

Cloud Native BNG Control Plane Metrics Reference, Release 2026.04.0

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About this Guide

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This preface describes how the *Cisco Cloud Native BNG Control Plane Metrics Reference* is organized and its document conventions.

- Conventions Used, on page iii

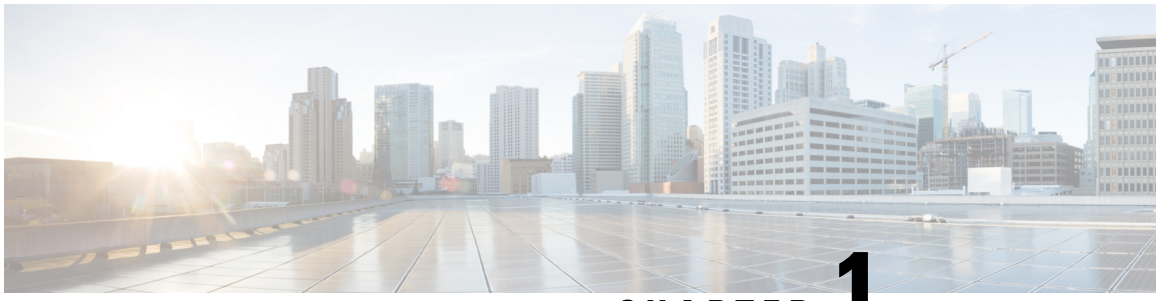
Conventions Used

The following tables describe the conventions used throughout this documentation.

Notice Type	Description
Information Note	Provides information about important features or instructions.
Caution	Alerts you of potential damage to a program, device, or system.
Warning	Alerts you of potential personal injury or fatality. May also alert you of potential electrical hazards.

Typeface Conventions	Description
Text represented as a `screen display`	This typeface represents displays that appear on your terminal screen, for example: `Login:`

Typeface Conventions	Description
Text represented as **commands**	This typeface represents commands that you enter, for example: **show ip access-list** This document always gives the full form of a command in lowercase letters. Commands are not case sensitive.
Text represented as a **command** *variable*	This typeface represents a variable that is part of a command, for example: **show card** *slot_number* *slot_number* is a variable representing the desired chassis slot number.
Text represented as menu or sub-menu names	This typeface represents menus and sub-menus that you access within a software application, for example: Click the **File** menu, then click **New**



CHAPTER 1

Cloud Native BNG Control Plane Interface for Metrics

- Summary Data, on page 1
- Feature Description, on page 1

Summary Data

Table 1: Summary Data

Applicable Product(s) or FunctionalArea	Cloud Native Broadband Network Gateway
Applicable Platform(s)	SMI
Feature Default Setting	Enabled – Always-on
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

Feature Description

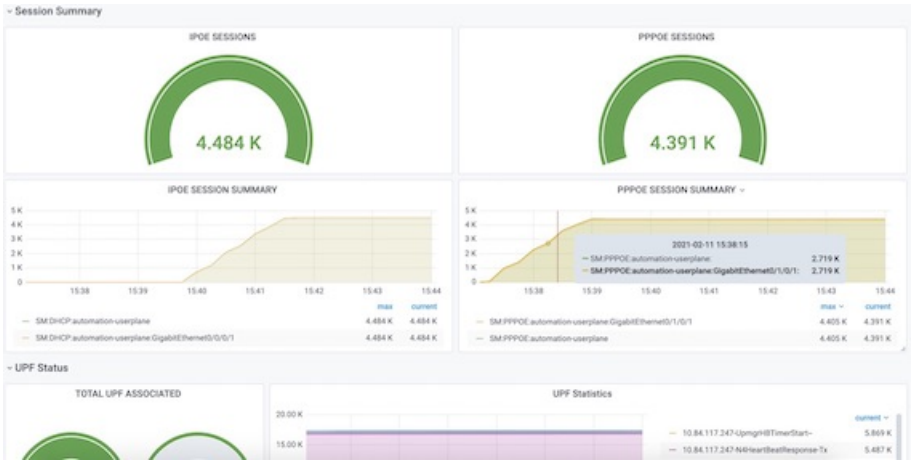
The Cisco Cloud Native Broadband Network Gateway uses Prometheus for gathering statistics/counters from its microservices.

