Active Directory pane, click **Save Changes**.

Procedure 2 Create the device-type group

Step 1: In Network Resources > Network Device Groups > Device Type, click **Create**.

Step 2: In the Name box, enter a name for the group. (Example: ASA)

Step 3: In the Parent box, select **All Device Types**, and then click **Submit**.



Procedure 3 Create the network device

For the Cisco ASA firewall, create a network device entry in Cisco Secure ACS.

Step 1: In Network Resources > Network Devices and AAA Clients, click **Create**.

Step 2: In the Name box, enter the device hostname. (Example: IE-ASA5545)

Step 3: In the Device Type box, select **All Device Types:ASA**.

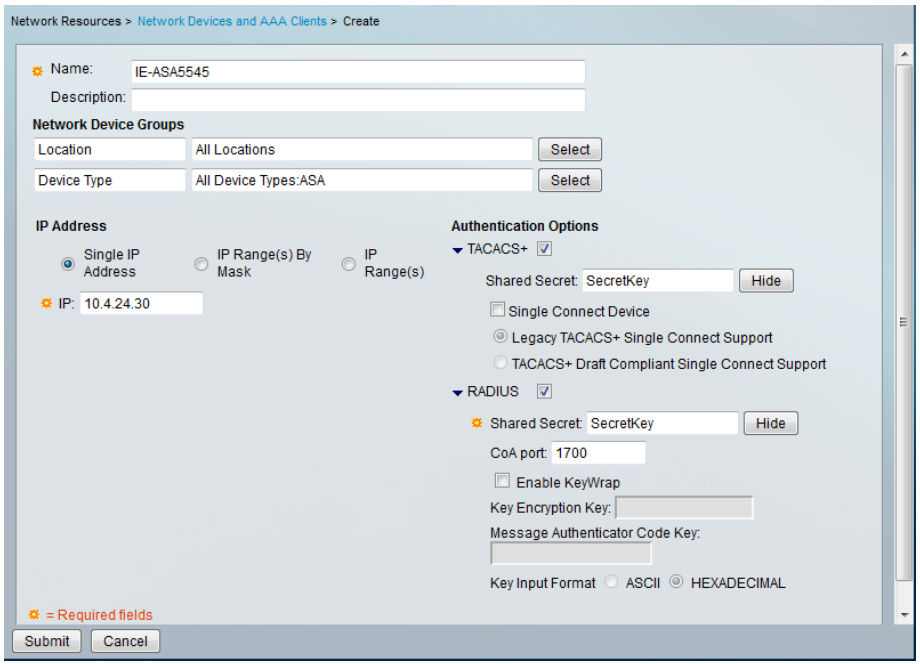
Step 4: In the IP box, enter the inside interface IP address of the Cisco ASA appliance. (Example: 10.4.24.30)

Step 5: Select **TACACS+**.

Step 6: Enter the TACACS+ shared secret key. (Example: SecretKey)

Step 7: Select **RADIUS**.

Step 8: Enter the RADIUS shared secret key, and then click **Submit**. (Example SecretKey)



Procedure 4 Create authorization profiles

Create two different authorization profiles to identify users that belong to either the vpn-administrator or vpn-partner groups in Active Directory.

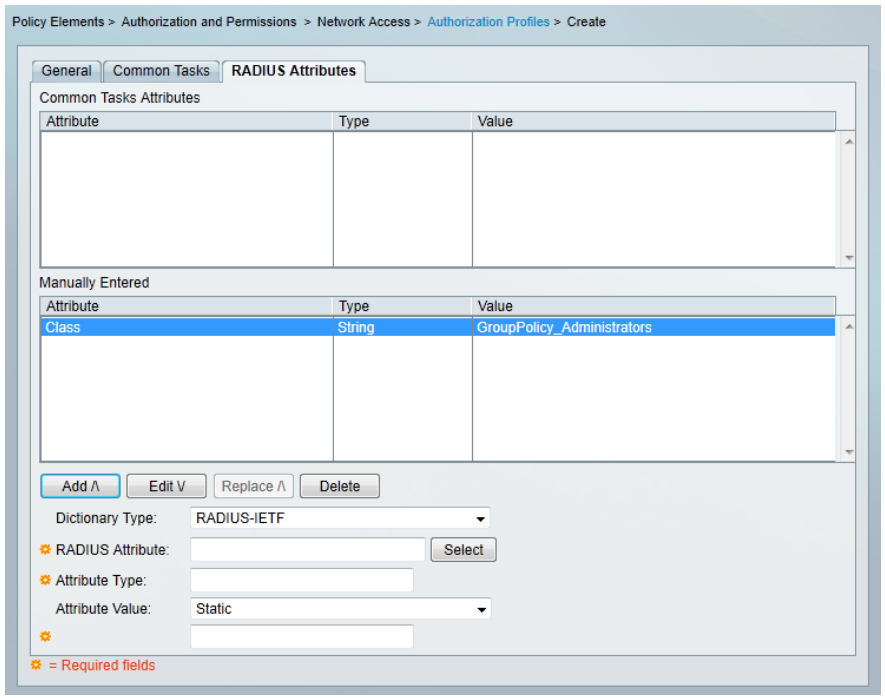
Step 1: In Policy Elements > Authorization and Permissions > Network Access > Authorization Profiles, click **Create.**

Step 2: In the Name box, enter a name for the authorization profile. (Example: RA-Administrator)

Step 3: Click the **RADIUS Attributes** tab, and then in the Manually Entered pane, in the Attribute box, select **Class**.

Next, you must configure the attribute value to match the group policy that you will configure on the Cisco ASA appliance.

Step 4: In the Value box, enter the group policy name, and then click **Add**. (Example: GroupPolicy_Administrators)



Step 5: Repeat this procedure to build an authorization profile for partners, using the group policy **GroupPolicy_Partner** value.

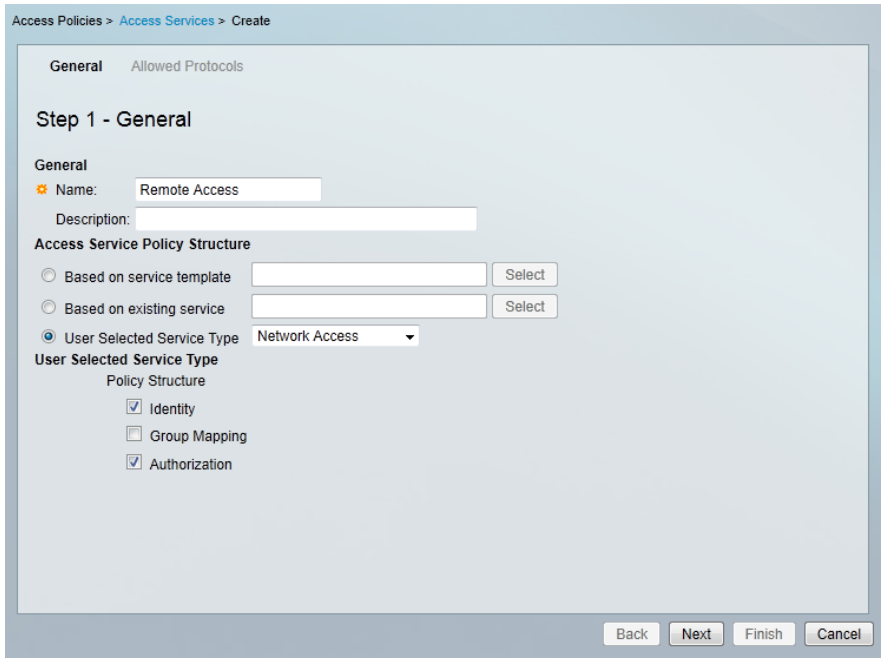
Procedure 5 Configure the access service

Create a policy to inspect for group membership in the return traffic from the Active Directory server.

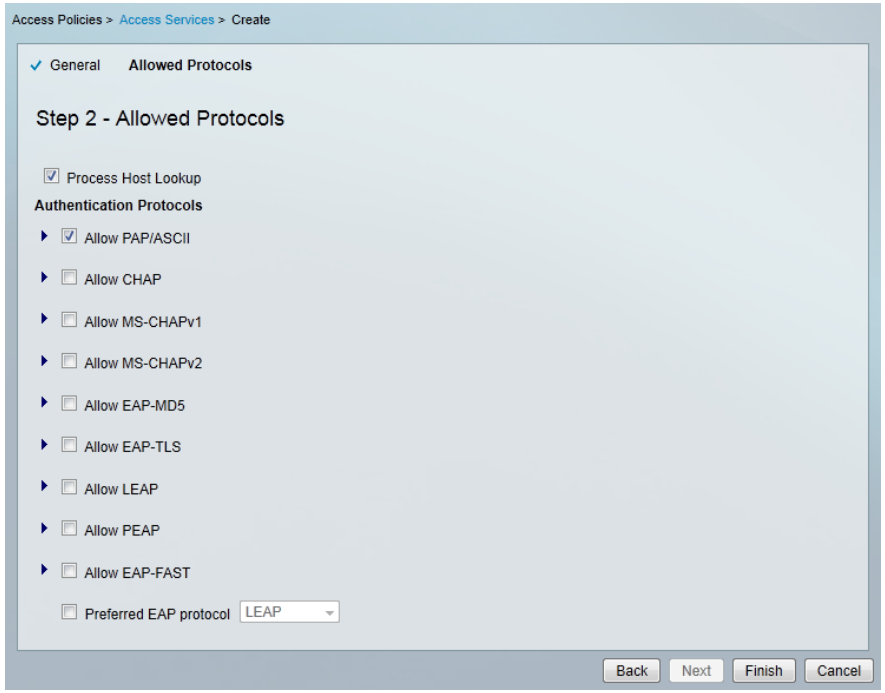
Step 1: In Access Policies > Access Services, click **Create**.

Step 2: On the General tab, enter the name **Remote Access**.

Step 3: Select **User Selected Service Type**, and then click **Next**.

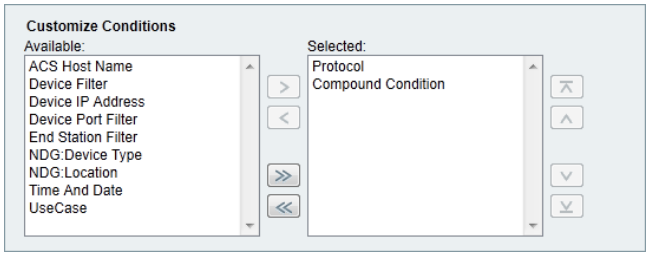


Step 4: On the **Allowed Protocols** tab, select **Allow PAP/ASCII**, and then click **Finish**.



Step 5: In Access Policies > Access Services > Service Selection Rules, click **Customize**.

Step 6: On the Customize Conditions pane, move **Compound Condition** from **Available** to **Selected**, and then click **OK**.



Step 7: On the Service Selection Rules pane, click **Create**.

Step 8: In the dialog box, name the rule **Remote Access**.

Step 9: Select **Protocol.**

Step 10: In the list at right, select **match**, and then in the box, enter **Radius**.

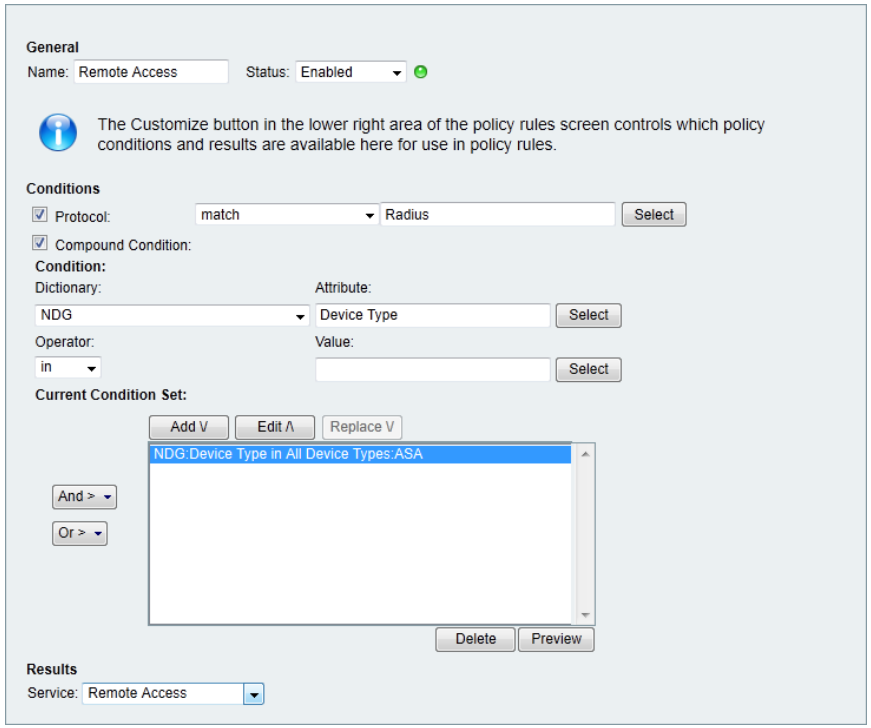
Step 11: Select **Compound Condition**, and then in the Dictionary list, choose **NDG**.

Step 12: For Attribute, select **Device Type.**

Step 13: For Value, select **All Device Types: ASA**.

Step 14: Under Current Condition Set, click **Add V**. The information is added to the Current Condition Set.

