# Configure ASA Packet Captures with CLI and ASDM

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## Introduction

This document describes how to configure the Cisco ASA firewall to capture the desired packets with the ASDM or the CLI.

## Prerequisites

### Requirements

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

### Components Used

This document is not restricted to specific hardware or software versions.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure

that you understand the potential impact of any command.

### Related Products

This configuration is also used with these Cisco products:

- Cisco ASA Versions 9.1(5) and later
- Cisco ASDM Version 7.2.1

## Background Information

This document describes how to configure the Cisco Adaptive Security Appliance (ASA) Next-Generation Firewall in order to capture the desired packets with either the Cisco Adaptive Security Device Manager (ASDM) or the Command Line Interface (CLI) (ASDM).

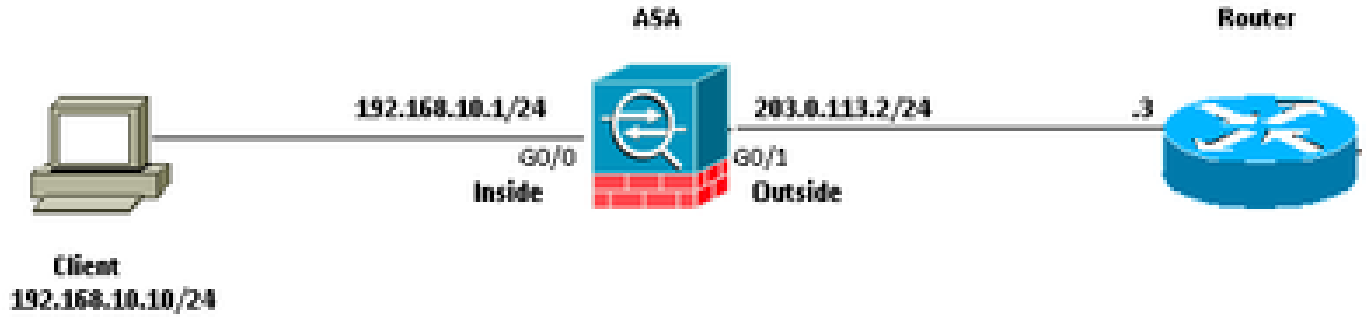
The packet capture process is useful to troubleshoot connectivity problems or monitor suspicious activity. In addition, it is possible to create multiple captures in order to analyze different types of traffic on multiple interfaces.

### Configure

This section provides information used to configure the packet capture features that are described in this document.

### Network Diagram

This document uses this network setup:




### Configurations

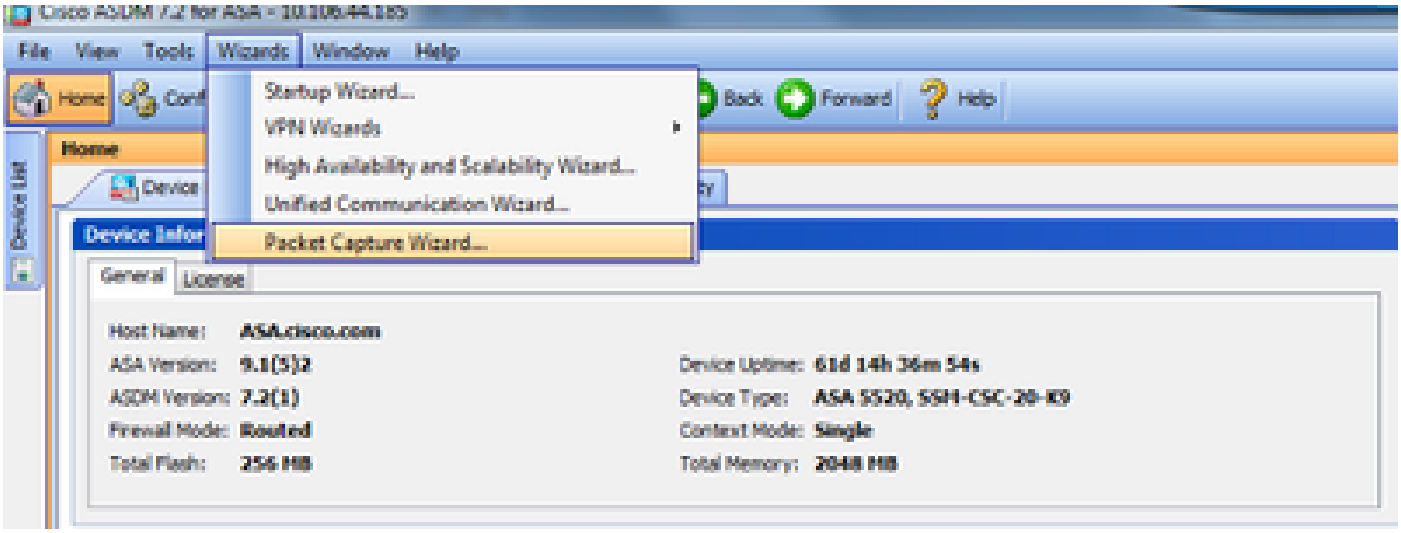
The IP address schemes used in this configuration are not legally routable on the Internet. They are RFC 1918 addresses that are used in a lab environment.

### Configure Packet Capture with the ASDM

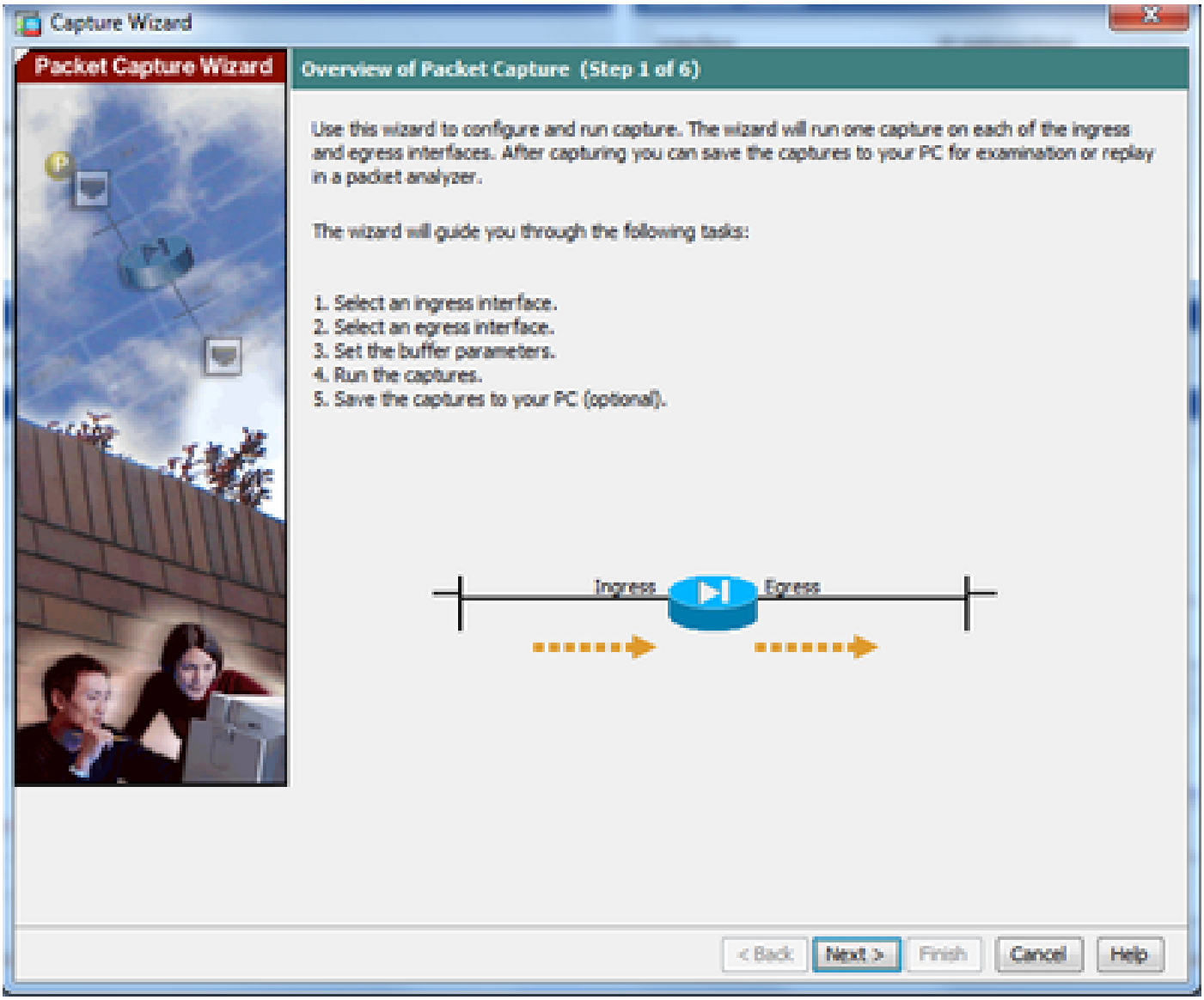
This example configuration is used in to capture the packets that are transmitted during a ping from User1 (inside network) to Router1 (outside network).