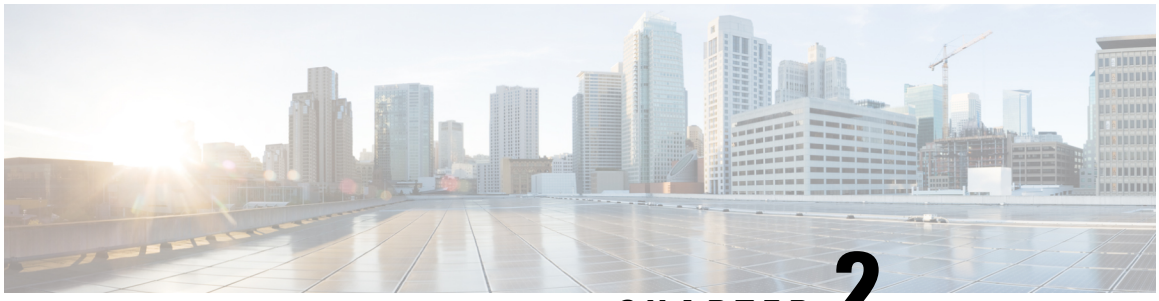
Grafana is used as the user interface to view metrics. It pulls the data from the Prometheus data store. Default graphs for KPI are available using Grafana for rendering a graphical view of the statistics with timelines.

For each microservice, counters and a set of labels are defined. Counters are incremented/decremented with the set of labels depending on the functionality.

The following snapshot is a sample of the Grafana dashboard.

Figure 1: Grafana Dashboard





CHAPTER 2

Metrics Verbosity Behaviour Changes

Scope

The behaviour changes in this chapter apply to these components:

- app-infra
- cn-ipam
- bng-dhcp
- bng-common
- radius-ep
- OAM and YANG

- Metrics verbosity framework, on page 3
- Metric gating changes by component, on page 5
- OAM and CLI behaviour changes, on page 8
- Configure application verbosity to enable Debug and Trace metrics, on page 8

Metrics verbosity framework

A metrics verbosity framework is a monitoring control mechanism that

- classifies application-layer metrics into verbosity levels,
- determines emission of metrics during a Prometheus scrape cycle, and
- enables configuration of metric visibility using OAM CLI and ConfigMap settings.

Each pod uses the **app-infra metrics verbosity framework** to determine whether a Prometheus metric is emitted during a scrape cycle. Metrics are classified into the following verbosity levels:

Table 2: Verbosity levels

Level	Integer value	Description
Production	0	Essential production metrics; always emitted.

Level	Integer value	Description
Debug	1	Investigation-oriented metrics; emitted when verbosity level is greater than or equal to Debug.
Trace	2	High-frequency or verbose metrics; emitted when verbosity level is greater than or equal to Trace.
Off	-1	Never emitted.

Verbosity level for each pod is configured through the OAM CLI and stored in the `infra-system-conf` ConfigMap. The **podType** field determines which type of pod is targeted.

Table 3: Verbosity configuration by pod type

podType	Applies to	Controls
service	cn-ipam, bng-dhcp, bng-smf, ...	Infra-internal metrics (framework metrics)
protocol	bng-n4-protocol, ...	Infra-internal metrics
load-balancer	LB pods	Infra-internal metrics
application	All pods	Application-layer metrics (for example, ipam-pool-stats, dhcp-* metrics)

Note A single pod responds to two verbosity settings: one for its podType (such as **service**) that controls infrastructure-internal metrics, and another for application, which controls application-layer metrics. If you want to adjust both types of metrics, you must configure both verbosity settings.

From Release 2026.02.0 onwards, the fallback level for application-layer metrics changed when no `podType: application` entry is present in the ConfigMap.

In `app-infra/src/app-infra/infra/Types.go`, the fallback level changed from

```
DefApplicationVerboseLevel = MetricsVerboseLevelDebug
```

to

```
DefApplicationVerboseLevel = MetricsVerboseLevelProduction.
```

Table 4: Application metric behaviour when no application entry is configured

Application metric gate	Before Release 2026.02.0	From Release 2026.02.0 onwards
Production (0)	Emitted	Emitted (no change)
Debug (1)	Emitted (default was Debug)	Suppressed (default is now Production)
Trace (2)	Suppressed	Suppressed (no change)



Important If your deployment previously showed application-level debug metrics without a configmap entry, you now need to explicitly add a `podType: application` entry to make these metrics visible.

