Newer Design Guide Available

Cisco Smart Business Architecture has become part of the Cisco Validated Designs program. For up-to-date guidance on the designs described in this guide, see http://cvddocs.com/fw/Aug13-285 For information about the Cisco Validated Design program, go to http://www.cisco.com/go/cvd







Remote Access VPN Deployment Guide

SMART BUSINESS ARCHITECTURE

February 2013 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 February 2013 is the "February 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 10.5.204.5 255.255.25.0

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.

February 2013 Series

Table of Contents

What's In This SBA Guide	1
Cisco SBA Borderless Networks	1
Route to Success	1
About This Guide	1
Introduction	2
Related Reading	2
Design Goals	2
Remote Access VPN	5
Business Overview	5
Technology Overview	5
Deployment Details	6
Configuring Cisco Secure ACS	6
Configuring the Standalone RA VPN Firewall	12
Configuring the Remote-Access VPN	20

Summary	38
Appendix A: Product List	39
Appendix B: Configuration Example	.41
Appendix C: Changes	49

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:

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

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



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 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



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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 dropsensitive 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 model—This integration 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 model—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 models 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-bystep 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: In the External User Groups pane, select the three vpn groups, and then click **OK**.

V	cisco.local/Users/vpn-administrator	GLOBAL
V	cisco.local/Users/vpn-employee	GLOBAL
V	cisco.local/Users/vpn-partner	GLOBAL

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

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.

Device Grou	p - General		
🔉 Name:	ASA		
Descriptio	n:		
😛 Parent:	All Device Types	Select	

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-ASA5545X)

Step 3: In the Network Device Groups section, in the Device Type row, click on **Select**. In the Network Device Groups dialog box, select **All Device Types:ASA** then click OK.

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)

• Name: E-ASA5545X Description: Internet Edge ASA5545X Network Device Groups Location All Locations Select Device Type All Device Types.ASA Select P Address ● IP Range(s) By Mask ● IP Range(s) • P: 10.4.24.30 • P: 10.4.	work Resources	> Network Devices and AAA Clients > Create	
Description: Internet Edge ASA5545X Network Device Groups Location All Locations Select IP Address ● IP Range(s) By Mask ● IP Range(s) ● IP: 10.4.24.30 ● IP: 10.4.24.30	o Name:	IE-ASA5545X	
Network Device Groups Location IP Address IP Address IP Range(s) By Mask IP Range(s) IP 10.4.2.4.30 <	Description	I Internet Edge ASA5545X	
Lecation All Locations Select Device Type Ald Device Types: ASA Select IP Address IP Address IP Range(s) By Mask IP Range(s) © IP 10.4.2.4.30 © IP 10.4.2.4.30 © IP 10.4.2.4.30 © IP 10.4.2.4.30 © Shared Secret: SecretKey © Legacy TACACS+ Single Connect Support TACACS+ Draft Compliant Single Connect Support TACACS+ Draft Compliant Single Connect Support CoA port 1700 © Shared Secret: SecretKey CoA port 1700 © Shared Secret: SecretKey Key Input Format ASCH IP HEXADECIMAL = Required fields	Network Dev	ice Groups	
Device Type All Device Types: ASA IP Address IP: 104.24.30 IP: 104.24.30 IP: 104.24	Location	All Locations	Select
P Address IIP Range(s) By Mask IIP Range(s) • IP: 104.224.30 Shared Secret: Secret: • Shared Secret: Secret: Secret: Secret: • Cohort Device Shared Secret: Secret: Secret: • Shared Secret: Secret: Secret: Secret: Secret: • Shared Secret: Secret: Secret: Secret: Secret: • Secret: Secret: Secret: Secret: Secret: Secret: Secret: <t< th=""><th>Device Type</th><th>All Device Types:ASA</th><th>Select</th></t<>	Device Type	All Device Types:ASA	Select
Single IP Address IP Range(s) By Mask IP Range(s) IP: 10.4.24.30 IP: 10.4.24.30 Shared Secret: SecretKey Single Connect Support TACACS+ Single Connect Support TACACS+ Single Connect Support TACACS+ Connect Support <th>IP Address</th> <th></th> <th>Authentication Options</th>	IP Address		Authentication Options
e IP: 10.4.24.30 Shared Secret: SecretKey Single Connect Device Legacy TACACS+ Single Connect Support TACACS+ Single Connect Support CACACS+ Draft Compliant Single Connect Support CACACS+ Draft Connect Support CACACS+ Draft Compliant Single Connect Support C	Single	IP Address 💿 IP Range(s) By Mask 💿 IP Range(s)	▼ TACACS+ 🕼
Single Connect Device Legacy TACACS+ Single Connect Support TACACS+ Draft Compliant Single Connect Support RADUS RADUS Shared Secret. SecretKey CoA port 1700 Enable Key/Wap Key Encryption Key; Message Authenticator Code Key; Key Input Format ASCII © HEXADECIMAL Required fields	AIR: 10.4.24	120	Shared Secret SecretKey
Legacy TACACS+ Single Connect Support TACACS+ Draft Compilant Single Connect Support TACACS+ Draft Compilant Single Connect Support RADUS Shared Secret SecretKey CoA port 1700 Enable KeyWrap Key Encryption Key, Message Authenticator Code Key; Key Input Format ASCII © HEXADECIMAL	• 11 . 10.4.24		Single Connect Device
TACACS+ Draft Compliant Single Connect Support RADIUS Shared Socret: SecretKey CoA port 1700 Enable KeyWrap Key Encryption Key, Message Authenticator Code Key; Key Input Format ASCII @ HEXADECIMAL = Required fields			Legacy TACACS+ Single Connect Support
Required fields			TACACS+ Draft Compliant Single Connect Support
Shared Secret SecretKey CoA port 1700 Enable KeyWrap Key Encryption Key. Message Authenticator Code Key. Key Input Format ASCII © HEXADECIMAL = Required fields			▼ RADIUS 📝
CoA port: 1700 Enable KeyWrap Key Encryption Key: Message Authenticator Code Key: Key Input Format ASCII HEXADECIMAL = Required fields			Shared Secret: SecretKey
			CoA port 1700
Key Encryption Key; Message Authenticator Code Key; Key Input Format ASCII (I) HEXADECIMAL			Enable KeyWrap
Message Authenticator Code Key; Key Input Format ASCII () HEXADECIMAL			Key Encryption Key:
Key Input Format ASCII HEXADECIMAL			Message Authenticator Code Key
t= Required fields			Key Input Format ASCII HEXADECIMAL
III	🗢 = Required fi	ields	
III			
Ibmit Cancel			m m
	Submit Car	acel	

Procedure 4

Create authorization profiles

Create three different authorization profiles to identify users that belong to the vpn-administrator, vpn-employee, 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: VPN-Administrator)

Step 3: Click the **RADIUS Attributes** tab, and then in the RADIUS Attribute row click **Select**.

Step 4: In the RADIUS Dictionary dialog box, pane, select **Class** and then click **OK**.

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

Step 5: In the Attribute Value box, enter the group policy name, and then click **Add** ^, (Example: GroupPolicy_Administrator).

Manually Entered			
Attribute		Туре	Value
Add A Edit V	Replace A De	elete	
Dictionary Type:	RADIUS-IETF		•
RADIUS Attribute:	Class	Sele	ct
🗢 Attribute Type:	String		
Attribute Value:	Static		•
o	GroupPolicy_Adminis	strator	
= Required fields			

Step 6: Click Submit.

General Common Tasks RADIUS At	tributes		
Attribute	Type	Value	
			E
Ianually Entered			
Attribute	Туре	Value	
			=
Add A Edit V Replace A	Delete		
Dictionary Type: RADIUS-IETF		•	
RADIUS Attribute:		Select	
Attribute Type:			
Attribute Value: Static		-	

Step 7: Repeat this procedure to build authorization profiles for vpnemployee and vpn-partner, using the group policy **GroupPolicy_Employee** and **GroupPolicy_Partner** values.

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 VPN.

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

Access Policies > Access Services > C	reate
General Allowed Protocols	
Step 1 - General	
General	
Name: Remote Access	VPN
Description:	
Access Service Policy Structu	re
Based on service template	Select
Based on existing service	Select
User Selected Service Type	Network Access
User Selected Service Type	
Policy Structure	
Crown Manajar	
Authorization	
Autonzation	
	Back Next Finish Cancel

Step 4: On the Allowed Protocols tab, select Allow MS-CHAPv2, and then click Finish.

Access Policies > Access Services > Create	
✓ General Allowed Protocols	
Step 2 - Allowed Protocols	
Process Host Lookup	
Authentication Protocols	
Allow PAP/ASCII	
Image: Allow CHAP	
Allow MS-CHAPv1	
V Allow MS-CHAPv2	
Allow EAP-MD5	
Allow EAP-TLS	
Allow LEAP	
Allow PEAP	
Allow EAP-FAST	
Preferred EAP protocol LEAP *	
	Back Next Finish Cancel

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

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

NDO:Davida Tuna	
NDG:Location Time And Date UseCase	<

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

Step 8: On the dialog box, for the name of the rule, enter Remote Access VPN.

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 VPN, and then click OK.



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

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

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

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

ACS Host Name Authentication Method Authentication Status Device Filter Device IP Address Device Port Filter Eap Authentication Method Eap Tunnel Building Method End Station Filter Identity Group	Compound Condition AD1:ExternalGroups	

Procedure 6 Create authorization rules

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

Step 2: In the Name box, enter a rule name. (Example: VPN-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: VPN-Administrator)

General	
Name: VPN-Administrator	status: Enabled 🔹
The Customize button policy conditions and	in the lower right area of the policy rules screen controls which esults are available here for use in policy rules.
Conditions	
Compound Condition:	-ANY-
AD1:ExternalGroups:	
contains any	
Select Deselect Clea	
Results Authorization Profiles:	
VPN-Administrator	
	You may select multiple authorization profiles. Attributes defined in multiple profiles will use the value from the first profile defined.
	▼

Step 6: Repeat Step 1 through Step 5 for the VPN-Employee and VPN-Partner rules.

