CHAPTER 3

Assigning a Home Address on the Home Agent

This chapter discusses how the Cisco Mobile Wireless Home Agent assigns home addresses to a mobile note, the different address types, and provides configuration details and examples.

This chapter includes the following sections:

Home Address Assignment

The Home Agent assigns a home address to the mobile node based on user NAI received during Mobile IP registration. The IP addresses assigned to a mobile station may be statically or dynamically assigned. The Home Agent does not permit simultaneous registrations for different NAIs with the same IP address, whether it is statically or dynamically assigned.

Static IP Address

Note Use of private addresses for Mobile IP services requires reverse tunneling between the PDSN/FA and the Home Agent.

The mobile user proposes the configured or available address as a non-zero home address in the registration request message. The Home Agent may accept this address, or return another address in the registration reply message. The Home Agent may obtain the IP address by accessing the home AAA server or DHCP server. The home AAA server may return the name of a local pool, or a single IP address. On successful Mobile IP registration, Mobile IP based services are made available to the user.

Static Home Addressing Without NAI

address served as the “user name” portion of the authentication. Static addressing can be beneficial because it allows each device to keep the same address all the time no matter where it is attached to the network. This allows the user to run mobile terminated services without updating the DNS, or some other form of address resolution. It is also easy to manage MNs with static addressing because the home address and the Home Agent are always the same. However, provisioning and maintenance are much more difficult with static addressing because address allocation must be handled manually, and both the Home Agent and MN must be updated. Here is an example configuration:

```
router (config)# ip mobile host 10.0.0.5 interface FastEthernet0/0
router (config)#                10.0.0.10 10.0.0.15 interface FastEthernet0/0
router (config)# ip mobile secure host 10.0.0.12 spi 100 key ascii secret
```

Static Home Addressing with NAI

Static home addressing can also be used in conjunction with NAI to support an NAI-based authorization and other services. It is also possible to allow a single user to use multiple static IP addresses either on the same device, or multiple devices, while maintaining only one AAA record and security association. A user must be authorized to use an address before the registration will be accepted. Addresses can be authorized either locally, or through a AAA server. If a MN requests an address which is already associated with a binding that has a different NAI, the HA will attempt to return another address from the pool unless the command is set.

Here is a sample configuration:

```
ip mobile home-agent reject-static-addr
```

Local Authorization

user *user@realm*
@realm

```
                                  user@staticuser.com               10.0.0.1 10.0.0.2
interface FastEthernet0/0
             ip mobile host nai                    static-address local-pool
static-pool interface FastEthernet0/0
             ip mobile host nai             static-address local-pool static-pool
```

static-ip-addresses **static-ip-pool**
static-ip-addresses

Radius Attributes:

Cisco-AVPair = “mobileip:static-ip-addresses=10.0.0.1 10.0.0.2 10.0.0.3”

Cisco-AVPair = “mobileip:static-ip-pool=static-pool”

Dynamic Home Agent Assignment

- 0.0.0.0 in the Home Agent field. Upon authentication/authorization, the PDSN retrieves the HA’s IP address. The PDSN then uses this address to forward the Registration Request to the HA, but does not update the actual HA address field in the Registration Request.

  The Home Agent sends a Registration Reply, and places it’s own IP address in the Home Agent field. At this point, any re-registration requests that are received would contain the Home Agent’s IP address in the Home Agent field.

  The second qualification is a function of the PDSN/Foreign Agent, and is included here for completeness. In this case, a AAA server is used to perform the dynamic Home Agent assignment function. Depending on network topology, either the local-AAA, or the home-AAA server would perform this function. When an access service provider is also serving as an ISP, Home Agents would be located in the access provider network. In this service scenario, a local-AAA server would perform Home Agent assignment function. Based on the user NAI received in the access request message, the AAA server would return an elected Home Agent’s address in an access reply message to the PDSN.

  A pool of Home Agent addresses is typically configured at the AAA server. For the access provider serving as an ISP, multiple pools of Home Agents could be configured at the local AAA server; however, this depends on SLAs with the domains for which Mobile IP, or proxy-Mobile IP services are supported. You can configure the Home Agent selection procedure at the AAA server, using either a round-robin or a hashing algorithm over user NAI selection criteria.

