



Mobile IP Home Agent Accounting

In Cisco IOS Mobile IP, the home agent keeps track of the location of the mobile node as it roams away from its home network and forwards all traffic destined to the mobile node to its new location on the Internet. The Mobile IP--Home Agent Accounting feature allows the home agent to generate the following three new accounting messages that are forwarded to the authentication, authorization, and accounting (AAA) server or the Service Selection Gateway (SSG):

- Accounting Start
- Accounting Update
- Accounting Stop

The SSG can act as the proxy server for the AAA server and acknowledge the accounting messages sent by the home agent. The accounting records generated by the home agent can be stored on the AAA server and be used by Internet service providers (ISPs) for billing, capacity planning, and operations.

Feature Specifications for the Mobile IP: Home Agent Accounting Feature

Feature History	
Release	Modification
12.2(15)T	This feature was introduced.
Supported Platforms	
For platform supported in Cisco IOS Release 12.2(15)T consult Cisco Feature Navigator.	

- [Finding Feature Information, page 2](#)
- [Prerequisites for Mobile IP Home Agent Accounting, page 2](#)
- [Information About Mobile IP Home Agent Accounting, page 2](#)
- [How to Configure Mobile IP Home Agent Accounting, page 4](#)
- [Configuration Examples for Mobile IP Home Agent Accounting, page 9](#)

- [Additional References](#), page 9
- [Command Reference](#), page 11
- [Glossary](#), page 12

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

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.

Prerequisites for Mobile IP Home Agent Accounting

Because home agent accounting generates messages for the AAA server, the network should have a reachable AAA server or SSG.

Information About Mobile IP Home Agent Accounting

Service Selection Gateway

The SSG is a switching solution for service providers that offer intranet, extranet, and Internet connections to subscribers using broadband access technology such as digital subscriber lines (DSL), cable modems, or wireless to allow simultaneous access to network services.

The SSG communicates with the AAA management network where RADIUS, Dynamic Host Configuration Protocol (DHCP), and Simple Network Management Protocol (SNMP) servers reside and with the ISP network, which may connect to the Internet, corporate networks, and value-added services.

SSG is designed and deployed such that all network traffic passes through it.

Feature Design of Home Agent Accounting

The SSG collects all the statistics information because all network traffic passes through it. However, it does not have the Mobile IP session information that the home agent maintains. The session information tracks how long a mobile node session lasts.

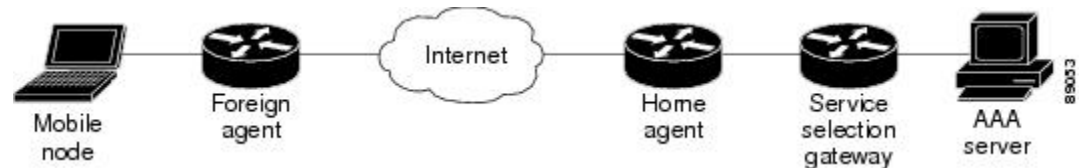


Note

This feature was developed for the SSG to act as the proxy server for the AAA. However, this feature works equally well without the SSG and any standard AAA server can accept home agent accounting messages.

For each mobile node, the home agent sends this session information to the SSG in the form of messages, which are described in the following sections. The SSG forwards the messages to the AAA server as shown in the figure below.

Figure 1: Topology for Home Agent Accounting with SSG and AAA Server



Message Types

The following messages are sent from the home agent to the SSG or AAA server:

Accounting Start

The home agent sends an Accounting Start message to the SSG/AAA when a mobile node successfully registers for the first time. This indicates the start of a new Mobile IP session for a mobile node.

In the case of a redundant home agent, a standby home agent will send an Accounting Start message only when it becomes active and does not have any bindings. This allows the SSG to maintain host objects for mobile nodes on the failed home agent.

