

10.3.1.1 Lab – Configure Clientless Remote Access SSL VPNs Using ASA 5505 ASDM Answers

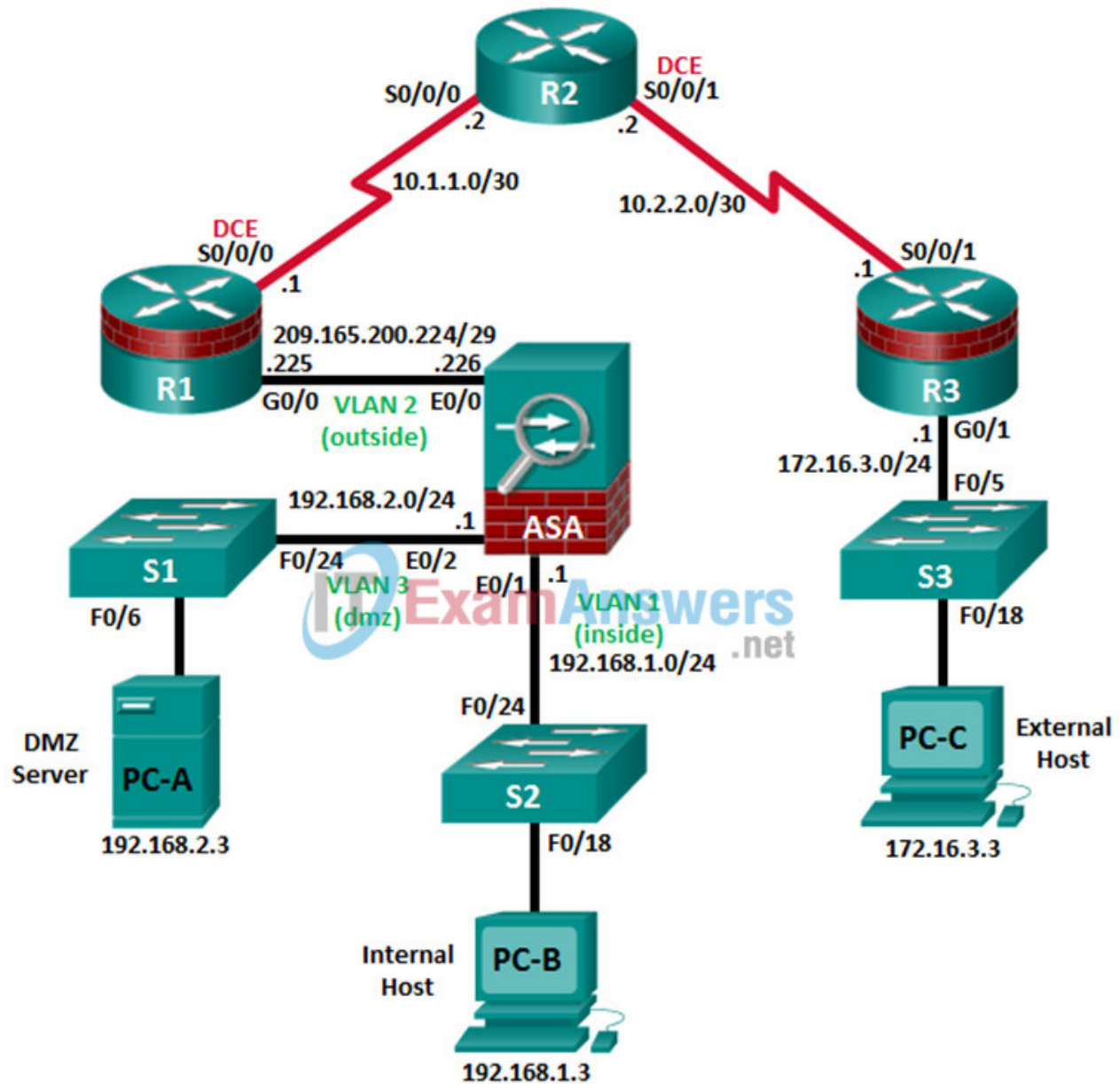
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June 7, 2022

10.3.1.1 Lab – Configure Clientless Remote Access SSL VPNs Using ASA 5505 ASDM (Instructor Version)

Instructor Note: Red font color or Gray highlights indicate text that appears in the instructor copy only.

Topology



Note: ISR G1 devices use FastEthernet interfaces instead of GigabitEthernet Interfaces.

IP Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway	Switch Port
R1	G0/0	209.165.200.225	255.255.255.248	N/A	ASA E0/0
	S0/0/0 (DCE)	10.1.1.1	255.255.255.252	N/A	N/A
R2	S0/0/0	10.1.1.2	255.255.255.252	N/A	N/A

Device	Interface	IP Address	Subnet Mask	Default Gateway	Switch Port
R3	S0/0/1 (DCE)	10.2.2.2	255.255.255.252	N/A	N/A
	G0/1	172.16.3.1	255.255.255.0	N/A	S3 F0/5
	S0/0/1	10.2.2.1	255.255.255.252	N/A	N/A
ASA	VLAN 1 (E0/1)	192.168.1.1	255.255.255.0	NA	S2 F0/24
	VLAN 2 (E0/0)	209.165.200.226	255.255.255.248	NA	R1 G0/0
	VLAN 3 (E0/2)	192.168.2.1	255.255.255.0	NA	S1 F0/24
PC-A	NIC	192.168.2.3	255.255.255.0	192.168.2.1	S1 F0/6
PC-B	NIC	192.168.1.3	255.255.255.0	192.168.1.1	S2 F0/18
PC-C	NIC	172.16.3.3	255.255.255.0	172.16.3.1	S3 F0/18

Objectives

Part 1: Basic Router/Switch/PC Configuration

- Cable the network and clear previous device settings, as shown in the topology.
- Configure basic settings for routers.
- Configure PC host IP settings.
- Verify connectivity.
- Save the basic running configuration for each router and switch.

Part 2: Access the ASA Console and ASDM

- Access the ASA console.
- Clear the previous ASA configuration settings.
- Bypass Setup mode.
- Configure the ASA by using the CLI script.
- Access ASDM.

Part 3: Configuring Clientless SSL VPN Remote Access Using ASDM

- Start the VPN wizard.
- Configure the SSL VPN user interface.
- Configure AAA user authentication.

- Configure the VPN group policy.
- Configure a bookmark list (clientless connections only).
- Review the configuration summary and deliver the commands to the ASA.
- Verify the ASDM SSL VPN connection profile.
- Verify VPN access from the remote host.
- Access the web portal page.
- View the clientless remote user session using the ASDM Monitor.

Background / Scenario

In addition to stateful firewall and other security features, the ASA can provide both site-to-site and remote access VPN functionality. The ASA provides two main deployment modes that are found in Cisco SSL remote access VPN solutions:

- **Clientless SSL VPN**—Clientless, browser-based VPN that lets users establish a secure, remote-access VPN tunnel to the ASA using a web browser and built-in SSL to protect VPN traffic. After authentication, users are presented with a portal page and can access specific, predefined internal resources from the portal.
- **Client-Based SSL VPN**—Provides full-tunnel SSL VPN connection, but requires a VPN client application to be installed on the remote host. After authentication, users can access any internal resource as if they were physically on the local network. The ASA supports both SSL and IPsec client-based VPNs.

In Part 1 of this lab, you will configure the topology and non-ASA devices. In Part 2, you will prepare the ASA for ASDM access. In Part 3, you will use the ASDM VPN wizard to configure a clientless SSL remote access VPN and verify access using a remote PC with a browser.

Your company has two locations connected to an ISP. Router R1 represents a CPE device managed by the ISP. Router R2 represents an intermediate Internet router. Router R3 connects users at the remote branch office to the ISP. The ASA is an edge security device that connects the internal corporate network and DMZ to the ISP while providing NAT services to inside hosts.

Management has asked you to provide VPN access, using the ASA as a VPN concentrator, to teleworkers. They want you to test the clientless access model, using SSL and a browser for client access.

Note: The router commands and output in this lab are from a Cisco 1941 router with Cisco IOS Release 15.4(3)M2 (with a Security Technology Package license). Other routers and Cisco IOS versions can be used. See the Router Interface Summary Table at the end of the lab to determine which interface identifiers to use based on the equipment in the lab. Depending on the router model and Cisco IOS version, the commands available and output produced might vary from what is shown in this lab.

The ASA used with this lab is a Cisco model 5505 with an 8-port integrated switch, running OS version 9.2(3) and ASDM version 7.4(1) and comes with a Base license that allows a maximum of three VLANs.

Note: Before beginning, ensure that the routers and switches have been erased and have no startup configurations.

Instructor Note: Instructions for erasing switches and routers are provided in Chapter 0.0.0.0.

Required Resources

- 1 ASA 5505 (OS version 9.2(3) and ASDM version 7.4(1) and Base license or comparable)
- 3 routers (Cisco 1941 with Cisco IOS Release 15.4(3)M2 image with a Security Technology package license)
- 3 switches (Cisco 2960 or comparable) (not required)
- 3 PCs (Windows 7 or Windows 8.1, with SSH Client software installed)
- Serial and Ethernet cables, as shown in the topology
- Console cables to configure Cisco networking devices

Part 1: Basic Router/Switch/PC Configuration

In Part 1, you will set up the network topology and configure basic settings on the routers such as interface IP addresses and static routing.

Note: Do not configure any ASA settings at this time.

Step 1: Cable the network and clear previous device settings.

Attach the devices shown in the topology diagram and cable as necessary. Ensure that the routers and switches have been erased and have no startup configurations.

Step 2: Configure R1 using the CLI script.

In this step, you will use the following CLI script to configure basic settings on R1. Copy and paste the basic configuration script commands listed below. Observe the messages as the commands are applied to ensure that there are no warnings or errors.

Note: Depending on the router model, interfaces might be numbered differently than those listed. You might need to alter the designations accordingly.

Note: Passwords in this task are set to a minimum of 10 characters but are relatively simple for the benefit of performing the lab. More complex passwords are recommended in a production network.

```

hostname R1
security passwords min-length 10
enable algorithm-type scrypt secret cisco12345
username admin01 algorithm-type scrypt secret admin01pass
ip domain name ccnasecurity.com
line con 0
  login local
  exec-timeout 5 0
  logging synchronous
exit
line vty 0 4
  login local
  transport input ssh
  exec-timeout 5 0
  logging synchronous
exit
interface gigabitethernet 0/0
  ip address 209.165.200.225 255.255.255.248
  no shut
exit
int serial 0/0/0
  ip address 10.1.1.1 255.255.255.252
  clock rate 2000000
  no shut
exit
ip route 0.0.0.0 0.0.0.0 Serial0/0/0
crypto key generate rsa general-keys modulus 1024

```

Step 3: Configure R2 using the CLI script.

