Support for One Million S1-U Peer-to-Peer Connections

This chapter describes StarOS support for the One Million S1-U Peer-to-Peer Connections feature.

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Feature Description

Due to production forecasts, support has been added to the StarOS for one million S1-U connections on a single S-GW.

The S1-U interface is the user plane interface carrying user data between an eNodeB and an S-GW received from the terminal. The StarOS now has the capability to scale the number of S1-U peers to one million per VPN context.

A CLI command enables operators to set the number of S1-U peers for which statistics should be collected. The limit is restricted to less than one million peers (128k) due to StarOS memory limitations.

How it Works

The gtpumgr uses the following guidelines while allocating peers:

- When a session installation comes from the Session Manager, a peer is created. If statistics are maintained at the Session Manager, the gtpumgr also creates the peer record with the statistics.
- Peer records are maintained per service.
- The number of peers is maintained at the gtpumgr instance level. The limit is one million S1-U peers per gtpumgr instance.
- If the limit of one million peers is exceeded, then peer creation fails. It causes a call installation failure in the gtpumgr, which leads to an audit failure if an audit is triggered.

The feature changes impact all the interfaces/services using the gtpu-service including GGSN/S4-SGSN/S-GW/P-GW/SAEGW/ePDG/SaMOG/HNB-GW/HeNB-GW for:

- The Gn and Gp interfaces of the General Packet Radio Service (GPRS)
- The Iu, Gn, and Gp interfaces of the UMTS system
- The S1-U, S2a, S2b, S4, S5, S8, and S12 interfaces of the Evolved Packet System (EPS)

Recovery/ICSR Considerations

- After a session manager/gtpumgr recovery or after an ICSR switchover, the same set of peers configured for statistics collection is recovered.
  - Peers with 0 sessions and without statistics are not recovered.
  - Peers with 0 sessions and with statistics are recovered.
  - Peers with Extension Header Support disabled are recovered.
- While upgrading from a previous release, ensure the newer release chassis **gtpu peer statistics threshold** is equal to or greater than the previous release. This way the GTPU peer statistics are preserved during the upgrade. For example, if you are upgrading from StarOS release 19.0 to 20.2, and the StarOS 19.0 system has 17,000 GTPU sessions, then configure the threshold on the StarOS 20.2 system to 17,000 as well.

Configuration and Restrictions

- Due to the large number of GTP-U entities connecting to the StarOS, Cisco recommends disabling the GTP-U Path Management feature.
- The configured threshold is not the hard upper limit for statistics allocation because of the distributed nature of system. It is possible that total GTP-U peers with statistics exceeds the configured threshold value to some extent.
- It is assumed that all 1 million peers are not connected to the node in a point-to-point manner. They are connected through routers.
- There will not be any ARP table size change for the StarOS to support this feature.

Configuring the Feature

This section describes how to configure support for the One Million S1-U Peer Connections feature.

gtpu peer statistics threshold

This new command has been added to *Context Configuration Mode* to specify the number of S1-U peers for which the StarOS will maintain statistics.

Use the following example to configure the feature:

```
configure
  context context_name
    gtpu peer statistics threshold value
    end
```

Notes :

- *value* represents the number of S1-U peers for which statistics will be maintained. Valid entries are from 16000 to 128000. The default setting is 16000.
- The threshold cannot be configured to a lower value than the current value.

Show Command Output

This section describes the show command output changes made to support the One Million S1-U Peers feature.

clear gtpu statistics peer-address

The **all** keyword has been added to this command to enable operators to clear statistics for all S1-U peers for which statistics are being maintained.

```
clear gtpu statistics peer-address all
```

show gtpu statistics

The output of this command has been enhanced to show the total number of GTPU peers, and the total number of GTPU peers configured for statistics collection.

- Total GTPU Peers:
- Total GTPU Peers with stats:

show session subsystem facility sessmgr

The output of this command has been enhanced to provide the total number of S1-U (GTP-U) peers that are configured for statistics collection.

- Total Gtpu Peers with stats

show session subsystem facility sessmgr