The PDSN/Foreign Agent sends the Registration Request to the Home Agent; however, there is no IP address in the HA field of the MIP RRQ (it is 0.0.0.0). When the PDSN retrieves the IP address from AAA, it does not update the MIP RRQ; instead, it forwards the RRQ to the HA address retrieved. The PDSN cannot alter the MIP RRQ because it does not know the MN-HA SPI, and key value (which contains the IP address of the Home Agent in the "Home Agent" field). Depending on network topology, either the local AAA, or the home AAA server would perform this function. In situations where the Home Agents are located in the access provider network, the local AAA server would perform Home Agent assignment function. Additionally, multiple pools of Home Agents could be configured at the local AAA server, depending on SLAs with the domains for which Mobile IP, or proxy Mobile IP services are supported.

It is not necessary for a home IP address to be configured in the mobile station to access packet data services. A mobile user may request a dynamically assigned address by proposing an all-zero home address in the registration request message. The Home Agent assigns a home address and returns it to the MN in the registration reply message. The Home Agent obtains the IP address by accessing the home AAA server. The AAA server returns the name of a local pool or a single IP address. On successful registration, Mobile IP based services are made available to the user.

Fixed Addressing

Note

user@realm.com

Local Pool Assignment

Note

@localpool.com pool local mippool
virtual-network 10.0.0.0 255.255.255.0

SNMP Traps to Track Utilization of Local IP Pool

- *threshold* **ip local pool**

DHCP Allocation

@dhcppool1.com address **dhcp-proxy-client**
dhcp-server 10.1.2.3 *FastEthernet 0/0*

Dynamic Addressing from AAA

```
        10.0.0.5 10.0.0.10
user@staticuser.com           FastEthernet0/0
@static.com           FastEthernet0/0
```

Cisco-AVPair = “mobileip:ip-address=65.0.0.71”

AAA Local Pool attribute:
Cisco-AVPair = “mobileip:ip-pool=dynamic-pool”

AAA DHCP server attribute:
Cisco-AVPair = “mobileip:dhcp-server=10.1.5.10”

On-Demand Address Pool (ODAP)

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Configuring ODAP-based Address Allocation

	Command	Purpose
Step 1	`Router(config)#`	

Here is an example:

Router (config)#**ip mobile host nai** @ispbar2.com address pool dhcp-pool ha-dhcp-pool

ODAP Restrictions

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-
-

Address Assignment for Same NAI - Multiple Static Addresses

Address Assignment For Same NAI - Different Mobile Terminal

-
-
-
-

Additionally, two flows originating from the same mobile using the same NAI—but two different Home Agents—are viewed as independent cases.

Configuration Examples

ODAP Redundancy Configuration

Active-HA configuration

```
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname mwt10-7206b
!
redundancy inter-device
 scheme standby cisco
!
ipc zone default
 association 1
  no shutdown
  protocol sctp
   local-port 500
    local-ip 10.0.0.2
   remote-port 500
    remote-ip 10.0.0.3
aaa new-model
!
aaa authentication ppp default local group radius
aaa authorization config-commands
aaa authorization ipmobile default group radius
aaa authorization network default group radius
aaa session-id common
!
ip dhcp ping packet 0
ip dhcp pool ha-dhcp-pool
   origin dhcp subnet size initial /30 autogrow /30
ip subnet-zero
ip cef
!
interface Ethernet2/0
 description to PDSN/FA
 ip address 10.0.0.2 255.0.0.0
 no ip route-cache
 no ip mroute-cache
 duplex half
 standby ip 10.0.0.4
 standby priority 110
 standby preempt delay min 100
 standby name cisco
!
interface Ethernet2/2
 description to AAA
 ip address 172.16.1.8 255.255.0.0
 no ip route-cache
 no ip mroute-cache
 duplex half
!
router mobile
!
ip classless
```

```
no ip http server
ip pim bidir-enable
ip mobile home-agent
ip mobile home-agent redundancy cisco
ip mobile virtual-network 33.0.0.0 255.0.0.0
ip mobile host nai user14@cisco.com address pool dhcp-pool ha-dhcp-pool
virtual-network 10.0.0.0 255.0.0.0 aaa
ip mobile secure home-agent 10.0.0.3 spi 100 key ascii redundancy
algorithm md5 mode
prefix-suffix
!
radius-server host 172.16.0.2 auth-port 1645 acct-port 1646
radius-server retransmit 3
radius-server key cisco
call rsvp-sync
!
mgcp profile default
!
dial-peer cor custom
!
gatekeeper
 shutdown
!
line con 0
line aux 0
line vty 0 4
!
end
```