Step 15: In the Results Service list, choose **Remote Access**, and then click **OK.**

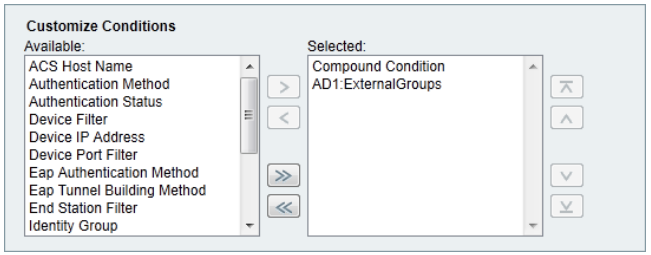


Step 16: Navigate to Access Policies > Access Services > Remote Access > Identity.

Step 17: In the Identity Source box, select **AD1**, and then click **Save Changes**.

Step 18: In Access Policies > Access Services > Remote Access > Authorization, click **Customize**.

Step 19: On the Customize Conditions pane, move **AD1:ExternalGroups** from **Available** to **Selected**, and then click **OK**.



Procedure 6 Create authorization rules

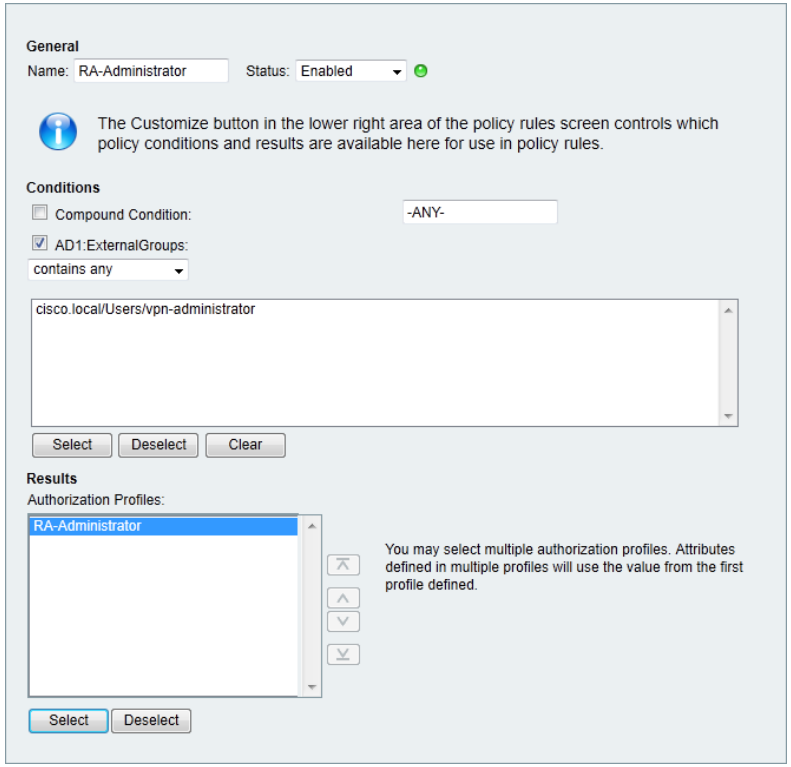
Step 1: In Access Policies > Access Services > Remote Access > Authorization, click **Create**.

Step 2: Enter a rule **Name**.(Example: RA-Administrator)

Step 3: Under Conditions, select **AD1:ExternalGroups**.

Step 4: In the condition definition box, select the Active Directory group. (Example: cisco.local/Users/vpn-administrator).

Step 5: Under Results, select the authorization profile, and then click **Select**. (Example: RA-Administrator)

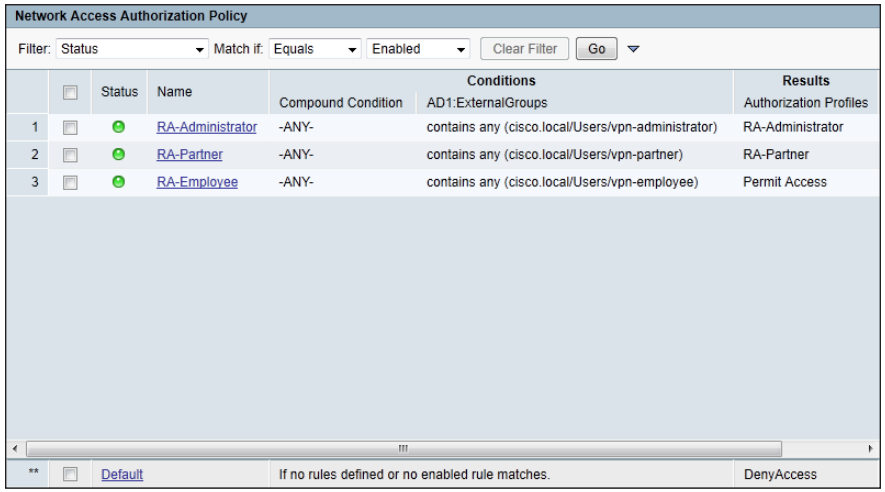


Step 6: Repeat Step 1 through Step 5 for the partner rule.

Step 7: Repeat Step 1 through Step 5 for the employee rule, using **Permit Access** as the authorization profile.

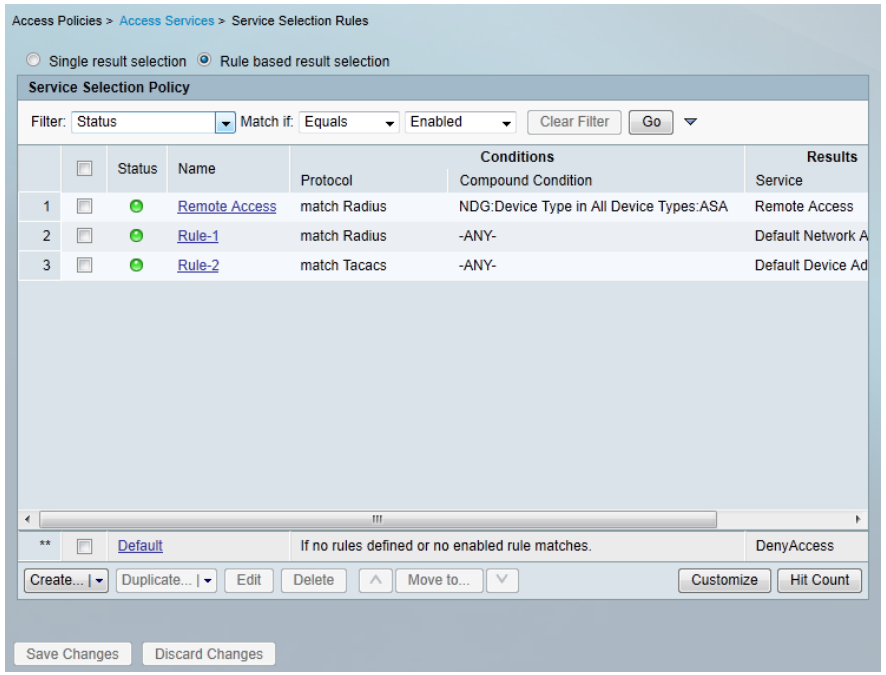
Step 8: On the Authorization pane, click the **Default** rule.

Step 9: Select **DenyAccess** as the authorization profile, and then click **OK.**



Once the remote-access services have been created, you can change the order.

Step 10: In Access Policies > Access Services > Service Selection Rules, select the **Remote Access** policy, and then use the up arrow button to move it to the first position.



Process

Configuring the Standalone RA VPN Firewall

1. Configure the LAN distribution switch
2. Apply Cisco ASA initial configuration
3. Configure internal routing
4. Configure user authentication
5. Configure time synchronization and logging
6. Configure device-management protocols
7. Configure HA on the primary Cisco ASA
8. Configure HA on the resilient Cisco ASA
9. Configure the outside switch
10. Configure primary Internet routing
11. Configure resilient Internet routing

If you are using an integrated deployment model where RA VPN services reside on the primary set of Internet edge firewalls, this process is not needed, and you can skip to "Configuring the Remote Access VPN." If you are using standalone RA VPN devices, then continue with this process.

Procedure 1 Configure the LAN distribution switch

The LAN distribution switch is the path to the organization's internal network. A unique VLAN supports the Internet edge devices, and the routing protocol peers with the appliances across this network.

Reader Tip

This procedure assumes that the distribution switch has already been configured following the guidance in the *Cisco SBA—Borderless Networks LAN Deployment Guide*. Only the procedures required to support the integration of the firewall into the deployment are included in this guide.

Step 1: Configure the interfaces that are connected to the RA VPN-specific firewalls.

```
interface GigabitEthernet1/0/23
 description VPN-ASA5525a Gig0/0
!
interface GigabitEthernet2/0/23
 description VPN-ASA5525b Gig0/0
!
interface range GigabitEthernet1/0/23, GigabitEthernet2/0/23
switchport access vlan 300
 switchport host
 macro apply EgressQoS
logging event link-status
no shutdown
```

Procedure 2 Apply Cisco ASA initial configuration

This procedure configures connectivity to the appliance from the internal network in order to enable management access.

Step 1: Configure the appliance host name.

```
hostname VPN-ASA5525
```

Step 2: Configure the appliance interface that is connected to the internal LAN distribution switch as a subinterface on VLAN 300. The interface is configured as a VLAN trunk port to allow flexibility to add additional connectivity.

```
interface GigabitEthernet0/0
no shutdown
!
interface GigabitEthernet0/0
nameif inside
ip address 10.4.24.24 255.255.255.224 standby 10.4.24.23
```

Step 3: Disable the dedicated management interface.

```
interface Management0/0
 no ip address
 shutdown
```

Step 4: Configure an administrative username and password.

```
username admin password [password] privilege 15
```

Tech Tip

All passwords in this document are examples and should not be used in production configurations. Follow your company's policy, or if no policy exists, create a password using a minimum of 8 characters with a combination of uppercase, lowercase, and numbers.

Procedure 3 Configure internal routing

A dynamic routing protocol is used to easily configure reachability between networks connected to the appliance and those that are internal to the organization. Because the RA VPN ASA device is not the default route for the inside network to get to the Internet, a distribute list must be used to filter out the default route from EIGRP updates to other devices.

Step 1: Create an access list to block default routes in updates.

```
access-list ALL_BUT_DEFAULT standard deny host 0.0.0.0
access-list ALL_BUT_DEFAULT standard permit any
```

Step 2: Enable Enhanced Interior Gateway Routing Protocol (EIGRP) on the appliance.

```
router eigrp 100
```

Step 3: Configure the appliance to advertise its statically defined routes including RA VPN clients but not default routes and connected networks that are inside the Internet edge network range.

```
 no auto-summary
 network 10.4.0.0 255.254.0.0
 redistribute static
 distribute-list ALL_BUT_DEFAULT out
```

Step 4: Configure EIGRP to peer with neighbors across the inside interface only.

```
 passive-interface default
 no passive-interface inside
```

Step 5: Summarize the remote access host routes in order to keep routing tables small.

```
interface GigabitEthernet0/0
 summary-address eigrp 100 10.4.28.0 255.255.252.0 5
```

Procedure 4 Configure user authentication

(Optional)

As networks scale in the number of devices to maintain, it poses an operational burden to maintain local user accounts on every device. A centralized authentication, authorization, and accounting (AAA) service reduces operational tasks per device and provides an audit log of user access for security compliance and root cause analysis. When AAA is enabled for access control, all management access to the network infrastructure devices (SSH and HTTPS) is controlled by AAA.

Reader Tip

The AAA server used in this architecture is the Cisco Secure ACS. Configuration of Cisco Secure ACS is discussed in the *Cisco SBA—Borderless Networks Device Management Using ACS Deployment Guide.*

TACACS+ is the primary protocol used to authenticate management logins on the infrastructure devices to the AAA server. A local AAA user database was defined already to provide a fallback authentication source in case the centralized TACACS+ server is unavailable.

Step 1: Configure the TACACS+ server.

```
aaa-server AAA-SERVER protocol tacacs+
aaa-server AAA-SERVER (inside) host 10.4.48.15 SecretKey
```

Step 2: Configure the appliance's management authentication to use the TACACS+ server first and then the local user database if the TACACS+ server is unavailable.

```
aaa authentication enable console AAA-SERVER LOCAL
aaa authentication ssh console AAA-SERVER LOCAL
aaa authentication http console AAA-SERVER LOCAL
aaa authentication serial console AAA-SERVER LOCAL
```

Step 3: Configure the appliance to use AAA to authorize management users.

```
aaa authorization exec authentication-server
```

Tech Tip

User authorization on the Cisco ASA firewall does not automatically present the user with the enable prompt if they have a privilege level of 15, unlike Cisco IOS devices.

Procedure 5 Configure time synchronization and logging

Logging and monitoring are critical aspects of network security devices in order to support troubleshooting and policy-compliance auditing.

The Network Time Protocol (NTP) is designed to synchronize time across a network of devices. An NTP network usually gets its time from an authoritative time source, such as a radio clock or an atomic clock attached to a time server. NTP then distributes this time across the organization's network.

Network devices should be programmed to synchronize to a local NTP server in the network. The local NTP server typically references a more accurate clock feed from an outside source.

There is a range of detail that can be logged on the appliance. Informational-level logging provides the ideal balance between detail and log-message volume. Lower log levels produce fewer messages, but they do not produce enough detail to effectively audit network activity. Higher log levels produce a larger volume of messages but do not add sufficient value to justify the number of messages logged.