In this step, you will use the following CLI script to configure basic settings on R2. Copy and paste the basic configuration script commands listed below. Observe the messages as the commands are applied to ensure that there are no warnings or errors.

```
hostname R2
security passwords min-length 10
enable algorithm-type scrypt secret cisco12345
username admin01 algorithm-type scrypt secret admin01pass
ip domain name ccnasecurity.com
line con 0
  login local
  exec-timeout 5 0
  logging synchronous
exit
line vty 0 4
  login local
  transport input ssh
  exec-timeout 5 0
  logging synchronous
exit
interface serial 0/0/0
  ip address 10.1.1.2 255.255.255.252
  no shut
exit
interface serial 0/0/1
  ip address 10.2.2.2 255.255.255.252
  clock rate 2000000
  no shut
exit
ip route 209.165.200.224 255.255.255.248 Serial0/0/0
ip route 172.16.3.0 255.255.255.0 Serial0/0/1
crypto key generate rsa general-keys modulus 1024
```

Step 4: Configure R3 using the CLI script.

In this step, you will use the following CLI script to configure basic settings on R3. Copy and paste the basic configuration script commands listed below. Observe the messages as the commands are applied to ensure that there are no warnings or errors.

```

hostname R3
security passwords min-length 10
enable algorithm-type scrypt secret cisco12345
username admin01 algorithm-type scrypt secret admin01pass
ip domain name ccnasecurity.com
line con 0
  login local
  exec-timeout 5 0
  logging synchronous
exit
line vty 0 4
  login local
  transport input
  exec-timeout 5 0
  logging synchronous
exit
interface gigabitethernet 0/1
  ip address 172.16.3.1 255.255.255.0
  no shut
exit
int serial 0/0/1
  ip address 10.2.2.1 255.255.255.252
  no shut
exit
ip route 0.0.0.0 0.0.0.0 Serial0/0/1
crypto key generate rsa general-keys modulus 1024

```

Step 5: Configure PC host IP settings.

Configure a static IP address, subnet mask, and default gateway for PC-A, PC-B, and PC-C as shown in the IP Addressing table.

Step 6: Verify connectivity.

Because the ASA is the focal point for the network zones and it has not yet been configured, there will be no connectivity between devices that are connected to it. However, PC-C should be able to ping the R1 interface Go/o. From PC-C, ping the R1 Go/o IP address (209.165.200.225). If these pings are unsuccessful, troubleshoot the basic device configurations before continuing.

Note: If you can ping from PC-C to R1 Go/o and So/o/o, you have demonstrated that static routing is configured and functioning correctly.

Step 7: Save the basic running configuration for each router and switch.

Part 2: Accessing the ASA Console and ASDM

Step 1: Clear the previous ASA configuration settings.

- a. Use the write erase command to remove the startup-config file from flash memory.

Note: The erase startup-config IOS command is not supported on the ASA.

- b. Use the reload command to restart the ASA. This causes the ASA to display in CLI Setup mode. If you see the System config has been modified. Save? [Y]es/[N]o: message, type n, and press Enter.

Step 2: Bypass Setup mode.

When the ASA completes the reload process, it should detect that the startup configuration file is missing and go into Setup mode. If it does not come up in this mode, repeat Step 2.

- a. When prompted to preconfigure the firewall through interactive prompts (Setup mode), respond with no.
- b. Enter privileged EXEC mode with the enable command. The password should be kept blank (no password).

Step 3: Configure the ASA by using the CLI script.

In this step, you will use a CLI script to configure basic settings, the firewall and DMZ.

- a. Other than the defaults that the ASA automatically inserts use the show run command to confirm that there is no previous configuration in the ASA.
- b. Enter global configuration mode. When prompted to enable anonymous call-home reporting, respond no.
- c. Copy and paste the Pre-VPN Configuration Script commands listed below at the ASA global configuration mode prompt to start configuring the SSL VPNs.

Observe the messages as the commands are applied to ensure that there are no warnings or errors. If prompted to replace the RSA key pair, respond yes.

```

hostname CCNAS-ASA
domain-name ccnasecurity.com
enable password cisco12345
interface Ethernet0/0
    switchport access vlan 2
    no shut
interface Ethernet0/1
    switchport access vlan 1
    no shut
interface Ethernet0/2
    switchport access vlan 3
    no shut
interface Vlan1
    nameif inside
    security-level 100
    ip address 192.168.1.1 255.255.255.0
interface Vlan2
    nameif outside
    security-level 0
    ip address 209.165.200.226 255.255.255.248
interface Vlan3
    no forward interface Vlan1
    nameif dmz
    security-level 70
    ip address 192.168.2.1 255.255.255.0
object network inside-net
    subnet 192.168.1.0 255.255.255.0
object network dmz-server
    host 192.168.2.3
access-list OUTSIDE-DMZ extended permit ip any host 192.168.2.3
object network inside-net
    nat (inside,outside) dynamic interface
object network dmz-server
    nat (dmz,outside) static 209.165.200.227
access-group OUTSIDE-DMZ in interface outside
route outside 0.0.0.0 0.0.0.0 209.165.200.225 1
username admin01 password admin01pass
aaa authentication telnet console LOCAL
aaa authentication ssh console LOCAL
aaa authentication http console LOCAL
http server enable
http 192.168.1.0 255.255.255.0 inside
ssh 192.168.1.0 255.255.255.0 inside
telnet 192.168.1.0 255.255.255.0 inside
telnet timeout 10
ssh timeout 10
class-map inspection_default
    match default-inspection-traffic
policy-map global_policy
    class inspection_default
        inspect icmp
crypto key generate rsa modulus 1024

```

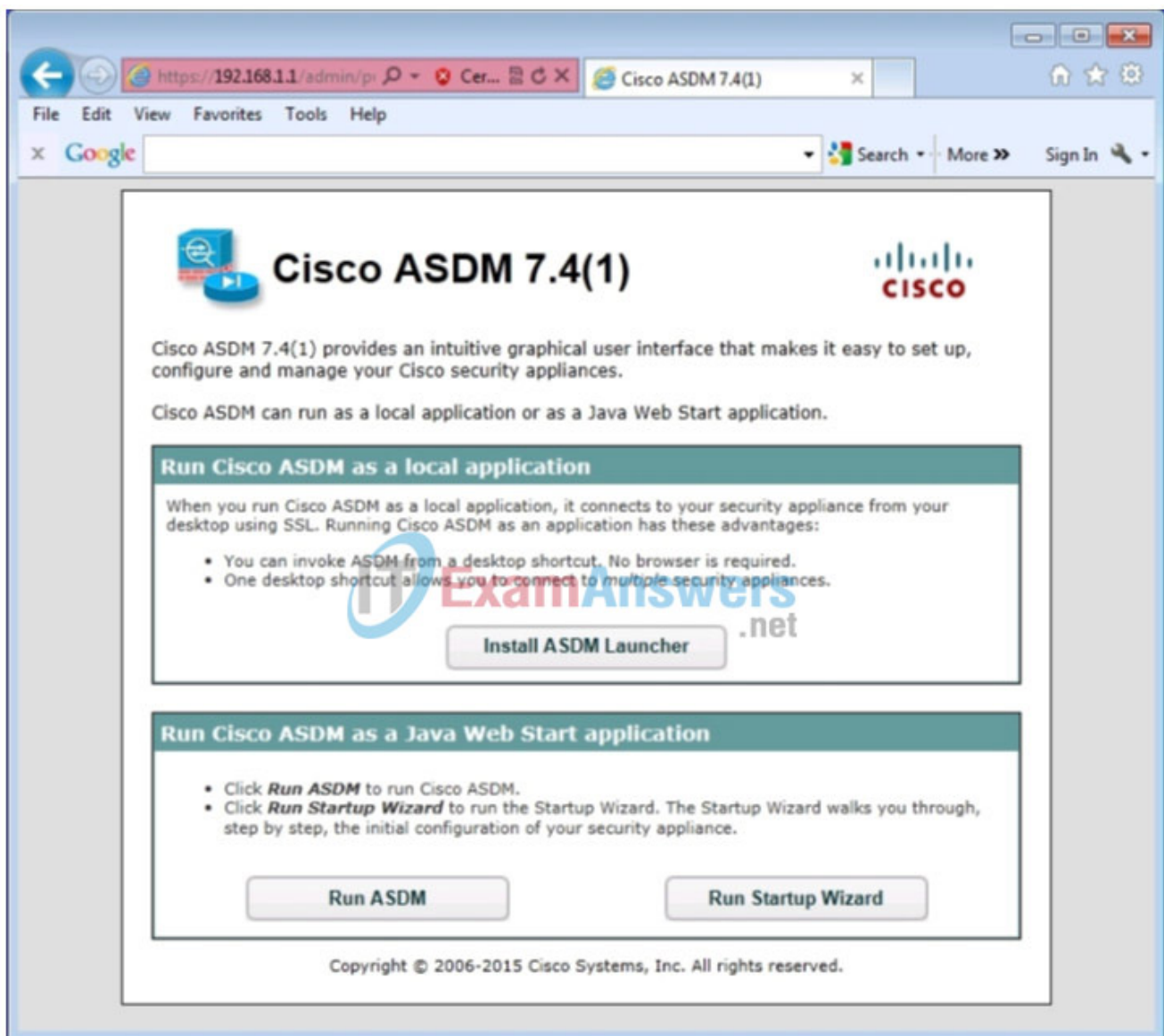
d. At the privileged EXEC mode prompt, issue the write mem (or copy run start) command to save the running configuration to the startup configuration and the RSA keys to non-volatile memory.

Step 4: Access ASDM.

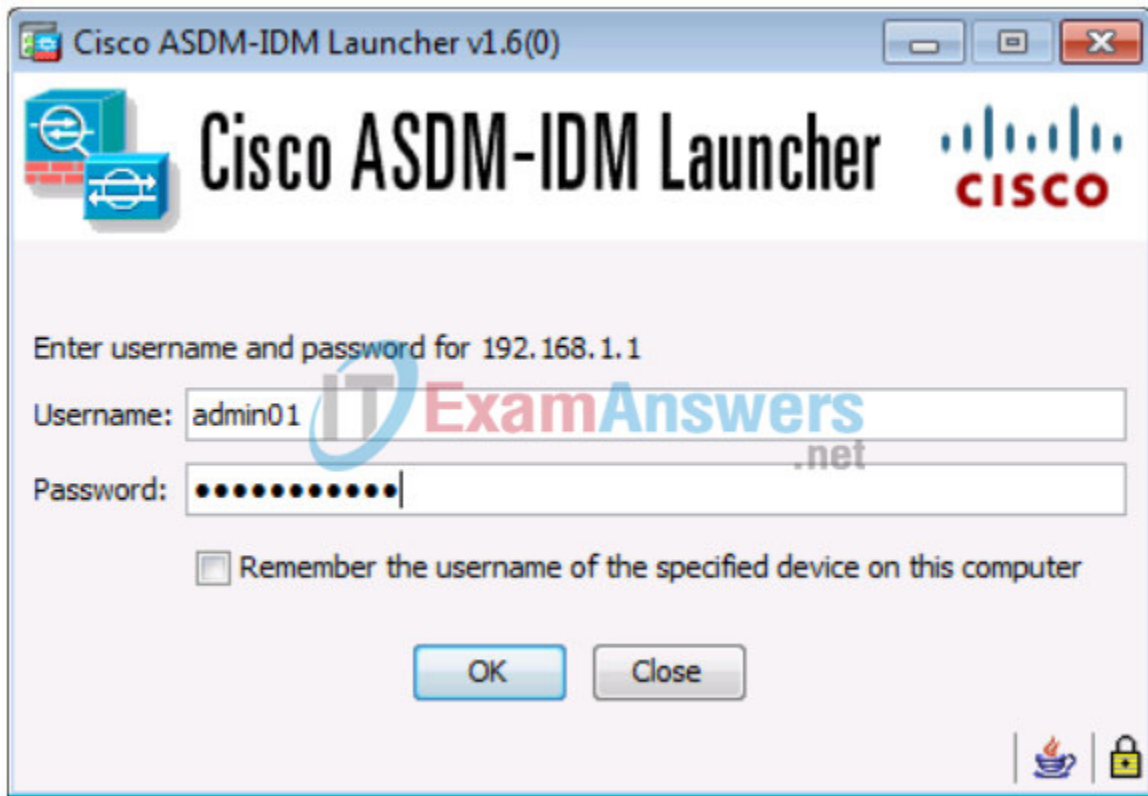
a. Open a browser on PC-B and test the HTTPS access to the ASA by entering https://192.168.1.1. After entering the https://192.168.1.1 URL, you should see a security warning about the website security certificate. Click Continue to this website. Click Yes for any other security warnings.