Standby-HA configuration

DHCP-Proxy-Client Configuration

Active-HA configuration

```
interface Loopback0
ip address 10.0.0.1 255.255.255.255
interface Ethernet2/0
 description to PDSN/FA
 ip address 10.0.0.2 255.0.0.0
 no ip route-cache
 no ip mroute-cache
 duplex half
 standby ip 10.0.0.4
 standby priority 110
 standby preempt delay sync 100
 standby name cisco
!
interface Ethernet2/2
 description to AAA
 ip address 172.16.1.8 255.255.0.0
 no ip route-cache
 no ip mroute-cache
 duplex half
!
router mobile
!
ip classless
no ip http server
ip pim bidir-enable
ip mobile home-agent
ip mobile home-agent redundancy cisco
ip mobile virtual-network 10.0.0.0 255.0.0.0
ip mobile host nai user01@cisco.com address pool dhcp-proxy-client
dhcp-server 10.0.0.101 virtual-network 10.0.0.0 255.0.0.0
ip mobile secure home-agent 10.0.0.3 spi 100 key ascii redundancy
algorithm md5 mode
prefix-suffix
!
ip mobile virtual-network 10.0.0.0 255.0.0.0
ip mobile host nai user01@cisco.com address pool dhcp-proxy-client
dhcp-server 10.0.0.101 virtual-network 10.0.0.0 255.0.0.0
radius-server host 172.16.0.2 auth-port 1645 acct-port 1646
radius-server retransmit 3
radius-server key cisco
call rsvp-sync
!
mgcp profile default
!
dial-peer cor custom
!
gatekeeper
 shutdown
!
line con 0
line aux 0
line vty 0 4
```

```
!
end
```

```
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname mwt10-7206b
!
aaa new-model
!
aaa authentication ppp default local group radius
aaa authorization config-commands
aaa authorization ipmobile default group radius
aaa authorization network default group radius
aaa session-id common
!
ip subnet-zero
ip cef
!
interface Loopback0
ip address 10.0.0.2 255.255.255.255
interface Ethernet2/0
 description to PDSN/FA
 ip address 10.0.0.3 255.0.0.0
 no ip route-cache
 no ip mroute-cache
 duplex half
 standby ip 10.0.0.4
 standby name cisco
!
interface Ethernet2/2
 description to AAA
 ip address 172.16.1.7 255.255.0.0
 no ip route-cache
 no ip mroute-cache
 duplex half
!
router mobile
!
ip local pool ha-pool 10.0.0.1 10.0.0.255
ip classless
no ip http server
ip pim bidir-enable
ip mobile home-agent
ip mobile home-agent redundancy cisco
ip mobile secure home-agent 10.0.0.2 spi 100 key ascii redundancy
algorithm md5 mode
prefix-suffix
ip mobile virtual-network 10.0.0.0 255.0.0.0
ip mobile host nai user01@cisco.com address pool dhcp-proxy-client
dhcp-server 10.0.0.101 virtual-network 10.0.0.0 255.0.0.0
!
radius-server host 150.2.0.2 auth-port 1645 acct-port 1646
radius-server retransmit 3
radius-server key cisco
call rsvp-sync
!
mgcp profile default
```

```
!
dial-peer cor custom
!
gatekeeper
 shutdown
!
line con 0
line aux 0
line vty 0 4
!
end
```