

MAG Service Configuration Mode Commands

The MAG Service Configuration Mode is used to create and manage a Mobility Access Gateway service in an HSGW (eHRPD network) or a P-MIP S-GW (LTE-SAE network). The MAG is the PMIP client and communicates with the Local Mobility Anchor (LMA) configured on a PDN Gateway (P-GW).

Command Modes

Exec > Global Configuration > Context Configuration > MAG Service Configuration

configure > context *context_name* **> mag-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-mag-service)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

Important For information on common commands available in this configuration mode, refer to the Common Commands chapter.

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bind

Binds the service to a logical IP interface serving as the S2a (HSGW, SaMOG) or S5/S8 (S-GW) interface and specifies the maximum number of subscribers that can access this service over the configured interface.

Product

HSGW

S-GW

SaMOG

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MAG Service Configuration

configure > context *context_name* **> mag-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-mag-service)#
```

Syntax Description

bind { address *ipv6_address* **| ipv4-address** *ipv4_address* **} [max-subscribers** *num* **]**
no bind address

no

Removes the interface binding from this service.

address *ipv6_address*

Specifies the IPv6 address of the interface configured as the S5/S8 interface.

ipv6_address is specified in IPv6 colon-separated-hexadecimal notation.

ipv4-address *ipv4_address*

Specifies the IPv4 address of the interface configured as the S2a or S5/S8 interface.



Important The SaMOG PMIPv6-based S2a interface currently supports IPv4 bind address only.

ipv4_address is specified in IPv4 colon-separated-hexadecimal notation.

max-subscribers *num*

Default: 1500000

Specifies the maximum number of subscribers that can access this service on this interface.

num must be an integer from 0 through 3000000.

Important The maximum number of subscribers supported depends on the installed license key and the number of active packet processing cards in the system. A fully loaded system can support 3,000,000 total subscribers. Refer to the **license key** command and the *Usage* section (below) for additional information.

Usage Guidelines

Associate the MAG service to a specific logical IP address. The logical IP address or interface takes on the characteristics of an S2a or S5/S8 interface that provides the session connectivity to/from a P-GW. Only one interface can be bound to a service. The interface should be configured prior to issuing this command.

This command also sets a limit as to the number of simultaneous subscribers sessions that can be facilitated by the service/interface at any given time.

When configuring the **max-subscribers** option, be sure to consider the following:

- The total number of S2a or S5/S8 interfaces you will configure
- The total number of subscriber sessions that all of the configured interfaces may handle during peak busy hours
- An average bandwidth per session multiplied by the total number of sessions
- The type of physical port to which these interfaces will be bound

Taking these factors into account and distributing your subscriber session across all available interfaces will allow you to configure your interfaces to optimally handle sessions without degraded performance.

Example

The following command would bind the logical IP interface with the address of *4551:0db8:85a3:08d3:3319:8a2e:0370:1344* to the MAG service and specifies that a maximum of *300,000* simultaneous subscriber sessions can be facilitated by the interface/service at any given time:

```
bind address 4551:0db8:85a3:08d3:3319:8a2e:0370:1344 max-subscribers
300000
```

encapsulation

Configures data encapsulation type to be used for specific MAG service.

Product

HSGW

S-GW

SaMOG

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MAG Service Configuration

configure > context *context_name* **> mag-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-mag-service)#
```

Syntax Description

```
encapsulation { gre | ipip }
default encapsulation
```

default

Resets the encapsulation type to be used by this service to the default option of GRE.

gre

gre: Specifies that GRE encapsulation is to be used for PMIPv6 tunnel data between the MAG and the Local Mobility Anchor (LMA). This is the default for this command.

Important The SaMOG PMIPv6-based S2a interface currently supports GRE encapsulation only.

ipip

ipip: Specifies that IP-in-IP encapsulation is to be used for PMIPv6 tunnel data between the MAG and the LMA.

Usage Guidelines

Use this command to select the encapsulation type to be used for PMIPv6 tunnel data between the MAG and the LMA.

Example

The following command sets the encapsulation data to IP-in-IP:

```
encapsulation ipip
```

heartbeat

Configures the PMIPv6 heartbeat message interval, retransmission timeout, and max retransmission for the MAG Service.