Step 7: In the Authorization pane, click the Default rule.

Step 8: Select DenyAccess as the authorization profile, and then click OK.

_		ICCESS AL	Infortzation Policy			
Filt	ter: St	atus	 Match if 	Equals -	✓ Clear Filter Go ▼	
		Status	Name	Compound Condition	Conditions AD1:ExternalGroups	Results Authorization Prof
1		0	VPN-Administrator	-ANY-	contains any (cisco.local/Users/vpn-administrator)	VPN-Administrate
2		0	VPN-Employee	-ANY-	contains any (cisco.local/Users/vpn-employee)	VPN-Employee
3		0	VPN-Partner	-ANY-	contains any (cisco.local/Users/vpn-partner)	VPN-Partner

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

Step 9: In Access Policies > Access Services > Service Selection Rule s, select the rule Remote Access VPN, and then use the up arrow button to move it above the default policies Rule-1 and Rule-2.

A	cces	s Policie	s > Acces	s Services > Service Selec	tion Rules		
	08	Single	result sele	ection 💿 Rule based re	sult selection		
	Ser	vice Se	election P	olicy			
	Filt	er: Sta	atus	✓ Match if: I	Equals - Enabled	✓ Clear Filter Go マ	
			Status	Name		Conditions	Results
			olalao	Humo	Protocol	Compound Condition	Service
	1		0	Remote Access VPN	match Radius	NDG:Device Type in All Device Types:ASA	Remote Access VPN
	2		0	Rule-1	match Radius	-ANY-	Default Network Access
	3		۲	Rule-2	match Tacacs	-ANY-	Default Device Admin

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 NTP and logging
- 6. Configure device-management protocols
- 7. Configure HA on the primary Cisco ASA
- 8. Configure standby firewall for resilience
- 9. Configure the outside switch
- 10. Configure Internet interfaces
- 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-ASA5525Xa Gig0/0
!
interface GigabitEthernet2/0/23
description VPN-ASA5525Xb 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-ASA5525X

Step 2: Configure the appliance interface that is connected to the internal LAN distribution switch.

interface GigabitEthernet0/0
no shutdown
!
interface GigabitEthernet0/0
nameif inside
ip address 10.4.24.24 255.255.254

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 Cisco 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.



Caution

Default route advertisement from the RA VPN firewall will result in multiple conflicting default routes on the distribution layer switch. You must block the advertisement of the default route in order to avoid conflicting default routes.

Step 1: Create an access list to block default routes and permit all other routes.

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 the RA VPN client address pool 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. A summary route matching the RA VPN client address pool is advertised after the first RA VPN client is connected to the RA VPN firewall. The summary route suppresses the advertisement of individual host routes.

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

(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 NTP 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. Informationallevel 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

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: Specify the list of supported SSL encryption algorithms for ASDM.

ssl encryption aes256-sha1 aes128-sha1 3des-sha1

Step 3: 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 Cisco ASA, enable failover.

failover

Step 2: Configure the Cisco ASA 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 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 10.4.24.97 255.255.258.248 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

Step 1: On the secondary Cisco ASA appliance, 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 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 10.4.24.97 255.255.258.248 standby 10.4.24.98

Step 6: Enable the failover interface.

interface GigabitEthernet0/2

no shutdown

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

VPN-ASA525X# 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, you configure the outside switch connection of the RA VPN Cisco ASA firewall. This deployment assumes a dual ISP design. It also assumes the outside switch is already configured with a base installation 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-ASA5525Xa Gig0/3
!
interface GigabitEthernet2/0/20
description VPN-ASA5525Xb 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

Configure Internet interfaces

In this procedure, you configure the outside interfaces of the RA VPN Cisco ASA firewalls. This deployment assumes 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://10.4.24.24)

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: On the Edit Interface dialog box, select **Enable Interface**, and then click **OK**.

Step 5: In the Interface pane, click Add > Interface.

Step 6: On the Add Interface dialog box, in the **Hardware Port** list, choose 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)

🔁 Add Interface		×
General Advan	ced IPv6	
Hardware Port:	GigabitEthernet0/0 👻	
VLAN ID:	16	
Subinterface ID	: 16	
Interface Name	: outside-16	
Security Level:	0	
Dedicate th	is interface to management only	
Channel Group:		
🔽 Enable Inte	face	
TD Address		
O Use Stati	c IP 💿 Obtain Address via DHCP 💿 Use PPPoE	_
IP Address	: 172.16.130.122	
Subnet Ma	sk: 255.255.255.0 +	
Description		
Desciption		
	OK Cancel Help	

Step 13: In the Interface pane, click Apply.

Step 14: Repeat Step 5 through Step 13 for the resilient Internet VLAN.

Step 15: Navigate to Configuration > Device Management > High Availability > Failover.

Step 16: On the Interfaces tab, in the Standby IP Address column, enter the IP addresses of the standby unit for the interfaces you just created. (Example: 172.16.130.121, 172.17.130.121)

Step 17: Select Monitored for each, and then click Apply.

iquration > Device Mar up Interfaces Criteria fine interface standby IP a	MAC Addresses	ligh Availability > Fai	-click on a standby a	ddress or click on a mor	itoring checkbox to e
Interface Name	Name	Active IP Address	Subnet Mask/ Prefix Length	Standby IP Address	Monitored
GigabitEthernet0/0	inside	🖳 10.4.24.24	255.255.255.224	🖳 10.4.24.23	V
GigabitEthernet0/3.16	outside-16	🖳 172.16.130.122	255.255.255.0	🖳 172.16.130.121	V
GigabitEthernet0/3.17	outside-17	4 172.17.130.122	255.255.255.0	4 172.17.130.121	V
		Apply	Reset		

Procedure 11 Configure resilient Internet routing

In this procedure, you configure a pair of static default routes through the primary and secondary Internet interfaces. Each route uses a different metric.

The primary route carries a metric of 1, making the route preferred; the primary route's availability is determined by the state of the 'track 1' object that is appended to the primary route. The route-tracking configuration defines a target reachable through the primary ISP's network to which the appliance sends Internet Control Message Protocol (ICMP) probes (pings) in order to determine if the network connection is active. The target destination must be able to respond to an ICMP echo request.

The tracked object should be in the primary ISP's network. The point of tracking an object in the primary ISP's network is because if reachability to this object is available, then all connectivity to that point is working, including the appliance's connection to the customer premise router, the WAN connection, and most routing inside the ISP's network. If the tracked object is unavailable, it is likely that the path to the primary ISP is down, and the appliance should prefer the secondary ISP's route.

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

Step 2: On the Add Static Route dialog box, in the **Interface** list, chose the interface created in the previous procedure's Step 9. (Example: outside-16)

Step 3: In the Network box, select any4.

Step 4: In the Gateway IP box, enter the primary Internet CPE's IP address. (Example: 172.16.130.126)

Step 5: In the Metric box, enter 1.

Step 6: In the Options pane, click Tracked.

Step 7: In the Track ID box, enter 1.

Step 8: In the Track IP Address box, enter an IP address in the ISP's cloud. (Example: 172.18.1.1)

Step 9: In the SLA ID box, enter 16.

Step 10: In the **Target Interface** list, choose the primary Internet connection interface, and then click **OK**. (Example: outside-16)

付 Add Static Route	
IP Address Type:	IPv4 IPv6
Interface:	outside-16 👻
Network:	any4
Gateway IP:	172.16.130.126 - Metric: 1
Options	
🔘 None	
🔘 Tunneled (Def	ault tunnel gateway for VPN traffic)
Tracked	
Track ID: 1	Track IP Address: 172.18.1.1
SLA ID: 16	Target Interface: outside-16 🗸
Monitoring O	ptions
Enabling the tra state of the rou	cked option starts a job for monitoring the te, by pinging the track address provided.
ОК	Cancel Help

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

Step 11: In Configuration > Device Setup > Routing > Static Routes, click Add.

Step 12: On the Add Static Route dialog box, in the **Interface** list, choose the resilient Internet connection interface. (Example: outside-17)

Step 13: In the Network box, select any4.

Step 14: In the **Gateway IP** box, enter the primary Internet CPE's IP address. (Example: 172.17.130.126)

Step 15: In the Metric box, enter 50, and then click OK.

📑 Add Static Route	
IP Address Type:	
Interface:	outside-17 👻
Network:	any4
Gateway IP:	172.17.130.126 - Metric: 50
Options	
None	
🔘 Tunneled (Def	ault tunnel gateway for VPN traffic)
🔘 Tracked	
Track ID:	Track IP Address:
SLA ID:	Target Interface: inside 🚽
Monitoring C	ptions
Enabling the tra state of the rou	cked option starts a job for monitoring the te, by pinging the track address provided.
ОК	Cancel Help

Step 16: In the Static Routes pane, click Apply.

Next, you add a host route for the tracked object via the Internet-CPE-1 address. This assures that probes to the tracked object will always use the primary ISP connection.

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

Step 18: In the Add Static Route dialog box, in the **Interface** list, choose the primary Internet connection interface. (Example: outside-16)

Step 19: In the **Network** box, enter the IP address used for tracking in the primary default route. (Example: 172.18.1.1/32)

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

💁 Add Static Route	
IP Address Type:	IPv4 O IPv6
Interface:	outside-16 👻
Network:	172.18.1.1/32
Gateway IP:	172.16.130.126 Metric: 1
Options	
None	
🔘 Tunneled (Def	ault tunnel gateway for VPN traffic)
Tracked	
Track ID:	Track IP Address:
SLA ID:	Target Interface: IPS-mgmt 👻
Monitoring O	ptions
Enabling the tra state of the rou	cked option starts a job for monitoring the te, by pinging the track address provided.
ОК	Cancel Help

Step 21: In the Static Routes pane, click Apply.