Complete these steps in order to configure the packet capture feature on the ASA with the ASDM:

1. Navigate to **Wizards > Packet Capture Wizard** to start the packet capture configuration, as shown:



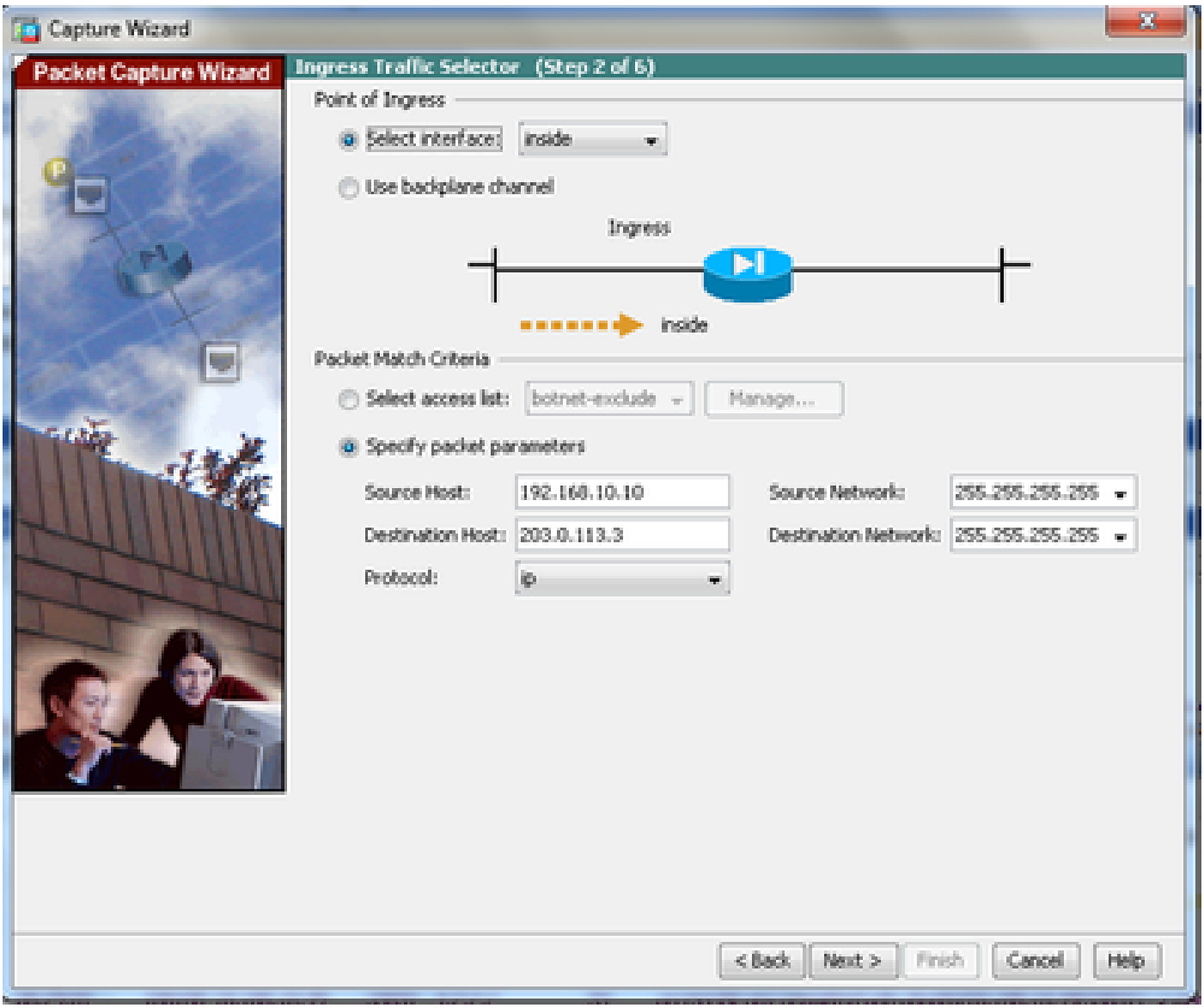

2. The **Capture Wizard** opens. Click **Next**.




3.0 In the new window, provide the parameters that are used in to capture the ingress traffic.

3.1 Select **inside** for the **Ingress Interface** and provide the source and the destination IP addresses of the packets to be captured, along with their subnet mask, in the respective space provided.

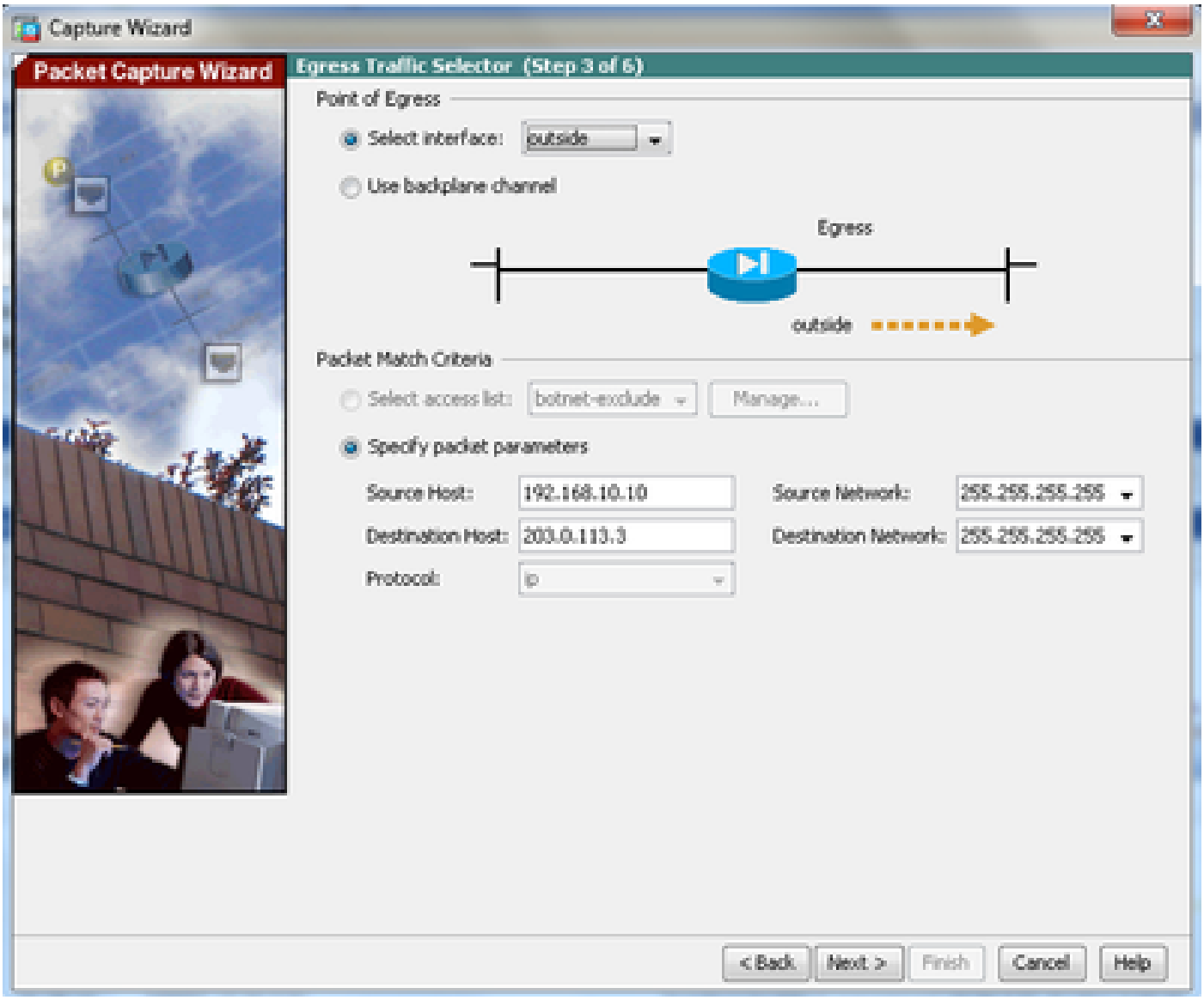
3.2 Choose the packet type to be captured by the ASA (IP is the packet type chosen here), as shown:




3.3 Click **Next**.

4.1 Select **outside** for the **Egress Interface** and provide the source and the destination IP addresses, along with their subnet mask, in the respective spaces provided.

If **Network Address Translation (NAT)** is performed on the Firewall, take this into consideration as well.



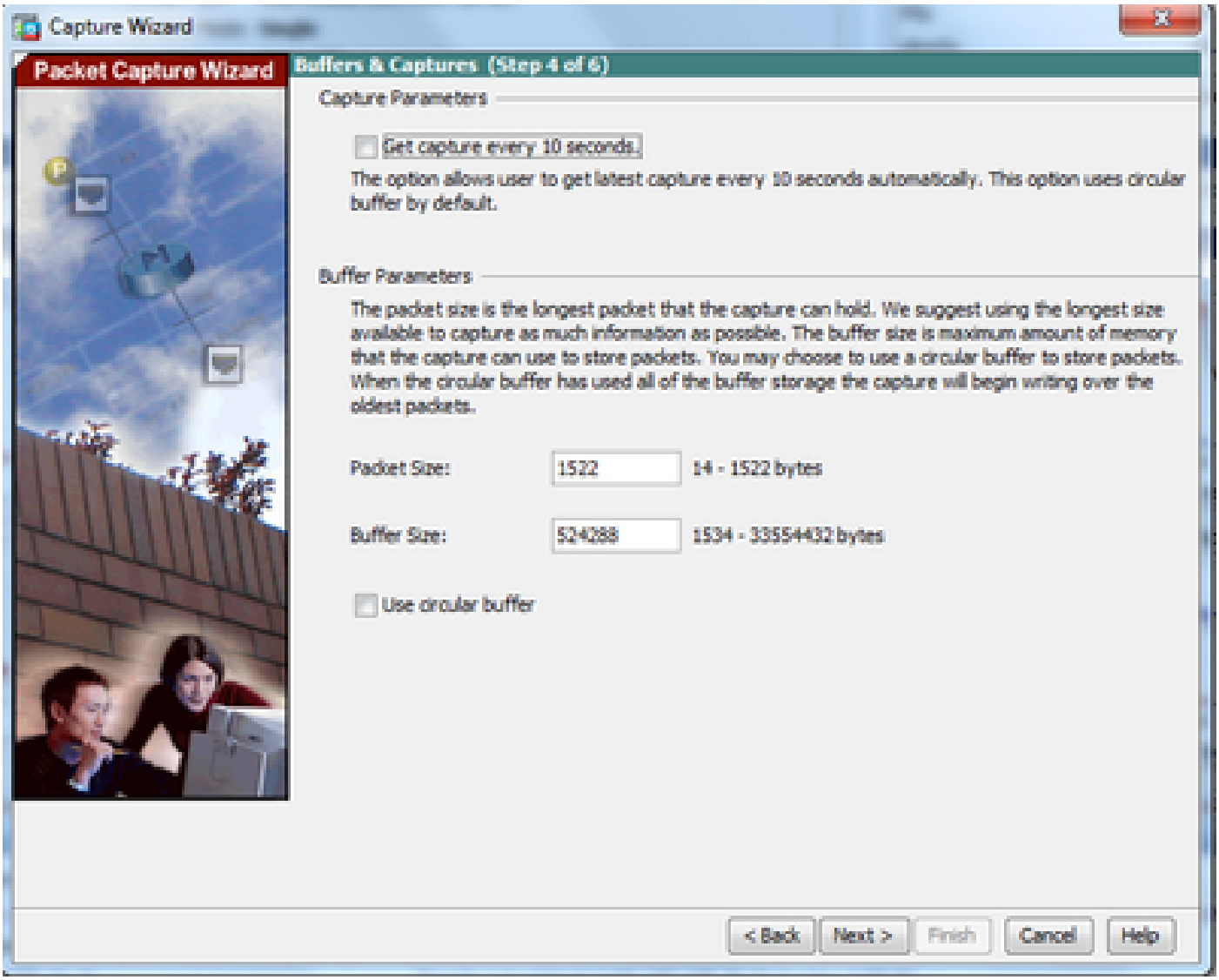

4.2 Click **Next**.

5.1 Enter the appropriate **Packet Size** and the **Buffer Size** in the respective space provided. This data is required for the capture to take place.

5.2 Check the **Use circular buffer** box to use the circular buffer option. Circular buffers never fill up.

As the buffer reaches its maximum size, older data is discarded and the capture continues.