Product

HSGW

SaMOG

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MAG Service Configuration

configure > context *context_name* **> mag-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-mag-service)#
```

Syntax Description

```
heartbeat { interval seconds | retransmission { max number | timeout seconds
 } }
default heartbeat { interval | retransmission { max | timeout } }
no heartbeat
```

no

Disables the PMIPv6 heartbeat functionality. The HSGW starts sending heartbeat request to peers when the heartbeat interval is configured.

default

Resets the specified parameter to the system default value.

interval *seconds*

The interval in seconds at which heartbeat messages are sent.

seconds is an integer from 30 through 3600.

Default: 60

retransmission max *number*

The maximum number of heartbeat retransmissions allowed.

number is an integer from 1 through 15.

Default: 3

retransmission timeout *seconds*

The timeout in seconds for heartbeat retransmissions.

seconds is an integer from 1 through 20.

Default: 3

Usage Guidelines

Proxy Mobile IPv6 (PMIPv6) is a network-based mobility management protocol to provide mobility without requiring the participation of the mobile node in any PMIPv6 mobility related signaling. The Mobile Access Gateway (MAG) service sets up tunnels dynamically to manage mobility for a mobile node.

This command provides configuration of heartbeat messages between the MAG and LMA services to know the reachability of the peers, to detect failures, quickly inform peers in the event of a recovery from node failures, and allow a peer to take appropriate action.

Example

The following command enables PMIPv6 heartbeat messaging to known MAG service peers and sets the heartbeat interval to 160 seconds.

```
heartbeat interval 160
```

information-element-set

Identifies the information element set of mobility options to be used in Proxy Binding Update (PBU) messages sent by the MAG to the LMA.

Product

HSGW

S-GW

SaMOG

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MAG Service Configuration

configure > context *context_name* **> mag-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-mag-service)#
```

Syntax Description

```
information-element-set { custom1 | custom2 [ disable-ie hardware-ie ] |
 custom3 | standard }
default information-element-set
```

default

Resets the command to the default value of "standard".

{ custom1 | custom2 [disable-ie hardware-ie] | custom3 | standard }

custom1: Specifies that a custom set of mobility options will be used in proxy binding update messages that are sent in Vendor Specific Mobility Options. These options are:

- User Location Info
- Hardware Identifier
- Access Network Charging Identifier

custom2 [disable-ie hardware-ie]: Specifies that a custom set of mobility options will be used in proxy binding update messages that are sent in Vendor Specific Mobility Options. When enabled, BSID will be sent in S2a PMIPv6 message.

If the **disable-ie hardware-ie** keyword is included with this command, then the information elements in PBU and the hardware ID in PBU are disabled. When information element custom2 is enabled, all the supported mobility options are enabled including hardware ID for a specific customer. The **disable-ie**keyword only disables the hardware ID mobility option in PBU. The **hardware-id** mobility option format is supported like **custom1**.

custom3: Specifies that a custom set of mobility options will be used in proxy binding update messages that are sent in Vendor Specific Mobility Options.

standard: Specifies that a standard set of mobility options are to be used in proxy binding update messages. 3GPP specification 29.275 defines these as Protocol Configuration Options.



Important The information element set of mobility options for SaMOG PMIPv6-based S2a interface must be set to **standard**. Any other configuration may result in a call setup failure.

Usage Guidelines Use this command to identify the type of information element set of mobility options to be used in PBU messages sent form the MAG to the LMA. The mobility options can be either standards-based (3GPP 29.275) or custom (vendor-specific as defined by 3GPP 29.275).

Example

The following command identifies the information element set of mobility options to use in PBU messages as custom:

```
information-element-set custom1
```

max-retransmissions

Configures maximum number of retransmissions of Proxy MIP control messages to the Local Mobility Anchor (LMA).