Note: Specify the HTTPS protocol in the URL.

b. At the ASDM welcome page, click Run ASDM. The ASDM-IDM Launcher will display.



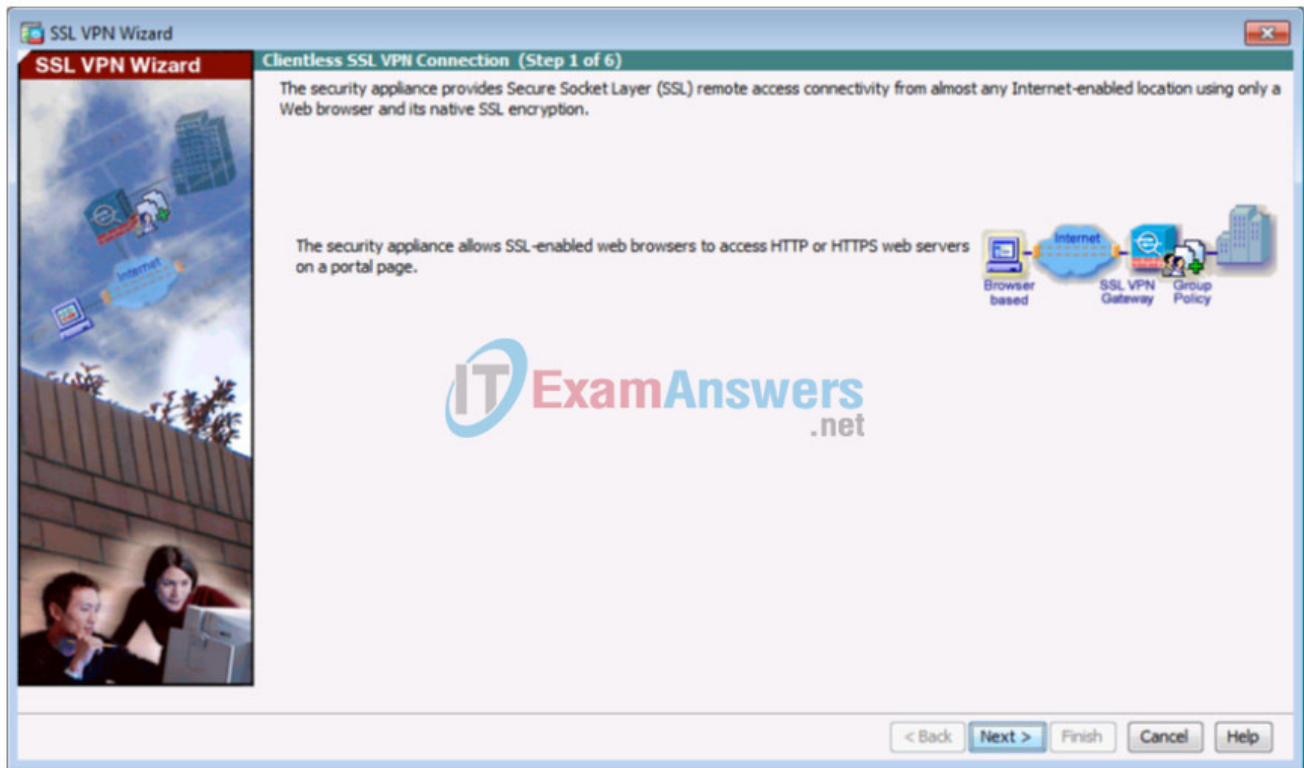
c. Log in as user admin01 with password admin01pass.



Part 3: Configuring Clientless SSL VPN Remote Access Using ASDM

Step 1: Start the VPN wizard.

- a. On the ASDM main menu, click Wizards > VPN Wizards > Clientless SSL VPN wizard. The SSL VPN wizard Clientless SSL VPN Connection screen displays.



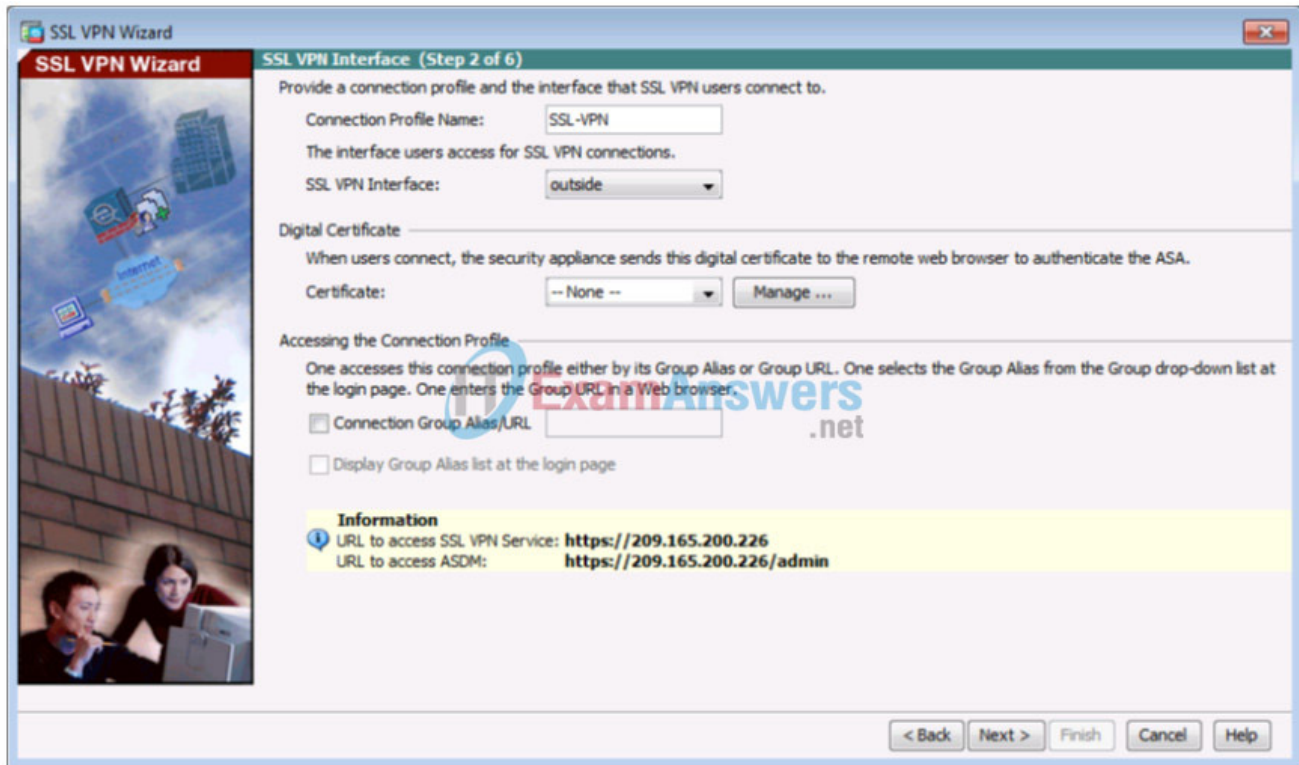
b. Review the on-screen text and topology diagram, and then click Next to continue.

Step 2: Configure the SSL VPN user interface.

a. On the SSL VPN Interface screen, configure SSL-VPN as the Connection Profile Name, and specify outside as the interface to which outside users will connect.

Note: By default, the ASA uses a self-signed certificate to send to the client for authentication. Optionally, the ASA may be configured to use a third-party certificate that is purchased from a well-known certificate authority, such as VeriSign, to connect clients. In the event that a certificate is purchased, it may be selected in the Digital Certificate drop-down menu.

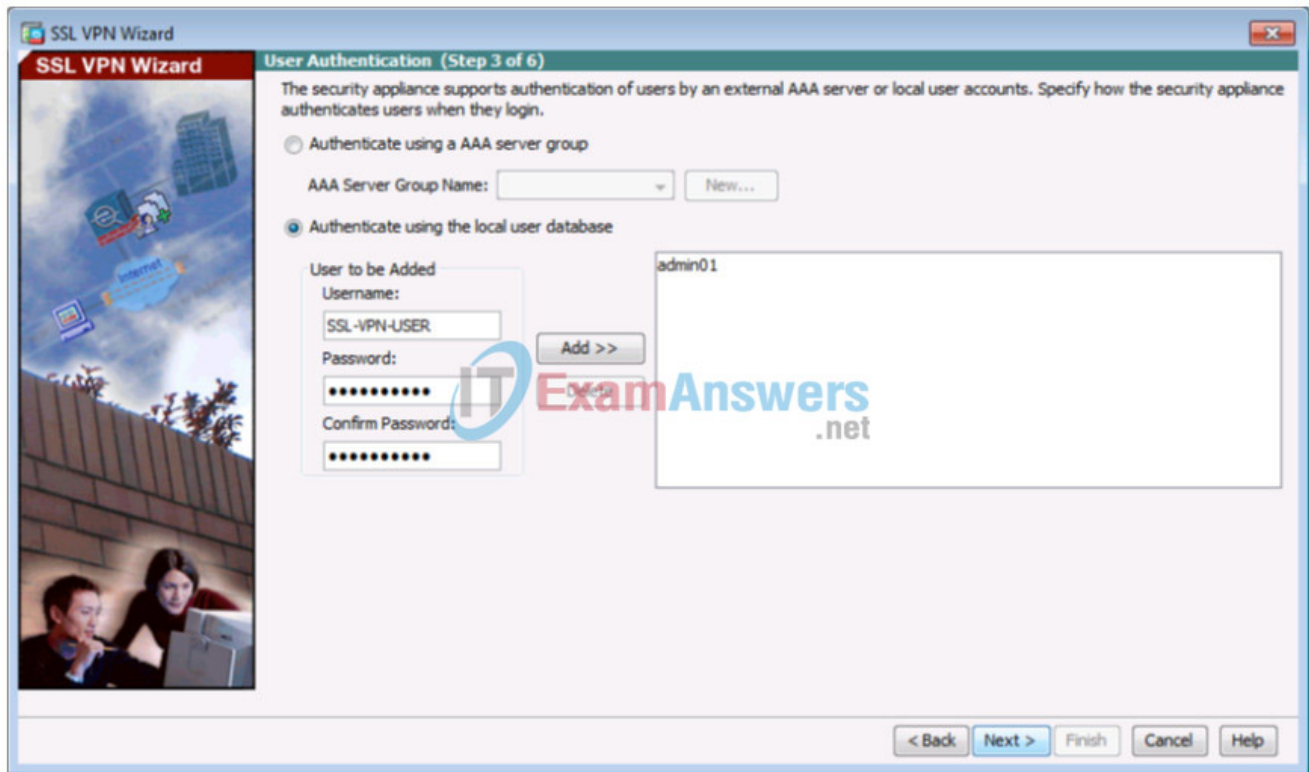
The SSL VPN Interface screen provides links in the Information section. These links identify the URLs that need to be used for the SSL VPN service access (log in) and for Cisco ASDM access (to access the Cisco ASDM software).



b. Click Next to continue.