Step 1: Configure the NTP server.

```
ntp server 10.4.48.17
```

Step 2: Configure the time zone.

```
clock timezone PST -8
clock summer-time PDT recurring
```

Step 3: Configure which logs to store on the appliance.

```
logging enable
logging buffered informational
```

Procedure 6 Configure device-management protocols

Cisco ASDM requires that the appliance's HTTPS server be available. Be sure that the configuration includes networks where administrative staff has access to the device through Cisco ASDM; the appliance can offer controlled Cisco ASDM access for a single address or management subnet (in this case, 10.4.48.0/24).

HTTPS and Secure Shell (SSH) Protocol are more secure replacements for the HTTP and Telnet protocols. They use Secure Sockets Layer (SSL) and Transport Layer Security (TLS) to provide device authentication and data encryption.

Use SSH and HTTPS protocols in order to more securely manage the device. Both protocols are encrypted for privacy, and the non-secure protocols, Telnet and HTTP, are turned off.

Simple Network Management Protocol (SNMP) is enabled to allow the network infrastructure devices to be managed by a Network Management System (NMS). SNMPv2c is configured for a read-only community string.

Step 1: Allow internal administrators to remotely manage the appliance over HTTPS and SSH.

```
domain-name cisco.local
http server enable
http 10.4.48.0 255.255.255.0 inside
ssh 10.4.48.0 255.255.255.0 inside
ssh version 2
```

Step 2: Configure the appliance to allow SNMP polling from the NMS.

```
snmp-server host inside 10.4.48.35 community cisco
snmp-server community cisco
```

Procedure 7 Configure HA on the primary Cisco ASA

This procedure describes how to configure active/standby failover for the primary RA VPN Cisco ASA. The failover key value must match on both devices in an active/standby pair. This key is used for two purposes: to authenticate the two devices to each other, and to secure state synchronization messages between the devices, which enables the Cisco ASA pair to maintain service for existing connections in the event of a failover.

Step 1: On the primary appliance, enable failover.

```
failover
```

Step 2: Configure the appliance as the primary appliance of the high availability pair.

```
failover lan unit primary
```

Step 3: Configure the failover interface.

```
failover lan interface failover GigabitEthernet0/2
failover key FailoverKey
failover replication http
failover link failover GigabitEthernet0/2
```

Step 4: Tune the failover poll timers. This minimizes the downtime experienced during a failover.

```
failover polltime unit msec 200 holdtime msec 800
failover polltime interface msec 500 holdtime 5
```

Step 5: Configure the failover interface IP address.

```
failover interface ip failover 10.4.24.97 255.255.255.248
standby 10.4.24.98
```

Step 6: Enable the failover interface.

```
interface GigabitEthernet0/2
 no shutdown
```

Step 7: Configure the standby IP address and monitoring of the inside interface.

```
interface GigabitEthernet0/0
 ip address 10.4.24.24 255.255.255.224 standby 10.4.24.23
monitor-interface inside
```

Procedure 8 Configure HA on the resilient Cisco ASA

Step 1: On the secondary Cisco ASA, enable failover.

```
failover
```

Step 2: Configure the appliance as the secondary appliance of the high availability pair.

```
failover lan unit secondary
```

Step 3: Configure the failover interface.

```
failover lan interface failover GigabitEthernet0/2
failover key FailoverKey
failover replication http
failover link failover GigabitEthernet0/2
```

Step 4: Tune the failover poll timers. This minimizes the downtime experienced during a failover.

```
failover polltime unit msec 200 holdtime msec 800
failover polltime interface msec 500 holdtime 5
```

Step 5: Configure the failover interface IP address.

```
failover interface ip failover 10.4.24.97 255.255.255.248
standby 10.4.24.98
```

Step 6: Enable the failover interface.

```
interface GigabitEthernet0/2
 no shutdown
```

Step 7: To verify standby synchronization between the Cisco ASA devices, on the command-line interface of the primary appliance, issue the **show failover state** command.

```
IE-ASA5540# show failover state

                 State          Last Failure Reason    Date/Time
This host  -     Primary
                 Active         None
Other host -     Secondary
                 Standby Ready  None

====Configuration State===
        Sync Done
====Communication State===
        Mac set
```

Procedure 9 Configure the outside switch

In this procedure, we configure the outside switch connection of the RA VPN Cisco ASA firewall. For this deployment, we are assuming a Dual ISP design. We also assume the outside switch is already configured with a base install and that the only changes required are to allow the RA VPN devices to connect. If this is not the case, please follow the steps in the *Cisco SBA—Borderless Networks Firewall and IPS Configuration Files Guide,* starting at the "Configuring the Firewall Internet Edge" process.

Step 1: Configure the interfaces that connect to the appliances.

```
interface GigabitEthernet1/0/20
 description VPN-ASA5525a Gig0/3
!
interface GigabitEthernet2/0/20
 description VPN-ASA5525b Gig0/3
!
interface range GigabitEthernet1/0/20, GigabitEthernet2/0/20
 switchport trunk allowed vlan 16,17
 switchport mode trunk
 spanning-tree portfast trunk
 macro apply EgressQoS
 logging event link-status
 logging event trunk-status
 no shutdown
```

Procedure 10 Configure primary Internet routing

In this procedure, we configure the outside interface of the RA VPN Cisco ASA firewall. For this deployment, we are assuming a Dual ISP design. If this is not the case, please follow the steps in the *Cisco SBA—Borderless Networks Firewall and IPS Configuration Files Guide*, starting at the "*Configuring the Firewall Internet Edge*" process.

Step 1: From a client on the internal network, navigate to the firewall's inside IP address, and then launch the Cisco ASA Security Device Manager. (Example: https://ie-asa5525.cisco.local/)

Step 2: In Configuration > Device Setup > Interfaces, click the interface that is connected to the outside switch. (Example: GigabitEthernet0/3)

Step 3: Click **Edit**.

Step 4: In the Edit Interface dialog box, select **Enable Interface**, and then click **OK**.

Step 5: On the Interface pane, click **Add** > **Interface**.

Step 6: In the Add Interface dialog box, in the Hardware Port list, select the interface enabled in Step 4. (Example: GigabitEthernet0/3)

Step 7: In the VLAN ID box, enter the VLAN number for the primary Internet VLAN. (Example: 16)

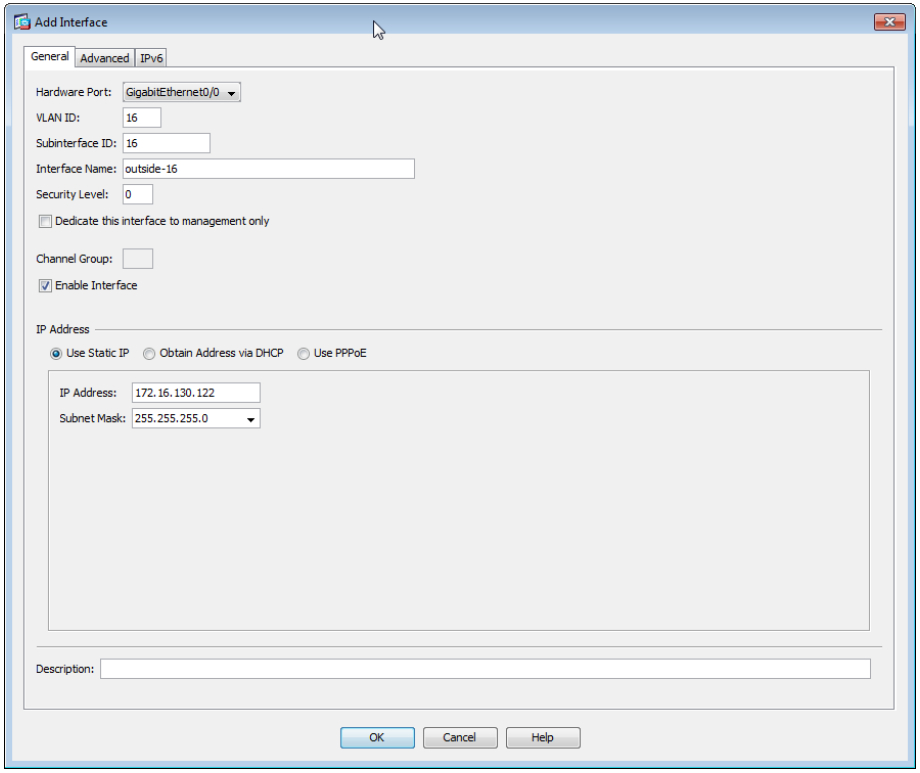
Step 8: In the Subinterface ID box, enter the VLAN number for the primary Internet VLAN. (Example: 16)

Step 9: Enter an **Interface Name**. (Example: outside-16)

Step 10: In the Security Level box, enter a value of **0**.

Step 11: Enter the interface **IP Address**. (Example: 172.16.130.122)

Step 12: Enter the interface **Subnet Mask**, and then click **OK**. (Example: 255.255.255.0)

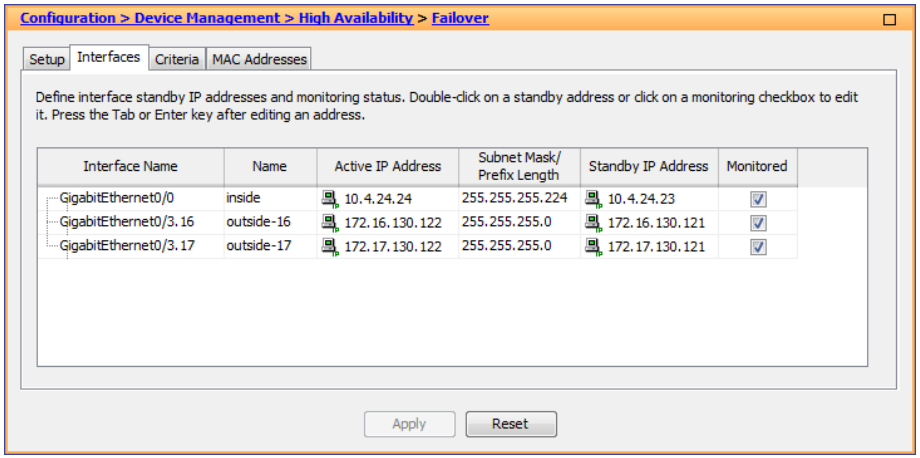


Step 13: On the Interface pane, click **Apply**.

Step 14: Navigate to Configuration > Device Management > High Availability > Failover.

Step 15: On the Interfaces tab, in the Standby IP Address column, enter the IP address of the standby unit for the interface you just created. (Example: 172.16.130.121)

Step 16: Select **Monitored**, and then click **Apply**.



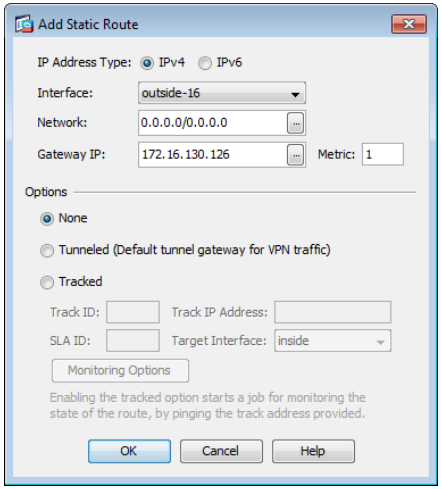
Next, you create the default route to the primary Internet CPE's address.

Step 17: In Configuration > Device Setup > Routing > Static Routes, click **Add**.

Step 18: In the Add Static Route dialog box, in the Interface list, chose the interface created in Step 9. (Example: outside-16)

Step 19: In the Network box, enter **0.0.0.0/0.0.0.0**.

Step 20: In the Gateway IP box, enter the primary Internet CPE's IP address, and then click **OK**. (Example: 172.16.130.126)



Step 21: On the Static Routes pane, click **Apply**.

Procedure 11 Configure resilient Internet routing

Now you configure the resilient Internet connection.

Step 1: Navigate to **Configuration** > **Device Setup** > **Interfaces**.

Step 2: On the Interface pane, click **Add** > **Interface**.

Step 3: In the Add Interface dialog box, in the **Hardware Port** list, choose the interface enabled in Step 4 above. (Example: GigabitEthernet0/3)

Step 4: In the VLAN ID box, enter the VLAN number for the resilient Internet VLAN. (Example: 17)

Step 5: In the Subinterface ID box, enter the VLAN number for the resilient Internet VLAN. (Example: 17)

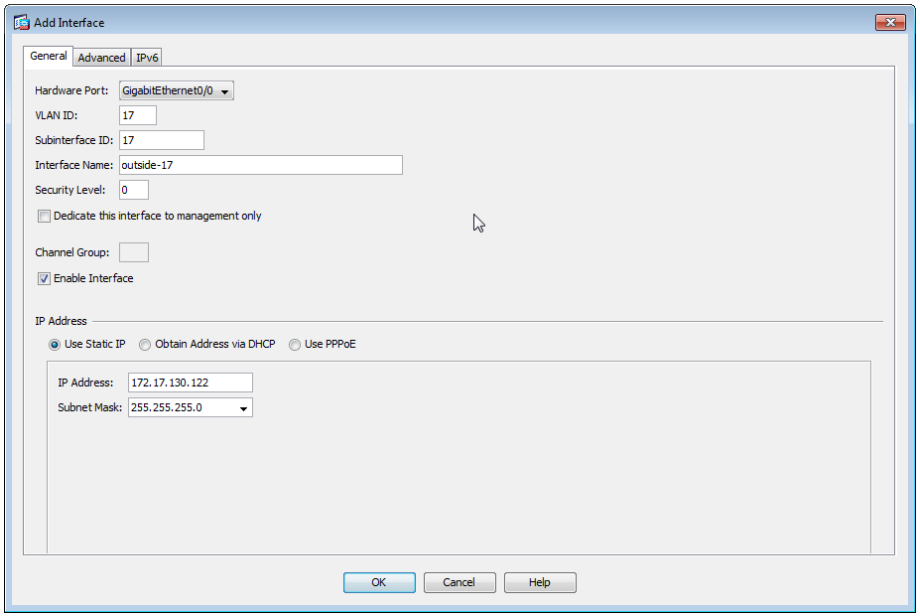
Step 6: Enter an **Interface Name**. (Example: outside-17)

Step 7: In the Security Level box, enter a value of **0**.

