

RADIUS NAS-IP-Address Attribute Configurability

The RADIUS NAS-IP-Address Attribute Configurability feature allows an arbitrary IP address to be configured and 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.

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Prerequisites for RADIUS NAS-IP-Address Attribute Configurability

The following requirements are necessary before configuring this feature:

- Experience with IP Security (IPSec) and configuring both RADIUS servers and authentication, authorization, and accounting (AAA) is necessary.
- RADIUS server and AAA lists must be configured.

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.

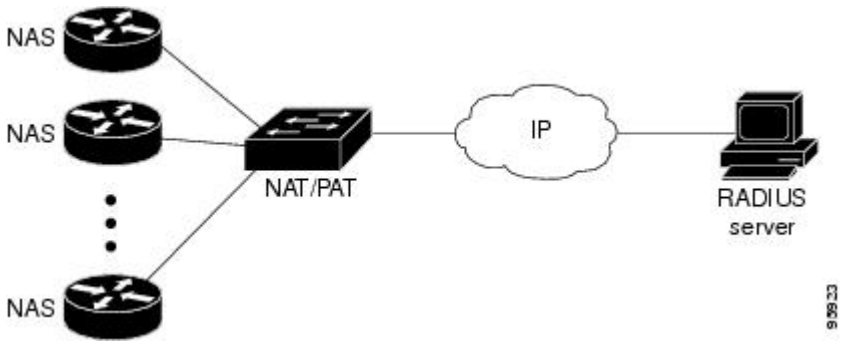
- RADIUS request message for sessions from different NASs must be differentiated.

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 simulate a large NAS RADIUS client using a cluster of small NAS RADIUS clients, as shown in the figure below, 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.

The figure below 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.



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

Configuring 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

Procedure

	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

Procedure

	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.

Example

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

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: Securing User Services*
Configuring RADIUS	" Configuring RADIUS " module.
RADIUS commands	*Cisco IOS Security Command Reference*

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
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/techsupport

Feature Information for RADIUS NAS-IP-Address Attribute Configurability

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Table 1: Feature Information for RADIUS NAS-IP-Address Attribute Configurability

Feature Name	Releases	Feature Information
RADIUS NAS-IP-Address Attribute Configurability	Cisco IOS XE Release 3.9S	This feature allows an arbitrary IP address to be configured and used as RADIUS attribute 4, NAS-IP-Address, without changing the source IP address in the IP header of the RADIUS packets. The **radius-server attribute 4** command was introduced this feature.