Product HSGW

S-GW

SaMOG

Privilege Administrator

Command Modes Exec > Global Configuration > Context Configuration > MAG Service Configuration

configure > context *context_name* **> mag-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-mag-service)#
```

Syntax Description

```
max-retransmissions num
default max-retransmissions
```

default

Rests the maximum number of allowed retransmissions to the default value of 5.

num

Default: 5

Specifies the maximum number of times the MAG service will attempt to communicate with the LMA before it marks it as unreachable.

count must be an integer from 0 through 4294967295.

Usage Guidelines Use this command to limit the number of retransmissions to LMA before marking it as unreachable. If the value configured is reached, the call is dropped.

Example

The following command configures the maximum number of retransmissions for the MAG service to *3*:

```
max-retransmissions 3
```

mobility-header-checksum

Switches between RFC3775 and RFC6275 for the "next header" value in the mobility header.

Product HSGW

Privilege Administrator

Command Modes Exec > Global Configuration > Context Configuration > MAG Service Configuration

configure > **context** *context_name* > **mag-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-mag-service)#
```

Syntax Description

```
mobility-option-type-value { rfc3775 | rfc6275 }
default mobility-option-type-value
```

default

Sets the command to the default value of rfc3775.

rfc3775

Configures the "next header" value to 2, as defined in RFC3775.

rfc6275

Configures the "next header" value to 135, as defined in RFC6275.

Usage Guidelines Use this command to switch between RFC3775 and RFC6275 for the "next header" value in the mobility header. This value is used for appending and calculating the checksum for outbound mobility messages from MAG to LMA. For inbound messages from LMA to MAG, either of the two values are acceptable for verifying the checksum.

Example

The following command configures the "next header" value to 2, as defined in RFC3775:

```
mobility-option-type-value rfc3775
```

mobility-option-type-value

Changes the mobility option type value used in mobility messages.

Product

HSGW

S-GW

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Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MAG Service Configuration

configure > context *context_name* **> mag-service** *service_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-mag-service)#`

Syntax Description

`mobility-option-type-value { custom1 | standard }`
`default mobility-option-type-value`

default

Sets the command to the default value of custom1.

custom1

(Default) Non-standard type values used before they were defined by IANA.

standard

Standard type values as defined by IANA. In addition, standard option uses type values defined in RFC 5844 for home address (HoA) options for the PMIPv6 PBU/PBA/revocation message.

Usage Guidelines

Use this command to change the mobility option type value used in mobility messages.

Example

The following command changes the mobility option type value to standard:

`mobility-option-type-value standard`

policy

Configures policies applied to MAG service.

Product

HSGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MAG Service Configuration

configure > context *context_name* **> mag-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-mag-service)#
```

Syntax Description

```
                  policy include-bsid-binding-update { all | none { dereg
 | handoff | init |  renew } }
                   [ default ] policy include-bsid-binding-update
```

default

Restores the command to the default values of **init** and **handoff**.

include-bsid-binding-update { all | none { dereg | handoff | init | renew } }

Configures the MAG Service to include BSID (Base Station Identification) in the PBU (Proxy Binding Update) sent by MAG to the P-GW. By default, BSID information is included in the update (**handoff**) and initialization (**init**) packets.

all: Include BSID in all the types of PBU that are sent.

none: Include BSID in none of the PBUs.

dereg: Include BSID in the PBU sent during deregistration.

handoff: Include BSID in the PBU sent during a handoff.

init: Include BSID in the PBU sent during initialization.

renew: Include BSID in the PBU sent during 'registration lifetime' renewal.

Usage Guidelines

Configures policies applied to MAG service.

Example

The following command configures the MAG Service to include BSID in the PBU during initalization, 'registration renewal', and deregistration.