Metric gating changes by component

Use the following tables to review metric gating changes for each component.

cn-ipam

File: `src/ipam/statsAPI.go`

Metrics that were previously always emitted now require configuration to be enabled.

Prometheus Metric	Old Behaviour	New Behaviour	Configuration Needed to Restore
`ipam_address_events_total`	Always emitted (no gate)	Emitted only when application level ≥ **Debug**	`podType: application, level: debug`
`ipam_static_request_statistics`	Always emitted (no gate)	Emitted only when application level ≥ **Debug**	`podType: application, level: debug`
`ipam_static_db_statistics`	Always emitted (no gate)	Emitted only when application level ≥ **Debug**	`podType: application, level: debug`
`ipam_threshold_event`	Always emitted (no gate)	Emitted only when application level ≥ **Debug**	`podType: application, level: debug`
`records_in_cdl_for_startrange`	Always emitted (no gate)	Emitted only when application level ≥ **Debug**	`podType: application, level: debug`
`ipam_msg_turn_around_time`	Always emitted (no gate)	Emitted only when application level ≥ **Trace**	`podType: application, level: trace`
`ipam_address_upf_total`	Always emitted (no gate)	Emitted only when application level ≥ **Debug**	`podType: application, level: debug`



Note

- The `metrics id_manager_cp_audit_validate_key_id` and `id_manager_key_service_statistics` are production-gated and remain unchanged—they continue to be emitted by default.
- The metric `ipam_handle_start_terminate` has its record function commented out, so it is registered but never emitted; there is no change to its behavior.

bng-dhcp

File: `bng-dhcp/images/bng_dhcp/src/bng-dhcp/metrics/metrics.go`

Six metrics that were previously always emitted are now gated at the Trace level. To emit these metrics, you must set **podType: application** and **level: trace** in the configuration.

Prometheus Metric	Old Behaviour	New Behaviour
`dhcp_ha_packet_drop_stats`	Always emitted (no gate)	Emitted only at application level ≥ **Trace**
`dhcp_n4_ipc_total`	Always emitted (no gate)	Emitted only at application level ≥ **Trace**
`dhcp_pkt_aborted_total`	Always emitted (no gate)	Emitted only at application level ≥ **Trace**
`dhcp_sess_update_reason`	Always emitted (no gate)	Emitted only at application level ≥ **Trace**
`dhcp_v4_packet_error_stats`	Always emitted (no gate)	Emitted only at application level ≥ **Trace**
`dhcp_up_inactive_packet_drop_stats`	Always emitted (no gate)	Emitted only at application level ≥ **Trace**

bng-common

File: `bng-common/src/bng-common/reconcp/stats.go`

Prometheus Metric	Old Behaviour	New Behaviour	Configuration Needed
`recon_cp_events_total`	Always emitted (no gate)	Emitted only at application level ≥ **Debug**	`podType: application, level: debug`

radius-ep

File: `radius-ep/images/radius_ep/src/radius-ep/app/statsAPI.go`

Prometheus Metric	Old Behaviour	New Behaviour
`radius_least_out_standing_server`	Suppressed unless application level ≥ Debug	**Always emitted** — now Production level

Summary

Component	Prometheus Metric	Before (level / gate)	After (level / gate)	Visible by Default?
cn-ipam	`ipam_address_events_total`	No gate — always emitted	Debug gate	**No (was Yes)**
	`ipam_static_request_statistics`	No gate — always emitted	Debug gate	**No (was Yes)**
	`ipam_static_db_statistics`	No gate — always emitted	Debug gate	**No (was Yes)**
	`ipam_threshold_event`	No gate — always emitted	Debug gate	**No (was Yes)**
	`records_in_cdl_for_startrange`	No gate — always emitted	Debug gate	**No (was Yes)**
	`ipam_msg_turn_around_time`	No gate — always emitted	Trace gate	**No (was Yes)**
	`ipam_address_upf_total`	No gate — always emitted	Debug gate	**No (was Yes)**
bng-dhcp	`dhcp_ha_packet_drop_stats`	No gate — always emitted	Trace gate	**No (was Yes)**
	`dhcp_n4_ipc_total`	No gate — always emitted	Trace gate	**No (was Yes)**
	`dhcp_pkt_aborted_total`	No gate — always emitted	Trace gate	**No (was Yes)**
	`dhcp_sess_update_reason`	No gate — always emitted	Trace gate	**No (was Yes)**
	`dhcp_v4_packet_error_stats`	No gate — always emitted	Trace gate	**No (was Yes)**
	`dhcp_up_inactive_packet_drop_stats`	No gate — always emitted	Trace gate	**No (was Yes)**
bng-common	`recon_cp_events_total`	No gate — always emitted	Debug gate	**No (was Yes)**
radius-ep	`radius_least_out_standing_server`	Debug gate — suppressed by default	No gate (Production)	**Yes (was No)**