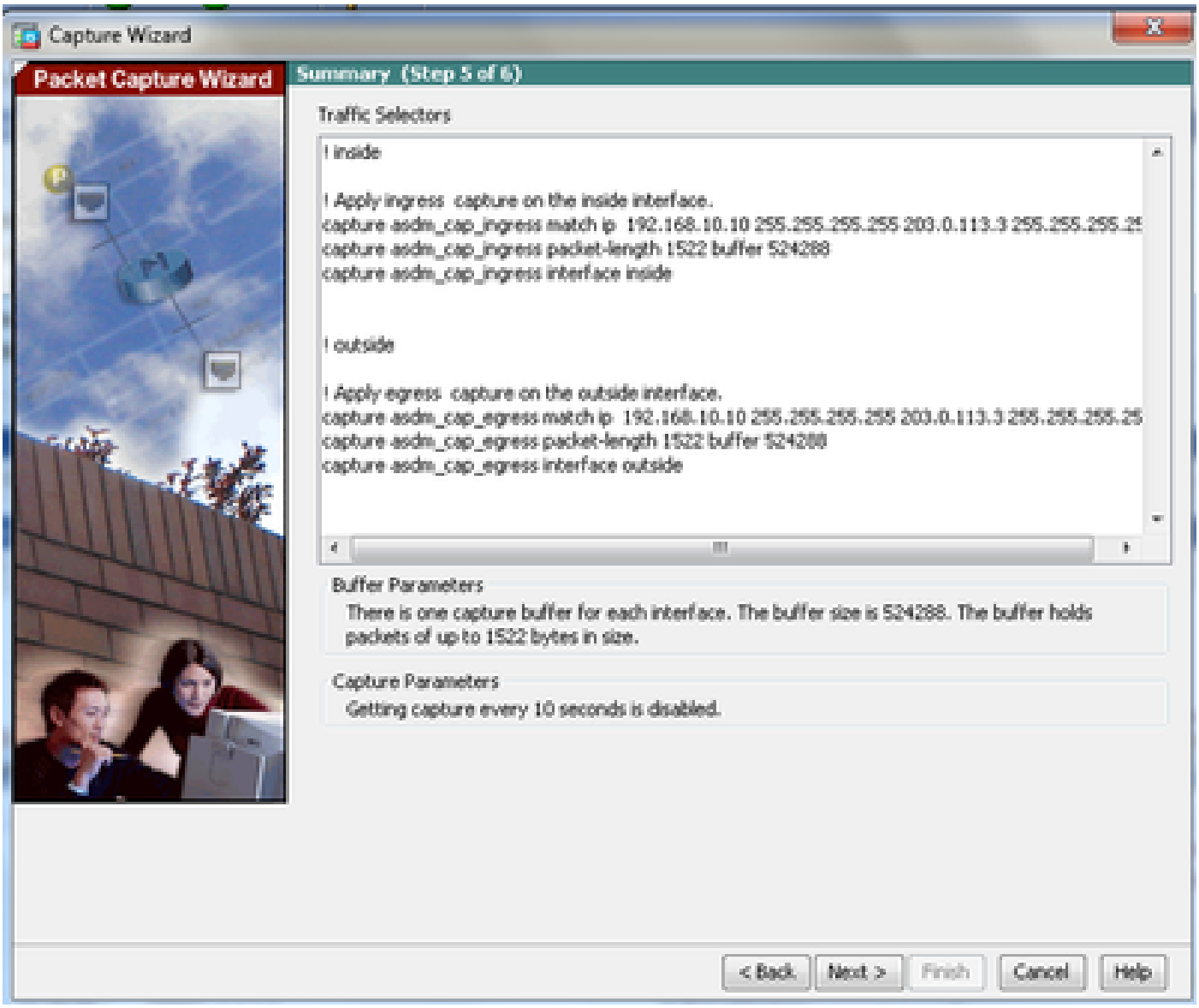
In this example, circular buffer is not used, so the check box is not checked.



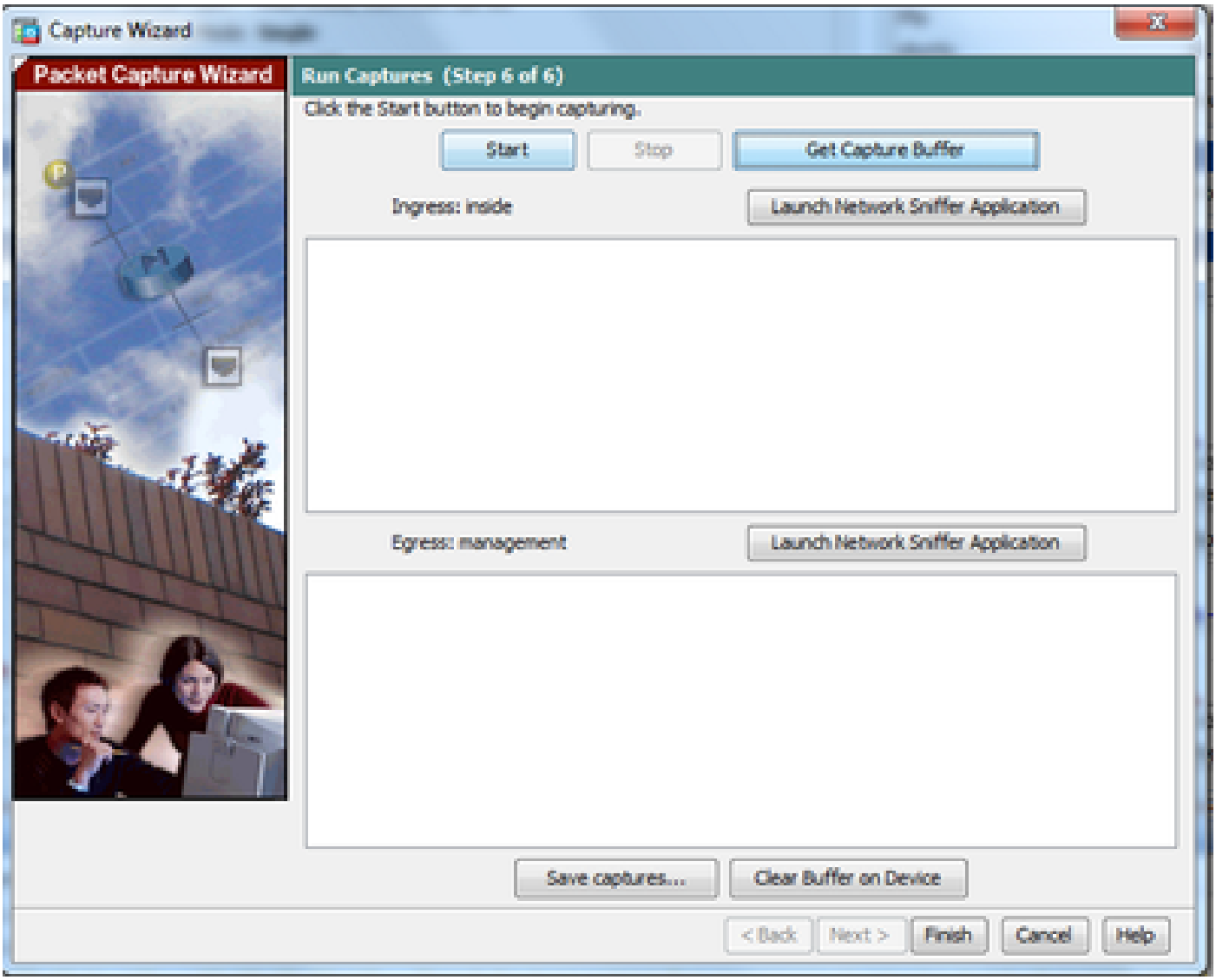

5.3 Click **Next**.

6.0 This window shows the **Access-lists** that must be configured on the ASA (so that the desired packets are captured) and the type of packets to be captured (IP packets are captured in this example).

