RADIUS NAS-IP-Address Attribute Configurability

The RADIUS NAS-IP-Address Attribute Configurability feature allows you to configure an arbitrary IP address to be used as RADIUS attribute 4, NAS-IP-Address, without changing the source IP address in the IP header of the RADIUS packets. This feature may be used for situations in which service providers are using a cluster of small network access servers (NASs) to simulate a large NAS to improve scalability. This feature allows the NASs to behave as a single RADIUS client from the perspective of the RADIUS server.

Feature History for RADIUS NAS-IP-Address Attribute Configurability

Release	Modification
12.3(3)B	This feature was introduced.
12.3(7)T	This feature was integrated into Cisco IOS Release 12.3(7)T.
12.2(27)SBA	This feature was integrated into Cisco IOS Release 12.2(27)SBA.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

Cisco Systems

Corporate Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Contents

- Prerequisites for RADIUS NAS-IP-Address Attribute Configurability, page 2
- Restrictions for RADIUS NAS-IP-Address Attribute Configurability, page 2
- Information About RADIUS NAS-IP-Address Attribute Configurability, page 3
- How to Configure RADIUS NAS-IP-Address Attribute Configurability, page 4
- Configuration Examples for RADIUS NAS-IP-Address Attribute Configurability, page 6
- Additional References, page 6
- Command Reference, page 7

Prerequisites for RADIUS NAS-IP-Address Attribute Configurability

- You must be familiar with IP Security (IPSec).
- You must be familiar with configuring both RADIUS servers and authentication, authorization, and accounting (AAA). Before configuring this feature, you must first set up the RADIUS server and the AAA lists.

Restrictions for RADIUS NAS-IP-Address Attribute Configurability

The following restrictions apply if a cluster of RADIUS clients are being used to simulate a single RADIUS client for scalability. Solutions, or workarounds, to the restrictions are also provided.

- RADIUS attribute 44, Acct-Session-Id, may overlap among sessions from different NASs.

  There are two solutions. Either the **radius-server attribute 44 extend-with-addr** or **radius-server unique-ident** command can be used on NAS routers to specify different prepending numbers for different NAS routers.

- RADIUS server-based IP address pool for different NASs must be managed.

  The solution is to configure different IP address pool profiles for different NASs on the RADIUS server. Different NASs use different pool usernames to retrieve them.

- RADIUS request message for sessions from different NASs must be differentiated.

  One of the solutions is to configure different format strings for RADIUS attribute 32, NAS-Identifier, using the **radius-server attribute 32 include-in-access-req** command on different NASs.

Information About RADIUS NAS-IP-Address Attribute Configurability

To configure the RADIUS NAS-IP-Address Attribute Configurability feature, you should understand the following concepts:

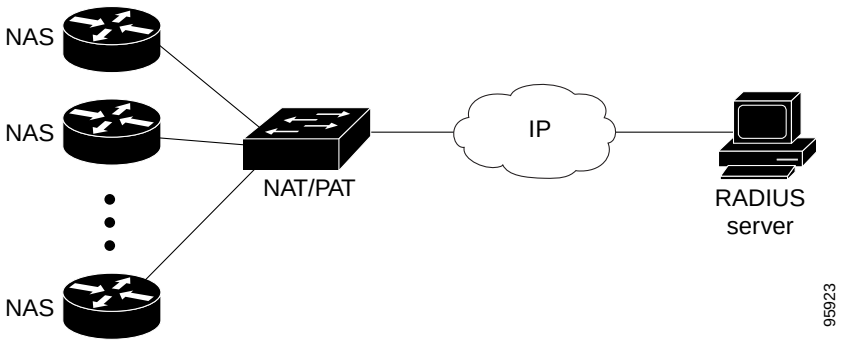
- Problem Definition and Solution Background Information, page 3
- Using the RADIUS NAS-IP-Address Attribute Configurability Feature, page 4

Problem Definition and Solution Background Information

To simulate a large NAS RADIUS client using a cluster of small NAS RADIUS clients, as shown in Figure 1, a Network Address Translation (NAT) or Port Address Translation (PAT) device is inserted in a network. The device is placed between a cluster of NASs and the IP cloud that is connected to a RADIUS server. When RADIUS traffic from different NASs goes through the NAT or PAT device, the source IP addresses of the RADIUS packets are translated to a single IP address, most likely an IP address on a loopback interface on the NAT or PAT device. Different User Datagram Protocol (UDP) source ports are assigned to RADIUS packets from different NASs. When the RADIUS reply comes back from the server, the NAT or PAT device receives it, uses the destination UDP port to translate the destination IP address back to the IP address of the NAS, and forwards the reply to the corresponding NAS.

Figure 1 demonstrates how the source IP addresses of several NASs are translated to a single IP address as they pass through the NAT or PAT device on the way to the IP cloud.