Note 14 metrics that were previously always visible are now suppressed by default. One metric, `radius_least_out_standing_server`, which was previously suppressed, is now always visible.

OAM and CLI behaviour changes

Behaviour changes:

- That YANG default has been removed.

  The `level` leaf in `tailf-mobile-infra.yang` previously had the default value `trace`. This default has been removed. The render template now owns the default.

New render template defaults

When an operator configures a verboseLevel entry without specifying the level, the render template now automatically applies a default value based on the type.

podType	Level when omitted (Before)	Level when omitted (After)
`service`	trace (2) via YANG default	trace (2) via render — *no change*
`protocol`	trace (2) via YANG default	trace (2) via render — *no change*
`load-balancer`	trace (2) via YANG default	trace (2) via render — *no change*
`application`	trace (2) via YANG default	**production (0)** via render — *changed*

Note **Operator Impact:**

Any existing CLI or OAM script that configures metrics `verbose-levels pod-type application` without specifying a level will now default to LEVEL: PRODUCTION (0) instead of TRACE (2). To keep the previous behavior, you must explicitly set `level trace`.

Configure application verbosity to enable Debug and Trace metrics

Procedure

Step 1 To restore visibility of cn-ipam Debug metrics (5 metrics), execute the following command on the OAM CLI:

Example:

```
metrics verbose-levels pod-type application level debug
```

This enables: `ipam_address_events_total`, `ipam_static_request_statistics`, `ipam_static_db_statistics`, `ipam_threshold_event`, and `records_in_cdl_for_startrange`.

Step 2 To restore visibility of cn-ipam Trace metric (1 metric), execute the following command:

Example:

```
metrics verbose-levels pod-type application level trace
```

This enables all cn-ipam debug metrics, as well as the `ipam_msg_turn_around_time` metric.

Step 3 To restore visibility of bng-dhcp Trace metrics (6 metrics), execute the following command on the bng-dhcp pods:

Example:

```
metrics verbose-levels pod-type application level trace
```

This enables `dhcp_ha_packet_drop_stats`, `dhcp_n4_ipc_total`, `dhcp_pkt_aborted_total`, `dhcp_sess_update_reason`, `dhcp_v4_packet_error_stats`, and `dhcp_up_inactive_packet_drop_stats` metrics.

Step 4 To restore visibility of bng-common Debug metric (1 metric), execute the following command:

Example:

```
metrics verbose-levels pod-type application level debug
```

This enables `recon_cp_events_total` metric.

Step 5 For `radius-ep` metrics, no CLI configuration is needed.

The metric `radius_least_out_standing_server` is always visible.

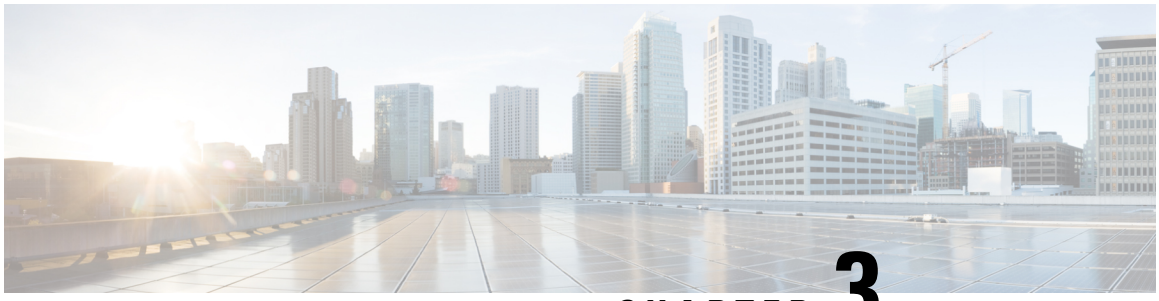
Step 6 After executing these commands, your ConfigMap structure should contain the following:

Example:

```
metrics:
  verboseLevels:
  - podType: service       # infra-internal metrics for service pods
    level: 2               # trace
  - podType: application   # application metrics (cn-ipam, bng-dhcp, etc.)
    level: 2               # trace — restores all Debug + Trace app metrics
```



Note Changes take effect immediately (live reload via file watcher); no pod restart required.