Accounting Update

The home agent generates an Accounting Update message when the mobile node changes its point of attachment (POA) in the mobile network. For a Mobile IP session, this corresponds to a successful re-registration from a mobile node when it changes its care-of address (CoA). The CoA is the current location of the mobile node on the foreign network.

Accounting Stop

The home agent sends an Accounting Stop message to indicate that the Mobile IP session has ended. This occurs when the lifetime of the mobile node expires, when the mobile node sends a successful deregistration request, or when the home agent is unconfigured by a network administrator.

Message Formats

All the messages contain only the following information:

- Network access identifier (NAI). This field is the name of the mobile node. The NAI is a character string that can be a unique identifier (username@realm) or a group identifier (realm).
- Network access server (NAS) IP. This field is the IP address of the accounting node. The home agent is the accounting node, so this field contains the home agent address.
- Framed IP address. This field is the IP address of the mobile node. Typically, the home agent will allocate an IP address to a mobile node after successful registration.
- Point of attachment (POA). This field indicates the POA for the mobile node on the network. For a Mobile IP session, this is the care-of address of the mobile node.

The message format is shown in the table below, including the RADIUS attribute number, which is transparent to the Mobile IP--Home Agent Accounting feature.

Table 1: Accounting Record Attributes

RADIUS Attribute Number	Attribute	Description
1	NAI/User-Name	Mobile node user name.
4	NAS IP Address	Accounting node IP address
8	Framed IP Address	IP address of the mobile node.
66	Tunnel-Client-Endpoint	This attribute is used to indicate POA/CoA address, because there is no CoA attribute. This choice of attribute works because the Mobile IP tunnel terminates on the CoA/POA and qualifies as Tunnel-Client-Endpoint.
40, 2	Acct_status_type	Indicates the accounting Start/Stop/Update for the service.

Benefits of Home Agent Accounting

The Mobile IP--Home Agent Accounting feature allows ISPs to bill consumers based on the usage of the service. The accounting information is stored on a AAA server database and used by billing software to charge for service usage for each mobile node. The ISPs can use this accounting information for billing, capacity planning, and operations.

How to Configure Mobile IP Home Agent Accounting

Configuring AAA

Access control is the way you manage who has user access to the network server and what services the users are allowed to use. AAA network security services provide the primary framework through which you set up access control on your router or access server.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **aaa new-model**
4. **aaa accounting network {default | *list-name*} start-stop group *group-name***
5. **aaa accounting update newinfo**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables higher privilege levels, such as privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	aaa new-model Example: Router(config)# aaa new-model	Enables AAA access control.
Step 4	aaa accounting network {default <i>list-name</i>} start-stop group <i>group-name</i> Example: Router(config)# aaa accounting network mylist start-stop group radius	Enables AAA accounting of requested services for billing or security purposes. • This command creates an accounting method list for network accounting and instructs the home agent to send network events for Mobile IP. The method list can be of any name or default. • The start-stop keyword indicate that the home agent will send Start and Stop records to the SSG or AAA server.
Step 5	aaa accounting update newinfo Example: Router(config)# aaa accounting update newinfo	Enables periodic interim accounting records to be sent to the accounting server. • This command instructs the home agent to send an Accounting Update message to the SSG or AAA server when a mobile node changes its POA and acquires a new care-of address.

Configuring RADIUS

RADIUS is a method for defining the exchange of AAA information in the network. In the Cisco implementation, RADIUS clients run on Cisco routers and send authentication requests to a RADIUS server that contains all user authentication and network server access information.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **radius-server host {hostname | ip-address}[auth-port port-number] [acct-port port-number]**
4. **radius-server retransmit retries**
5. **radius-server key {0 string | 7 string | string}**
6. **radius-server attribute 44 include-in-access-req**

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 host {hostname ip-address}[auth-port port-number] [acct-port port-number] Example: Router(config)# radius-server host 128.107.162.173 auth-port 1645 acct-port 1646	Specifies a RADIUS server host.
Step 4	radius-server retransmit retries Example: Router(config)# radius-server retransmit 3	Specifies the number of times the Cisco IOS software searches the list of RADIUS server hosts before giving up.
Step 5	radius-server key {0 string 7 string string} Example: Router(config)# radius-server key cisco	Sets the authentication and encryption key for all RADIUS communications between the router and the RADIUS daemon.