<u>C</u>	onfiguratio	n > Device 9	<u>ietup > Routinq</u> :	> <u>Static Routes</u>		
	Specify stati Filter: 🔘 B	c routes. oth () IPv4	only 💿 IPv6 only	/		
	Interface	IP Address	Netmask/ Prefix Length	Gateway IP	Metric/ Distance	Options
	outside-16	0.0.0.0	0.0.0.0	172.16.130.126	1	Tracked ID - 1 Address - 172.18.1.1 Interface - outside-16
	outside-16	172.18.1.1	255.255.255.255	172.16.130.126	1	None
	outside-17	0.0.0.0	0.0.0.0	172.17.130.126	50	None

Process

Configuring the Remote-Access VPN

- 1. Load AnyConnect client images
- 2. Configure remote access
- 3. Create the AAA server group
- 4. Define the VPN address pool
- 5. Configure DNS and certificates
- 6. Configure default tunnel gateway
- 7. Configure remote access routing
- 8. Configure the group-URL
- 9. Enable SSL for additional interface
- 10. Configure additional NAT exemption
- 11. Configure the connection profile
- 12. Configure the employee policy
- 13. Configure the partner policy
- 14. Configure the admin policy
- 15. 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

Load AnyConnect client images

Download the Cisco AnyConnect Secure Mobility Client images from cisco. com to the computer you use to run ASDM. There are separate images for Windows, Apple OS X, and Linux; only the images that are required by your organization must be downloaded. The images then need to be uploaded to both the primary and secondary RA VPN Cisco ASAs.

Step 1: Navigate to Tools > File Management.

Step 2: Click File Transfer, and then select Between Local PC and Flash.

Step 3: Browse to the location on your local file system and copy each image to the Cisco ASA flash memory by selecting the image and then clicking the right arrow.



Step 4: Repeat Step 3 for each client image. After completing the file transfers for all client images, click **Close**.

Step 5: Repeat Step 1 through Step 4 for the secondary RA VPN Cisco ASA. From a client on the internal network, navigate to the secondary RA VPN Cisco ASA's inside IP address, and then launch ASDM. (Example: https://10.4.24.23)

Tech Tip

Do not attempt to modify the firewall configuration on the standby appliance. You should make configuration changes only to the primary appliance.

Procedure 2

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: In the **Connection Profile Name** box, enter a name. (Example: AnyConnect)

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

AnyConnect VPN Connection	Setup Wizard		×	
Steps	Connection Profile Identifi	cation		
1. Introduction	This step allows you to configure a Connection Profile Name and the Interface the remote access users will access for VPN			
2. Connection Profile	connections.			
3. VPN Protocols	Connection Profile Name:	AnyConnect		
4. Client Images	VPN Access Interface:	nutside_16		
5. Authentication Methods	ven Access Interface.	outside-to		
6. Client Address Assignment				
 Network Name Resolution Servers 				
8. NAT Exempt				
 AnyConnect Client Deployment 				
10. Summary				
[< Back Next >]	Cancel Help	

Step 5: Under VPN Protocols, select SSL, clear IPsec.

Jochs	VPN Protocols
Introduction Connection Profile Identification VPN Protocols Client Images Authentication Methods Client Address Assignment Network Name Resolution Servers NAT Exempt AnyConnect Client Deployment Summary	AnyConnect can use either the IPsec or SSL protocol to protect the data traffic. Please select which protocol or protocols you would like this connection profile to support. SSL IPsec Device Certificate Device certificate

Next, generate a self-signed identity certificate and install it on the appliance.

1 Tech Tip

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

Step 6: In the Device Certificate pane, click Manage.

Step 7: On the Manage Identity Certificates dialog box, click Add.

Step 8: On the Add Identity Certificate dialog box, enter a new Trustpoint Name (Example: VPN-ASA5525X-Trustpoint), and then 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 9: For Key Pair, select New.

Step 10: On the Add Key Pair dialog box, select **RSA** and **Enter new key pair name**, and then in the box, enter a name. (Example: VPN-ASA5525X-Keypair)

Step 11: Click Generate Now.



Step 12: On 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=VPN-ASA5525X.cisco.local)

Step 13: Select Generate self-signed certificate and Act as Local certificate authority and issue dynamic certificates to TLS-Proxy, and then click Add Certificate.

付 Add Identity Certificate	X
Trustpoint Name:	VPN-ASA5525X-Trustpoint
Import the identity certif	icate from a file (PKC512 format with Certificate(s)+Private Key):
Decryption Passphrase:	
File to Import From:	Browse
Add a new identity certif	icate:
Key Pair:	VPN-ASA5525X-Keypair Show New
Certificate Subject DN:	CN=VPN-ASA5525X.cisco.local Select
📝 Generate self-signed	certificate
📝 Act as local certif	icate authority and issue dynamic certificates to TLS-Proxy
	Advanced
Add Certifi	cate Cancel Help

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, verify that the **IPsec** check box is cleared and the certificate you created is reflected in the Device Certificate box, and then click **Next**.

📴 AnyConnect VPN Connection	n Setup Wizard
Steps	VPN Protocols
 Introduction Connection Profile Identification VPN Protocols Client Images Authentication Methods Client Address Assignment Network Name Resolution Servers NAT Exempt AnyConnect Client Deployment Summary 	AnyConnect can use either the IPsec or SSL protocol to protect the data traffic. Please select which protocol or protocols you would like this connection profile to support. SSL IPsec Device Certificate Device Certificate Device certificate identifies the ASA to the remote access clients. Certain AnyConnect features (Always-On, IPsec/IKEv2) require that valid device certificate be available on the ASA. Device Certificate: VPN-ASA5525X-Trustpoint:hostname= Manage
	< Back Next > Cancel Help

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

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

Step 18: On the Browse Flash dialog box, select the appropriate AnyConnect client image to support your user community (linux, macosx, or win), and then click **OK**.

📴 Browse Flash			[
Folders	Files		
⊡ <mark>-> disk0:</mark>	FileName ^ 1	Size (bytes)	Date Modified
in the section of the	🗀 coredumpinfo		06/27/12 15:32:58
	Crypto_archive		06/27/12 15:32:56
🗄 🗀 tmp	🗀 log		06/27/12 15:32:42
🖅 🦳 sdesktop	🔁 sdesktop		06/27/12 15:49:04
	🗀 tmp		09/17/12 14:56:44
	anyconnect-linux-3.1.00495-k9.pkg	10,978,512	09/17/12 15:33:32
	anyconnect-macosx-i386-3.1.00495-k9.pkg	11,191,648	09/17/12 15:34:02
	anyconnect-win-3.1.00495-k9.pkg	29,806,775	09/17/12 15:34:50

Step 19: On 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.

Next, if necessary, reorder the list of images so that the most commonly used image is listed first and least commonly used images are listed last.

Step 21: Click the image you want to move, and then click the up or down arrows to reorder the image.

Step 22: On the Client Images page, click Next.

oteps	Client Images	
1. Introduction	ASA can automatically upload the latest AnyConnect packa	ge to the client device when it accesses the enterprise networ
2. Connection Profile Identification	A regular expression can be used to match the user-agent You can also minimize connection setup time by moving the	of a browser to an image. image used by the most commonly encountered operation syst
3. VPN Protocols	to the top of the list.	
4. Client Images		
5. Authentication Methods	🍄 Add 🧭 Replace 🔟 Delete 🎓 🔸	
6. Client Address Assignment	Image	Regular expression to match user-agent
 Network Name Resolution Servers 	disk0:/anyconnect-win-3.1.00495-k9.pkg disk0:/anyconnect-macosx-i386-3.1.00495-k9.pkg	
8. NAT Exempt	disk0:/anyconnect-linux-3.1.00495-k9.pkg	
 AnyConnect Client Deployment 		
10. Summary		
	New york download Any Connect Clinck and there from Connection	ha analis - Marchan at 1000 (Sarthan Salahan
	You can download AnyConnect Client packages from Cisco	by searching AnyConnect VPN Client or <u>click here</u> .

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

Procedure 3 Create

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: On 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

📴 New Authentication Server Group		83
Create a new authentication serve To add more servers to the group Configuration > Device Manageme	er group containing one authentication server. or change other AAA server settings, go to ent > Users/AAA > AAA Server Groups.	
Server Group Name:	AD	
Authentication Protocol:	NT	
Server IP Address:	10.4.48.10	
Interface:	inside 🔹	
NT Domain Controller Name:	AD-1	
ОК	Cancel Help	

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

Steps	Authentication Methods
Introduction Connection Profile Identification VPN Protocols Client Images Authentication Methods Client Address Assignment Network Name Resolution Servers NAT Exempt AnyConnect Client Deployment Summary	This step lets you specify the location of the authentication server. You can click on the "New" button to create a new server group. AAA Server Group: AD New AAA Server Group Details AAA Server Group Details AAA Server Name or IP Address Interface Timeout 10.4,48,10 Inside 5

Option 2. Use Cisco Secure ACS for AAA

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

Step 2: On 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

	🕼 New Authentication Server Group	23			
	Create a new authentication server group containing one authentication server. To add more servers to the group or change other AAA server settings, go to Configuration > Device Management > Users/AAA > AAA Server Groups.				
	Server Group Name: AAA-RADIUS				
	Authentication Protocol:				
	Server IP Address: 10.4.48.15				
	Interface:				
	Server Secret Key:				
	Confirm Server Secret Key:				
	OK Cancel Help				
3:	On the Authentication Methods page, click Next .				

AnyConnect VPN Connection Setup Wizard		
Steps	Authentication Methods	
Introduction Connection Profile Identification VPN Protocols Client Images Authentication Methods Client Address Assignment Network Name Resolution Servers NAT Exempt AnyConnect Client Deployment Summary	This step lets you specify the location of the authentication server. You can click on the "New" button to create a new server group. AAA Server Group: AAA-RADIUS New AAA Server Group Details AAA Server Group Details Server Name or IP Address Interface Timeout 10.4:48.15 inside 10	
	< Back Next > Cancel Help	

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

Procedure 4

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: On 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

🚰 Add IPv4 Pool	X]
Name:	RA-pool	
Starting IP Address:	10.4.28.1	
Ending IP Address:	10.4.31.254	
Subnet Mask:	255.255.252.0 ▼	
ОК	Cancel Help	

Step

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

AnyConnect VPN Connection Setup Wizard	
Steps	Client Address Assignment
Introduction Connection Profile Identification VPN Protocols Client Images Authentication Methods Generate Address Assignment Network Name Resolution Servers Not Proceed	This step allows you to create a new address pool or select an existing address pool for IPv4 and IPv6. The AnyConnect clients will be assigned addresses from the pools when they connect. IPv6 address pool is only supported for SSL connection. IPv6 Address Pool IP v6 Address Pool Address Pool RA-pool V New Details of the selected address pool Starting IP Address: 10.4.28.1 Ending IP Address: 10.4.31.254
9. AnyConnect Client Deployment 10. Summary	Subnet Mask: 255.255.252.0
	< Back Next > Cancel Help

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**.