Step 8: Enter the interface **IP Address**. (Example: 172.17.130.122)

Step 9: Enter the interface **Subnet Mask**, and then click **OK**. (Example: 255.255.255.0)

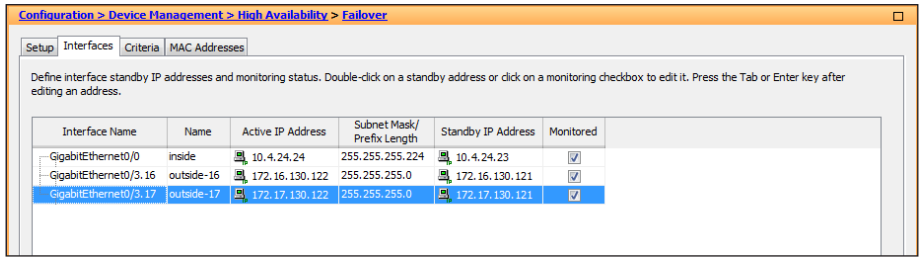
Step 10: On the Interface pane, click **Apply**.



Step 11: Navigate to Configuration > Device Management > High Availability > Failover.

Step 12: On the Interfaces tab, in the Standby IP Address column, enter the IP address of the standby unit for the interface you just created. (Example: 172.17.130.121)

Step 13: Select **Monitored**, and then click **Apply**.



Next, you edit the default route to the primary Internet CPE's address.

Step 14: Navigate to Configuration > Device Setup > Routing > Static Routes.

Step 15: Select the default route to the Internet, and click **Edit**.

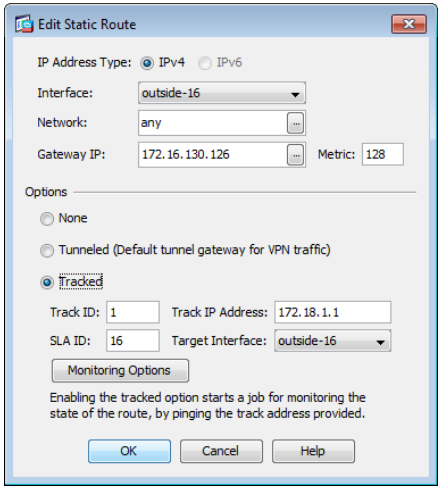
Step 16: In the Edit Static Route dialog box, in the Options pane, select **Tracked**.

Step 17: In the Track ID box, enter **1**.

Step 18: In the Track IP Address box, enter an IP address in the ISP's cloud. (Example: 172.18.1.1)

Step 19: In the SLA ID box, enter **16**.

Step 20: In the Target Interface list, select the primary Internet connection interface, and then click **OK**. (Example: outside-16)



Process

Configuring the Remote-Access VPN

1. Configure remote access
2. Create the AAA server group
3. Define the VPN address pool
4. Configure remote access routing
5. Configure the group-URL
6. Configure resilient Internet connection
7. Configure the partner policy
8. Configure the admin policy
9. Configure Cisco AnyConnect Client Profile

The majority of the VPN configuration tasks are addressed in the Cisco AnyConnect VPN Connection Setup Wizard. Depending on requirements, additional work might need to be completed after the wizard.

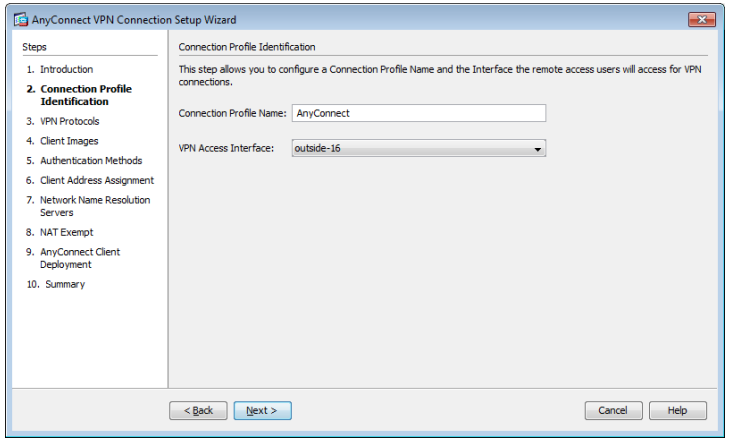
Procedure 1 Configure remote access

Step 1: Navigate to **Wizards > VPN Wizards > AnyConnect VPN Wizard.**

Step 2: In the AnyConnect VPN Connection Setup Wizard dialog box, click **Next**.

Step 3: Enter a **Connection Profile Name**. (Example: AnyConnect)

Step 4: In the **VPN Access Interface** list, select the primary Internet connection, and then click **Next**. (Example: outside-16)



Generate a self-signed identity certificate and install it on the appliance.

Tech Tip

Note that because the certificate in this example is self-signed, clients generate a security warning until they accept the certificate.

Step 5: In the Device Certificate pane, click **Manage.**

Step 6: In the Manage Identity Certificates dialog box, click **Add**.

Step 7: On the Add Identity Certificate dialog box, select **Add a new identity certificate**.

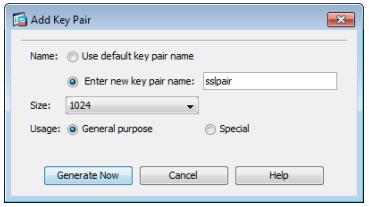
Tech Tip

Entering a new key pair name prevents the certificate from becoming invalid if an administrator accidentally regenerates the default RSA key pair.

Step 8: For Key Pair, select **New**.

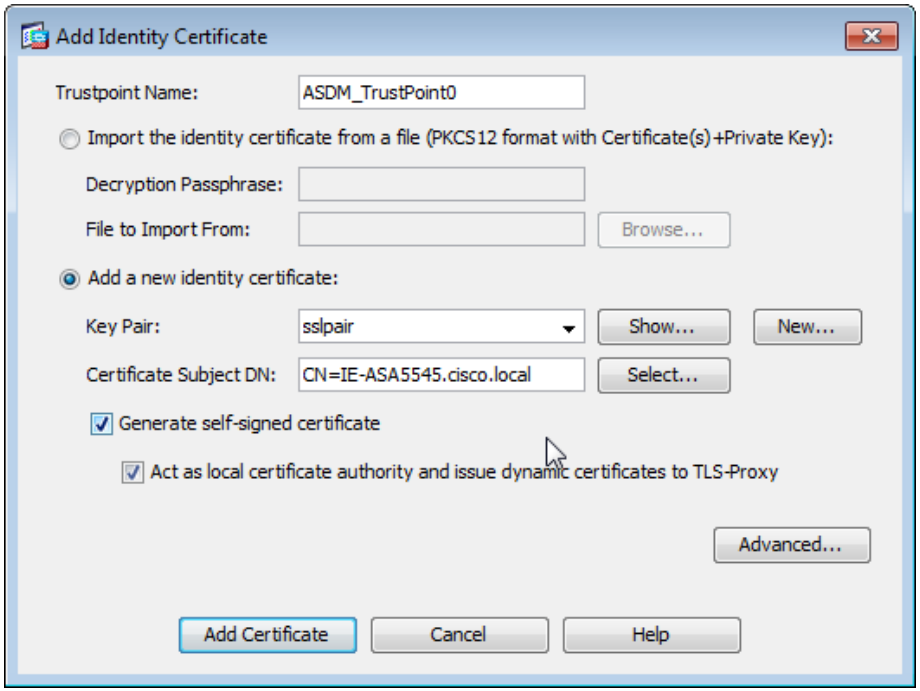
Step 9: In the Add Key Pair dialog box, select **Enter new key pair name**, and then in the box, enter a name. (Example: sslpair)

Step 10: Click **Generate Now**.



Step 11: In the Add Identity Certificate dialog box, in **Certificate Subject DN**, enter the fully qualified domain name used to access the appliance on the outside interface. (Example: CN=IE-ASA5545.cisco.local)

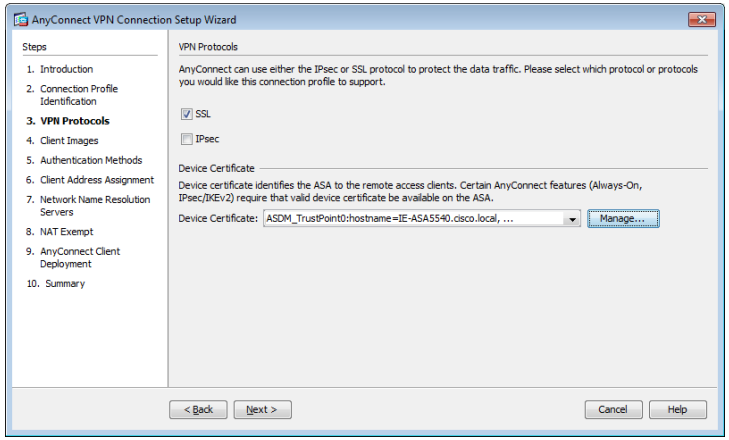
Step 12: Select **Generate self-signed certificate** and **Act as Local certificate authority and issue dynamic certificates to TLS-Proxy**, and then click **Add Certificate.**



Step 13: The Enrollment Status dialog box shows that the enrollment succeeded. Click **OK**.

Step 14: In the Manage Identity Certificates dialog box, click **OK**.

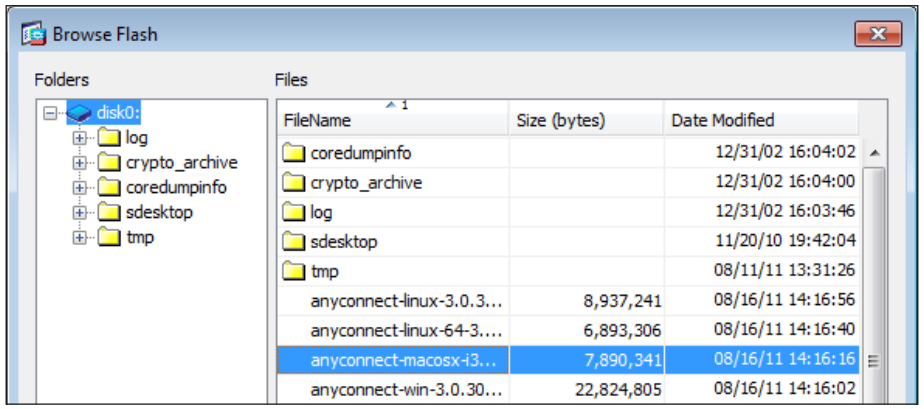
Step 15: On the VPN Protocols page, clear **IPsec**, verify that the certificate you created is reflected in the Device Certificate field, and then click **Next**.



Step 16: On the Client Images page, click **Add**.

Step 17: In the Add AnyConnect Client Image dialog box, click **Browse Flash.**

Step 18: In the Browse Flash dialog box, select the appropriate AnyConnect client image to support your user community, and then click **OK**.



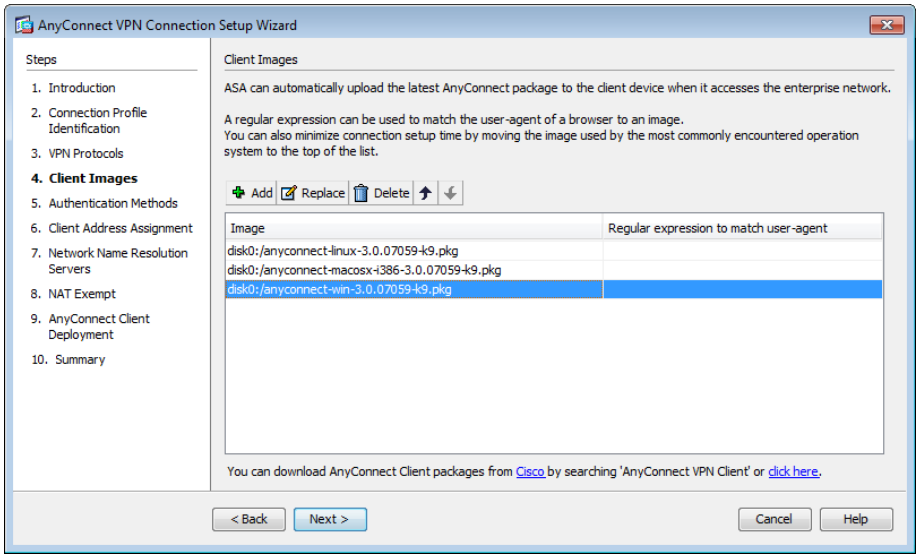
Tech Tip

If your Cisco ASA does not already have AnyConnect Client images loaded in the flash disk, you can use the **Upload** button in the Add AnyConnect Client Image dialog box to install new or updated client images into the flash disk of the appliance.

Step 19: In the Add AnyConnect Client Image dialog box, click **OK**.

Step 20: Repeat Step 17 through Step 19 for all the required Cisco AnyConnect client images.