6.1 Click **Next**.

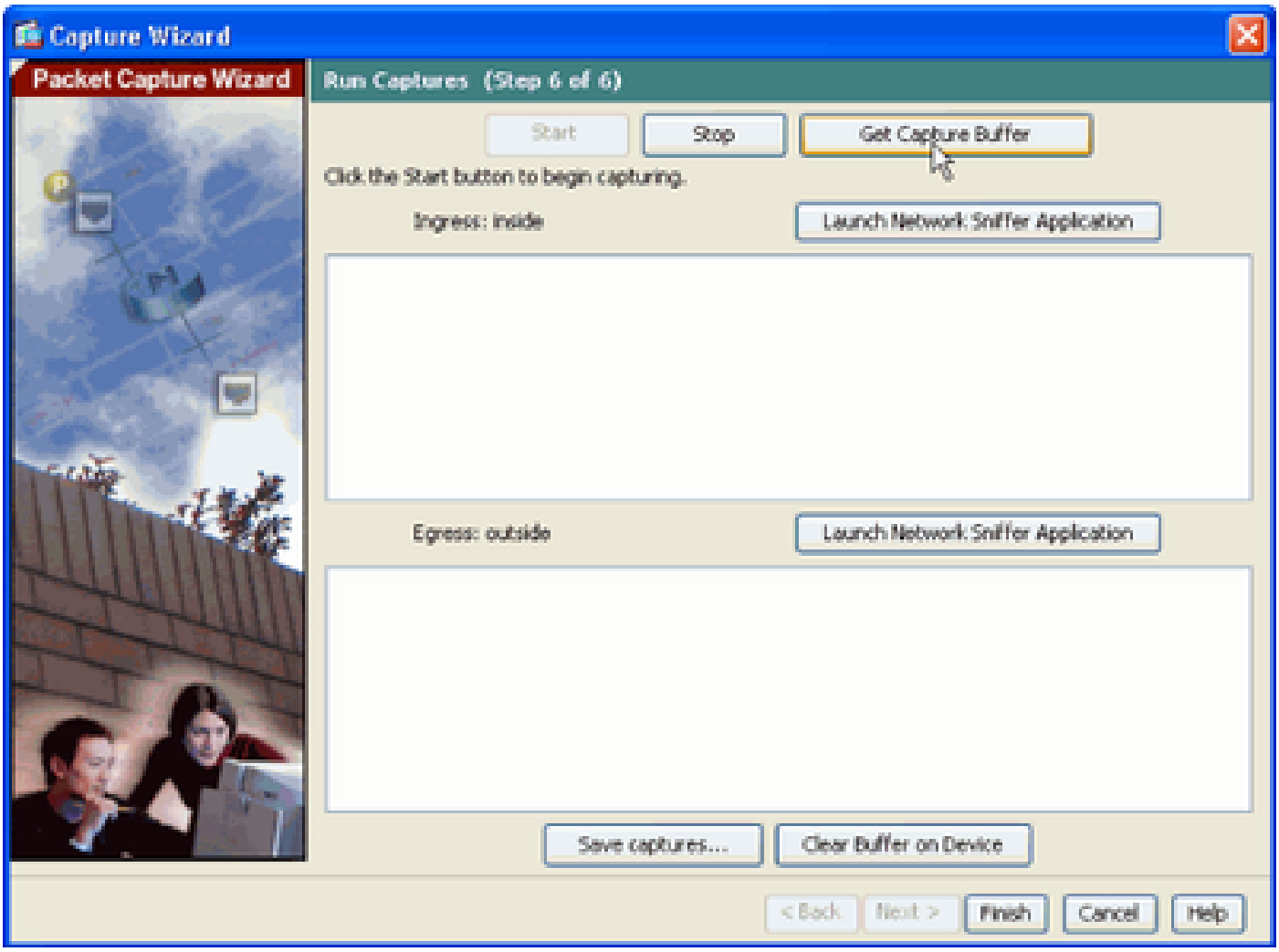



7. Click **Start** in order to start the packet capture, as shown:



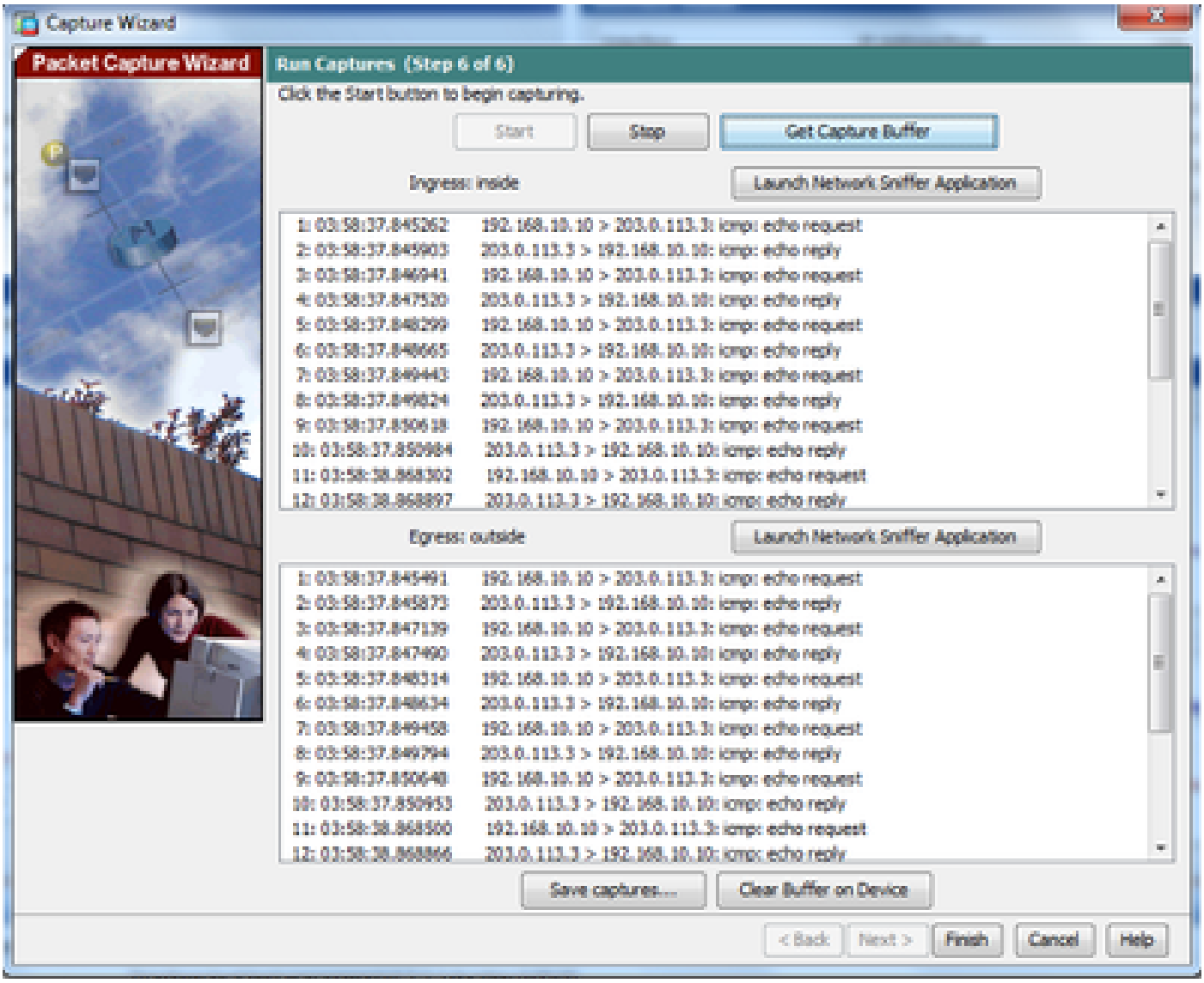

After the packet capture starts, attempt to ping the outside network from the inside network so that the packets that flow between the source and the destination IP addresses are captured by the ASA capture buffer.

8. Click **Get Capture Buffer** in order to view the packets that are captured by the ASA capture buffer.




The captured packets are shown in this window for both the ingress and egress traffic.