AnyConnect VPN Connection Setup Wizard			
Steps	Network Name R	esolution Servers	
1. Introduction	This step lets you	u specify how domain names are resolved for the remote user when acce	essing the internal network.
2. Connection Profile Identification	DNS Servers:	10.4.48.10	
3. VPN Protocols	WINS Servers:		
4. Client Images	Domain Name:	cisco.local	
5. Authentication Methods			
6. Client Address Assignment			
7. Network Name Resolution Servers			
8. NAT Exempt			
9. AnyConnect Client Deployment			
10. Summary			
	< Back	lext >	Cancel Help

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, choose inside.

Step 7: In the Local Network box, enter any4, and then click Next.

🚰 AnyConnect VPN Connectio	n Setup Wizard	×
Steps	NAT Exempt To naturally address translation is eachiled on the ASA, the VDN traffic must be exempt from this translation	
Introduction Connection Profile Identification VPN Protocols Client Images Authentication Methods Client Address Assignment Network Name Resolution Servers Nat Exempt	In network address translation is enabled of the ASA, the very carrie finds the exempt from this translation. Inside Interface is the interface directly connected to your internal network. Inside Interface: inside Local Network is the network address(es) of the internal network that client can access. Local Network: any4	
9. AnyConnect Client Deployment 10. Summary	The traffic between AnyConnect client and internal network will be exempt from network address translation.	
	< Back Next > Cancel He	lp

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

Step 9: On the Summary page, click Finish.

Configure DNS and certificates

Step 1: In this procedure, you generate an additional identity certificate for the secondary outside interface of the RA VPN Cisco ASA firewall. The certificate that was generated in the AnyConnect Wizard in Step 8 of Procedure 2, "Configure remote access," is used only for the primary outside interface.

Step 2: The IP addresses assigned to each of the outside interfaces correspond to a fully qualified domain name (FQDN) that can be resolved using an external DNS server.

Table 2 - DNS names for external IP addresses

Usage	Interface name	IP address	FQDN
Primary	outside-16	172.16.130.122	VPN-ASA5525X.cisco.local
Secondary	outside-17	172.17.130.122	VPN-ASA5525X-FO.cisco.local

Step 3: Using the values in Table 2, on your DNS server create DNS records for both the primary and secondary address on the RA VPN Cisco ASA appliance.

Step 4: Generate an identity certificate for the secondary interface. In Configuration > Remote Access VPN > Certificate Management > Identity Certificates, click Add.

Step 5: On the Add Identity Certificate dialog box, enter a new Trustpoint Name (example: VPN-ASA5525X-FO-Trustpoint), and then select **Add a new identity certificate**.

Step 6: For Key Pair, select the previously created key pair. (Example: VPN-ASA5525X-Keypair)

Step 7: On the Add Identity Certificate dialog box, in **Certificate Subject DN**, enter the FQDN used to access the appliance on the secondary outside interface. (Example: CN=VPN-ASA5525X-FO.cisco.local)

Step 8: Select the **Generate self-signed certificate** and **Act as local certificate authority and issue dynamic certificates to TLS-Proxy** check boxes, and then click **Add Certificate**.

💁 Add Identity Certificate	X
Trustpoint Name:	VPN-ASA5525X-FO-Trustpoint
Import the identity certification	cate from a file (PKCS12 format with Certificate(s)+Private Key):
Decryption Passphrase:	
File to Import From:	Browse
Add a new identity certification	cate:
Key Pair:	VPN-ASA5525X-Keypair 🗸 Show New
Certificate Subject DN:	CN=VPN-ASA5525X-FO.cisco.loca Select
📝 Generate self-signed	certificate
📝 Act as local certifi	cate authority and issue dynamic certificates to TLS-Proxy
	Advanced
Add Certifi	Cancel Help

Step 9: When the Enrollment Status dialog box that shows that the enrollment has succeeded appears, click **OK**.

Step 10: In Configuration Management > Device Management >

Advanced > SSL Settings, in the Certificates pane, select the secondary outside interface (Example: outside-17), and then click Edit.

Step 11: On the Select SSL Certificate dialog box, in the **Primary Enrolled Certificate** list, choose the additional identity certificate that was created in Step 6, and then click **OK** and then click **Apply**.

📴 Select SSL Certificate	[<u>3</u>]						
Specify enrolled trustpoints to be used for SSL authentication and VPN load balancing on the outside-17 interface. To enroll a trustpoint, go to Configuration > Features > Device Administration > Certificate > Enrollment.							
Interface:	outside-17						
Primary Enrolled Certificate:	VPN-ASA5525X-FO-Trustpoint:hostname=VPN-ASA5525X.c 👻						
Load Balancing Enrolled Certificate:	None						
ОК	Cancel Help						

Step 12: Force certificate replication to the secondary RA VPN appliance. From the command prompt, issue the **write standby** command from the primary RA VPN appliance.

VPN-ASA5525X# write standby

Next, export the primary identity certificates for backup and distribution.

Step 13: Navigate to Configuration > Remote Access VPN > Certificate Management > Identify Certificates, select the certificate for backup, and then click Export.

Step 14: Select the PKCS12 format (Certificates(s) + Private Key) certificate format. This format is used for restoring a certificate to a new device.

Step 15: Enter a secure passphrase (Example: c1sco123), and then click **Export Certificate**.

📴 Export certificate		23
Export to File:	C:\VPN-ASA5525X-PKC512	Browse
Certificate Format:		
	OPKCS12 Format (Certificate(s) + Private Key)	
	PEM Format (Certificate Only)	
Configuration Encryption P	assphrase	
Encryption Passphrase:	•••••	
Confirm passphrase:	•••••	
Export Cer	tificate Cancel Help	

Step 16: Repeat the export in PEM format. This format is used for distribution to VPN client devices when using self-signed certificates. A secure passphrase is not used with the PEM format.

Step 17: Repeat Step 11 through Step 14 for the secondary identity certificate.

🔤 Export certificate		— ×-
Export to File:	C:\VPN-ASA5525X-PEM	Browse
Certificate Format:	PKC512 Format (Certificate(s) + Private Key)	
	PEM Format (Certificate Only)	
Configuration Encryption P	assphrase	
Encryption Passphrase:		
Confirm passphrase:		
Export Cer	tificate Cancel Help	

Configure default tunnel gateway

This procedure is only required when configuring a standalone RA VPN device. If you are using an integrated deployment model, skip to Procedure 7, "Configure remote access routing."

Traffic from remote-access VPN clients to and from the Internet must be inspected by the organization's firewall and IPS. 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 firewall and IPS has the visibility to handle the traffic correctly.

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

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

- · Interface-inside
- Network—any4
- · Gateway IP-10.4.24.1
- · Options—Tunneled (Default tunnel gateway for VPN traffic)

付 Add Static Route	
IP Address Type:	⑧ IPv4 ○ IPv6
Interface:	inside 👻
Network:	any4
Gateway IP:	10.4.24.1 Metric: 255
Options	
None	
Tunneled (Def	ault tunnel gateway for VPN traffic)
🔘 Tracked	
Track ID:	Track IP Address:
SLA ID:	Target Interface: inside 🚽
Monitoring C	options
Enabling the tra state of the rou	cked option starts a job for monitoring the te, by pinging the track address provided.
ОК	Cancel Help

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

nfiguratio	n > Device !	Setup > Routing	> <u>Static Routes</u>			
5pecify stat Filter: 💿 B	ic routes. ioth 💿 IPv4	Fonly 🔘 IPv6 onl	y			
Interface	IP Address	Netmask/ Prefix Length	Gateway IP	Metric/ Distance	Options	Add
inside	0.0.0.0	0.0.0.0	10.4.24.1	255	Tunneled	Edit
outside-16	0.0.0.0	0.0.0.0	172.16.130.126	1	Tracked ID - 1 Address - 172.18.1.1 Interface - outside-16	Delete
outside-16	172.18.1.1	255.255.255.255	172.16.130.126	1	None	
outside-17	0.0.0.0	0.0.0.0	172.17.130.126	50	None	

Procedure 7

Configure remote access routing

Cisco ASA advertises 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 1: In Configuration > Device Setup > Routing > EIGRP > Summary Address, click Add.

Step 2: On 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

🔁 Add EIGRP Summan	/ Address Entry			×
EIGRP AS:	100 👻	Interface:	GigabitEthernet0/0	•
IP Address:	10.4.28.0	Netmask:	255.255.252.0	•
Adminstrative Distance:	5	(default 5)		
	OK Cancel	Helj	D	

Step 3: In the Summary Address pane, click Apply.

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

Step 4: Navigate to Configuration > Device Setup > Interfaces.

Step 5: Select Enable traffic between two or more hosts connected to the same interface, and then click Apply.

interface	Name	State	Security Level	IP Address	Subnet Mask Prefix Length	VLAN	Add 🔻
igabitEthernet0/0	inside	Enabled	100	10.4.24.24	255.255.255.224	native	Edit
igabitEthernet0/1		Disabled				native	
igabitEthernet0/2		Enabled				native	Delete
igabitEthernet0/3		Enabled				native	
igabitEthernet0/3.16	outside-16	Enabled	0	172.16.130.122	255.255.255.0	vlan16	
igabitEthernet0/3.17	outside-17	Enabled	0	172.17.130.122	255.255.255.0	vlan17	
igabitEthernet0/4		Disabled				native	
igabitEthernet0/5		Disabled				native	
igabitEthernet0/6		Disabled				native	
igabitEthernet0/7		Disabled				native	
lanagement0/0		Disabled				native	
Enable traffic between tw Enable traffic between tw	io or more interf	aces which a connected l	are configure to the same	ed with same security interface	levels	4	
Epoble jumbo fromo recor							

Procedure 8

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: In 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://172.16.130.122/AnyConnect)

📑 Add Group URL	83
URL: https://172.16.130.122/AnyConnect	
📝 Enabled	
OK Cancel Help	

Step 6: If you are using the dual ISP design, which has a resilient Internet connection, repeat Step 1 through Step 5, using the firewall's resilient Internet connection IP address. (Example: https://172.17.130.122/ AnyConnect)

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

Procedure 9

Enable SSL for additional interface

(Optional)

This procedure is required only when using the dual ISP design.

