Bulk Statistics Support

Feature Description

Bulkstats is a collection of software features and framework in the existing legacy StarOS architecture that collects and exports the packet core node's important performance and health related statistics to an external node. These statistics provide an effective way for the operators to monitor the overall health and performance of the nodes and helps them take corrective actions or optimize the packet core network for better utilization thereby helping to reduce the overall opex costs of the operators. The individual statistics are configured to be collected in a group called 'schema'.

The system's support for bulk statistics allows operators to choose to view not only statistics that are of importance to them, but also to configure the format in which it is presented. This simplifies the post-processing of statistical data since it can be formatted to be parsed by external, back-end processors.

Statistics or bulk statistics reporting is an important aspect of a Mobile Packet Core node. In order for a product to be deployed in the network it has to support statistics that meets Carrier Grade requisites. Bulk statistics are used by Operators for the following:

- Performance KPI monitoring
- Network Fault analysis and debugging
- Network Optimization
- Traffic pattern analysis
- Node health analysis

When used along with an element management system (EMS), the data can be parsed, archived, and graphed.

In the CUPS environment, the system can be configured to collect Control Plane (CP) and User Plane (UP) bulk statistics and send them to a collection server (called a receiver).

The system supports the configuration of up to four sets (primary/secondary) of receivers. Each set can be configured to collect specific sets of statistics from the supported list of schemas. Statistics can be pulled manually from the system or sent at configured intervals. The bulk statistics are stored on the receiver(s) in files.

The format of the bulk statistic data files can be configured by the user. Users can specify the format of the filename, file headers, and/or footers to include information such as the date, system hostname, system uptime,

the IP address of the system generating the statistics (available for only for headers and footers), and/or the time that the file was generated.

An EMS is capable of further processing the statistics data through XML parsing, archiving, and graphing.

The Bulk Statistics Server component of an EMS parses collected statistics and stores the information in its PostgreSQL database. It can also generate XML output and can send it to a Northbound NMS or an alternate bulk statistics server for further processing.

Additionally, the Bulk Statistics server can archive files to an alternate directory on the server. The directory can be on a local file system or on an NFS-mounted file system on an EMS server.

Note Due to high dependency on the web element manager (WEM), it is observed that using file-1 as the default receiver with redundant and secondary-on-failure option results in issues. To solve this issue Cisco recommends using other files such as file-2, file-3 and file-4.

Bulk statistics in CUPS is implemented as follows:

- The CP and UP collects and exports the statistics separately to an aggregator node in the CUPS architecture.
- The receiver co-relates the statistics from CP and UP using the node-names or any other information configured as part of bulk stats configuration. Any EMS tool can render this data similar to how it is rendered from a standalone system.
- Bulk statistics schemas are categorized into the following:
  - **Control Plane**: These schemas must be configured only in the Control Plane node.
  - **User Plane**: These schemas must be configured only in the User Plane node.
  - **Shared**: In this type of schema, some counters are applicable only on CP and some are on UP. When the schemas are configured on both nodes, only relevant counters will be retrieved.
  - **Both**: These schemas are applicable to both Control Plane and User Plane nodes.

Caution Schemas have to be configured only on their respective nodes. Configuration of non-relevant schemas can result in performance impact, undesired behavior, and so on. For example, If a CP schema is configured on a UP schema the statistics would never be collected leading to performance impact.

- The current bulk statistics proclet is implemented as defined in the existing StarOS system.
- The configuration changes remain as defined in the existing StarOS system.

In this release, the following list of schemas are supported in the CUPS architecture:

- APN
- APN-Expansion
- APN-QCI-Duration
- CARD

- Context
- DCCA
- DCCA-Group
- Diameter
- DPCA
- ECS
- EGTPC
- GTPP
- GTPU
- ICSR
- IMSA
- IP-Pool
- P2P
- P-GW
- P-GW-EGTPC-S2A
- P-GW-EGTPC-S2B
- P-GW-EGTPC-S5S8
- PORT
- RADIUS
- RADIUS-Group
- Rulebase
- SAE-GW
- S-GW
- System
- VLAN-NPU
- Sx

APN Schema

Currently there are no APNs defined on the UP. Therefore, there are no APN level counters available. However, the PDN instance is used, which is mapped with the bulk statistics counters and is retrieved accordingly.

SAE-GW/S-GW/P-GW Schema

Packet and Byte counters on the UP are available on the UP for only for a single service - userplane service. The PDR information available when the statistics counters are pushed from VPP is used for services such as - P-GW, S-GW and SAE-GW, on different UP interfaces such as S1-U, S4/S8 and so on. The sessmgr

maps the PDR information to a bearer or CLP to increment the respective counter. Various counters are added and implemented for each of the P-GW, S-GW and SAE-GW services.

Mapping QCI values to these counters is supported. The QCI+ARP value is sent in the TEID field of the SX packet from the CP to UP that is in turn pushed to the CLP. The CLP contains a TID value. When the statistics are incre-mented on UP, the QCI counters are mapped with the respective TID values received from VPP, and the QCI statistics are incremented accordingly.

SX Schema

The SX schema is a new schema added in support of bulk statistics for CUPS. Around 160 statistics counter exist for an SX service that are applicable to both CP and UP. The same schema can be configured on both CP and UP. The counters in this schema provide statistics about SX service usage between CP and UP. This schema is not applicable in the non-CUPS architecture.

Important For more information on bulk statistic configuration, refer to the *Bulk Statistics* chapter in the *ASR 5500 System Administration Guide*.