Figure 1 NAS Addresses Translated to a Single IP Address



RADIUS servers normally check the source IP address in the IP header of the RADIUS packets to track the source of the RADIUS requests and to maintain security. The NAT or PAT solution satisfies these requirements because only a single source IP address is used even though RADIUS packets come from different NAS routers.

However, when retrieving accounting records from the RADIUS database, some billing systems use RADIUS attribute 4, NAS-IP-Address, in the accounting records. The value of this attribute is recorded on the NAS routers as their own IP addresses. The NAS routers are not aware of the NAT or PAT that runs between them and the RADIUS server; therefore, different RADIUS attribute 4 addresses will be recorded in the accounting records for users from the different NAS routers. These addresses eventually expose different NAS routers to the RADIUS server and to the corresponding billing systems.

Using the RADIUS NAS-IP-Address Attribute Configurability Feature

The RADIUS NAS-IP-Address Attribute Configurability feature allows you to freely configure an arbitrary IP address as RADIUS NAS-IP-Address, RADIUS attribute 4. By manually configuring the same IP address, most likely the IP address on the loopback interface of the NAT or PAT device, for all the routers, you can hide a cluster of NAS routers behind the NAT or PAT device from the RADIUS server.

How to Configure RADIUS NAS-IP-Address Attribute Configurability

This section contains the following procedures:

- Configuring a RADIUS NAS-IP-Address Attribute Configurability, page 4
- Monitoring and Maintaining RADIUS NAS-IP-Address Attribute Configurability, page 5

Configuring a RADIUS NAS-IP-Address Attribute Configurability

Before configuring the RADIUS NAS-IP-Address Attribute Configurability feature, you must have configured the RADIUS servers or server groups and AAA method lists.

To configure the RADIUS NAS-IP-Address Attribute Configurability feature, perform the following steps.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **radius-server attribute 4** *ip-address*

DETAILED STEPS

	Command or Action	Purpose

Step 1	`enable`
	
	Example:
	`Router> enable`
		Enables privileged EXEC mode.
		• Enter your password if prompted.

Step 2	`configure terminal`
	
	Example:
	`Router# configure terminal`
		Enters global configuration mode.

Step 3	`radius-server attribute 4` *ip-address* **Example:** `Router (config)# radius-server attribute 4 10.2.1.1`	Configures an IP address to be used as the RADIUS NAS-IP-Address, attribute 4.

Monitoring and Maintaining RADIUS NAS-IP-Address Attribute Configurability

To monitor the RADIUS attribute 4 address that is being used inside the RADIUS packets, use the **debug radius** command.

SUMMARY STEPS

1. **enable**
2. **debug radius**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**debug radius** **Example:** `Router# debug radius`	Displays information associated with RADIUS.

Examples

The following sample output is from the **debug radius** command:

```
Router# debug radius

RADIUS/ENCODE(0000001C): acct_session_id: 29
RADIUS(0000001C): sending
RADIUS(0000001C): Send Access-Request to 10.0.0.10:1645 id 21645/17, len 81
RADIUS:  authenticator D0 27 34 C0 F0 C4 1C 1B - 3C 47 08 A2 7E E1 63 2F
RADIUS:  Framed-Protocol      [7]   6   PPP                         [1]
RADIUS:  User-Name            [1]   18  "shashi@pepsi.com"
RADIUS:  CHAP-Password        [3]   19  *
RADIUS:  NAS-Port-Type        [61]  6   Virtual                     [5]
RADIUS:  Service-Type         [6]   6   Framed                      [2]
RADIUS:  NAS-IP-Address       [4]   6   10.0.0.21
UDP: sent src=10.1.1.1(21645), dst=10.0.0.10(1645), length=109
UDP: rcvd src=10.0.0.10(1645), dst=10.1.1.1(21645), length=40
RADIUS: Received from id 21645/17 10.0.0.10:1645, Access-Accept, len 32
RADIUS:  authenticator C6 99 EC 1A 47 0A 5F F2 - B8 30 4A 4C FF 4B 1D F0
RADIUS:  Service-Type         [6]   6   Framed                      [2]
RADIUS:  Framed-Protocol      [7]   6   PPP                         [1]
RADIUS(0000001C): Received from id 21645/17
```

Configuration Examples for RADIUS NAS-IP-Address Attribute Configurability

This section provides the following configuration example:

- Configuring a RADIUS NAS-IP-Address Attribute Configurability: Example, page 6

Configuring a RADIUS NAS-IP-Address Attribute Configurability: Example

The following example shows that IP address 10.0.0.21 has been configured as the RADIUS NAS-IP-Address attribute:

```
radius-server attribute 4 10.0.0.21
radius-server host 10.0.0.10 auth-port 1645 acct-port 1646 key cisco
```

Additional References

The following sections provide references related to RADIUS NAS-IP-Address Attribute Configurability.