Step 3: Configure AAA user authentication.

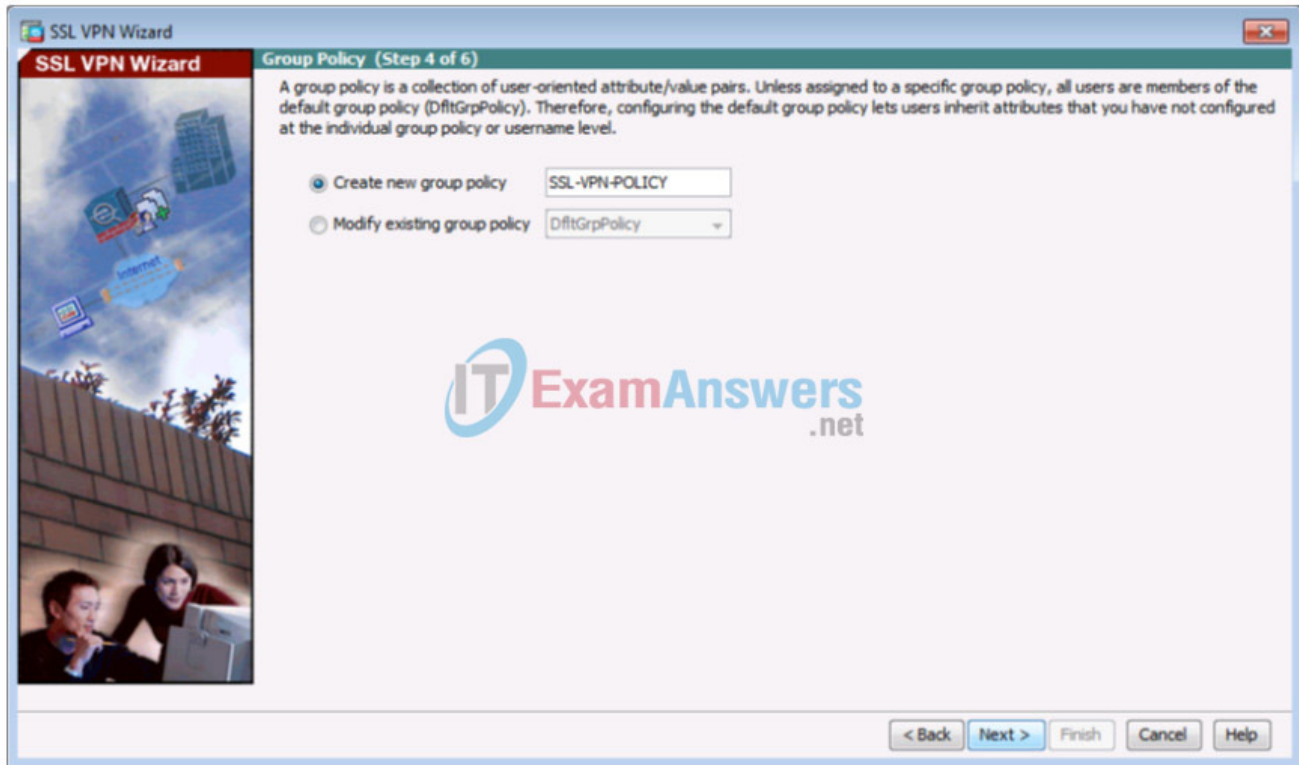
- On the User Authentication screen, click Authenticate using the local user database.
- Enter the user name SSL-VPN-USER with password cisco12345.
- Click Add to create the new user and click Next to continue.



Step 4: Configure the VPN group policy.

a. On the Group Policy screen, create a new group policy named SSL-VPN-POLICY. (When configuring a new policy, the policy name cannot contain any spaces.)

Note: By default, the created user group policy inherits its settings from the DfltGrpPolicy. These settings may be modified after the wizard has been completed by navigating to the Configuration > Remote Access VPN > Clientless SSL VPN Access > Group Policies submenu.



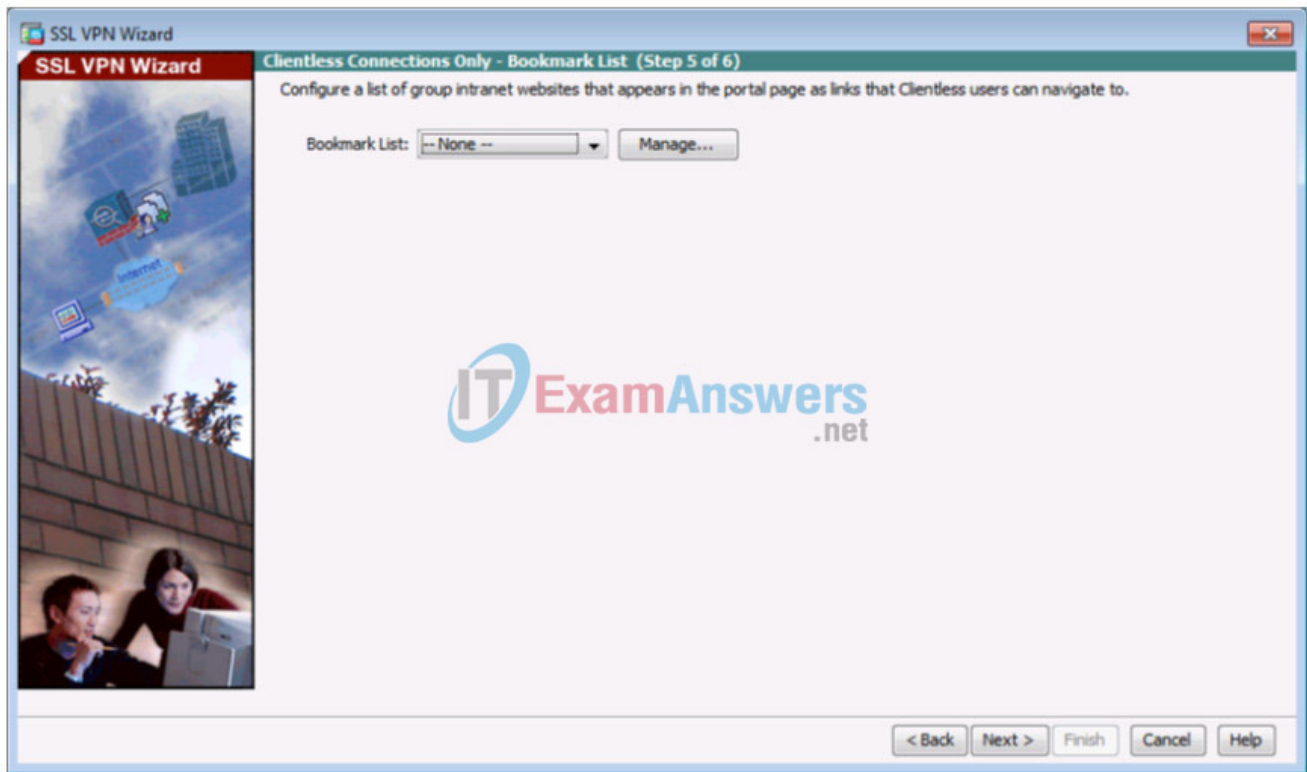
b. Click Next to continue.

Step 5: Configure the bookmark list (clientless connections only).

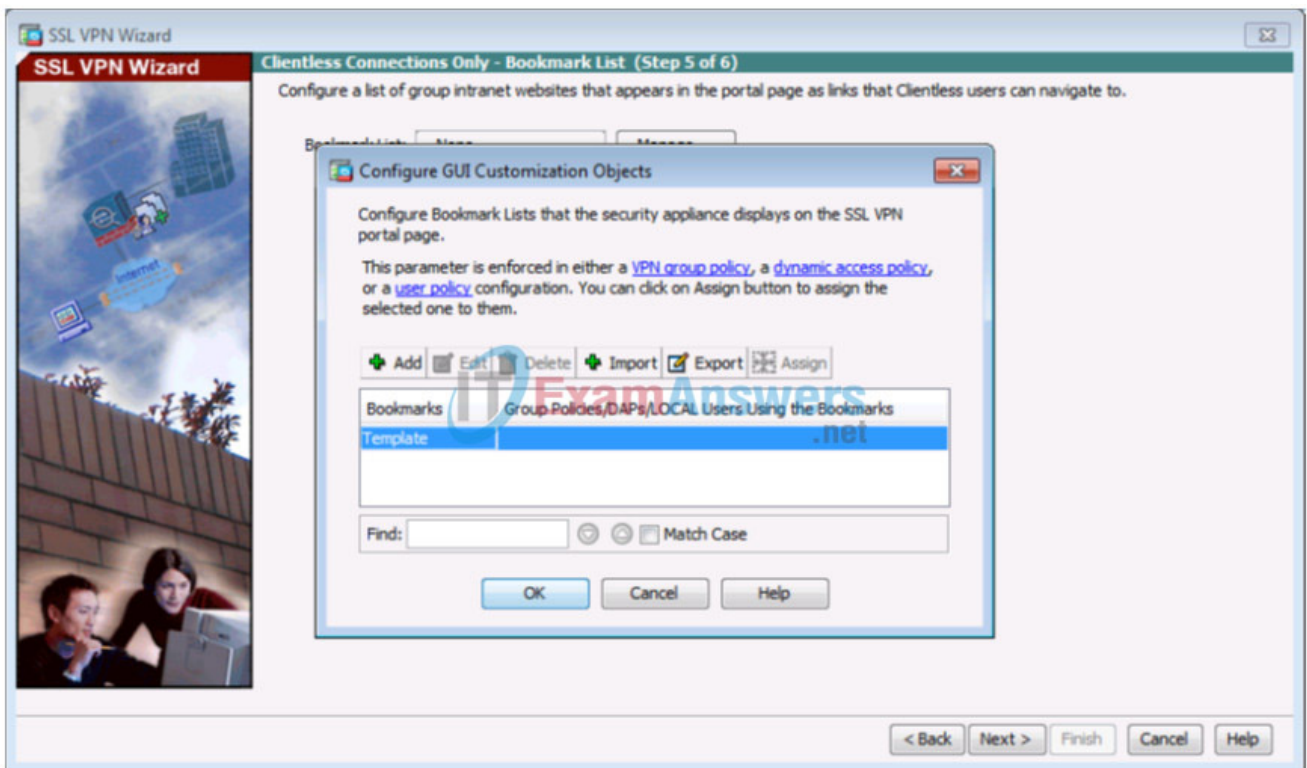
A bookmark list is a set of URLs configured to be used in the clientless SSL VPN web portal. If there are bookmarks already listed, use the Bookmark List drop-down list, select the bookmark of choice, and click Next to continue with the SSL VPN wizard.