	Command or Action	Purpose
Step 6	radius-server attribute 44 include-in-access-req Example: <pre>Router(config)# radius-server attribute 44 include-in-access-req</pre>	(Optional) Sends RADIUS attribute 44 in access-request packets.

Enabling Home Agent Accounting

To enable home agent accounting, use the following commands:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip mobile home-agent accounting {default | *list-name*}**
4. **ip mobile home-agent address *ip-address***
5. **ip mobile host {*lower*[*upper*] | nai *string*} {interface *name*}**
6. **ip mobile secure {host {*lower-address*[*upper-address*] | nai *string*} spi *spi* key hex *string* algorithm {md5 | hmac-md5} mode *prefix-suffix*}**
7. **end**
8. **show ip mobile globals**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: <pre>Router> enable</pre>	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: <pre>Router# configure terminal</pre>	Enters global configuration mode.
Step 3	ip mobile home-agent accounting {default <i>list-name</i>}	Enables home agent accounting.

	Command or Action	Purpose
	Example: <pre>Router(config)# ip mobile home-agent accounting mylist</pre>	Applies the method list defined in the aaa accounting command.
Step 4	ip mobile home-agent address <i>ip-address</i> Example: <pre>Router(config)# ip mobile home-agent address 10.3.3.1</pre>	Enables and controls home agent services.
Step 5	ip mobile host <i>{lower[upper] nai string}</i> <i>{interface name}</i> Example: <pre>Router(config)# ip mobile host 10.3.3.2 10.3.3.5 interface ethernet2/2</pre>	Configures the mobile node or mobile host group.
Step 6	ip mobile secure <i>{host {lower-address[upper-address] nai string} spi spi key hex string algorithm {md5 hmac-md5} mode prefix-suffix}</i> Example: <pre>Router(config)# ip mobile secure host 10.3.3.2 spi 1000 key hex 123456781234567812345678123245678 algorithm md5 mode prefix-suffix</pre>	Specifies the mobility security associations for the mobile host.
Step 7	end Example: <pre>Router(config)# end</pre>	Exits to privileged EXEC mode.
Step 8	show ip mobile globals Example: <pre>Router# show ip mobile globals</pre>	Displays global information for mobile agents. See the display output in the Examples section. Notice that the HA accounting field shows enabled status.

Examples

The following sample output shows the home agent accounting status:

```
Router# show ip mobile globals
IP Mobility global information:
Home Agent
  Registration lifetime: INFINITE
  Broadcast enabled
  Replay protection time: 10 secs
  Reverse tunnel enabled
```

```
ICMP Unreachable enabled
Strip realm disabled
NAT detect disabled
HA Accounting enabled using method list: mylist
Address 10.3.3.1
Foreign Agent is not enabled, no care-of address
Mobility Agent
1 interfaces providing service
Encapsulations supported: IPIP and GRE
Tunnel fast switching enabled
Discovered tunnel MTU aged out after 1:00:00
```

Troubleshooting Tips

In the event that home agent accounting is not operating correctly, use the following **debug** commands in privileged EXEC mode to determine where the problem may exist:

- **debug aaa accounting**
- **debug radius**
- **debug ip mobile**

See the *Cisco IOS Debug Command Reference* publication for information about these commands.