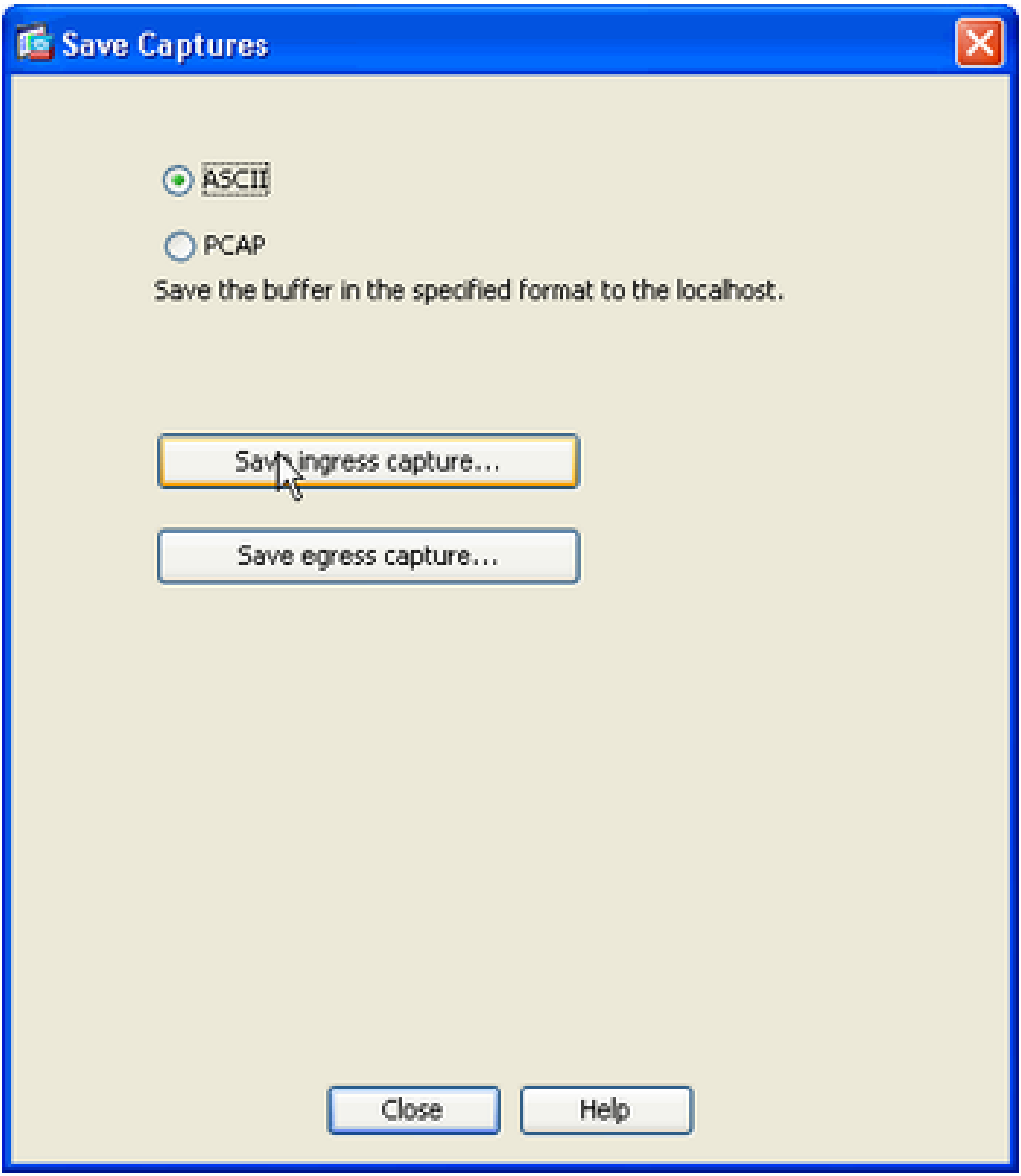
9. Click **Save captures** to save the capture information.




10.1 From the **Save captures** window, choose the required format in which the capture buffer is to be saved. This is either **ASCII** or **PCAP**.

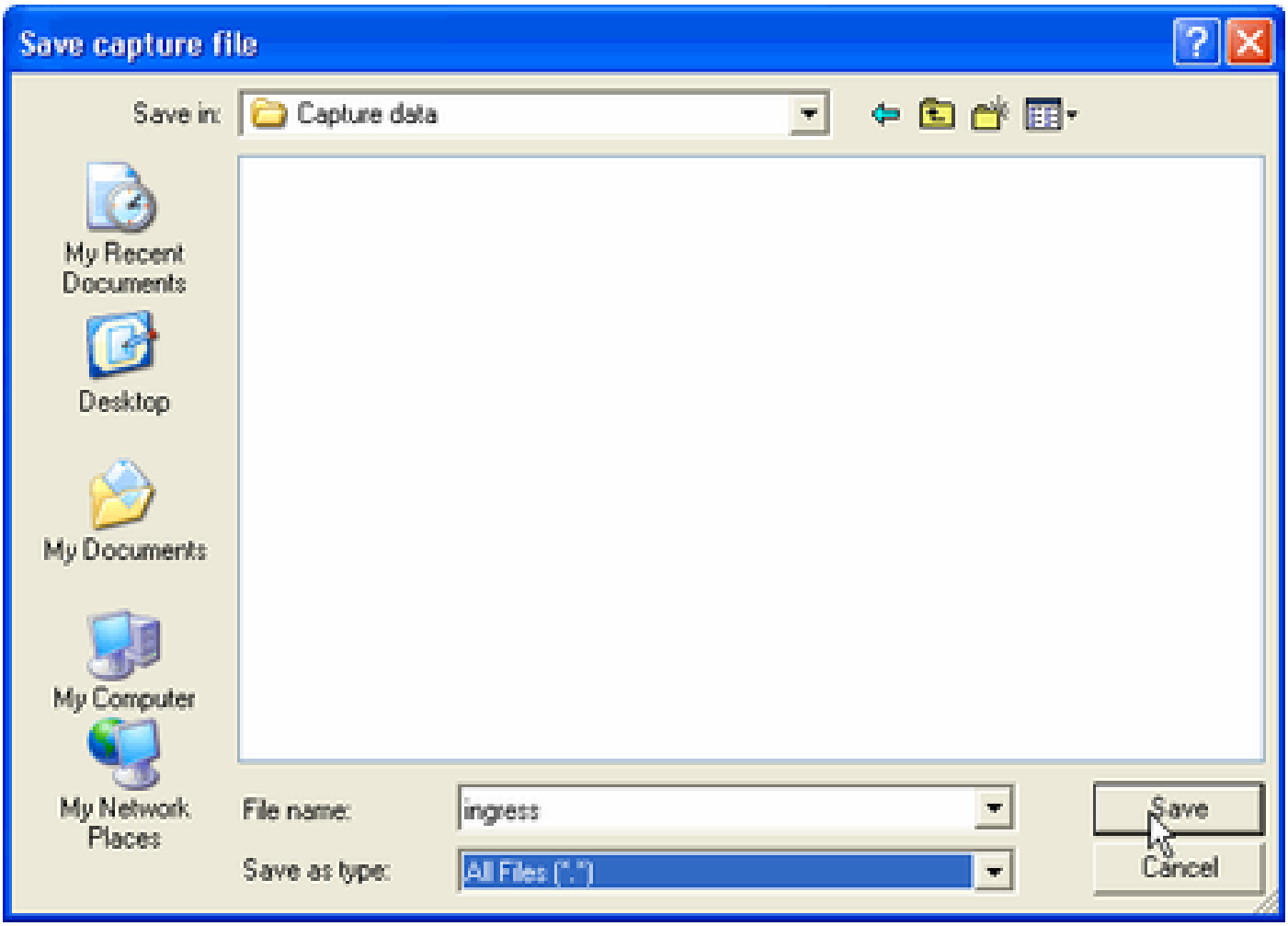
10.2 Click the radio button next to the format names.

10.3 Click **Save ingress capture** or **Save egress capture** as required. The PCAP files can then be opened with capture analyzers, such as **Wireshark**, and it is the preferred method.