Note: There are no configured bookmark lists by default and, therefore, they must be configured by the network administrator.

a. On the Clientless Connections Only – Bookmark List screen, click Manage to create an HTTP server bookmark in the bookmark list.

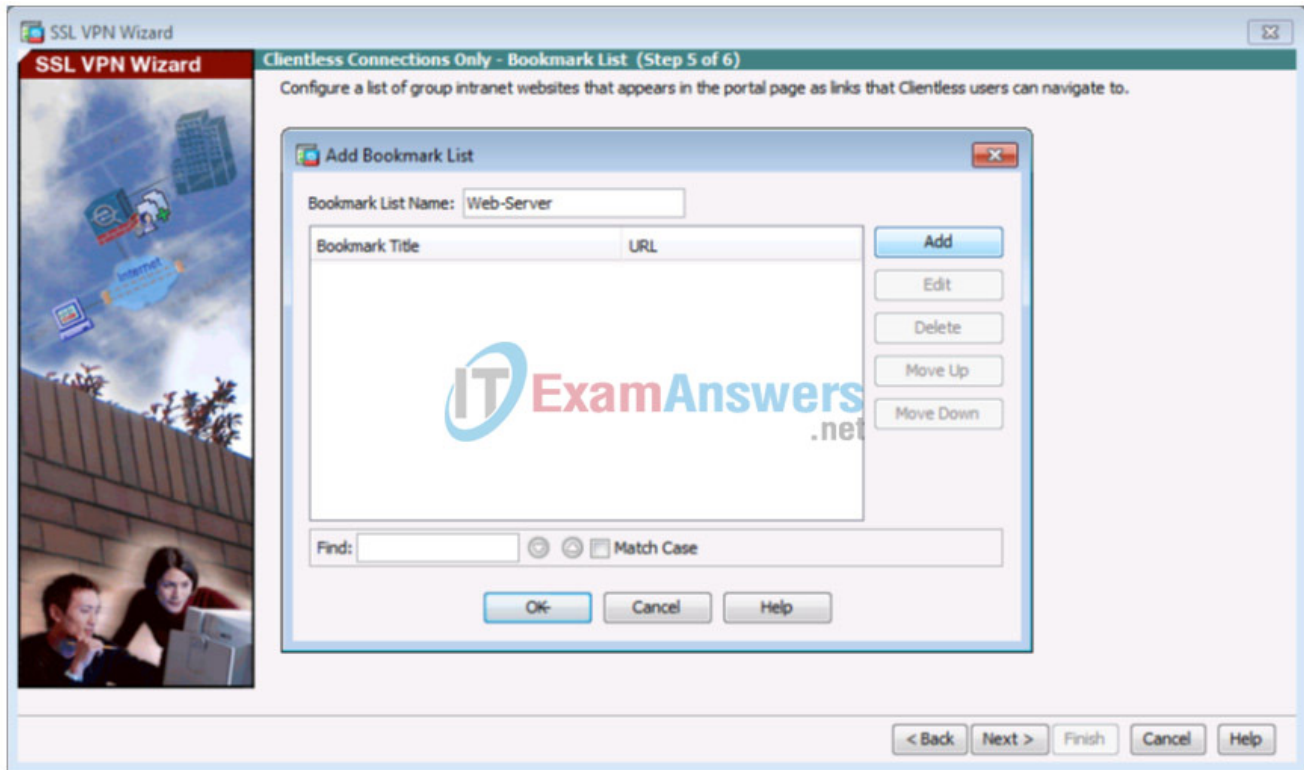


b. In the Configure GUI Customization Objects window, click Add to open the Add Bookmark List window. Name the list Web-Server.

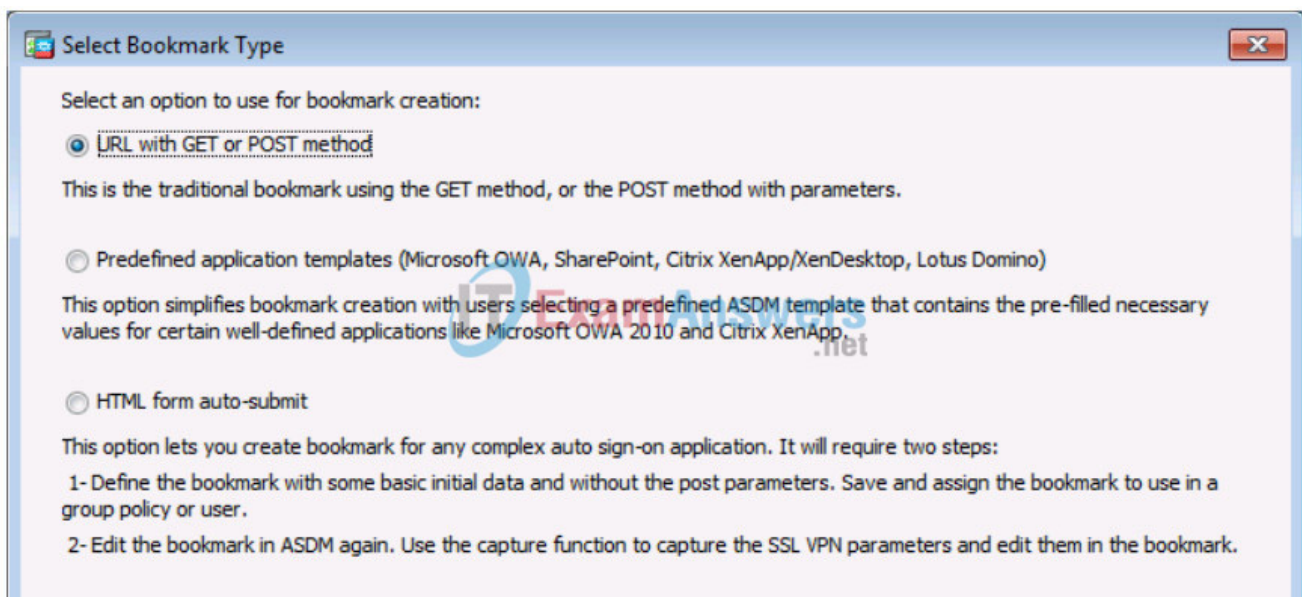


Note: If the Web-Server bookmark list is shown as available from a previous configuration, you can delete it in ASDM and re-create it.

c. In the Add Bookmark List window, click Add to open the Select Bookmark Type window.



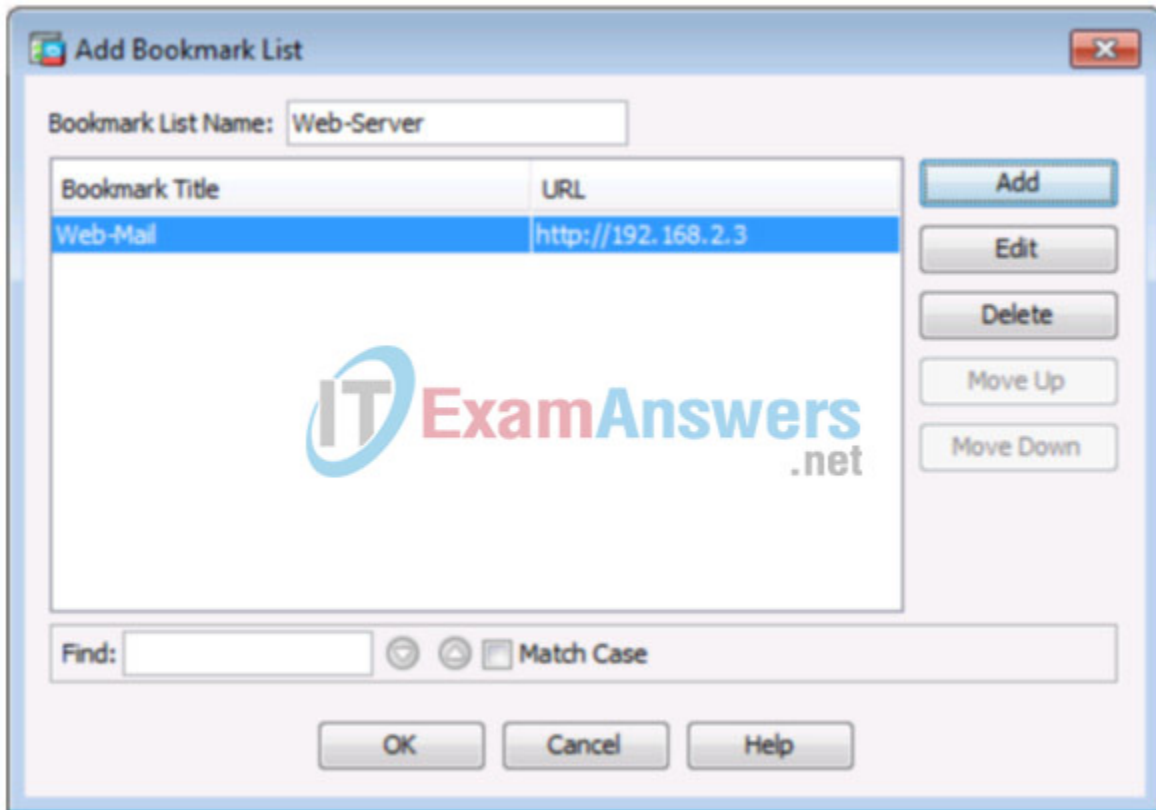
d. As shown in the figure, the ASDM can create three types of bookmarks. Select the URL with GET or POST method, click OK.