Related Documents

Related Topic	Document Title
Configuring AAA	"Authentication, Authorization, and Accounting (AAA)" section of *Cisco IOS Security Configuration Guide*
Configuring RADIUS	"Configuring RADIUS" chapter of *Cisco IOS Security Configuration Guide*
RADIUS commands	*Cisco IOS Security Command Reference*, Release 12.3 T
Other security commands	*Cisco IOS Security Command Reference*, Release 12.3 T

Standards

Standards	Title
No new or modified standards are supported by this feature.	—

MIBs

MIBs	MIBs Link
No new or modified MIBs are supported by this feature.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFCs	Title
No new or modified RFCs are supported by this feature.	—

Technical Assistance

Description	Link
Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/public/support/tac/home.shtml

Command Reference

This section documents the following new command.

radius-server attribute 4

radius-server attribute 4

To configure an IP address for the RADIUS attribute 4 address, use the **radius-server attribute 4** command in global configuration mode. To delete an IP address as the RADIUS attribute 4 address, use the **no** form of this command.

radius-server attribute 4 *ip-address*

no radius-server attribute 4 *ip-address*

Syntax Description

ip-address	IP address to be configured as RADIUS attribute 4 inside RADIUS packets.

Defaults

If this command is not configured, the RADIUS NAS-IP-Address attribute will be the IP address on the interface that connects the network access server (NAS) to the RADIUS server.

Command Modes

Global configuration

Command History

Release	Modification
12.3(3)B	This command was introduced.
12.3(7)T	This command was integrated into Cisco IOS Release 12.3(7)T.
12.2(27)SBA	This command was integrated into Cisco IOS Release 12.2(27)SBA.

Usage Guidelines

Normally, when the **ip radius-source interface** command is configured, the IP address on the interface that is specified in the command is used as the IP address in the IP headers of the RADIUS packets and as the RADIUS attribute 4 address inside the RADIUS packets.

However, when the **radius-server attribute 4** command is configured, the IP address in the command is used as the RADIUS attribute 4 address inside the RADIUS packets. There is no impact on the IP address in the IP headers of the RADIUS packets.

If both commands are configured, the IP address that is specified in the **radius-server attribute 4** command is used as the RADIUS attribute 4 address inside the RADIUS packets. The IP address on the interface that is specified in the **ip radius-source interface** command is used as the IP address in the IP headers of the RADIUS packets.

Some authentication, authorization, and accounting (AAA) clients (such as PPP, virtual private dial-up network [VPDN] or Layer 2 Tunneling Protocol [L2TP], Voice over IP [VoIP], or Service Selection Gateway [SSG]) may try to set the RADIUS attribute 4 address using client-specific values. For example, on an L2TP network server (LNS), the IP address of the L2TP access concentrator (LAC) could be specified as the RADIUS attribute 4 address using a VPDN or L2TP command. When the **radius-server attribute 4** command is configured, the IP address specified in the command takes precedence over all IP addresses from AAA clients.

During RADIUS request retransmission and during RADIUS server failover, the specified IP address is always chosen as the value of the RADIUS attribute 4 address.

Examples

The following example shows that the IP address 10.0.0.21 has been configured as the RADIUS NAS-IP-Address attribute:

```
radius-server attribute 4 10.0.0.21
radius-server host 10.0.0.10 auth-port 1645 acct-port 1646 key cisco
```

The following **debug radius** command output shows that 10.0.0.21 has been successfully configured.

```
Router# debug radius

RADIUS/ENCODE(0000001C): acct_session_id: 29
RADIUS(0000001C): sending
RADIUS(0000001C): Send Access-Request to 10.0.0.10:1645 id 21645/17, len 81
RADIUS:  authenticator D0 27 34 C0 F0 C4 1C 1B - 3C 47 08 A2 7E E1 63 2F
RADIUS:  Framed-Protocol     [7]   6   PPP                       [1]
RADIUS:  User-Name           [1]   18  "shashi@pepsi.com"
RADIUS:  CHAP-Password       [3]   19  *
RADIUS:  NAS-Port-Type       [61]  6   Virtual                   [5]
RADIUS:  Service-Type        [6]   6   Framed                    [2]
RADIUS:  NAS-IP-Address      [4]   6   10.0.0.21
UDP: sent src=11.1.1.1(21645), dst=10.0.0.10(1645), length=109
UDP: rcvd src=10.0.0.10(1645), dst=10.1.1.1(21645), length=40
RADIUS: Received from id 21645/17 10.0.0.10:1645, Access-Accept, len 32
RADIUS:  authenticator C6 99 EC 1A 47 0A 5F F2 - B8 30 4A 4C FF 4B 1D F0
RADIUS:  Service-Type        [6]   6   Framed                    [2]
RADIUS:  Framed-Protocol     [7]   6   PPP                       [1]
RADIUS(0000001C): Received from id 21645/17
```

Related Commands

Command	Description
ip radius-source interface	Forces RADIUS to use the IP address of a specified interface for all outgoing RADIUS packets.