Step 21: On the Client Images page, click **Next**.



Remaining in the wizard, you now create a new AAA server group to authenticate remote-access users. To authenticated users, the server group uses either NTLM to the Active Directory server or RADIUS to the Cisco Secure ACS server.

Procedure 2 Create the AAA server group

For VPN user authentication, you point Cisco ASA to either the Cisco Secure ACS you configured earlier or to the organization's Active Directory server.

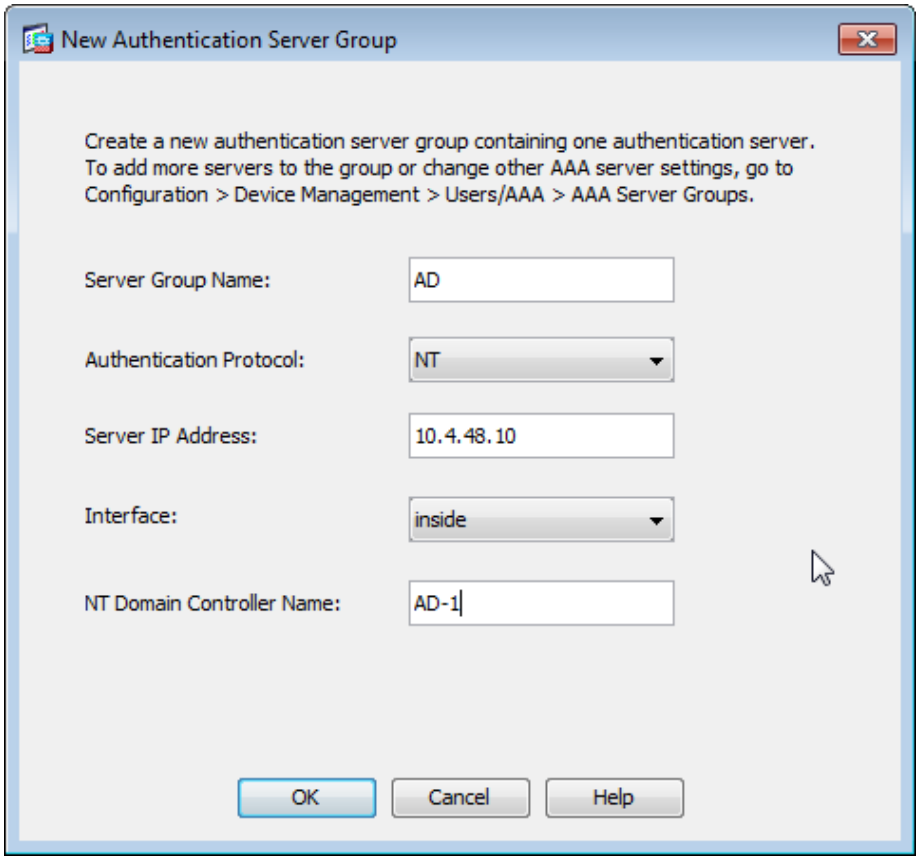
If the authentication process authenticates directly to Active Directory, complete Option 1 of this procedure. If the authentication process uses Cisco Secure ACS, complete Option 2 of this procedure.

Option 1. Use Active Directory for AAA

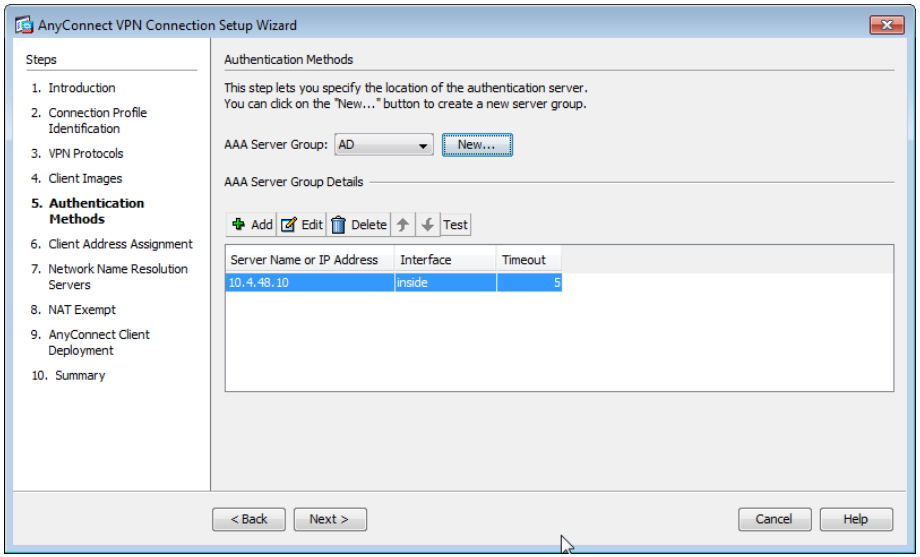
Step 1: On the Authentication Methods page, next to **AAA Server Group**, click **New**.

Step 2: In the New Authentication Server Group dialog box, enter the following values, and then click **OK**:

- Server Group Name: AD
- Authentication Protocol—NT
- Server IP Address—10.4.48.10
- Interface—inside
- NT Domain Controller Name—AD-1



Step 3: On the Authentication Methods page, click **Next**.

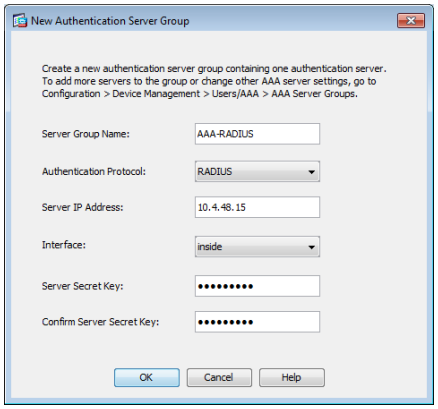


Option 2. Use Cisco Secure ACS for AAA

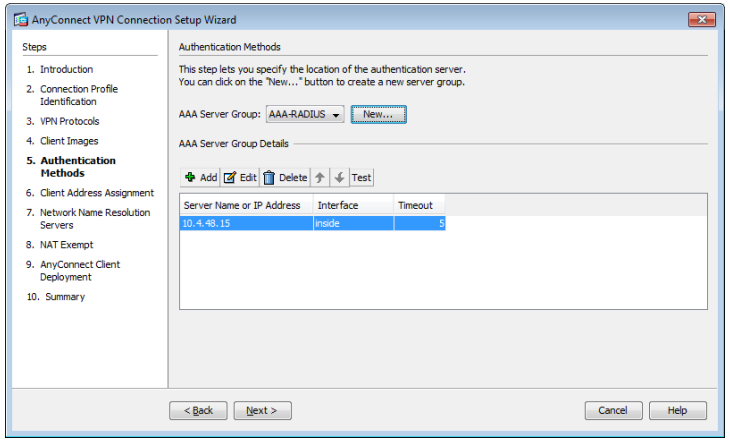
Step 1: On the Authentication Methods page, next to **AAA Server Group**, click **New**.

Step 2: In the New Authentication Server Group dialog box, enter the following values, and then click **OK**:

- Server Group Name—AAA-RADIUS
- Authentication Protocol—RADIUS
- Server IP Address—10.4.48.15 (IP address of the Cisco Secure ACS server)
- Interface—inside
- Server Secret Key—SecretKey
- Confirm Server Secret Key—SecretKey



Step 3: On the Authentication Methods page, click **Next**.



Next, you define the remote-access VPN address pool that will be assigned to users when they connect to the VPN service.

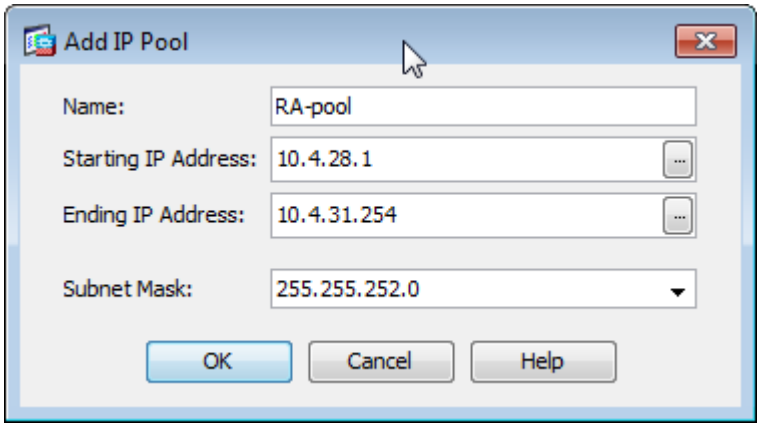
Procedure 3 Define the VPN address pool

You need to decide on an appropriate address space for your RA VPN address pool. In this example you use 4 class-C address ranges (~1000 addresses) as the pool.

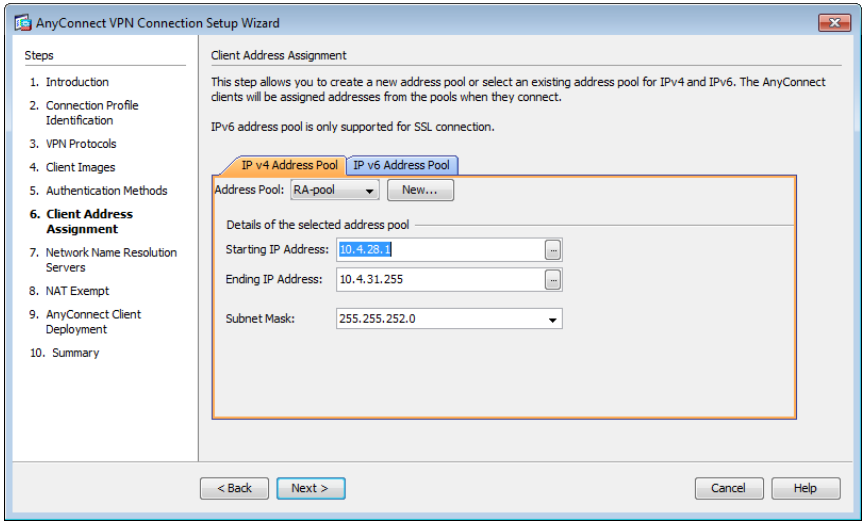
Step 1: On the Client Address Assignment page, in the IPv4 Address Pool tab, click **New**.

Step 2: In the Add IP Pool dialog box, enter the following values, and then click **OK**:

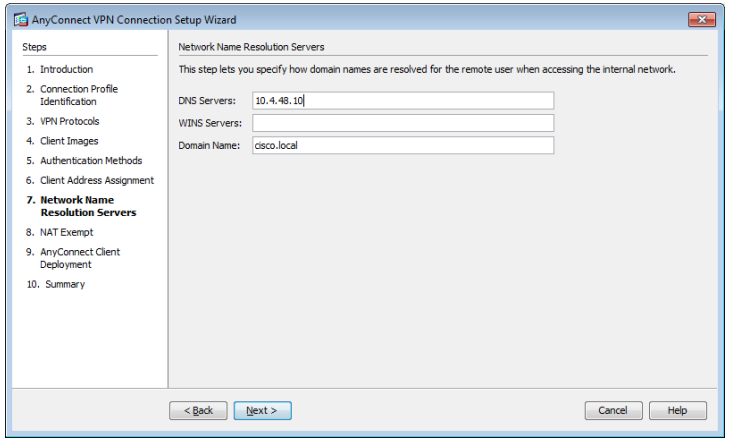
- Name—RA-pool
- Starting IP Address—10.4.28.1
- Ending IP Address—10.4.31.254
- Subnet Mask—255.255.252.0



Step 3: On the Client Address Assignment page, verify that the pool you just created is selected, and then click **Next**.



Step 4: On the Network Name Resolution Servers page, enter the organization's **DNS Servers** (Example: 10.4.48.10) and the organization's **Domain Name** (Example: cisco.local), and then click **Next**.



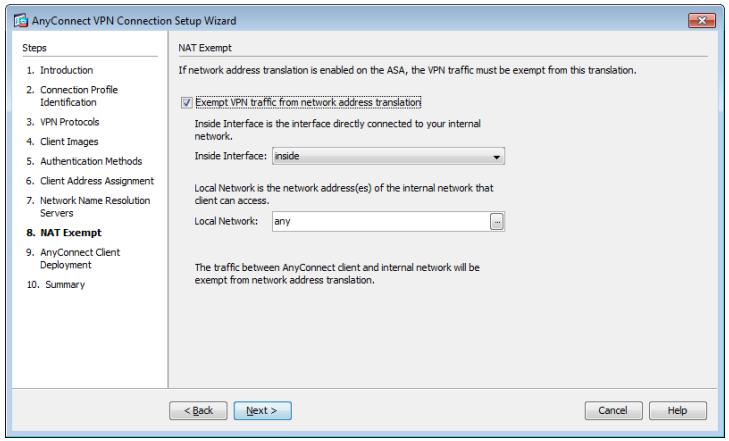
If you are using RA VPN integrated with Cisco ASA Series firewalls, NAT exemption must be configured for traffic from the LAN that is going to the remote-access clients. If this were not configured, traffic to clients would be translated, changing the source address of the traffic and making it impossible for clients to receive traffic correctly from servers with which they communicate.

Step 5: If you are implementing a standalone VPN design, skip to Step 8.

If you are implementing an integrated VPN design, in the wizard, on the NAT Exempt page, select **Exempt VPN traffic from network address translation**.

Step 6: In the Inside Interface list, select **inside**.