CHAPTER 3

cnBNG Metrics Reference

- cnbng Metrics Reference, on page 11

cnbng Metrics Reference

CNBNG Radius Statistics Category

radius_requests_statistics

Description: Total number of radius packets sent & received

Sample Query:
`'radius_requests_statistics{rad_svr_ip="1.1.1.1",rad_svr_port="1812",rad_svr_port_type="Auth"}'`

Labels:

- Label: `rad_svr_ip`

  Label Description: Radius Server IP (v4/v6) address

- Label: `rad_svr_port`

  Label Description: Radius Server Port number (e.g. 1812/1813)

- Label: `rad_svr_port_type`

  Label Description: Type of server (Auth/Acct)

- Label: `rad_msg_code`

  Label Description: Type of Radius Messages AAAAuthReq: Radius Authentication Request Message AAAAcctReq: Radius Accounting Request Message TestAuth: Radius Authentication Test message TestAcct: Radius Accounting Test message

- Label: `rad_pkt_type`

  Label Description: Direction of Radius message from cnBNG perspective Tx: Outboung message to the server Retry_Tx: Retry Outbound Tx message to the server Rx: Inbound message from the server

- Label: `rad_result`

Label Description: Results of Radius handshake Failed: Transation failed Failure_No_Server: No server could be found Failure_Bad_Authenticator: pre-shared secret between cnBNG and Radius server is not matching. Success: Successful transaction Timeout: Radius handshake is timed out Failure_Reject: Radius handshake rejected by the server

radius_requests_current

Description: Current outstanding radius packets

Sample Query:
`'radius_requests_current{rad_svr_ip="1.1.1.1",rad_svr_port="1812",rad_svr_port_type="Auth"}'`

Labels:

- Label: `rad_svr_ip`

  Label Description: Radius Server IP (v4/v6) address

- Label: `rad_svr_port`

  Label Description: Radius Server Port number (e.g. 1812/1813)

- Label: `rad_svr_port_type`

  Label Description: Type of server (Auth/Acct)

- Label: `rad_msg_code`

  Label Description: Type of Radius Messages AAAAuthReq: Radius Authentication Request Message AAAAcctReq: Radius Accounting Request Message TestAuth: Radius Authentication Test message TestAcct: Radius Accounting Test message

radius_coa_dm_requests_statistics

Description: Total number of radius COA & DM packets

Sample Query: `'radius_coa_dm_requests_statistics{rad_svr_ip="1.1.1.1",rad_msg_code="CoaReq"}'`

Labels:

- Label: `rad_svr_ip`

  Label Description: Radius Server IP (v4/v6) address

- Label: `rad_msg_code`

  Label Description: Type of Radius Dynamic Authotization (CoA/DM) Messages DisconnectRequest: Packet of disconect request from CoA Client received on cnBNG. DisconnectACK: Packet of disconnect request accepted by cnBNG and ACK sent to CoA client. DisconnectNAK: Packet of disconnect request rejected by cnBNG and NACK sent to CoA client. CoAReq: CoA request from CoA client received on cnBNG. CoAACK: CoA request accepted by cnBNG and ACK sent to CoA client. CoANAK: CoA request rejected by cnBNG and NACK sent to CoA client.