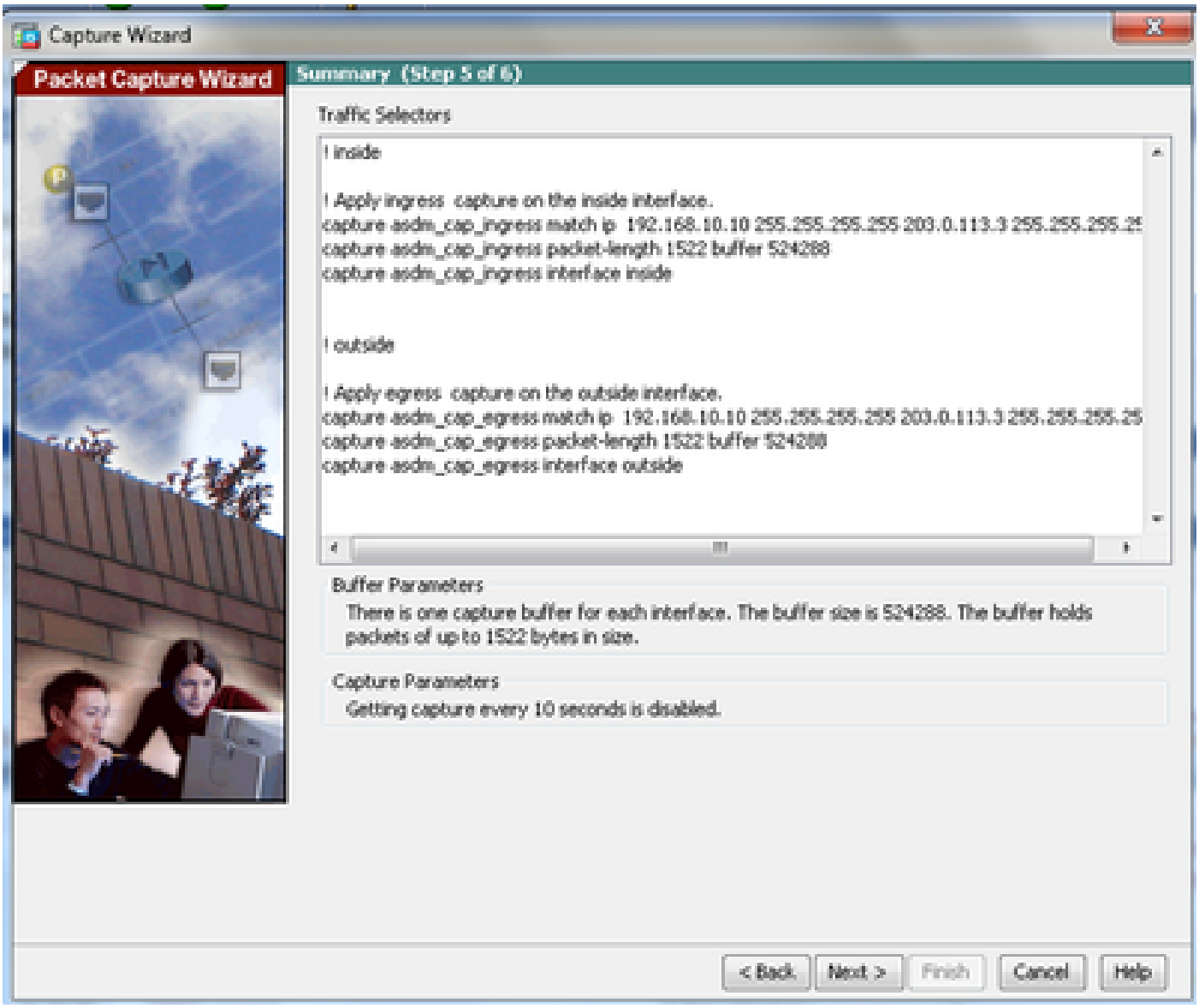



11.1 From the **Save capture file** window, provide the file name and the location where the capture file is to be saved.

11.2 Click **Save**.




12. Click **Finish**.




This completes the GUI packet capture procedure.

## Configure Packet Capture with the CLI

Complete these steps in order to configure the packet capture feature on the ASA with the CLI:

1. Configure the inside and outside interfaces as illustrated in the network diagram with the correct IP address and security levels.

2. Start the packet capture process with the capture command in privileged EXEC mode. In this configuration example, the capture named **capin** is defined. Bind it to the **inside** interface, and specify with the **match** keyword that only the packets that match the traffic of interest are captured:

   <#root>

   ```
   ASA#
   capture capin interface inside match ip 192.168.10.10 255.255.255.255
    203.0.113.3 255.255.255.255
   ```

3. Similarly, the capture named **capout** is defined. Bind it to the **outside** interface, and specify with the **match** keyword that only the packets that match the traffic of interest are captured:

   <#root>

   ```
   ASA#
   ```

   ```
   capture capout interface outside match ip 192.168.10.10 255.255.255.255
   203.0.113.3 255.255.255.255
   ```

   The ASA now begins to capture the traffic flow between the interfaces. In order to stop the capture at anytime, enter the **no capture** command followed by the capture name.

   Here is an example:

   <#root>

   ```
   no capture capin interface inside
   no capture capout interface outside
   ```

## Available Capture Types on the ASA

This section describes the different types of captures that are available on the ASA.

- **asa_dataplane** - Captures packets on the ASA backplane that pass between the ASA and a module that uses the backplane, such as the ASA CX or IPS module.

  <#root>

  ```
  ASA#
  ```

  ```
  cap asa_dataplace interface asa_dataplane
  ```

  ```
  ASA#
  ```

  ```
  show capture
  ```

  ```
  capture asa_dataplace type raw-data interface asa_dataplane [Capturing - 0 bytes]
  ```

- **asp-drop** drop-code - Captures packets that are dropped by the accelerated security path. The drop-code specifies the type of traffic that is dropped by the accelerated security path.

  <#root>

  ```
  ASA#
  ```

  ```
  capture asp-drop type asp-drop acl-drop
  ```

  ```
  ASA#
  ```

```
show cap
```

```
ASA#
```

```
show capture asp-drop
```

```
 2 packets captured

 1: 04:12:10.428093       192.168.10.10.34327 > 10.94.0.51.15868: S
    2669456341:2669456341(0) win 4128 <mss 536> Drop-reason: (acl-drop)
    Flow is denied by configured rule
 2: 04:12:12.427330       192.168.10.10.34327 > 10.94.0.51.15868: S
    2669456341:2669456341(0) win 4128 <mss 536> Drop-reason: (acl-drop)
    Flow is denied by configured rule
 2 packets shown
```

```
ASA#
```

```
show capture asp-drop
```

```
 2 packets captured

 1: 04:12:10.428093       192.168.10.10.34327 > 10.94.0.51.15868: S
    2669456341:2669456341(0) win 4128 <mss 536> Drop-reason: (acl-drop)
    Flow is denied by configured rule
 2: 04:12:12.427330       192.168.10.10.34327 > 10.94.0.51.15868: S
    2669456341:2669456341(0) win 4128 <mss 536> Drop-reason: (acl-drop)
    Flow is denied by configured rule
 2 packets shown
```

- **ethernet-type** type - Selects an Ethernet type to capture. Supported Ethernet types include 8021Q, ARP, IP, IP6, LACP, PPPOED, PPPOES, RARP, and VLAN.

  This example show how to capture ARP traffic:

<#root>

```
ASA#
```

```
cap arp ethernet-type ?
```

```
exec mode commands/options:
  802.1Q
  <0-65535>  Ethernet type
  arp
  ip
  ip6
  pppoed
  pppoes
  rarp
  vlan
```

```
cap arp ethernet-type arp interface inside
```

```
ASA#
 show cap arp


22 packets captured

   1: 05:32:52.119485       arp who-has 10.10.3.13 tell 10.10.3.12


 2: 05:32:52.481862       arp who-has 192.168.10.123 tell 192.168.100.100
   3: 05:32:52.481878       arp who-has 192.168.10.50 tell 192.168.100.10


   4: 05:32:53.409723       arp who-has 10.106.44.135 tell 10.106.44.244
   5: 05:32:53.772085       arp who-has 10.106.44.108 tell 10.106.44.248
   6: 05:32:54.782429       arp who-has 10.106.44.135 tell 10.106.44.244
   7: 05:32:54.784695       arp who-has 10.106.44.1 tell xx.xx.xx.xxx:
```

- **real-time** - Displays the captured packets continuously in real-time. In order to terminate a real-time packet capture, press Ctrl-C. In order to permanently remove the capture, use the no form of this command.
- This option is not supported when you use the **cluster exec capture** command.