Step 7: In the Local Network box, enter **any**, and then click **Next**.



Step 8: On the AnyConnect Client Deployment page, click **Next.**

Step 9: On the Summary page, click **Finish**.

Finally, you must upload the Cisco AnyConnect client images to the secondary appliance.

Step 10: On the secondary appliance, copy the following Cisco AnyConnect client images to the local flash disk.

```
ftp://10.4.48.27/anyconnect-win-3.0.07059-k9.pkg disk0:
ftp://10.4.48.27/anyconnect-macosx-i386-3.0.07059-k9.pkg
disk0:
ftp://10.4.48.27/anyconnect-linux-3.0.07059-k9.pkg disk0:
```

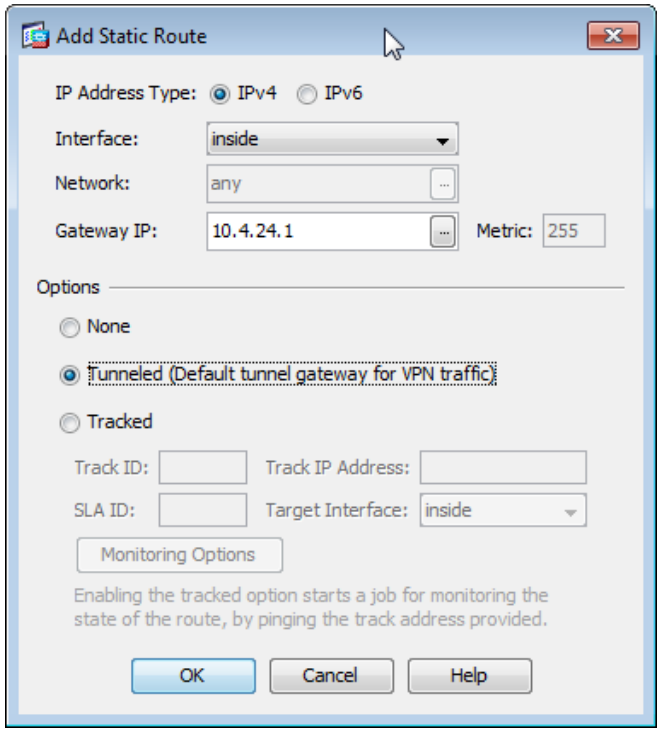
Procedure 4 Configure remote access routing

Traffic from remote-access VPN clients to and from the Internet must be inspected by the organization's firewall, IPS, and policy controls such as Cisco IronPort Web Security Appliance. To accomplish this, all traffic to and from the VPN clients must be routed toward the LAN distribution switch, regardless of the traffic's destination, so that the Cisco ASA policy engine has the visibility to handle the traffic correctly.

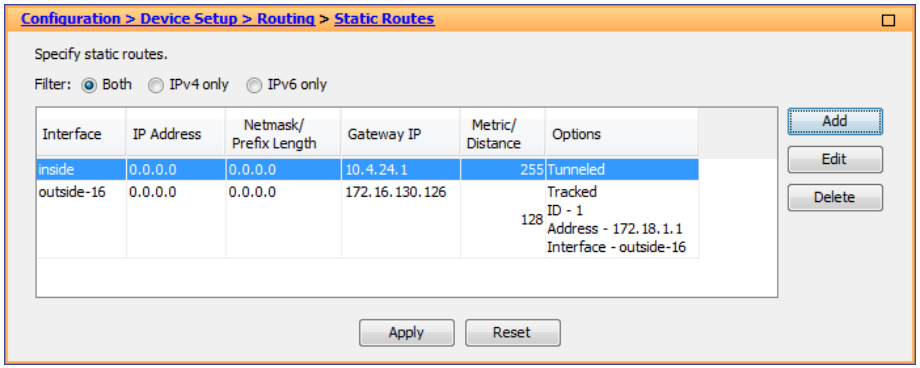
Step 1: In Configuration > Device Setup > Routing > Static Routes, click **Add**.

Step 2: In the Add Static Route dialog box, configure the following values, and then click **OK**.

- Interface—inside
- Network—any
- Gateway IP—10.4.24.1
- Options—Tunneled (Default tunnel gateway for VPN traffic)



Step 3: Verify the configuration, and then click **Apply**.

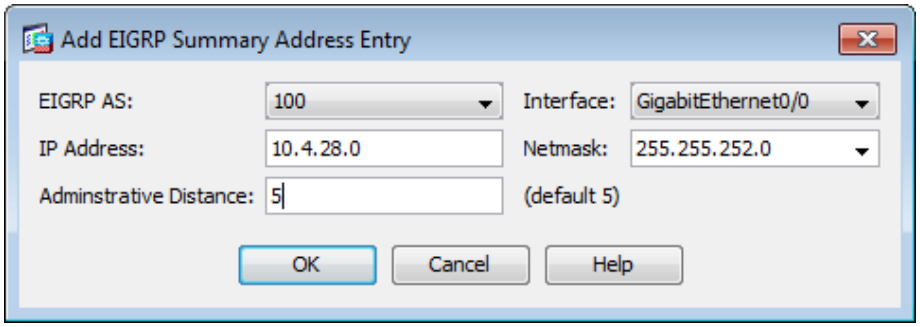


Cisco ASA advertises the each connected user to the rest of the network as individual host routes. Summarizing the address-pool reduces the IP route table size for easier troubleshooting and faster recovery from failures.

Step 4: In Configuration > Device Setup > Routing > EIGRP > Summary Address, click **Add**.

Step 5: In the Add EIGRP Summary Address Entry dialog box, configure the following values, and then click **OK**.

- EIGRP AS—100
- Interface—GigabitEthernet0/0
- IP Address—10.4.28.0 (Enter the remote-access pool's summary network address.)
- Netmask—255.255.252.0
- Administrative Distance—5

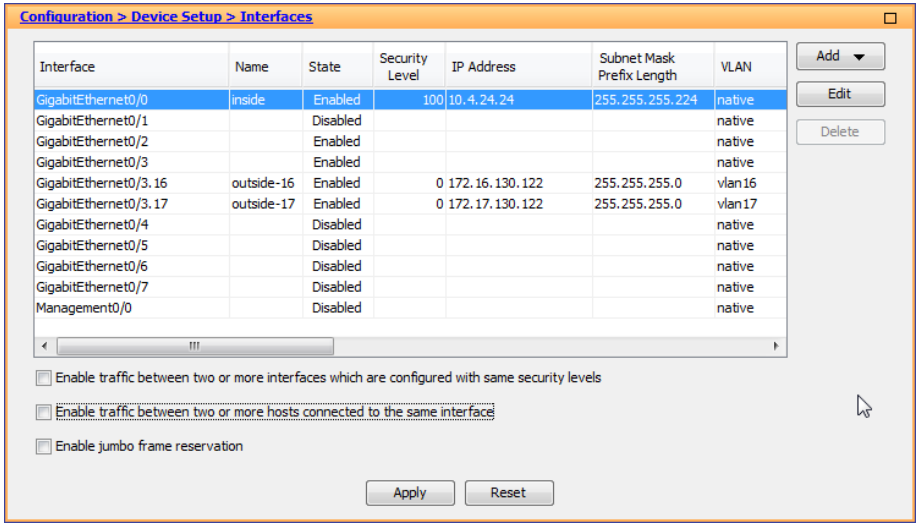


Step 6: On the Summary Address pane, click **Apply**.

Next, you allow intra-interface traffic. This is critical in allowing VPN users (specifically remote workers with Cisco Unified Communications software clients) to communicate with each other.

Step 7: Navigate to Configuration > Device Setup > Interfaces.

Step 8: Select **Enable traffic between two or more hosts connected to the same interface**, and then click **Apply**.



Procedure 5 Configure the group-URL

The Cisco AnyConnect client's initial connection is typically launched with a web browser. After the client is installed on a user's computer, subsequent connections can be established through the web browser again or directly through the Cisco AnyConnect client, which is now installed on the user's computer. The user needs the IP address or DNS name of the appliance, a username and password, and the name of the VPN group to which they are assigned. Alternatively, the user can directly access the VPN group with the group-url, after which they need to provide their username and password.

If using the Dual ISP design, expect to offer VPN connectivity through both ISP connections, and be sure to provide group-urls for the IP address or host names for both ISPs.

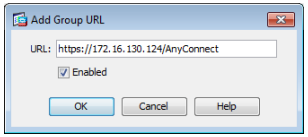
Step 1: Navigate to Configuration > Remote Access VPN > Network (Client) Access > AnyConnect Connection Profiles.

Step 2: In the Connection Profiles pane, select the profile created in the previous procedure (Example: AnyConnect), and then click **Edit**.

Step 3: On the Edit AnyConnect Connect Profile dialog box, navigate to Advanced > Group Alias/Group URL.

Step 4: On the Group URLs pane, click **Add**.

Step 5: In the URL box, enter the URL containing the firewall's primary Internet connection IP address and a user group string, and then click **OK**. (Example: https://172.16.130.134/AnyConnect)



Step 6: If you are using the Dual ISP design, which has a resilient Internet connection, repeat Step 1- Step 5, using the firewall's resilient Internet connection IP address. (Example: https://172.17.130.124/AnyConnect)

If you are using the Single ISP design, advance to the next procedure.

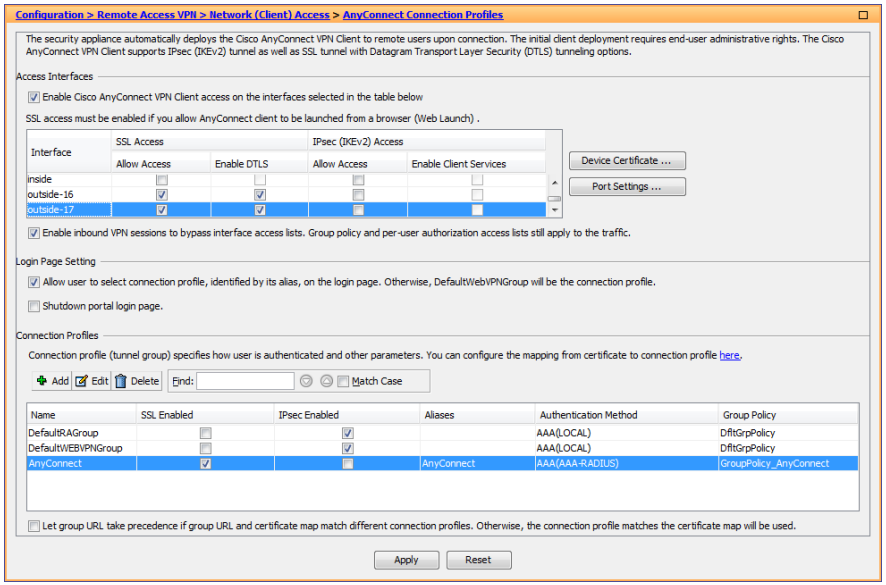
Procedure 6 Configure resilient Internet connection

(Optional)

Step 1: Navigate to Configuration > Remote Access VPN > Network (Client) Access > AnyConnect Connection Profiles.

Step 2: In the Configuration window, in the Access Interfaces pane, select the interface attached to the resilient Internet connection. (Example: outside-17)

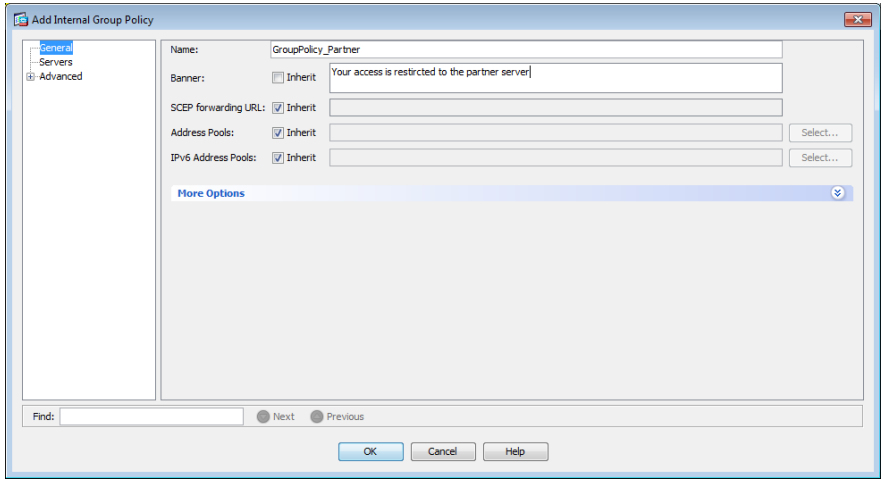
Step 3: Under SSL Access, select **Allow Access**, and then click **Apply**.



Procedure 7 Configure the partner policy

Step 1: In Configuration > Remote Access VPN > Network (Client) Access > Group Policies, click **Add**.

Step 2: On the Add Internal Group Policy dialog box, enter a **Name**. (Example: GroupPolicy_Partner)

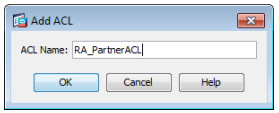


Step 3: Click the two down arrows. The More Options pane expands.

Step 4: For IPv4 Filter, clear **Inherit**, and then click **Manage**.

Step 5: On the ACL Manager dialog box, click **Add** > **Add ACL**.