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.

5L access must be	enabled if you al	low AnyConnect clier	nt to be launched from a br	owser (Web Launch) .			
	SSL Access		IPsec (IKEv2) Ac	cess			
nterface	Allow Access	Enable DTLS	Allow Access	Enable Client Services		Device Certificate]
side	(m)		(T)		- 1	Port Settions	1
utside-16	\checkmark				¹	Port Settings	J
utside-17					-		
Enable inbound Page Setting - Allow user to s Shutdown port Shutdown port nection Profiles - onnection profile	l VPN sessions to l elect connection p al login page. (tunnel group) sp	ovpass interface acc rofile, identified by it ecifies how user is a	s alias, on the login page.	Otherwise, DefaultWebVPNGro ameters. You can configure the	ip will be the	e connection profile,	n profile <u>here</u> ,
Page Setting Allow user to s Shutdown port Shutdown port action Profiles annection profile Add	VPN sessions to l elect connection p al login page. (tunnel group) sp (tunnel group) sp	oypass interface acc rofile, identified by it ecifies how user is a rd:	s alias, on the login page. uthenticated and other par	Otherwise, DefaultWebVPNGro ameters. You can configure the	p will be the	e connection profile.	n profile <u>hare</u> .
Page Setting - Allow user to s Shutdown port scion Profiles - onnection profile Add C Edit ame	VPN sessions to l elect connection p al login page. (tunnel group) sp (tunnel group) sp Elete SSL Enabl	ovpass interface acc rofile, identified by it ecifies how user is a id:	s alias, on the login page. uthenticated and other par	Otherwise, DefaultWebVPNGro ameters. You can configure the case	p will be the mapping fro Authen	e connection profile.	n profile <u>hers</u> . Group Policy
Page Setting - Allow user to s Allow user to s Shutdown port action Profiles Add C Edit ame faultRAGroup	VPN sessions to l elect connection p al login page. (tunnel group) sp (tunnel group) sp Electe SSL Enabl	vypass interface aco rofile, identified by it ecifies how user is a id: ed	s alias, on the login page. uthenticated and other par © © © Match C IPsec Enabled	Otherwise, DefaultWebVPNGro ameters. You can configure the lase Aliases	ip will be the mapping fro Authen AAA(LO	e connection profile. om certificate to connection tication Method CAL)	n profile <u>bare</u> , Group Policy Dfilforp#olicy
Enable inbound Page Setting Allow user to s Shutdown port ection Profiles wnnection profile Add C Edir ame efaultRAGroup efaultRAGroup	VPN sessions to l elect connection p al login page. (tunnel group) sp (tunnel group) sp Electe SSL Enabl	pypass interface aco rofile, identified by it ecifies how user is as d: ed	s alias, on the login page. Ithenticated and other par © © © Match C IPsec Enabled Ø	Otherwise, DefaultWebVPNGro ameters. You can configure the ase Alases	p will be the mapping fro Authen AAA(LO AAA(LO	e connection profile.	n profile (<u>tere</u> , Group Policy Dffilics/Policy Dffilics/Policy

Procedure 10

Configure additional NAT exemption

(Optional)

This procedure is required only when using the dual ISP design with the integrated VPN design.

Step 1: Navigate to **Configuration > Firewall > NAT Rules**. A previous NAT exemption rule already exists from an earlier procedure. (Example: Source Intf: inside, Dest Intf: outside-16, Destination: NETWORK_OBJ_10.4.28.0_22) Right-click this rule, and then click **Copy**.

Match Criteri	a: Original Packe	±			Action: Translated F	Packet	
Source Intf	Dest Intf	Source	Destination	Service	Source	Destination	Service
inside	outside-16	🏟 any	NETWORK_OBJ_10.4.28.0_22	🏟 any	Original (S)	Original	Original

Step 2: Right-click after the original rule, and then click **Paste**. The new rule is opened for editing.

Step 3: Change the Destination Interface to the resilient interface (example: outside-17), and then click **OK**.

📴 Paste After NAT Rule			23
Match Criteria: Original Packet —			
Source Interface:	inside 🔹 👻	Destination Interface:	outside-17 🔹
Source Address:	any	Destination Address:	ORK_OBJ_10.4.28.0_22
		Service:	any
Action: Translated Packet			
Source NAT Type:	Static 👻		
Source Address:	Original 📰	Destination Address:	Original 👘
🔲 Use one-to-one address transl	ation		
PAT Pool Translated Address:		Service:	Original 📖
Round Robin			
Extend PAT uniqueness to p	er destination instead of per in	terface	
Translate TCP and UDP port	s into flat range 1024-65535	Include range 1-102	3
Eall through to interface PAT			
Use IPv6 for source interface I	PAT	Use IPv6 for destir	nation interface PAT
Options			
📝 Enable rule			
Translate DNS replies that mat	ch this rule		
📝 Disable Proxy ARP on egress ir	nterface		
📝 Lookup route table to locate e	gress interface		
Direction: Both 👻			
Description:			
	OK Cancel	Help	

Configure the connection profile

Complete this procedure when using Cisco Secure ACS as a proxy to Active Directory for authentication. The MS-CHAPv2 authentication protocol requires that password management is enabled on the RA VPN Cisco ASA appliance. This procedure is recommended but not required when using Active Directory by itself.

Step 1: Navigate to Configuration > Remote Access VPN > Network (Client) Access > AnyConnect Connection Profiles. In the Connection Profiles pane, select the profile that created previously using the AnyConnect VPN Wizard (Example: AnyConnect), and then click Edit.

Step 2: In Advanced > General, in the Password Management pane, select Enable password management.

📑 Edit AnyConnect Connect	ion Profile: AnyConnect
Basic Advanced - Client Addressing - Authentication - Secondary Authenticat - Authorization - Accounting - Group Alias/Group URL	Enable Simple Certificate Enrollment Protocol (SCEP) for this Connection Profile Strip the realm from username before passing it on to the AAA Server Strip the group from username before passing it on to the AAA Server Group Delimiter: None Important: group delimiter is a global parameter. Changing it here affects all other remote connection profiles. Password Management O Notify user 14 days prior to password expiration Notify user on the day password expires Override account-disabled indication from AAA Server

Step 3: For Banner, clear the **Inherit** check box, and then enter a banner message for the employee policy. (Example: Group "vpn-employee" allows for unrestricted access with a tunnel all policy.)

Edit Internal Group Policy:	GroupPolicy_Employee			Σ
General	Name:	GroupPolicy	Employee	
Advanced	Banner:	📄 Inherit	Group "vpn-employee" allows for unrestricted access with a tunnel all policy.	
	SCEP forwarding URL:	🔽 Inherit]
	Address Pools:	🔽 Inherit		Select
	IPv6 Address Pools:	🔽 Inherit		Select
	More Uptions			*
Find:		Next 🔘	Previous	
			OK Cancel Help	

Procedure 13

• 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)

Procedure 12

Configure the employee 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_Employee)

February 2013 Series

Step 3: For Banner, clear the **Inherit** check box, and then enter a banner message for the partner policy. (Example: Group "vpn-partner" allows for access control list (ACL) restricted access with a tunnel all policy.)

[Add Internal Group Policy				8
	General	Name:	GroupPolicy_	Partner	
		Banner:	🔲 Inherit	Group "vpn-partner" allows for ACL restricted access with a tunnel all policy	
		SCEP forwarding URL:	📝 Inherit		
		Address Pools:	📝 Inherit		Select
		IPv6 Address Pools:	📝 Inherit		Select
					~
		More Uptions			۲
	Find:) Next 🔘 I	Previous	
				OK Cancel Help	

Step 4: Click the two down arrows. The More Options pane expands.

Step 5: For Filter, clear the Inherit check box, and then click Manage.

Step 6: On the ACL Manager dialog box, click the Standard ACL tab, then click Add > Add ACL.

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

Add ACL		23
ACL Name: RA_Pa	rtnerACL	
ОК	Cancel	Help

Step 8: Click Add > Add ACE.

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

Step 10: 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)

🔂 Add ACE	23
Action: 💿 Permit 💿 Deny	
Address: 10.4.48.35/32	
Description:	
Partners can access this internal host only.	
OK Cancel Help	

Step 11: On the ACL Manager dialog box, click OK.

ACL Mar	nager		
Standard /	ACL Extended ACL		
💠 Add 🚽	🗹 Edit 🏦 Delete 🛧 🤘	F 🕉 🖻 🏨	*
No	Address	Action	Description
RA_Pa	rtnerACL		
	10.4.48.35	🖌 Permit	Partners can access this internal host only

Step 12: On the Add Internal Group Policy dialog box, click OK.

al Name:	GroupPolicy_P	artner		
ers inced Banner:	🔲 Inherit	Group "vpn-partr	er" allows for ACL restricted access with a tunnel all policy.	
SCEP forwarding	URL: VI Inherit			_
Address Pools:	👽 Inherit			Select
IPv6 Address Po	ols: 👿 Inherit 🛛			Select
More Options				
Tunneling Prote	ocols:	📝 Inherit	Clientless SSL VPN SSL VPN Client Psec IKEv1 Psec IKEv2	2 L2TP/IPsed
Filter:		📄 Inherit	RA_PartnerACL	Manage
NAC Policy:		📝 Inherit		Manage
Access Hours:		📝 Inherit		Manage
Simultaneous L	ogins:	📝 Inherit		
Restrict access	to VLAN:	📝 Inherit	v]
Connection Pro	file (Tunnel Group) Lo	ock: 📝 Inherit]
Maximum Conn	ect Time:	📝 Inherit	Unlimited minutes	
Idle Timeout:		📝 Inherit	None minutes	
On smart card	removal:	📝 Inherit	 Disconnect Keep the connection 	
	Alauk OD	revious		

Step 13: In the Group Policies pane, click Apply.

