

# NEMO-LMA Heartbeat


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# Feature Information

### Summary Data

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|---|---|
| **Status** | New Feature |
| **Introduced-In Release** | 21.2 |
| **Modified-In Release(s)** | Not Applicable |
| **Applicable Product(s)** | P-GW |
| **Applicable Platform(s)** | ASR 5500 |
| **Default Setting** | Disabled |
| **Related CDETS ID(s)** | CSCuw08182 |
| **Related Changes in This Release** | NEMO PMIPv6 Heartbeat on LMA (SAEGW) |
| **Related Documentation** | Command Line Interface Reference<br>P-GW Administration Guide<br>SAEGW Administration Guide |

### Revision History

**Important** Revision history details are not provided for features introduced before release 21.2.

| Revision Details | Release | Release Date |
|---|---|---|
| New in this release. | 21.2 | April 27, 2017 |

# Feature Description

Path management mechanism through Heartbeat messages between the Mobile Router (MR) and Network Mobility-Local Mobility Anchor (NEMO-LMA) is important to know the availability of the peers, to detect failures, quickly inform peers if recovery from the node fails and allow a peer to take appropriate action.

# How It Works

The MR and the LMA exchange Heartbeat messages at regular intervals to detect the status of availability between them. The NEMO-LMA initiates a Heartbeat exchange with the MR, by sending a Heartbeat Request message, to check if the MR is reachable. The NEMO-LMA records the sequence number of the last Heartbeat Request message and is used to match the corresponding Heartbeat Response. The NEMO-LMA responds to a Heartbeat Request message with a Heartbeat Response message, irrespective of whether there is PMIPv6 session with the corresponding peer.

### Binding Error

When the Binding Error message, with status set to 2, is received in response to a Heartbeat Request message, the NEMO-LMA does not use Heartbeat messages further with the corresponding peer.

### Failure Detection

When the LMA node does not receive the Heartbeat response for the configurable parameter **max-heartbeat-retransmission** <*value*> **exceed-action drop-session**, the NEMO-LMA concludes that the peer is not reachable. As such, the Heartbeat request to the peer is stopped and clears the NEMO-LMA session without any traps.

### Restart Detection

If the restart counter value is different from the previous received value, then it assumes that the peer had crashed and recovered. And so, the existing NEMO-LMA sessions are cleared.

## License Requirements

Use of NEMO requires that a valid license key be installed. Contact your Cisco account or Support representative for information on how to obtain a license.

# Configuring NEMO-LMA Heartbeat

Use the following commands under LMA Service Configuration Mode to clear NEMO-LMA sessions without generating traps:

```
configure
   context context_name
      lma-service service_name
         heartbeat retransmission max number [ exceed-action drop-session ]
         end
```

**Notes**:

- **retransmission max**: The maximum number of heartbeat retransmissions allowed. The *number* must be an integer from 0 to 15. Default: 3
- **exceed-action**: Specifies the action to be taken after the maximum number of Heartbeat retransmissions is reached.
- **drop-session**: Used for dropping the session when path failure is detected.
- The **exceed-action** and **drop-session** keywords are valid only for NEMO-LMA sessions and takes effect if the Heartbeat feature is enabled.

# Monitoring and Troubleshooting the NEMO-LMA Heartbeat

The following sections describe commands available to monitor and troubleshoot the feature.

## monitor protocol

When using the **monitor protocol** command, enable option **48** to monitor the Heartbeat Request/Reply messages.

## show lma-service statistics

Use this command to see the statistics related to Heartbeat messages. The output generated appears similar to the following:

```
Total Disconnects:          1
   Lifetime expiry:         0      Deregistrations:     0
      Admin Drops:          0      Path Failure Drops:  1
      Other Reasons:        0
```

## show session disconnect-reasons

Use this command to see the call disconnected due to heartbeat path failure. The output generated appears similar to the following:

```
mme-guti_realloc_failed-detach(615)          0        0.00000
mme-pcscf-rest-detach(616)                   0        0.00000
Reject-ho-old-tun-path-failure(617)          0        0.00000
mip-path-failure(618)                        0        0.00000
```

# Bulk Statistics

### LMA Schema

The following new bulk statistics variable is added to the LMA schema in support of this feature:

- lma-pathfailsessionscleared – If any path failures/restarted counter value changes for the NEMO-LMA Heartbeat feature, the sessions disconnection counter is incremented.