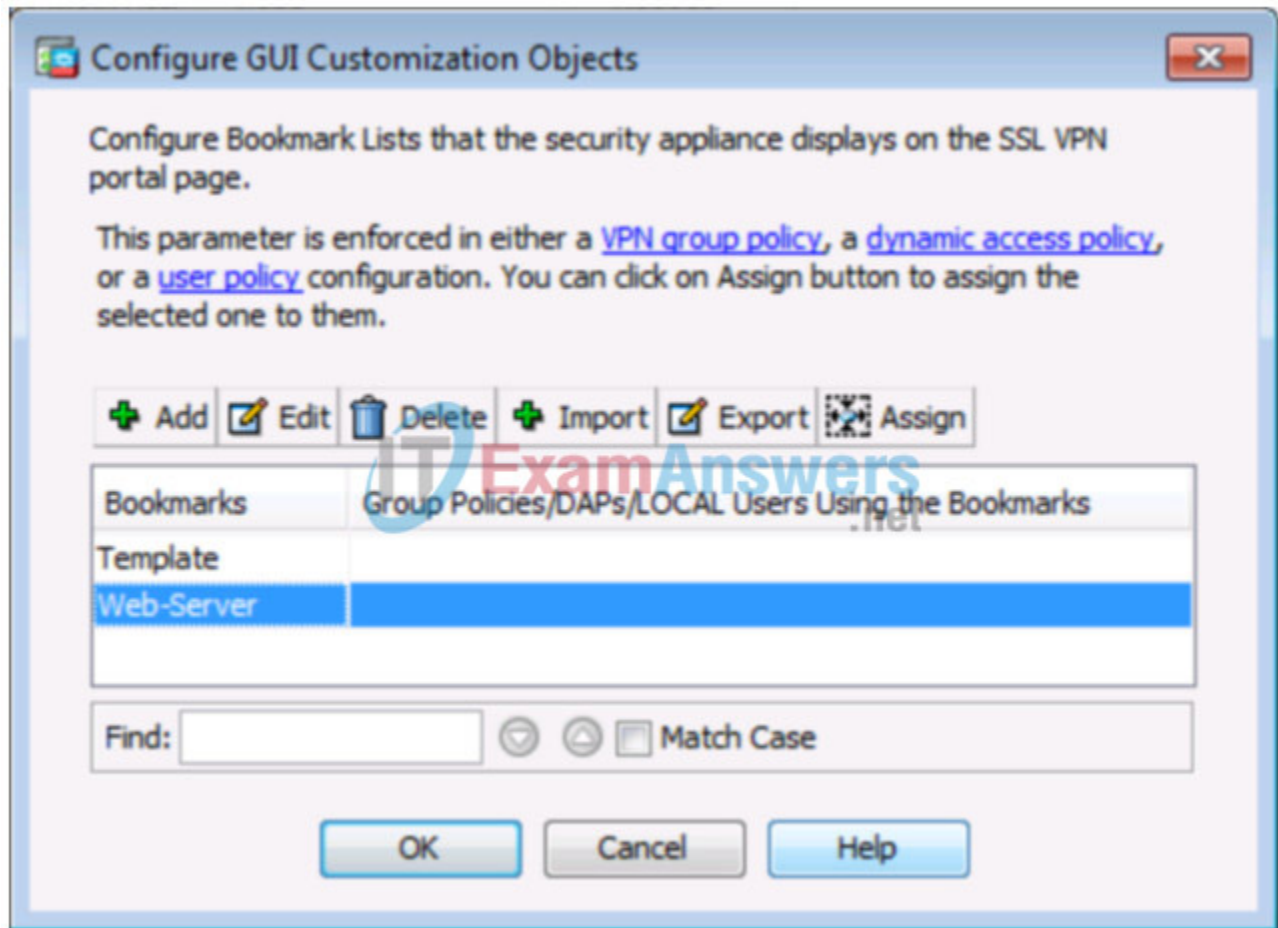
e. Enter the bookmark title and enter the server destination IP address or hostname as the URL to be used with the bookmark entry. In this example, the Bookmark Title of Web-Mail is entered and an internal IP address of 192.168.2.3 (the DMZ server) is specified. If this server has HTTP web services with web mail installed and functional, the outside users are able to access the server from the ASA portal when they connect.

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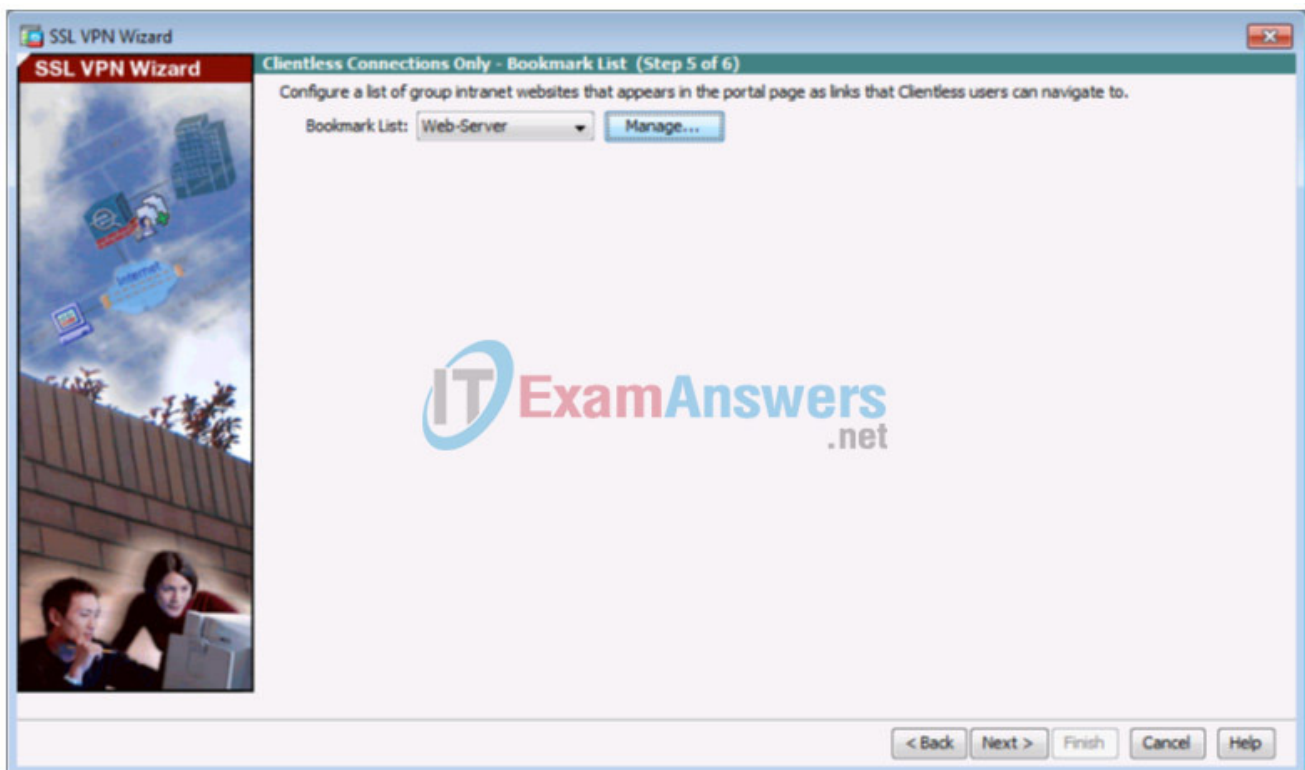
f. Click OK to continue and return to the Add Bookmark List window which now displays the Web-Server bookmark title and URL.



g. Click OK to continue and return to the Configure GUI Customization Objects window which now displays the Web-Server bookmark.

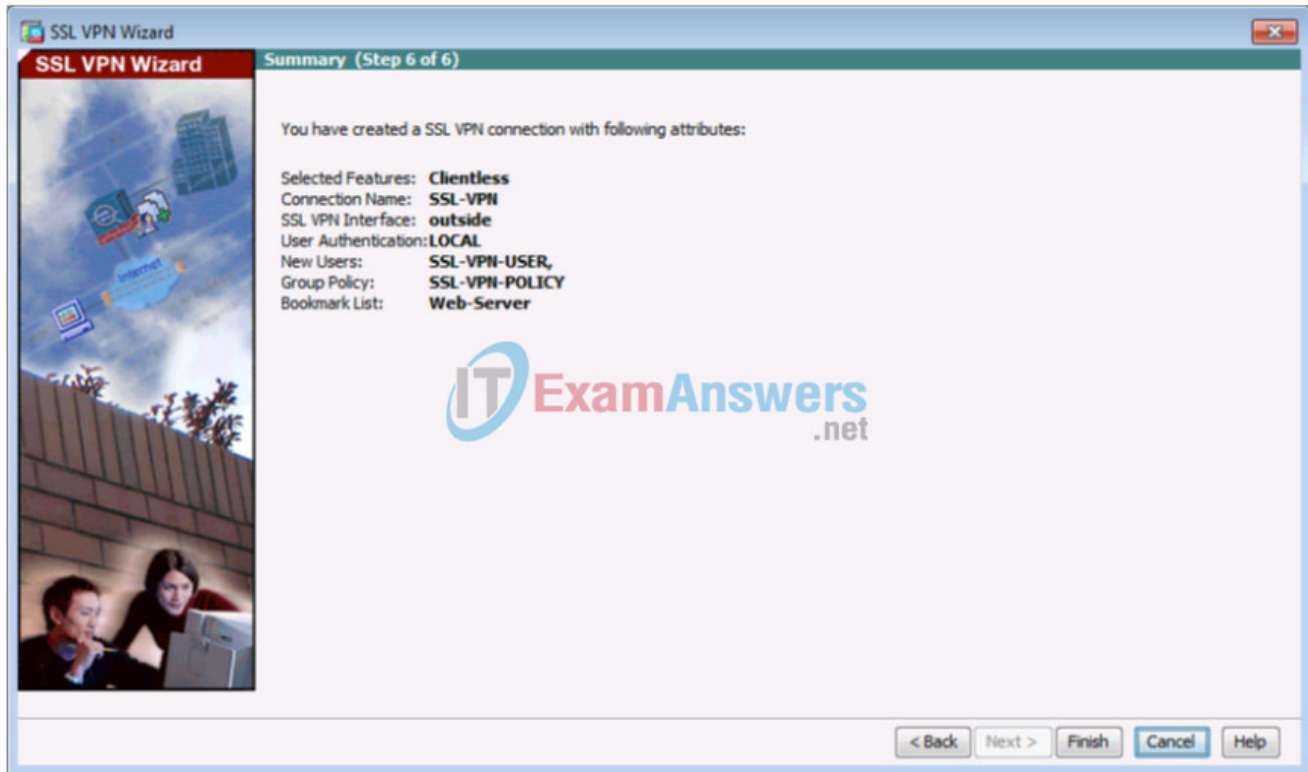


h. Click OK to continue and return to the Bookmark List window and click Next to continue.