Procedure 14 **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_Administrator)

Step 3: For Banner, clear the **Inherit** check box, and then enter a banner message for the administrator policy. (Example: Group "vpn-administrator" allows for unrestricted access with a split tunnel policy.)

5	Edit Internal Group Policy:	GroupPolicy_Administr	ator		×
	General	Name:	GroupPolicy_	Administrator	
	Advanced	Banner:	📄 Inherit	Group "vpn-administrator" allows for unrestricted access with a split tunnel policy.	
		SCEP forwarding URL:	🔽 Inherit		
		Address Pools:	🔽 Inherit		Select
		IPv6 Address Pools:	🔽 Inherit		Select
		More Options			~
		Tiore options			
	ete di			Providence	
	Pino:	0	nvext 🔘	Previous	
				OK Cancel Help	

Step 4: In the navigation tree, click Advanced > Split Tunneling.

Step 5: For Policy, clear the Inherit check box, and then select Tunnel Network List Below.

Step 6: For Network List, clear the **Inherit** check box, and then click **Manage**.

Step 7: On the ACL Manager dialog box, click the **Standard ACL** tab, and then click **Add > Add ACL**.

Step 8: On the Add ACL dialog box, enter an **ACL Name**, and then click **OK**. (Example RA_SplitTunnelACL)



Step 9: Click Add > Add ACE.

Step 10: On the Add ACE dialog box, for Action, select Permit.

Step 11: In the Address box, enter the internal summary IP address and netmask, and then click **OK**. (Example: 10.4.0.0/15)

뒄 Add A	CE 🛛]
Action:	ermit O Deny	
Address:	10.4.0.0/15	
Descriptio	יחנ	
Internal r	networks	
	OK Cancel Help	
	OK Cancel Help	

Step 12: Click Add > Add ACE.

Step 13: On the Add ACE dialog box, for Action, select Permit.

Step 14: In the Address box, enter the DMZ summary IP address and netmask, and then click **OK**. (Example: 192.168.16.0/21)

🔂 Add A	CE	×
Action:	ermit O Deny	
Address:	192.168.16.0/21	
Descriptio	n:	_
DMZ netv	vorks	
	OK Cancel Help	

Step 15: On the ACL Manager dialog box, click OK.

💠 Add	- 🗹 Edit 🍿 Delete 🛉	f 🐰 🗈 🛍	
No	Address	Action	Description
🗏 RA_P	artnerACL		
1	10.4.48.35	🖌 Permit	Partners can access this internal host only
RA_S	plitTunnelACL		
1	10.4.0.0/15	🖌 Permit	Internal networks
2	192.168.16.0/21	🖌 Permit	DMZ networks

Step	16:	On the	Add	Internal	Group	Policy	dialog	box,	click OK.
------	-----	--------	-----	----------	-------	--------	--------	------	-----------

Servers	Split tunneling network lists distinguish makes split tunneling decisions on the b	networks that basis of a netv	t require traffic to go through the tunnel and those that do not require tunneling. The security appliance work list, which is an ACL that consists of list of addresses on the private network.
Split Tunneling	DNS Names:	🗸 Inherit	
	Send All DNS Lookups Through Tunnel:	🗸 Inherit	🔘 Yes 💿 No
	Policy:	📄 Inherit	Tunnel Network List Below 🔹
	Network List:	📄 Inherit	RA_SplitTunnelACL Manage

Step 17: In the Group Policies pane, click Apply.

Configure Cisco AnyConnect Client Profile

Cisco AnyConnect Client Profile is the location where 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: On the Add AnyConnect Client Profile dialog box, in the Profile Name box, enter **RA-Profile**, click **OK**, and then click **Apply**.

🔂 Add AnyConn	ect Client Profile	8
Profile Name	RA-Profile	
Profile Usage	AnyConnect VPN Profile	
Enter a device fi automatically cre	ile path for an xml file, ie. disk0:/ac_profile. The file will be eated if it does not exist.	
Profile Location	disk0:/ra-profile.xml	Browse Flash
		Upload
Group Policy	<unassigned></unassigned>	
	Enable 'Always On VPN' for selected group	
	OK Cancel Help	

Step 3: In the AnyConnect Client Profile pane, select the RA-Profile you just built, and then click **Edit**. This launches the AnyConnect Client Profile Editor.

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. The Server List panel opens.

Step 5: Click Add.

Step 6: On the Server List Entry dialog box, in the Host Display Name box, enter the primary FQDN of the remote-access firewall. (Example: VPN-ASA5545X.cisco.local)

Tech Tip

The entry used for the Host Display Name must be listed in your organization's DNS database. If you have not updated your DNS to include the primary and secondary FQDNs as listed in Table 2, do so now.

Step 7: In the Backup Server List pane, in the Host Address box, enter the secondary FQDN of the remote-access firewall (Example: VPN-ASA5525X-FO.cisco.local), click **Add**, and then click **OK**.

Host Display Name (required) FQDN or IP Address	VPN-ASA5525X.cisco.l	User Group	Additional mobile-only settings	Edit
Group URL				
Backup Server List			Load Balancing Server List	anring Eields have been disabled
Host Address		Add	Host Address	Add
	VPN-ASA5525X-FO.cisco.loca	Move Up Move Down Delete		Delete
Primary Protocol		SSL 👻	Automatic SCEP Host	
Standard Authenticatio	n Only (IOS gateways)		CA URL	
Auth Method During	IKE Negotiation	IKE-RSA 👻	Prompt For Challenge Password	
IKE Identity			CA Thumbprint	

Step 8: Click OK. The AnyConnect Client Profile Editor closes.

When running a RA VPN Cisco ASA firewall pair, the AnyConnect client profile must be manually replicated to the secondary Cisco ASA firewall.

Step 9: Navigate to Tools > File Management, click File Transfer, and then select Between Local PC and Flash.

Step 10: Browse to a destination on your local file system and copy the AnyConnect client profile file from the Cisco ASA disk (Example: ra-profile. xml) by selecting the profile and then clicking the left arrow.

Step 11: After a successful file transfer, click Close.



Step 12: Navigate to the secondary RA VPN Cisco ASA's inside IP address, and then launch ASDM. (Example: https://10.4.24.23)



Step 13: Navigate to Tools > File Management.

Step 14: Click File Transfer, and then select Between Local PC and Flash.

Step 15: Browse to a destination on your local filesystem and copy the AnyConnect client profile file from to the secondary Cisco ASA disk (Example: ra-profile.xml) by selecting the profile and then clicking on the right arrow. After a successful file transfer, click **Close**.

Step 16: Close ASDM on the secondary RA VPN Cisco ASA appliance.

Step 17: On the primary RA VPN Cisco ASA appliance, in the AnyConnect Client Profile pane, select the AnyConnect VPN profile (Example: RA-Profile), and then click **Change Group Policy**.

Step 18: In the Change Group Policy for Profile dialog box, in the **Available Group Policies** list, choose the three group policies you just created, click the right arrow, and then click **OK**.

Change Group Policy for Profile RA-Pro	ofile
This panel is used to assign (or unassign) the Profile Name: RA-Profile	selected profile to one or more group policies.
Profile Usage: AnyConnect VPN Profile	Enable 'Always On VPN' for selected group(s) 😗
Available Group Policies	Selected Group Policies
DfltGrpPolicy	GroupPolicy_Administrator
GroupPolicy_AnyConnect	GroupPolicy_Employee
	GroupPolicy_Partner
ОК	Close

Step 19: In 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 remote access VPN component of Borderless Networks and is meant to be used in conjunction with the *Cisco SBA—Borderless Networks Firewall and IPS Deployment Guide* in addition to the *MPLS WAN Deployment Guide*, which can be found here: 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 9.0(1)
	Cisco ASA 5525-X IPS Edition - security appliance	ASA5525-IPS-K9	IPS 7.1(6)E4
	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	7.0(2)
RA VPN Firewall	Cisco ASA 5545-X Firewall Edition - security appliance	ASA5545-K9	ASA 9.0(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 ASA 5512-X Security Plus license	ASA5512-SEC-PL	
	Firewall Management	ASDM	7.0(2)
AnyConnect License	AnyConnect Essentials VPN License - ASA 5545-X (2500 Users)	L-ASA-AC-E-5545	_
	AnyConnect Essentials VPN License - ASA 5525-X (750 Users)	L-ASA-AC-E-5525	
	AnyConnect Essentials VPN License - ASA 5515-X (250 Users)	L-ASA-AC-E-5515	
	AnyConnect Essentials VPN License - ASA 5512-X (250 Users)	L-ASA-AC-E-5512	

Internet Edge LAN

Functional Area	Product Description	Part Numbers	Software
Outside Switch	Cisco Catalyst 2960-S Series 24 Ethernet 10/100/1000 ports and Four GbE SFP Uplink ports	WS-C2960S-24TS-L	15.0(1)SE2 LAN Base license

VPN Client

Functional Area	Product Description	Part Numbers	Software
VPN Client	Cisco AnyConnect Secure Mobility Client (Windows)	Cisco AnyConnect Secure Mobility Client	3.1.00495
	Cisco AnyConnect Secure Mobility Client (Mac OS X)	Cisco AnyConnect Secure Mobility Client	
	Cisco AnyConnect Secure Mobility Client (Linux)	Cisco AnyConnect Secure Mobility Client	