<#root>

```
ASA#
cap capin interface inside real-time

Warning: using this option with a slow console connection may
         result in an excessive amount of non-displayed packets
         due to performance limitations.


Use ctrl-c to terminate real-time capture
```

- **Trace -** Traces the captured packets in a manner similar to the ASA packet tracer feature.

<#root>

```
ASA#
cap in interface Webserver trace match tcp any any eq 80



// Initiate Traffic


 1: 07:11:54.670299   192.168.10.10.49498 > 198.51.100.88.80: S
    2322784363:2322784363(0) win 8192
    <mss 1460,nop,wscale 2,nop,nop,sackOK>
```

```
Phase: 1
Type: CAPTURE
Subtype:
Result: ALLOW
Config:
Additional Information:
MAC Access list

Phase: 2
Type: ACCESS-LIST
Subtype:
Result: ALLOW
Config:
Implicit Rule
Additional Information:
MAC Access list

Phase: 3
Type: ROUTE-LOOKUP
Subtype: input
Result: ALLOW
Config:
Additional Information:
in   0.0.0.0         0.0.0.0         outside

Phase: 4
Type: ACCESS-LIST
Subtype: log
Result: ALLOW
Config:
access-group any in interface inside
access-list any extended permit ip any4 any4 log
Additional Information:

Phase: 5
Type: NAT
Subtype:
Result: ALLOW
Config:
object network obj-10.0.0.0
nat (inside,outside) dynamic interface
Additional Information:
Dynamic translate 192.168.10.10/49498 to 203.0.113.2/49498

Phase: 6
Type: NAT
Subtype: per-session
Result: ALLOW
Config:
Additional Information:

Phase: 7
Type: IP-OPTIONS
Subtype:
Result: ALLOW
Config:
Additional Information:

Phase: 8
Type:
Subtype:
Result: ALLOW
```

```
Config:
Additional Information:

Phase: 9
Type: ESTABLISHED
Subtype:
Result: ALLOW
Config:
Additional Information:

Phase: 10
Type:
Subtype:
Result: ALLOW
Config:
Additional Information:

Phase: 11
Type: NAT
Subtype: per-session
Result: ALLOW
Config:
Additional Information:

Phase: 12
Type: IP-OPTIONS
Subtype:
Result: ALLOW
Config:
Additional Information:

Phase: 13
Type: FLOW-CREATION
Subtype:
Result: ALLOW
Config:
Additional Information:
New flow created with id 41134, packet dispatched to next module

Phase: 14
Type: ROUTE-LOOKUP
Subtype: output and adjacency
Result: ALLOW
Config:
Additional Information:
found next-hop 203.0.113.1 using egress ifc outside
adjacency Active
next-hop mac address 0007.7d54.1300 hits 3170

Result:
output-interface: outside
output-status: up
output-line-status: up
Action: allow
```

**Note**: On ASA 9.10+, the any keyword only captures packets with ipv4 addresses. The any6 keyword captures all ipv6 addressed traffic.

These are advanced settings that can be configured with Packet Captures.

Please review the command reference guide on how to set them.

- **ikev1/ikev2 -** Captures only Internet Key Exchange Version 1 (IKEv1) or IKEv2 protocol information.
- **isakmp -** Captures Internet Security Association and Key Management Protocol (ISAKMP) traffic for VPN connections. The ISAKMP subsystem does not have access to the upper-layer protocols. The capture is a pseudo capture, with the physical, IP, and UDP layers combined together in order to satisfy a PCAP parser. The peer addresses are obtained from the SA exchange and are stored in the IP layer.
- **lacp -** Captures Link Aggregation Control Protocol (LACP) traffic. If configured, the interface name is the physical interface name. This is useful when you work with Etherchannels in order to identify the present behavior of LACP.
- **tls-proxy -** Captures decrypted inbound and outbound data from the Transport Layer Security (TLS) proxy on one or more interfaces.
- **webvpn -** Captures WebVPN data for a specific WebVPN connection.

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⚠ **Caution**: When you enable WebVPN capture, it affects the performance of the security appliance. Ensure that you disable the capture after you generate the capture files that are needed in order to troubleshoot.

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## Defaults

These are the ASA system default values:

- The default type is raw-data.
- The default buffer size is 512 KB.
- The default Ethernet type is IP packets.
- The default packet-length is 1,518 bytes.

## View the Captured Packets

## On the ASA

In order to view the captured packets, enter the show capture command followed by the capture name. This section provides the **show** command outputs of the capture buffer contents. The **show capture capin** command shows the contents of the capture buffer named **capin**:

<#root>

```
ASA#

show cap capin


 8 packets captured

 1: 03:24:35.526812       192.168.10.10 > 203.0.113.3: icmp: echo request
```

```
 2: 03:24:35.527224       203.0.113.3 > 192.168.10.10: icmp: echo reply
 3: 03:24:35.528247       192.168.10.10 > 203.0.113.3: icmp: echo request
 4: 03:24:35.528582       203.0.113.3 > 192.168.10.10: icmp: echo reply
 5: 03:24:35.529345       192.168.10.10 > 203.0.113.3: icmp: echo request
 6: 03:24:35.529681       203.0.113.3 > 192.168.10.10: icmp: echo reply
 7: 03:24:57.440162       192.168.10.10 > 203.0.113.3: icmp: echo request
 8: 03:24:57.440757       203.0.113.3 > 192.168.10.10: icmp: echo reply
```

The **show capture capout** command shows the contents of the capture buffer named **capout**:

<#root>

```
ASA#
show cap capout


 8 packets captured

 1: 03:24:35.526843       192.168.10.10 > 203.0.113.3: icmp: echo request
 2: 03:24:35.527179       203.0.113.3 > 192.168.10.10: icmp: echo reply
 3: 03:24:35.528262       192.168.10.10 > 203.0.113.3: icmp: echo request
 4: 03:24:35.528567       203.0.113.3 > 192.168.10.10: icmp: echo reply
 5: 03:24:35.529361       192.168.10.10 > 203.0.113.3: icmp: echo request
 6: 03:24:35.529666       203.0.113.3 > 192.168.10.10: icmp: echo reply
 7: 03:24:47.014098       203.0.113.3 > 203.0.113.2: icmp: echo request
 8: 03:24:47.014510       203.0.113.2 > 203.0.113.3: icmp: echo reply
```

## Download from the ASA for Offline Analysis

There are a couple of ways to download the packet captures for analysis offline:

1. Navigate to

   https://<ip_of_asa>/admin/capture/<capture_name>/pcap

   on any browser.

**Tip**: If you leave out the **pcap** keyword, then only the equivalent of the **show capture <cap_name>** command output is provided.

1. Enter the copy capture command and your preferred file transfer protocol in order to download the capture:

```
copy /pcap capture:<capture-name> tftp://<server-ip-address>
```

**Tip**: When you troubleshoot an issue with the use of packet captures, Cisco recommends that you download the captures for offline analysis.

## Clear a Capture

In order to clear the capture buffer, enter the **clear capture <capture-name>** command:

<#root>

```
ASA#
show capture

 capture capin type raw-data interface inside [Capturing - 8190 bytes]
 match icmp any any
 capture capout type raw-data interface outside [Capturing - 11440 bytes]
 match icmp any any

 ASA#
clear cap capin

 ASA#
clear cap capout

 ASA#
 show capture

 capture capin type raw-data interface inside [Capturing - 0 bytes]
 match icmp any any
 capture capout type raw-data interface outside [Capturing - 0 bytes]
 match icmp any any
```

Enter the **clear capture /all** command in order to clear the buffer for all captures:

<#root>

```
ASA#
clear capture /all
```

## Stop a Capture

The only way to stop a capture on the ASA is to disable it completely with this command:

```
no capture <capture-name>
```

# Verify

There is currently no verification procedure available for this configuration.

# Troubleshoot

There is currently no specific troubleshoot information available for this configuration.