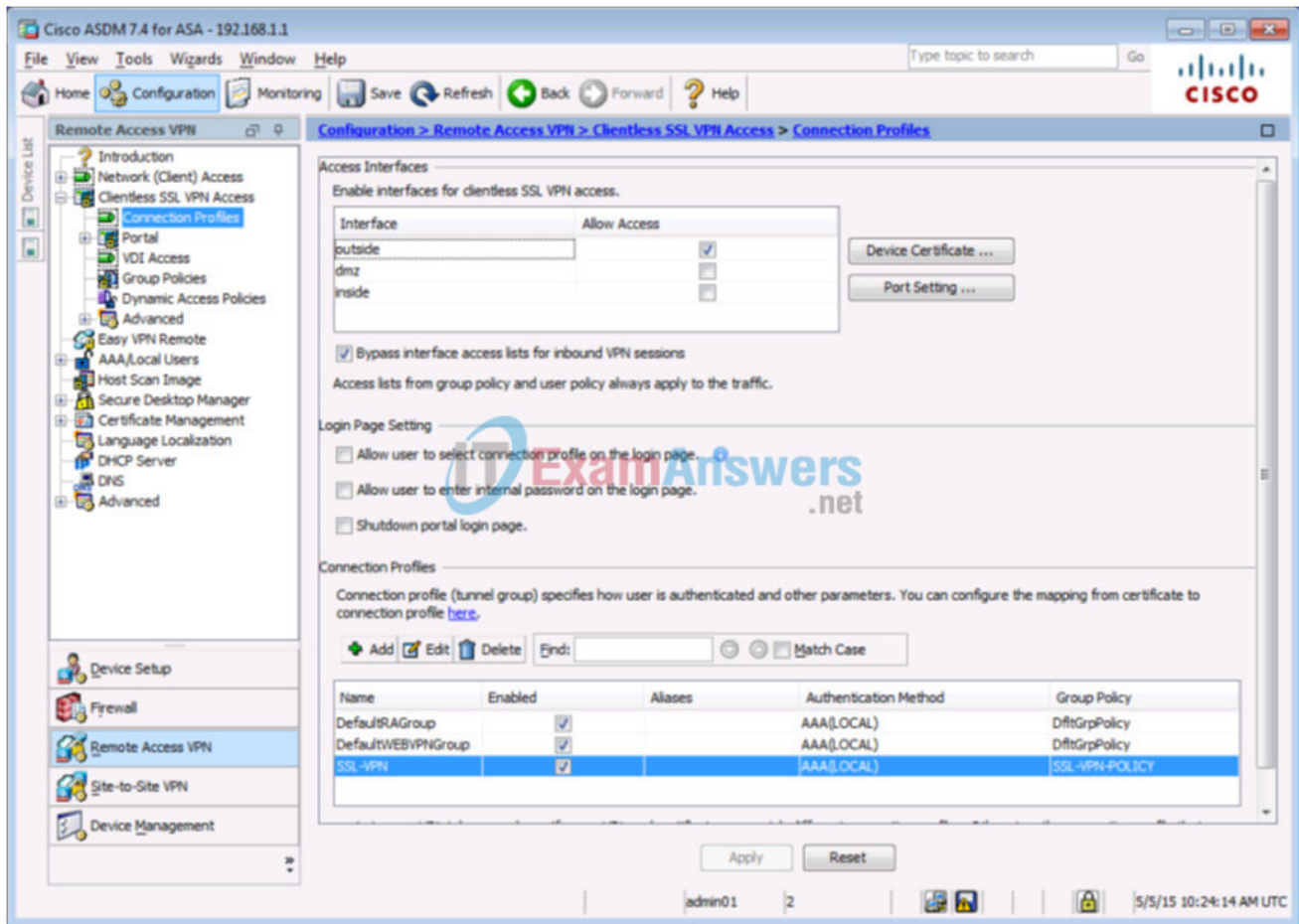
Step 6: Review the configuration summary and deliver the commands to the ASA.

The Summary page is displayed next. Verify that the information configured in the SSL VPN wizard is correct. Click Back to make changes, or click Cancel and restart the VPN wizard. Click Finish to complete the process and deliver the commands to the ASA



Step 7: Verify the ASDM SSL VPN connection profile.

In ASDM, click Configuration > Remote Access VPN > Clientless SSL VPN Access > Connection Profiles. In this window, the VPN configuration can be verified and edited.



Step 8: Verify VPN access from the remote host.

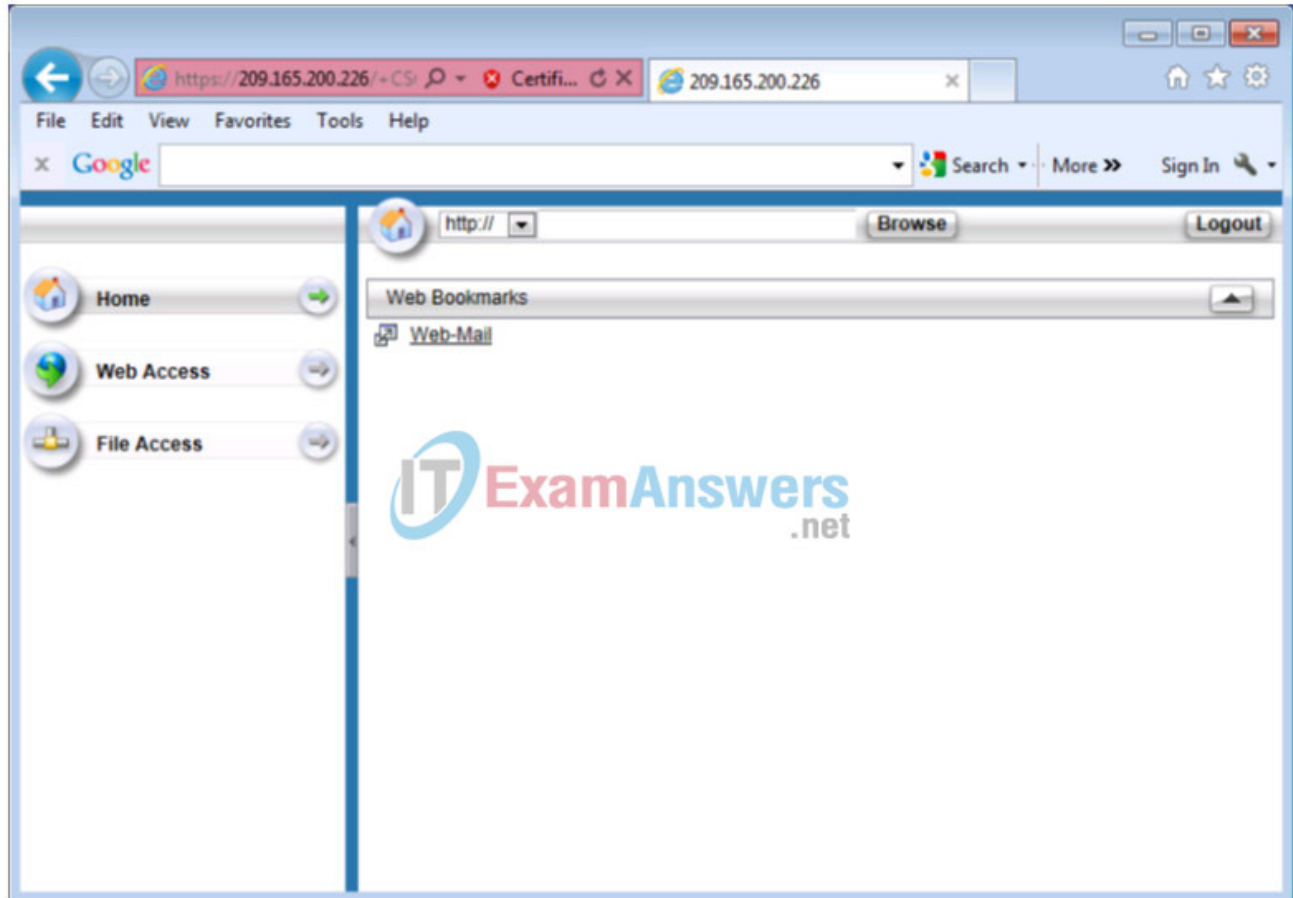
- Open the browser on PC-C and enter the login URL for the SSL VPN into the address field (<https://209.165.200.226>). Use secure HTTP (HTTPS) because SSL is required to connect to the ASA.
- The Logon window should display. Enter the previously configured username SSL-VPN-USER and password cisco12345, and click Logon to continue.



Step 9: Access the web portal window.

After the user authenticates, the ASA SSL web portal page lists the various bookmarks previously assigned to the profile. If the Bookmark points to a valid server IP address or hostname that has HTTP web services installed and functional, the outside user will be able to access the server from the ASA portal.

Note: In this lab, the web mail server is not installed.



Step 10: View the clientless remote user session using the ASDM Monitor.

While the remote user at PC-C is still logged in and on the ASA portal page, you can view the session statistics using ASDM monitor.

From the ASDM menu bar on PC-B, click Monitoring and then select VPN > VPN Statistics > Sessions. Click the Filter By pull-down list and select Clientless SSL VPN. You should see the SSL-VPN-USER session logged in from PC-C (172.16.3.3).

Note: You may need to click Refresh to display the remote user session.

Cisco ASDM 7.4 for ASA - 192.168.1.1

File View Tools Wizards Window Help

Home Configuration Monitoring Save Refresh Back Forward Help

VPN

Monitoring > VPN > VPN Statistics > Sessions

Type	Active	Cumulative	Peak Concurrent	Inactive
Clientless VPN		1	1	1
Browser		1	1	1

Filter By: Clientless SSL VPN -- All Sessions -- Filter

Username	Group Policy	Protocol	Login Time	Bytes Tx
IP Address	Connection Profile	Encryption	Duration	Bytes Rx
SSL-VPN-USER	SSL-VPN-POLICY	Clientless	14:46:21 UTC Tue May 5 2015	285328
172.16.3.3	DefaultWEBVPNGroup	Clientless: (L)RC4	0h:01m:58s	36674

Details Logout Ping

To sort VPN sessions, right-click on the above table and select Table Sort Order from popup menu.

Logout By: -- All Sessions -- Logout Sessions Refresh

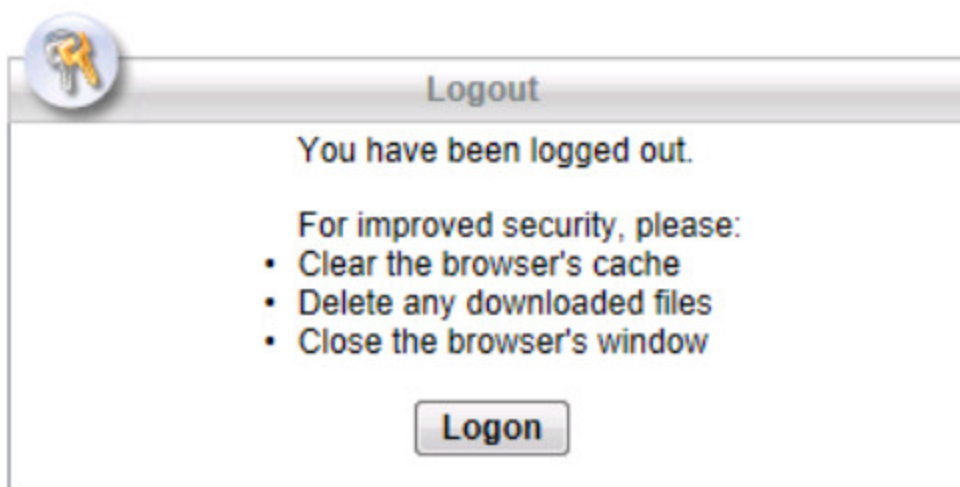
Last Updated: 5/5/15 7:51:42 AM

Data Refreshed Successfully.

admin01 2 5/5/15 10:24:14 AM UTC

Step 11: Log out of the web portal page.

The user should log out of the web portal window on PC-C using the Logout button when done (See Step 10). However, the web portal will also time out if there is no activity. In either case a logout window will be displayed informing users that for additional security, they should clear the browser cache, delete the downloaded files, and close the browser window.



Reflection

1. What are some benefits of clientless vs. client-based VPNs?

They are easier to setup because only a browser is required and no client software needs to be installed. They can be used to limit access to very specific resources based on URLs that are defined by network administration.

2. What are some differences when using SSL as compared to IPsec for remote access tunnel encryption?

Client-based VPNs can offer a more secure tunnel, if using IPsec, but are somewhat more complex to configure.