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	Cisco Catalyst 6500 E-Series 6-Slot Chassis	WS-C6506-E	15.0(1)SY1
Virtual Switch Pair	Cisco Catalyst 6500 VSS Supervisor 2T with 2 ports 10GbE and PFC4	VS-S2T-10G	IP Services license
	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-2T	
	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	Cisco Catalyst 4507R+E 7-slot Chassis with 48Gbps per slot	WS-C4507R+E	3.3.0.SG(15.1-1SG)
Switch	Cisco Catalyst 4500 E-Series Supervisor Engine 7-E, 848Gbps	WS-X45-SUP7-E	Enterprise Services
	Cisco Catalyst 4500 E-Series 24-port GbE SFP Fiber Module	WS-X4624-SFP-E	license
	Cisco Catalyst 4500 E-Series 12-port 10GbE SFP+ Fiber Module	WS-X4712-SFP+E	
Stackable Distribution Layer	Cisco Catalyst 3750-X Series Stackable 12 GbE SFP ports	WS-C3750X-12S-E	15.0(2)SE
Switch	Cisco Catalyst 3750-X Series Two 10GbE SFP+ and Two GbE SFP ports network module	C3KX-NM-10G	IP Services license
	Cisco Catalyst 3750-X Series Four GbE SFP ports network module	C3KX-NM-1G	

Appendix B: Configuration Example

RA VPN ASA5525X

```
ASA Version 9.0(1)
1
hostname VPN-ASA5525X
domain-name cisco.local
enable password 8Ry2YjIyt7RRXU24 encrypted
passwd 2KFQnbNIdI.2KYOU encrypted
names
ip local pool RA-pool 10.4.28.1-10.4.31.254 mask 255.255.252.0
L
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
L
interface GigabitEthernet0/3
 no nameif
 no security-level
 no ip address
interface GigabitEthernet0/3.16
```

vlan 16 nameif outside-16 security-level 0 ip address 172.16.130.122 255.255.255.0 interface GigabitEthernet0/3.17 vlan 17 nameif outside-17 security-level 0 ip address 172.17.130.122 255.255.255.0 T interface GigabitEthernet0/4 shutdown no nameif no security-level no ip address T 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 1 interface Management0/0 management-only shutdown no nameif no security-level no ip address I. boot system disk0:/asa901-smp-k8.bin ftp mode passive clock timezone PST -8 clock summer-time PDT recurring dns server-group DefaultDNS 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 object network internal-network subnet 10.4.0.0 255.254.0.0 description Internal Network access-list ALL BUT DEFAULT standard deny host 0.0.0.0 access-list ALL BUT DEFAULT standard permit any4 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 pager lines 24 logging enable logging buffered informational

logging asdm informational mtu inside 1500 mtu outside-16 1500 mtu outside-17 1500 failover failover lan unit secondary failover lan interface failover GigabitEthernet0/2 failover polltime unit msec 200 holdtime msec 800 failover polltime interface msec 500 holdtime 5 failover key FailoverKey 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-702.bin no asdm history enable arp timeout 14400 no arp permit-nonconnected nat (inside,outside-17) 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 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 1 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 1 route outside-16 0.0.0.0 0.0.0.0 172.16.130.126 1 track 1

route outside-17 0.0.0.0 0.0.0.0 172.17.130.126 50 route outside-16 172.18.1.1 255.255.255.255 172.16.130.126 1 route inside 0.0.0.0 0.0.0.0 10.4.24.1 tunneled timeout xlate 3:00:00 timeout pat-xlate 0:00:30 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 sipdisconnect 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 SecretKey aaa-server AAA-RADIUS protocol radius aaa-server AAA-RADIUS (inside) host 10.4.48.15 timeout 5 key SecretKey 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 cisco no snmp-server location no snmp-server contact snmp-server community cisco 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 ipsec ikev1 transform-set ESP-AES-256-MD5 esp-aes-256 espmd5-hmac crypto ipsec ikev1 transform-set ESP-DES-SHA esp-des esp-sha-hmac crypto ipsec ikev1 transform-set ESP-3DES-SHA esp-3des esp-shahmac crypto ipsec ikev1 transform-set ESP-DES-MD5 esp-des esp-md5-hmac crypto ipsec ikev1 transform-set ESP-AES-192-MD5 esp-aes-192 espmd5-hmac crypto ipsec ikev1 transform-set ESP-3DES-MD5 esp-3des esp-md5hmac crypto ipsec ikev1 transform-set ESP-AES-256-SHA esp-aes-256 espsha-hmac crypto ipsec ikev1 transform-set ESP-AES-128-SHA esp-aes esp-shahmac crypto ipsec ikev1 transform-set ESP-AES-192-SHA esp-aes-192 espsha-hmac crypto ipsec ikev1 transform-set ESP-AES-128-MD5 esp-aes esp-md5hmac crypto ipsec security-association pmtu-aging infinite crypto dynamic-map SYSTEM DEFAULT CRYPTO MAP 65535 set ikev1 transform-set ESP-AES-128-SHA ESP-AES-128-MD5 ESP-AES-192-SHA ESP-AES-192-MD5 ESP-AES-256-SHA ESP-AES-256-MD5 ESP-3DES-SHA ESP-3DES-MD5 ESP-DES-SHA ESP-DES-MD5 crypto dynamic-map SYSTEM DEFAULT CRYPTO MAP 65535 set reverseroute crypto map outside-16 map 65535 ipsec-isakmp dynamic SYSTEM DEFAULT CRYPTO MAP crypto map outside-16 map interface outside-16 crypto ca trustpoint VPN-ASA5525X-Trustpoint enrollment self subject-name CN=VPN-ASA5525X.cisco.local keypair VPN-ASA5525X-Keypair proxy-ldc-issuer crl configure crypto ca trustpoint VPN-ASA5525X-FO-Trustpoint enrollment self

subject-name CN=VPN-ASA5525X-FO.cisco.local keypair VPN-ASA5525X-Keypair proxy-ldc-issuer crl configure crypto ca trustpoint ASDM TrustPoint0 enrollment self subject-name CN=VPN-ASA5525X keypair foobar proxy-ldc-issuer crl configure crypto ca trustpool policy crypto ca certificate chain VPN-ASA5525X-Trustpoint certificate 196dbd50 30820379 30820261 a0030201 02020419 6dbd5030 0d06092a 864886f7 0d010105 0500304c 3121301f 06035504 03131856 504e2d41 53413535 3235582e 63697363 6f2e6c6f 63616c31 27302506 092a8648 86f70d01 09021618 56504e2d 41534135 35323558 2e636973 636f2e6c 6f63616c 301e170d 31323132 31373232 34353131 5a170d32 32313231 35323234 3531315a 304c3121 301f0603 55040313 1856504e 2d415341 35353235 582e6369 73636f2e 6c6f6361 6c312730 2506092a 864886f7 0d010902 16185650 4e2d4153 41353532 35582e63 6973636f 2e6c6f63 616c3082 0122300d 06092a86 4886f70d 01010105 00038201 0f003082 010a0282 010100be b40a3916 c07f0a5a ca49459f 1ff0fde1 18fdd1d3 1549f412 591ea3da d0fdc925 e590bd9f ddb0a47b 488cfbcc 0a8245de 2c1bba6c b63c12d4 9378e952 c3146de5 5cbaa719 c6cbc071 8ad5b3c1 fa3f9aaa f382b256 8518fa3b 0f4674d9 c973ec60 b78a92a9 ccaeca0a bf55510d 1dd0e6b9 19c8d200 ae13aa37 aed1dae8 f06cd971

16cf1
e1f57
74d18
30101
42836
83673
50500
1a26b
9e7b1
2500f
ll1fa1
d54c9
d54c9
d54c9 d6bc6
d54c9
d54c9 d6bc6 d8bc5
d54c9 d6bc6 d8bc5
d54c9 d6bc6 d8bc5 b0a1a
d54c9 d6bc6 d8bc5 b0a1a
d54c9 d6bc6 d8bc5 b0a1a
d54c9 d6bc6 d8bc5 b0a1a nt
d54c9 d6bc6 d8bc5 b0a1a nt
d54c9 d6bc6 d8bc5 b0a1a nt <u>6092a</u>