Configuration Examples for Mobile IP Home Agent Accounting

Home Agent Accounting Example

In the following example, an accounting method list called *mylist* is created for network accounting. The accounting method list, *mylist*, is applied at the home agent, which enables home agent accounting.

```
!
aaa new-model
!
!
aaa accounting mylist start-stop group radius
aaa accounting update newinfo
!
!
ip mobile home-agent accounting mylist address 10.3.3.1
ip mobile host 10.3.3.2 10.3.3.5 interface Ethernet2/2
ip mobile secure host 10.3.3.2 spi 1000 key hex 123456781234567812345678123245678 algorithm
md5 mode prefix-suffix
!
!
radius-server host 128.107.162.173 auth-port 1645 acct-port 1646
radius-server retransmit 3
radius-server key cisco
```

Additional References

For additional information related to Mobile IP--Home Agent Accounting feature, refer to the following references:

Related Documents

Related Topic	Document Title
Mobile IP configuration tasks	"Configuring Mobile IP" chapter in the <i>Cisco IOS IP Configuration Guide</i> , Release 12.2
Mobile IP commands: complete command syntax, command mode, defaults, usage guidelines, and examples	"Mobile IP Commands" chapter in the <i>Cisco IOS IP Command Reference, Volume 1 of 3: Addressing and Services</i> , Release 12.2T
AAA configuration tasks	<i>Cisco IOS Security Configuration Guide</i> , Release 12.2
AAA commands: complete command syntax, command mode, defaults, usage guidelines, and examples	<i>Cisco IOS Security Command Reference</i> , Release 12.2T
RADIUS configuration tasks	<i>Cisco IOS Security Configuration Guide</i> , Release 12.2
RADIUS commands: complete command syntax, command mode, defaults, usage guidelines, and examples	<i>Cisco IOS Security Command Reference</i> , Release 12.2T
SSG configuration tasks and commands	"Service Selection Gateway" feature document, Release 12.2(8)T

Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	--

MIBs

MIBs	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL: http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

<http://tools.cisco.com/ITDIT/MIBS/servlet/index>

If Cisco MIB Locator does not support the MIB information that you need, you can also obtain a list of supported MIBs and download MIBs from the Cisco MIBs page at the following URL:

<http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>

To access Cisco MIB Locator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

<http://www.cisco.com/register>

RFCs

RFCs	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified 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, tools, and lots more. 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

The following commands are introduced or modified in the feature or features documented in this module. For information about these commands, see the *Cisco IOS IP Mobility Command Reference* at http://www.cisco.com/en/US/docs/ios/ipmobility/command/reference/imo_book.html. For information about all Cisco IOS commands, go to the Command Lookup Tool at <http://tools.cisco.com/Support/CLILookup> or to the *Cisco IOS Master Commands List*.

- **ip mobile home-agent accounting**
- **show ip mobile globals**

Glossary

care-of address --The termination point of the tunnel to a mobile node or mobile router. This can be a collocated care-of address, by which the mobile node or mobile router acquires a local address and detunnels its own packets, or a foreign agent care-of address, by which a foreign agent detunnels packets and forwards them to the mobile node or mobile router. The care-of address is included in the Mobile IP registration request and is used by the home agent to forward packets to the mobile node in its current location.

foreign agent --A router on the visited network of a foreign network that provides routing services to the mobile node while registered. The foreign agent detunnels and delivers packets to the mobile node or mobile router that were tunneled by the home agent of the mobile node. For packets sent by a mobile node, the foreign agent may serve as a default router for registered mobile nodes.

home agent --A router on a home network of the mobile node or that tunnels packets to the mobile node or mobile router while they are away from home. It keeps current location information for registered mobile nodes called a mobility binding.

mobile node --A host or router that changes its point of attachment from one network or subnet to another. A mobile node may change its location without changing its IP address; it may continue to communicate with other Internet nodes at any location using its home IP address, assuming that link-layer connectivity to a point of attachment is available.

NAI --Network access identifier. The user ID submitted by the mobile node during registration to identify the user for authentication. The NAI may help route the registration request to the correct home agent.



Note

Refer to the [Internetworking Terms and Acronyms](#) for terms not included in this glossary.