Router Interface Summary Table

Router Interface Summary				
Router Model	Ethernet Interface #1	Ethernet Interface #2	Serial Interface #1	Serial Interface #2
1800	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
1900	Gigabit Ethernet 0/0 (G0/0)	Gigabit Ethernet 0/1 (G0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2801	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/1/1)
2811	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2900	Gigabit Ethernet 0/0 (G0/0)	Gigabit Ethernet 0/1 (G0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)

Note: To find out how the router is configured, look at the interfaces to identify the type of router and how many interfaces the router has. There is no way to effectively list all the combinations of configurations for each router class. This table includes identifiers for the possible combinations of Ethernet and Serial interfaces in the device. The table does not include any other type of interface, even though a specific router may contain one. An example of this might be an ISDN BRI interface. The string in parenthesis is the legal abbreviation that can be used in Cisco IOS commands to represent the interface.

Device Configs

ASA 5505 Config – After Part 3 – Clientless VPN

```

CCNAS-ASA# show running-config
: Saved
:
: Hardware:   ASA5505, 512 MB RAM, CPU Geode 500 MHz
:
ASA Version 9.2(3)
!
hostname CCNAS-ASA
domain-name ccnasecurity.com
enable password 9D8jmmgkfNZLETh encrypted
xlate per-session deny tcp any4 any4
xlate per-session deny tcp any4 any6
xlate per-session deny tcp any6 any4
xlate per-session deny tcp any6 any6
xlate per-session deny udp any4 any4 eq domain
xlate per-session deny udp any4 any6 eq domain
xlate per-session deny udp any6 any4 eq domain
xlate per-session deny udp any6 any6 eq domain
names
!
interface Ethernet0/0
  switchport access vlan 2
!
interface Ethernet0/1
!
interface Ethernet0/2
  switchport access vlan 3
!
interface Ethernet0/3
  shutdown
!
interface Ethernet0/4
  shutdown
!
interface Ethernet0/5
  shutdown
!
interface Ethernet0/6
  shutdown
!
interface Ethernet0/7
  shutdown
!
interface Vlan1
  nameif inside
  security-level 100
  ip address 192.168.1.1 255.255.255.0
!
interface Vlan2
  nameif outside
  security-level 0
  ip address 209.165.200.226 255.255.255.248

```

```

!
interface Vlan3
  no forward interface Vlan1
  nameif dmz
  security-level 70
  ip address 192.168.2.1 255.255.255.0
!
ftp mode passive
dns server-group DefaultDNS
  domain-name ccnasecurity.com
object network inside-net
  subnet 192.168.1.0 255.255.255.0
object network dmz-server
  host 192.168.2.3
access-list OUTSIDE-DMZ extended permit ip any host 192.168.2.3
pager lines 24
mtu inside 1500
mtu outside 1500
mtu dmz 1500
icmp unreachable rate-limit 1 burst-size 1
no asdm history enable
arp timeout 14400
no arp permit-nonconnected
!
object network inside-net
  nat (inside,outside) dynamic interface
object network dmz-server
  nat (dmz,outside) static 209.165.200.227
access-group OUTSIDE-DMZ in interface outside
route outside 0.0.0.0 0.0.0.0 209.165.200.225 1
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 sip-disconnect 0:02:00
timeout sip-provisional-media 0:02:00 uauth 0:05:00 absolute
timeout tcp-proxy-reassembly 0:01:00
timeout floating-conn 0:00:00
dynamic-access-policy-record DfltAccessPolicy
user-identity default-domain LOCAL
aaa authentication telnet console LOCAL
aaa authentication ssh console LOCAL
aaa authentication http console LOCAL
http server enable
http 192.168.1.0 255.255.255.0 inside
no snmp-server location
no snmp-server contact
crypto ipsec security-association pmtu-aging infinite
crypto ca trustpool policy
telnet 192.168.1.0 255.255.255.0 inside
telnet timeout 10
ssh stricthostkeycheck

```

```

ssh 192.168.1.0 255.255.255.0 inside
ssh timeout 10
ssh key-exchange group dh-group1-sha1
console timeout 0

threat-detection basic-threat
threat-detection statistics access-list
no threat-detection statistics tcp-intercept
webvpn
    enable outside
group-policy SSL-VPN-POLICY internal
group-policy SSL-VPN-POLICY attributes
    vpn-tunnel-protocol ssl-clientless
webvpn
    url-list value Web-Server-
username SSL-VPN-USER password dd5hS0YgTYVkJRgxL encrypted privilege 0
username SSL-VPN-USER attributes
    vpn-group-policy SSL-VPN-POLICY
username admin01 password UsMZmktANM6Z2Y9I encrypted
tunnel-group SSL-VPN type remote-access
tunnel-group SSL-VPN general-attributes
    default-group-policy SSL-VPN-POLICY
!
class-map inspection_default
    match default-inspection-traffic
!
policy-map type inspect dns preset_dns_map
    parameters
        message-length maximum client auto
        message-length maximum 512
policy-map global_policy
    class inspection_default
        inspect dns preset_dns_map
        inspect ftp
        inspect h323 h225
        inspect h323 ras
        inspect ip-options
        inspect netbios
        inspect rsh
        inspect rtsp
        inspect skinny
        inspect esmtp
        inspect sqlnet
        inspect sunrpc
        inspect tftp
        inspect sip
        inspect xdmcp
        inspect icmp
!
service-policy global_policy global
prompt hostname context
call-home reporting anonymous prompt 2

```

```
call-home
  profile CiscoTAC-1
    no active
    destination address http
https://tools.cisco.com/its/service/oddce/services/DDCEService
    destination address email callhome@cisco.com
    destination transport-method http
    subscribe-to-alert-group diagnostic
    subscribe-to-alert-group environment
    subscribe-to-alert-group inventory periodic monthly
    subscribe-to-alert-group configuration periodic monthly
    subscribe-to-alert-group telemetry periodic daily
Cryptochecksum:34769acca234634ad350833c85e020b9
: end
```

Router R1

```

R1# show run
Building configuration...

Current configuration : 1694 bytes
!
version 15.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname R1
!
boot-start-marker
boot-end-marker
!
security passwords min-length 10
enable secret 9 $9$40VlVQCgcg5HRU$9JbJ5Wps0TBRm8H1cyIPLqGmTG3t3AFS9bx1I51tsnE
!
no aaa new-model
memory-size iomem 15
!
!
ip cef
no ipv6 cef
!
multilink bundle-name authenticated
!
cts logging verbose
!
username admin01 secret 9
$9$5GtoxBiNFw5p9k$upl/WwRQGzsvRp6m4PWRoti1TWCR5G97MxBKnugrW6M
!
redundancy
!
interface Embedded-Service-Engine0/0
no ip address
shutdown
!
interface GigabitEthernet0/0
ip address 209.165.200.225 255.255.255.248
duplex auto
speed auto
!
interface GigabitEthernet0/1
no ip address
shutdown
duplex auto
speed auto
!
interface Serial0/0/0
ip address 10.1.1.1 255.255.255.252
clock rate 2000000

```

```

!
interface Serial0/0/1
  no ip address
  shutdown
!
ip forward-protocol nd
!
no ip http server
no ip http secure-server
!
ip route 0.0.0.0 0.0.0.0 Serial0/0/0
!
control-plane
!
line con 0
  exec-timeout 5 0
  logging synchronous
  login local
line aux 0
line 2
  no activation-character
  no exec
  transport preferred none
  transport output pad telnet rlogin lapb-ta mop udptn v120 ssh
  stopbits 1
line vty 0 4
  exec-timeout 5 0
  logging synchronous
  login local
  transport input telnet
!
scheduler allocate 20000 1000
!
end

```

Router R2


```
R2# show run
Building configuration...

Current configuration : 1678 bytes
!
version 15.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname R2
!
boot-start-marker
boot-end-marker
!
security passwords min-length 10
enable secret 9 $9$Nb4BPAMsmT24y.$4bn2kyZCwulndKiaU1453lzF4n3ge95hfoFIKrucvpI
!
no aaa new-model
memory-size iomem 15
!
ip cef
no ipv6 cef
!
multilink bundle-name authenticated
!
cts logging verbose
!
username admin01 secret 9
$9$6PSI5.sujsergN.$LFz4TeeqS/1FtxvK23Le8jxUAY9sjeedVmyF/PA9sPo
!
redundancy
!
interface Embedded-Service-Engine0/0
 no ip address
interface Embedded-Service-Engine0/0
 no ip address
 shutdown
!
interface GigabitEthernet0/0
 no ip address
 shutdown
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 no ip address
 shutdown
 duplex auto
 speed auto
!
interface Serial0/0/0
```

```

    ip address 10.1.1.2 255.255.255.252
    !
interface Serial0/0/1
    ip address 10.2.2.2 255.255.255.252
    clock rate 2000000
    !
ip forward-protocol nd
    !
no ip http server
no ip http secure-server
    !
ip route 172.16.3.0 255.255.255.0 Serial0/0/1
ip route 209.165.200.224 255.255.255.248 Serial0/0/0
    !
control-plane
    !
line con 0
    exec-timeout 5 0
    logging synchronous
    login local
line aux 0
line 2
    no activation-character
    no exec
    transport preferred none
    transport output pad telnet rlogin lapb-ta mop udptn v120 ssh
    stopbits 1
line vty 0 4
    exec-timeout 5 0
    logging synchronous
    login local
    transport input telnet
    !
scheduler allocate 20000 1000
    !
end

```

Router R3

```
R3# show run
Building configuration...

Current configuration : 1655 bytes
!
version 15.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname R3
!
boot-start-marker
boot-end-marker
!
security passwords min-length 10
enable secret 9 $9$5Mho73ipFPMgWE$yJiMb2sLFmK1P2mWClFwuB3gtdlQWqyjhaZNruqHyrk
!
no aaa new-model
memory-size iomem 15
!
ip cef
no ipv6 cef
!
multilink bundle-name authenticated
!
cts logging verbose
!
vtp domain TSHOOT
vtp mode transparent
username admin01 secret 9
$9$JXN7EcHDQcdh2k$9qnRjzJxhSGJK3KGF9F0piZU6HpDCGdWFRUdfg6QIVY
!
redundancy
!
interface Embedded-Service-Engine0/0
 no ip address
 shutdown
!
interface GigabitEthernet0/0
 no ip address
 shutdown
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 ip address 172.16.3.1 255.255.255.0
 duplex auto
 speed auto
!
interface Serial0/0/0
 no ip address
```

```

shutdown
clock rate 2000000
!
interface Serial0/0/1
 ip address 10.2.2.1 255.255.255.252
!
ip forward-protocol nd
!
no ip http server
no ip http secure-server
!
ip route 0.0.0.0 0.0.0.0 Serial0/0/1
!
control-plane
!
line con 0
 exec-timeout 5 0
 logging synchronous
 login local
line aux 0
line 2
 no activation-character
 no exec
 transport preferred none
 transport output pad telnet rlogin lapb-ta mop udptn v120 ssh
 stopbits 1
line vty 0 4
 exec-timeout 5 0
 logging synchronous
 login local
 transport input telnet
!
scheduler allocate 20000 1000
end

```

Switches S1, S2 and S3 – Use default configs, except for host name