3235582d 464f2e63 6973636f 2e6c6f63 616c3127 30250609 2a864886 f70d0109 02161856 504e2d41 53413535 3235582e 63697363 6f2e6c6f 63616c30 1e170d31 32313231 3732234 3535355a 170d3232 31323135 32323435 35355a30 4f312430 22060355 0403131b 56504e2d 41534135 35323558 2d464f2e 63697363 6f2e6c6f 63616c31 27302506 092a8648 86f70d01 09021618 56504e2d 41534135 35323558 2e636973 636f2e6c 6f63616c 30820122 300d0609 2a864886 f70d0101 01050003 82010f00 3082010a 02820101 00beb40a 3916c07f 0a5aca49 459f1ff0 fde118fd d1d31549 f412591e a3dad0fd c925e590 bd9fddb0 a47b488c fbcc0a82 45de2c1b ba6cb63c 12d49378 e952c314 6de55cba a719c6cb c0718ad5 b3c1fa3f 9aaaf382 b2568518 fa3b0f46 74d9c973 ec60b78a 92a9ccae ca0abf55 510d1d0 e6b919c8 d200ae13 aa37aed1 dae8f06c d9719db5 a13eef9f ab17a66f 1745973e d31b80cc 10fc27e7 159be2ad a507000d 016156c3 c3b5dddb 10102db9 39537bea 683e5d15 e0e0ec61 6cf1d16b d4afe744 c3ecca68 642121ec 21aae051 21c56dcc 6c776863 8f872cee 1f57015f c2a4bd5a 4f36ccfe 7a2e78c2 0b1bf0e5 f5fa01b8 27832fbf 07481df7 4d18113c
6973636f 2e6c6f63 616c3127 30250609 2a864886 f70d0109 02161856 504e2d41 53413535 3235582e 63697363 6f2e6c6f 63616c30 1e170d31 32313231 37323234 3535355a 170d3232 31323135 32323435 35355a30 4f312430 22060355 0403131b 56504e2d 41534135 35323558 2d464f2e 63697363 6f2e6c6f 63616c31 27302506 092a8648 86f70d01 09021618 56504e2d 41534135 35323558 2e636973 636f2e6c 6f63616c 30820122 300d0609 2a864886 f70d0101 01050003 82010f00 3082010a 02820101 00beb40a 3916c07f 0a5aca49 459f1ff0 fde118fd d1d31549 f412591e a3dad0fd c925e590 bd9fddb0 a47b488c fbcc0a82 45de2c1b ba6cb63c 12d49378 e952c314 6de55cba a719c6cb c0718ad5 b3c1fa3f 9aaaf382 b2568518 fa3b0f46 74d9c973 ec60b78a 92a9ccae ca0abf55 510d1d00 e6b919c8 d200ae13 aa37aed1 dae8f06c d9719db5 a13eef9f ab17a66f 1745973e d31b80cc 10fc27e7 159be2ad a507000d 016156c3 c3b5ddb 10102db9 39537bea 683e5d15 e0e0ec61 6cf1d16b d4afe744 c3ecca68 642121ec 21aae051 21c56dcc 6c776863 8f872cee 1f57015f c2a4bd5a 4f36ccfe 7a2e78c2 0b1bf0e5 f5fa01b8 27832fbf 07481df7 4d18113c
02161856 504e2d41 53413535 3235582e 63697363 6f2e6c6f 63616c30 1e170d31 32313231 37323234 3535355a 170d3232 31323135 32323435 35355a30 4f312430 22060355 0403131b 56504e2d 41534135 35323558 2d464f2e 63697363 6f2e6c6f 663616c 30820122 300d0609 2a86488 f70d0101 01050003 82010f00 3082010a 6663616c 3082010a 6663616c 62625590 02820101 00beb40a 3916c07f 0a5aca49 459f1ff0 fde118fd d1d31549 f412591e
53413535 3235582e 63697363 6f2e6c6f 63616c30 1e170d31 32313231 37323234 3535355a 170d3232 31323135 32323435 35355a30 4f312430 22060355 0403131b 56504e2d 41534135 35323558 2d464f2e 63697363 6f2e6c6f 63616c31 27302506 092a8648 86f70d01 09021618 56504e2d 41534135 35323558 2e636973 636f2e6c 6f63616c 30820122 300d0609 2a86488 f70d0101 01050003 82010f00 3082010a 02820101 00beb40a 3916c07f 0a5aca49 459f1ff0 fde118fd d1d31549 f412591e 33dad0fd 02820101 00beb40a 3916c07f 0a5aca49 459f1ff0 fde118fd d1d31549 f412591e 33dad0fd 02820101 0a6af382 6526318 510d1d0 e6b919c8 d200ae13 aa37aed1 04088f06c 0719db5 a13eef9f ab17a66f 1745973e d31b80cc 10fc27e7 159be2ad 3507000d 016156c3 c3b55ddb 10102db9 <td< td=""></td<>
32313231 37323234 3535355a 170d3232 31323135 32323435 3535530 4f312430 22060355 0403131b 56504e2d 41534135 35323558 2d464f2e 63697363 6f2e6c6f 63616c3 27302506 092a8648 86f70d01 09021618 56504e2d 41534135 35323558 2e636973 636f2e6c 6f63616c 30820122 300d0609 2a864886 f70d0101 01050003 82010f00 3082010a 02820101 00beb40a 3916c07f 0a5aca49 459f1ff0 fde118fd d1d31549 f412591e 33dad0fd c925e590 bd9fddb0 a47b488c fbcc0a82 45de2c1b ba6cb63c 12d49378 92a9ccae ca0abf55 510d1dd0 e6b919c8 d200ae13 aa37aed1 dae8f06c 049719db5 a13eef9f ab17a66f 1745973e d31b80cc 10fc27e7 159be2ad a507000d 016156c3 c3b5dddb 10102db9 39537bea 683e5d15 e0e0ec61 6cf1d16b d4afe744 c3ecca68 642121ec 21aae051 21
3535355a 170d3232 31323135 32323435 35355a30 4f312430 22060355 0403131b 56504e2d 41534135 35323558 2d464f2e 63697363 6f2e6c6f 63616c31 27302506 092a8648 86f70d01 09021618 56504e2d 41534135 35323558 2e636973 636f2e6c 6f63616c 30820122 300d0609 2a864886 f70d0101 01050003 82010f00 3082010a 02820101 00beb40a 3916c07f 0a5aca49 459f1f0 fde118fd d1d31549 f412591e 3dad0fd c925e590 bd9fddb0 a47b488c fbcc0a82 45de2c1b ba6cb63c 12d49378 9aaaf382 9aaaf382 9aaaf382 b2568518 fa3b0f46 74d9c973 ec60b78a 92a9ccae ca0abf55 510d1dd0 e6b919c8 d200ae13 aa37aed1
22060355 0403131b 56504e2d 41534135 35323558 2d464f2e 63697363 6f2e6c6f 092a8648 86f70d01 09021618 56504e2d 41534135 35323558 2e636973 636f2e6c 6f63616c 30820122 300d0609 2a864886 f70d0101 01050003 82010f00 3082010a 02820101 00beb40a 3916c07f 0a5aca49 459f1ff0 fde118fd d1d31549 f412591e 33dad0fd 2925e590 bd9fddb0 a47b488c fbcc0a82 45de2c1b ba6cb63c 12d49378 9252c314 6de55cba a719c6cb c0718ad5 b3c1fa3f 9aaaf382 b2568518 fa3b0f46 74d9c973 e60b78a 92a9ccae ca0abf55 510d1d0 e6b919c8 d200ae13 aa37aed1 dae8f06c d9719db5 a13eef9f ab17a66f 1745973e d31b80cc 10fc27e7 159be2ad
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30168014 2836731d
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16be77e3 907c3543 cb6fcfbe ba47d730 0d06092a 864886f7 0d010105 05000382 0101001f 5a3e2fcc c384ca51 7519a55b 15d16c77 9a23ed00 72fba6fa ce0251dc 274e59e8 664c0119 c42ae064 1956a610 a9f08787 3df62168 cdd9ac8a 968f69d3 ebd48f27 c1ede1f6 63169317 bf070a22 f321d4b9 b6157593 59cb71cb bf8492fe ff8f8072 defb92eb 5d50b97c 24fd0c60 cd6ad778 afa18e73 b824b132 11970758 e0a8b8f9 75b0a458 90bdefdb 324a6eb0 547a703c 0eb1d205 26f894db 02632a6d 5b6c534b 77344868 10b4c4c3 811c073e e0193ddf bfcb3e0d 8eae3e4c 10d0a269 6f500e65 fbf99d3b 5f06061f 241a1679 4fb0cb00 f07a01da 930a4636 959afbfd 27e01065 d3730911 08eb3c6b c7494ff5 df273d77 adc52e75 79dd62a6 67d77785 e88d11 quit crypto ikev1 enable outside-16 crypto ikev1 policy 10 authentication crack encryption aes-256 hash sha group 2 lifetime 86400 crypto ikev1 policy 20 authentication rsa-sig encryption aes-256 hash sha group 2 lifetime 86400 crypto ikev1 policy 30 authentication pre-share encryption aes-256 hash sha

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group-policy GroupPolicy AnyConnect internal L track 1 rtr 16 reachability group-policy GroupPolicy AnyConnect attributes telnet timeout 5 wins-server none ssh 10.4.48.0 255.255.255.0 inside dns-server value 10.4.48.10 ssh timeout 5 vpn-tunnel-protocol ssl-client ssh version 2 default-domain value cisco.local console timeout 0 group-policy GroupPolicy Partner internal group-policy GroupPolicy Partner attributes threat-detection basic-threat threat-detection statistics access-list banner value Group "vpn-partner" allows for access control list no threat-detection statistics tcp-intercept (ACL) restricted access with a tunnel all policy. ntp server 10.4.48.17 vpn-filter value RA PartnerACL ssl encryption aes256-shal aes128-shal 3des-shal webvpn ssl trust-point VPN-ASA5525X-FO-Trustpoint outside-17 anyconnect profiles value RA-Profile type user ssl trust-point VPN-ASA5525X-Trustpoint outside-16 group-policy GroupPolicy Administrator internal webvpn group-policy GroupPolicy Administrator attributes enable outside-16 banner value Group "vpn-administrator" allows for unrestricted enable outside-17 access with a split tunnel policy. anyconnect-essentials split-tunnel-policy tunnelspecified anyconnect image disk0:/anyconnect-win-3.1.00495-k9.pkg 1 split-tunnel-network-list value RA SplitTunnelACL anyconnect image disk0:/anyconnect-macosx-i386-3.1.00495-k9.pkg 2 webvpn anyconnect image disk0:/anyconnect-linux-3.1.00495-k9.pkg 3 anyconnect profiles value RA-Profile type user anyconnect profiles RA-Profile disk0:/ra-profile.xml username admin password 7KKG/zg/Wo8c.YfN encrypted privilege 15 tunnel-group AnyConnect type remote-access anyconnect enable tunnel-group-list enable tunnel-group AnyConnect general-attributes group-policy GroupPolicy Employee internal address-pool RA-pool group-policy GroupPolicy Employee attributes authentication-server-group AAA-RADIUS banner value Group "vpn-employee" allows for unrestricted access default-group-policy GroupPolicy AnyConnect with a tunnel all policy. password-management vpn-filter value Block Trusted Host tunnel-group AnyConnect webvpn-attributes split-tunnel-policy excludespecified group-alias AnyConnect enable split-tunnel-network-list value CWS Tower Exclude group-url https://172.16.130.122/AnyConnect enable webvpn group-url https://172.17.130.122/AnyConnect enable anyconnect modules value websecurity anyconnect profiles value RA-Profile type user class-map inspection default anyconnect profiles value RA-WebSecurityProfile.wso type match default-inspection-traffic websecurity 1 always-on-vpn profile-setting T

policy-map type inspect dns preset dns map Notes 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 : end

Appendix C: Changes

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

- We updated the Cisco ASA firewall software to 9.0(1) with ASDM 7.0(2)
- We updated various screenshots to reflect the new software versions.
- We made minor updates to improve the usability of the guide.



Feedback

Please use the feedback form to send comments and suggestions about this guide.



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