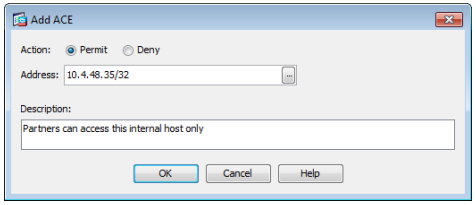
Step 6: In the Add ACL dialog box, enter an **ACL Name**, and then click **OK**. (Example RA_PartnerACL)



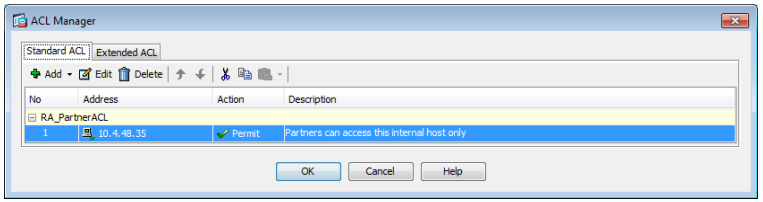
Step 7: Click **Add** > **Add ACE**.

Step 8: In the Add ACE dialog box, for Action, select **Permit**.

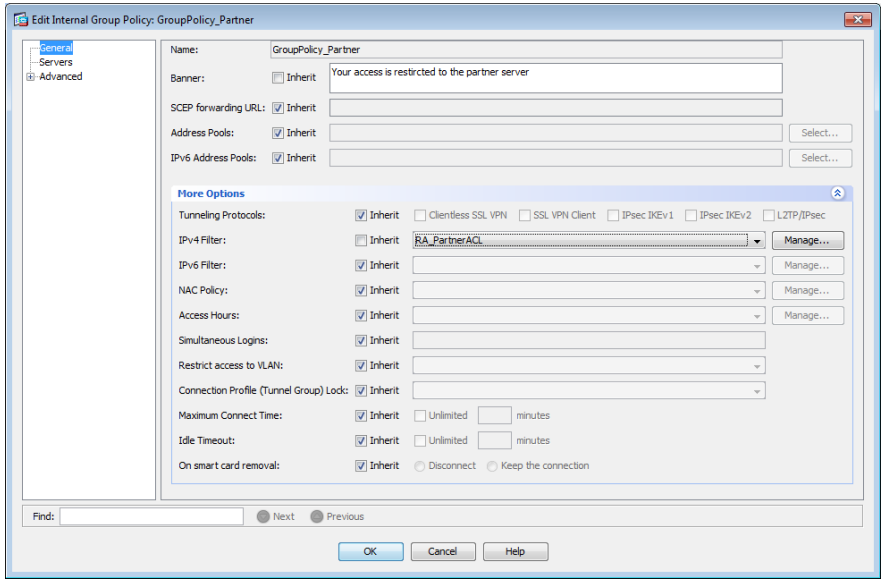
Step 9: In the Address box, enter the IP address and netmask that the partner is allowed to access, and then click **OK**. (Example: 10.4.48.35/32)



Step 10: In the ACL Manager dialog box, click **OK**.



Step 11: In the Add Internal Group Policy dialog box, click **OK**.

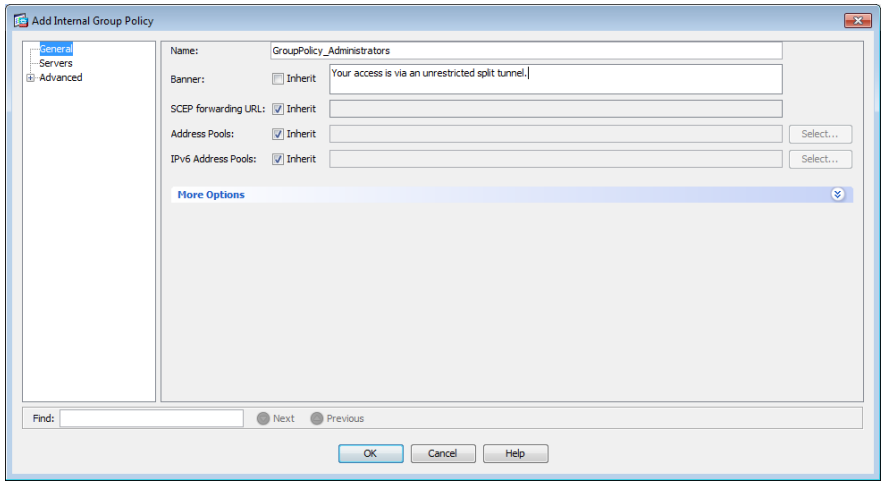


Step 12: On the Group Policies pane, click **Apply**.

Procedure 8 Configure the admin policy

Step 1: In Configuration > Remote Access VPN > Network (Client) Access > Group Policies, click **Add**.

Step 2: On the Add Internal Group Policy dialog box, enter a **Name**. (Example: GroupPolicy_Administrators)



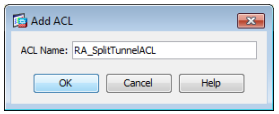
Step 3: In the navigation tree, click **Advanced** > **Split Tunneling**.

Step 4: For Policy, clear **Inherit**, and then select **Tunnel Network List Below**.

Step 5: For Network List, clear **Inherit**, and then click **Manage**.

Step 6: On the ACL Manager dialog box, click **Add** > **Add ACL**.

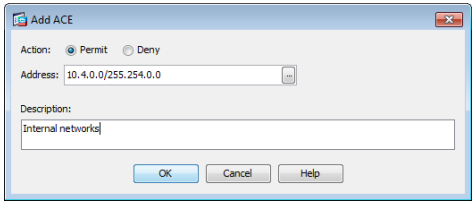
Step 7: In the Add ACL dialog box, enter an **ACL Name**, and then click **OK**. (Example RA_SplitTunnelACL)



Step 8: Click **Add** > **Add ACE**.

Step 9: In the Add ACE dialog box, for Action, select **Permit**.

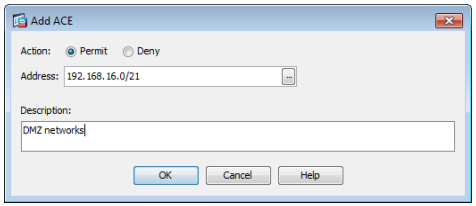
Step 10: In the Address box, enter the internal summary IP address and netmask, and then click **OK**. (Example: 10.4.0.0/255.254.0.0)



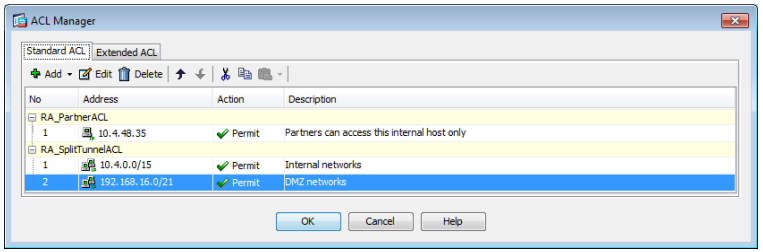
Step 11: Click **Add** > **Add ACE**.

Step 12: In the Add ACE dialog box, for Action, select **Permit**.

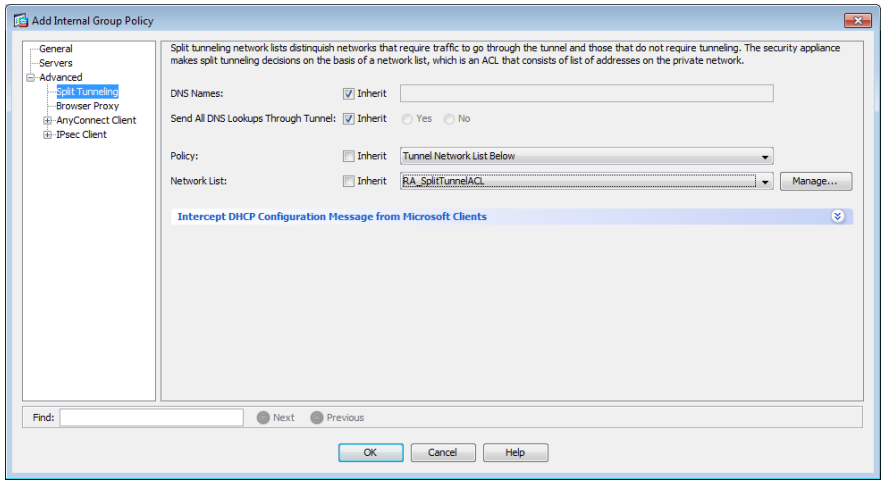
Step 13: In the Address box, enter the DMZ summary IP address and netmask, and then click **OK**. (Example: 192.168.16.0/21)



Step 14: In the ACL Manager dialog box, click **OK**.



Step 15: In the Add Internal Group Policy dialog box, click **OK**.



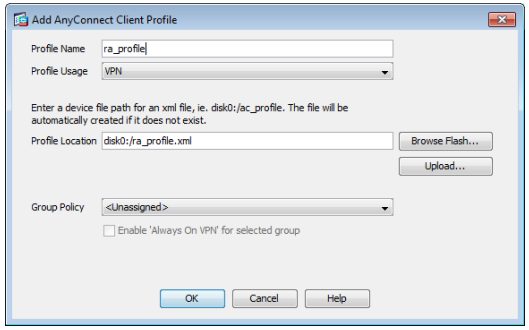
Step 16: On the Group Policies pane, click **Apply**.

Procedure 9 Configure Cisco AnyConnect Client Profile

Cisco AnyConnect Client Profile is the location where some of the newer configuration of the Cisco AnyConnect client is defined. Cisco AnyConnect 2.5 and later use the configuration in this section, including many of the newest features added to the Cisco AnyConnect client.

Step 1: In Configuration > Remote Access VPN > Network (Client) Access > AnyConnect Client Profile, click **Add**.

Step 2: In the Add AnyConnect Client Profile dialog box, in the Profile Name box, enter **ra_profile**, and then click **OK** and **Apply**.



Step 3: On the AnyConnect Client Profile pane, select the ra_profile you just built, and then click **Edit**.

The Server List Panel allows you to enter names and addresses for the appliances to which the Cisco AnyConnect Client is allowed to connect.

Step 4: Click **Server List** > **Add**.

Step 5: In the Server List Entry dialog box, in the Hostname box, enter the name of the remote-access firewall. (Example: IE-ASA5545)

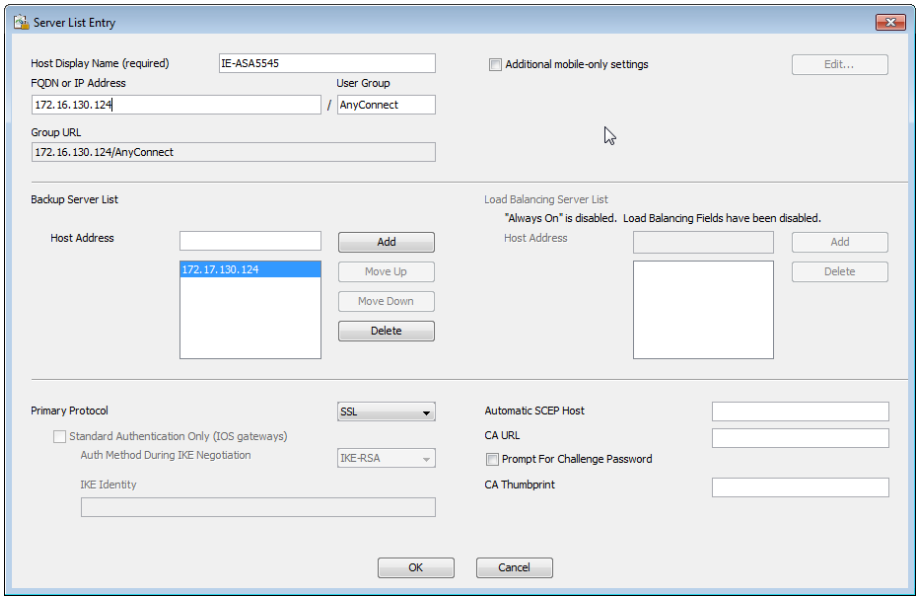
Step 6: In the FQDN or IP Address box, enter the firewall's primary Internet connection IP address. (Example: 172.16.130.124)

Step 7: In the User Group box, enter the name defined in Step 3. (Example: AnyConnect)

Step 8: If you are using the standalone VPN design, in the Host Address box, enter the firewall's resilient Internet connection IP address, and then click **Add**. (Example: 172.17.130.124)

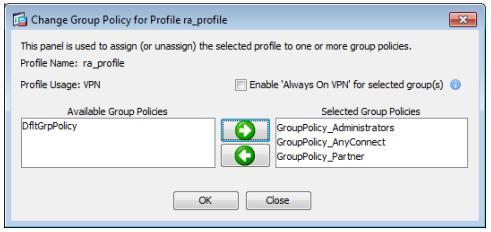
If you are using the integrated VPN design, proceed to the next step.

Step 9: Click **OK**.



Step 10: On the AnyConnect Client Profile pane, click **Change Group Policy**.

Step 11: In the Change Group Policy for Profile dialog box, in the available group policies list, select the three group policies you just created, click the right arrow, and then click **OK**.



Step 12: On the AnyConnect Client Profile pane, click **Apply**.

Summary

This deployment guide is a reference design for Cisco customers and partners. It covers the Internet edge component of Borderless Networks and is meant to be used in conjunction with the Cisco *SBA—Borderless Networks LAN Deployment Guide* in addition to the *MPLS WAN Deployment Guide*, *Layer 2 WAN Deployment Guide*, and *VPN WAN Deployment Guide*, which can be found at http://www.cisco.com/go/sba/

If your network is beyond the scale of this design, please refer to the Cisco Validated Designs (CVD) for larger deployment models. CVDs can be found on Cisco.com. The Cisco products used in this design were tested in a network lab at Cisco. The specific products are listed at the end of this document for your convenience.