```
policy include-bsid-binding-update init renew dereg
```

reg-lifetime

Configures the Mobile IPv6 session registration lifetime for this service.

Product

HSGW

S-GW

SaMOG

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MAG Service Configuration

configure > context *context_name* **> mag-service** *service_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-mag-service)#`

Syntax Description

`reg-lifetime` *`seconds`*
`default reg-lifetime`

default

Resets the command value to the default setting of 600.

seconds

Default: 600

Sets the time value (in seconds) for session lifetimes for this service.

seconds must be an integer from1 through 262140.

Usage Guidelines

Use this command to limit PMIPv6 lifetime on this service. If the Proxy Binding Acknowledge (PBA) from the LMA contains a lifetime shorter or longer than what is specified, it is used instead.

Example

The following command sets the registration lifetime for Mobile IPv6 sessions using this service to *1200* seconds (20 minutes):

`reg-lifetime 1200`

renew-percent-time

Configures percentage of lifetime at which a registration renewal is sent to the Local Mobility Anchor (LMA).

Product

HSGW

S-GW

SaMOG

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MAG Service Configuration

configure > context *context_name* **> mag-service** *service_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-mag-service)#`

Syntax Description

`renew-percent-time` *`percent`*
`default renew-percent-time`

default

Resets the command to the default value of 75.

percent

Default: 75

Specifies the time percentage when the registration renewal is sent to the LMA. *percent* is a percentage value of the registration lifetime expressed as an integer from 1 through 100.

Usage Guidelines

Use this command to specify when a registration renewal is sent to the LMA for subscribers using this service.

If the registration lifetime is 600 seconds (10 minutes) and this command is set to 75 (percent), then the registration renewal message is sent after 450 seconds of the registration lifetime has expired.

Example

The following command sets the registration renewal time for subscribers using this service to *90* percent of the registration lifetime:

```
renew-percent-time 90
```

retransmission-policy

Configures the retransmission policy for Proxy MIP control message retransmissions.

Product

HSGW

SaMOG

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MAG Service Configuration

configure > **context** *context_name* > **mag-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-mag-service)#
```

Syntax Description

```
retransmission-policy { exponential-backoff | normal }
default retransmission-policy
```

default

Returns the command to its default setting of exponential-backoff.

{ exponential-backoff | normal }

Sets the retransmission timeout behavior for this service.

exponential-backoff: Specifies that the Proxy Binding Update (PBU) retransmission uses an exponential backoff to increase the retransmission timeout for each retry.

normal: Specifies that the PBU retransmission uses the configured retransmission timeout value for all PBU retransmission retries.

Usage Guidelines

Use this command to specify the retransmission policy for PMIP control messages.

Example

The following command sets the retransmission timeout policy for PMIP control packets to "normal":

```
retransmission-policy normal
```

retransmission-timeout

Configures the maximum allowable time for the MAG service to wait for a response from the LMA before it attempts to communicate with the LMA again (if the system is configured to retry the LMA), or marks the LMA as unreachable.

Product

HSGW

S-GW

SaMOG

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MAG Service Configuration

configure > context *context_name* **> mag-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-mag-service)#
```

Syntax Description

retransmission-timeout *time*
{ default | no } retransmission-timeout

default

Resets the timeout setting to the default value of 3,000 milliseconds.

no

Deletes a previously configured timeout value.

time

Default: 3000

Specifies the maximum allowable time (in milliseconds) for the MAG service to wait for a response from the LMA before it: (a) attempts to communicate with the LMA again (if the system is configured to retry the LMA) or (b) marks the LMA as unreachable.

time must be an integer from 100 through 100000.

Usage Guidelines Use the retransmission timeout command in conjunction with the **max-retransmissions** command in order to configure the MAG services behavior when it does not receive a response from a particular LMA.

Example

The following command configures a retransmission timeout value of 5000 milliseconds:

```
retransmission-timeout 5000
```

signalling-packets

Enables the QoS Differentiated Services Code Point (DSCP) marking feature for IP headers carrying outgoing signalling packets.

Product HSGW

S-GW

Privilege Administrator

Command Modes Exec > Global Configuration > Context Configuration > MAG Service Configuration

configure > context *context_name* **> mag-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-mag-service)#
```

Syntax Description

```
signalling-packets ip-header-dscp value
[ default | no ] signalling-packets ip-header-dscp
```

default

Restores the specified parameter to its default setting of 0x0.

no

Disables the specified functionality.

ip-header-dscp *value*

Used to configure the QoS Differentiated Services Code Point (DSCP) marking for IP header encapsulation.

value: Represents the DSCP setting as the first six most-significant bits of the ToS field. It can be configured to any hexadecimal value from 0x0 through 0x3F. Default is 0x0.

Usage Guidelines Use this command to enable or disable the DSCP marking feature for IP headers carrying outgoing signalling packets. DSCP marking is disabled by default.

Example

The following command configures the HSGW service to support DSCP marking for IP headers carrying outgoing signalling packets:

```
signalling-packets ip-header-dscp 0x21
```