Notes

Appendix A: Product List

Internet Edge

Functional Area	Product Description	Part Numbers	Software
Firewall	Cisco ASA 5545-X IPS Edition - security appliance	ASA5545-IPS-K9	ASA 8.6(1)1, IPS 7.1(4) E4
	Cisco ASA 5525-X IPS Edition - security appliance	ASA5525-IPS-K9	
	Cisco ASA 5515-X IPS Edition - security appliance	ASA5515-IPS-K9	
	Cisco ASA 5512-X IPS Edition - security appliance	ASA5512-IPS-K9	
	Cisco ASA5512-X Security Plus license	ASA5512-SEC-PL	
	Firewall Management	ASDM	6.6.114
RA VPN Firewall	Cisco ASA 5545-X Firewall Edition - security appliance	ASA5545-K9	8.6(1)1
	Cisco ASA 5525-X Firewall Edition - security appliance	ASA5525-K9	
	Cisco ASA 5515-X Firewall Edition - security appliance	ASA5515-K9	
	Cisco ASA 5512-X Firewall Edition - security appliance	ASA5512-K9	
	Cisco ASA5512-X Security Plus license	ASA5512-SEC-PL	
	Firewall Management	ASDM	6.6.114
Mobile License	AnyConnect Essentials VPN License - ASA 5545-X (2500 Users)	ASA-AC-E-5545	—
	AnyConnect Essentials VPN License - ASA 5525-X (750 Users)	ASA-AC-E-5525	
	AnyConnect Essentials VPN License - ASA 5515-X (250 Users)	ASA-AC-E-5515	
	AnyConnect Essentials VPN License - ASA 5512-X (250 Users)	ASA-AC-E-5512	

VPN Client

Functional Area	Product Description	Part Numbers	Software
VPN Client	Cisco AnyConnect Secure Mobility Client	Cisco AnyConnect Secure Mobility Client	3.0.07059

Access Control

Functional Area	Product Description	Part Numbers	Software
Authentication Services	ACS 5.3 VMware Software and Base License	CSACS-5.3-VM-K9	5.3

LAN Distribution Layer

Functional Area	Product Description	Part Numbers	Software
Modular Distribution Layer Virtual Switch Pair	Cisco Catalyst 6500 E-Series 6-Slot Chassis	WS-C6506-E	15.0(1)SY1 IP services
	Cisco Catalyst 6500 VSS Supervisor 2T with 2 ports 10GbE and PFC4	VS-S2T-10G	
	Cisco Catalyst 6500 16-port 10GbE Fiber Module w/DFC4	WS-X6816-10G-2T	
	Cisco Catalyst 6500 24-port GbE SFP Fiber Module w/DFC4	WS-X6824-SFP	
	Cisco Catalyst 6500 4-port 40GbE/16-port 10GbE Fiber Module w/DFC4	WS-X6904-40G-2T	
	Cisco Catalyst 6500 4-port 10GbE SFP+ adapter for WX-X6904-40G module	CVR-CFP-4SFP10G	
Modular Distribution Layer Switch	Cisco Catalyst 4507R+E 7-slot Chassis with 48Gbps per slot	WS-C4507R+E	3.3.0.SG(15.1-1SG) Enterprise Services
	Cisco Catalyst 4500 E-Series Supervisor Engine 7-E, 848Gbps	WS-X45-SUP7-E	
	Cisco Catalyst 4500 E-Series 24-port GbE SFP Fiber Module	WS-X4624-SFP-E	
	Cisco Catalyst 4500 E-Series 12-port 10GbE SFP+ Fiber Module	WS-X4712-SFP+E	
Stackable Distribution Layer Switch	Cisco Catalyst 3750-X Series Stackable 12 GbE SFP ports	WS-C3750X-12S-E	15.0(1)SE2 IP Services
	Cisco Catalyst 3750-X Series Two 10GbE SFP+ and Two GbE SFP ports network module	C3KX-NM-10G	
	Cisco Catalyst 3750-X Series Four GbE SFP ports network module	C3KX-NM-1G	

Appendix B: Configuration Example

RA VPN ASA-5525-X

```
ASA Version 8.6(1)1
!
hostname VPN-ASA5525
domain-name cisco.local
enable password 8Ry2YjIyt7RRXU24 encrypted
passwd 2KFQnbNIdI.2KYOU encrypted
names
!
interface GigabitEthernet0/0
 nameif inside
 security-level 100
 ip address 10.4.24.24 255.255.255.224 standby 10.4.24.23
 summary-address eigrp 100 10.4.28.0 255.255.252.0 5
!
interface GigabitEthernet0/1
 shutdown
 no nameif
 no security-level
 no ip address
!
interface GigabitEthernet0/2
 description LAN/STATE Failover Interface
!
interface GigabitEthernet0/3
 no nameif
 no security-level
 no ip address
!
interface GigabitEthernet0/3.16
 description Prymary Internet connection VLAN 16
 vlan 16
 nameif outside-16
 security-level 0
 ip address 172.16.130.122 255.255.255.0 standby 172.16.130.121
!
interface GigabitEthernet0/3.17
 description Resilient Internet connection on VLAN 17
 vlan 17
 nameif outside-17
 security-level 0
 ip address 172.17.130.122 255.255.255.0 standby 172.17.130.121
!
interface GigabitEthernet0/4
 shutdown
 no nameif
 no security-level
 no ip address
!
interface GigabitEthernet0/5
 shutdown
 no nameif
 no security-level
 no ip address
!
interface GigabitEthernet0/6
 shutdown
 no nameif
 no security-level
 no ip address
!
interface GigabitEthernet0/7
 shutdown
 no nameif
 no security-level
 no ip address
```

```
!
interface Management0/0
 shutdown
 no nameif
 no security-level
 no ip address
 management-only
!
ftp mode passive
clock timezone PST -8
clock summer-time PDT recurring
dns domain-lookup inside
dns server-group DefaultDNS
 name-server 10.4.48.10
 domain-name cisco.local
same-security-traffic permit intra-interface
object network NETWORK_OBJ_10.4.28.0_22
 subnet 10.4.28.0 255.255.252.0
access-list RA_PartnerACL remark Partners can access this
internal host only
access-list RA_PartnerACL standard permit host 10.4.48.35
access-list RA_SplitTunnelACL remark Internal networks
access-list RA_SplitTunnelACL standard permit 10.4.0.0
255.254.0.0
access-list RA_SplitTunnelACL remark DMZ networks
access-list RA_SplitTunnelACL standard permit 192.168.16.0
255.255.248.0
access-list ALL_BUT_DEFAULT standard deny host 0.0.0.0
access-list ALL_BUT_DEFAULT standard permit any
pager lines 24
logging enable
logging buffered informational
logging asdm informational
mtu inside 1500
mtu outside-16 1500
mtu outside-17 1500
ip local pool RA-pool 10.4.28.1-10.4.31.255 mask 255.255.252.0
failover
failover lan unit primary
failover lan interface failover GigabitEthernet0/2
failover polltime unit msec 200 holdtime msec 800
failover polltime interface msec 500 holdtime 5
failover key *****
failover replication http
failover link failover GigabitEthernet0/2
failover interface ip failover 10.4.24.97 255.255.255.248 standby
10.4.24.98
monitor-interface outside-16
monitor-interface outside-17
icmp unreachable rate-limit 1 burst-size 1
asdm image disk0:/asdm-66114.bin
no asdm history enable
arp timeout 14400
nat (inside,outside-16) source static any any destination static
NETWORK_OBJ_10.4.28.0_22 NETWORK_OBJ_10.4.28.0_22 no-proxy-arp
route-lookup
!
router eigrp 100
 no auto-summary
 distribute-list ALL_BUT_DEFAULT out
 network 10.4.0.0 255.254.0.0
 passive-interface default
 no passive-interface inside
 redistribute static
!
route outside-16 0.0.0.0 0.0.0.0 172.16.130.126 128 track 1
route inside 0.0.0.0 0.0.0.0 10.4.24.1 tunneled
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 sip-provisional-media 0:02:00 uauth 0:05:00 absolute
```

```
timeout tcp-proxy-reassembly 0:01:00
timeout floating-conn 0:00:00
dynamic-access-policy-record DfltAccessPolicy
aaa-server AAA-SERVER protocol tacacs+
aaa-server AAA-SERVER (inside) host 10.4.48.15
 key *****
aaa-server AAA-RADIUS protocol radius
aaa-server AAA-RADIUS (inside) host 10.4.48.15
 timeout 5
 key *****
user-identity default-domain LOCAL
aaa authentication enable console AAA-SERVER LOCAL
aaa authentication ssh console AAA-SERVER LOCAL
aaa authentication http console AAA-SERVER LOCAL
aaa authentication serial console AAA-SERVER LOCAL
aaa authorization exec authentication-server
http server enable
http 10.4.48.0 255.255.255.0 inside
snmp-server host inside 10.4.48.35 community *****
no snmp-server location
no snmp-server contact
snmp-server community *****
snmp-server enable traps snmp authentication linkup linkdown
coldstart warmstart
sla monitor 16
 type echo protocol ipIcmpEcho 172.18.1.1 interface outside-16
sla monitor schedule 16 life forever start-time now
crypto ca trustpoint ASDM_TrustPoint0
 enrollment self
 subject-name CN=VPN-ASA5525.cisco.local
 keypair sslpair
 proxy-ldc-issuer
 crl configure
crypto ca certificate chain ASDM_TrustPoint0
crypto ikev2 remote-access trustpoint ASDM_TrustPoint0
!
track 1 rtr 16 reachability
telnet timeout 5
ssh 10.4.48.0 255.255.255.0 inside
ssh timeout 5
ssh version 2
console timeout 0
threat-detection basic-threat
threat-detection statistics access-list
no threat-detection statistics tcp-intercept
ntp server 10.4.48.17
ssl trust-point ASDM_TrustPoint0 outside-16
ssl trust-point ASDM_TrustPoint0 outside-17
webvpn
 enable outside-16
 enable outside-17
 anyconnect-essentials
 anyconnect image disk0:/anyconnect-linux-3.0.07059-k9.pkg 1
 anyconnect image disk0:/anyconnect-macosx-i386-3.0.07059-k9.pkg 2
 anyconnect image disk0:/anyconnect-win-3.0.07059-k9.pkg 3
 anyconnect profiles ra_profile disk0:/ra_profile.xml
 anyconnect profiles web_security_profile disk0:/web_security_
profile.wsp
 anyconnect profiles web_security_profile.wso disk0:/web_
security_profile.wso
 anyconnect enable
 tunnel-group-list enable
group-policy GroupPolicy_AnyConnect internal
group-policy GroupPolicy_AnyConnect attributes
 wins-server none
 dns-server value 10.4.48.10
 vpn-tunnel-protocol ssl-client
 split-tunnel-policy excludespecified
 split-tunnel-network-list value Scansafe_Tower_Exclude
 default-domain value cisco.local
 webvpn
  anyconnect modules value dart,websecurity
  anyconnect profiles value ra_profile type user
```

```
anyconnect profiles value web_security_profile.wso type
websecurity
  always-on-vpn disable
group-policy GroupPolicy_Administrators internal
group-policy GroupPolicy_Administrators attributes
 banner value Your acess is via unrestricted split tunnel.
 split-tunnel-policy tunnelall
 split-tunnel-network-list value RA_SplitTunnelACL
 webvpn
  anyconnect profiles value ra_profile type user
group-policy GroupPolicy_Partner internal
group-policy GroupPolicy_Partner attributes
 banner value Your Access is restricted to the partner server
 vpn-filter value RA_PartnerACL
 webvpn
  anyconnect profiles value ra_profile type user
username admin password w2Y.6Op4j7clVDk2 encrypted privilege 15
tunnel-group AnyConnect type remote-access
tunnel-group AnyConnect general-attributes
 address-pool RA-pool
 authentication-server-group AAA-RADIUS
 default-group-policy GroupPolicy_AnyConnect
tunnel-group AnyConnect webvpn-attributes
 group-alias AnyConnect enable
 group-url https://172.16.130.122/AnyConnect enable
 group-url https://172.17.130.122/AnyConnect enable
!
class-map inspection_default
 match default-inspection-traffic
!
!
policy-map type inspect dns preset_dns_map
 parameters
  message-length maximum client auto
  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 ip-options
  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
prompt hostname context
no call-home reporting anonymous
call-home
 profile CiscoTAC-1
  no active
  destination address http https://tools.cisco.com/its/service/
oddce/services/DDCEService
  destination address email callhome@cisco.com
  destination transport-method http
  subscribe-to-alert-group diagnostic
  subscribe-to-alert-group environment
  subscribe-to-alert-group inventory periodic monthly 23
  subscribe-to-alert-group configuration periodic monthly 23
  subscribe-to-alert-group telemetry periodic daily
```

Appendix C: Changes

This appendix summarizes the changes to this guide since the previous Cisco SBA series.

- We updated Cisco ASA 5500 Adaptive Secure Appliances to model 5525-X or 5545-X.
- We updated the Cisco ASA Software from version 8.4.2 to version 8.6.1.1.
- We added ability to use either Active Directory or Cisco Secure ACS for user authentication.

Notes

Feedback

Click here to provide feedback to Cisco SBA.

SMART BUSINESS ARCHITECTURE

Americas Headquarters
Cisco Systems, Inc.
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