- Label: `rad_pkt_type`

  Label Description: Direction of Radius message from cnBNG perspective Tx: Outboung message to the CoA client Rx: Inbound message from the CoA client

- Label: `rad_result`

Label Description: Results of Radius handshake for CoA/DM during dynamic authorization with CoA client Success: Successful transaction Failure_Invalid_Request: Invalid request coming from CoA client Failure_Unknown_MsgType: Invalid message type from CoA client Failure_Bad_Authenticator: Mismatch in preshared secret between CoA client cnBNG Failure_Drop_Retry_Coa: Retried CoA packet is dropped by cnBNG

radius_coa_dm_requests_current

Description: Current outstanding radius COA/DM requests

Sample Query: `'radius_coa_dm_requests_current{rad_svr_ip="1.1.1.1",rad_msg_code="CoaReq"}'`

Labels:

- Label: `rad_svr_ip`

  Label Description: Radius Server IP (v4/v6) address

- Label: `rad_msg_code`

  Label Description: Type of Radius Dynamic Authotization (CoA/DM) Messages DisconnectRequest: Packet of disconect request from CoA Client received on cnBNG. DisconnectACK: Packet of disconnect request accepted by cnBNG and ACK sent to CoA client. DisconnectNAK: Packet of disconnect request rejected by cnBNG and NACK sent to CoA client. CoAReq: CoA request from CoA client received on cnBNG. CoAACK: CoA request accepted by cnBNG and ACK sent to CoA client. CoANAK: CoA request rejected by cnBNG and NACK sent to CoA client.

- Label: `rad_pkt_type`

  Label Description: Direction of Radius message from cnBNG perspective Tx: Outboung message to the CoA client Rx: Inbound message from the CoA client

- Label: `rad_result`

  Label Description: Results of Radius handshake for CoA/DM during dynamic authorization with CoA client Success: Successful transaction Failure_Invalid_Request: Invalid request coming from CoA client Failure_Unknown_MsgType: Invalid message type from CoA client Failure_Bad_Authenticator: Mismatch in preshared secret between CoA client cnBNG Failure_Drop_Retry_Coa: Retried CoA packet is dropped by cnBNG

radius_server_status

Description: Display active/inactive status of radius-server. Server status values are UP/Down/Deleted

Sample Query:
`'radius_server_status{rad_svr_ip="1.1.1.1",rad_svr_port="1812",rad_svr_port_type="Auth"}'`

Labels:

- Label: `rad_svr_ip`

  Label Description: Radius Server IP (v4/v6) address

- Label: `rad_svr_port`

  Label Description: Radius Server Port number (e.g. 1812/1813)

- Label: `rad_svr_port_type`

Label Description: Type of server (Auth/Acct)

radius_server_rtt_ms

Description: Display Radius Server RTT

Sample Query:
`'radius_server_rtt_ms{rad_svr_ip="1.1.1.1",rad_svr_port="1812",rad_svr_port_type="Auth"}'`

Labels:

- Label: `rad_svr_ip`

  Label Description: Radius Server IP (v4/v6) address

- Label: `rad_svr_port`

  Label Description: Radius Server Port number (e.g. 1812/1813)

- Label: `rad_svr_port_type`

  Label Description: Type of server (Auth/Acct)

radius_least_out_standing_server

Description: Display Least Outstanding Radius Server statistics

Sample Query:
`'radius_least_out_standing_server{least_outstanding_server="1.1.1.1:1812",batch_size="25"}'`

Labels:

- Label: `least_outstanding_server`

  Label Description: Radius Server IP (v4/v6) in the form of ip_port

- Label: `batch_size`

  Label Description: batch_size in number of messages. Default value is 25

CNBNG PFCP and GTPU packet statistics Category

bng_proto_udp_total

Description: Total number of PFCP/GTPU packets received/transmitted

Sample Query:
`'bng_proto_udp_total{pkt_type="Pfcp",message_name="n4_session_establishment_req"}'`

Labels:

- Label: `pkt_type`

  Label Description: Type of packet which can be Pfcp: Packet Forwarding Control Protocol packets Gtpu: GPRS Tunnelling Protocol packets

- Label: `message_direction`

  Label Description: Transmitted or received packet type inbound: Received outbound: Transmitted

- Label: `status`

  Label Description: status of packet processing with values: accepted, discarded, ignore-response, decode-error, encode-error, IPCFailure, Invalid, Timeout, proxy-rsp-error, request-nil, response-nil, upfinfo-nil, GetMsgobj-error, response-error, received, send, resend, retrans-accepted, retrans, rsp-rcvd-after-timeout, failed, unsupported, getcon-nil, upf-inactive, av-sla-lt-1sec, BGIPCFailure

- Label: `transport_type`

  Label Description: Initial or retransmitted request original: First request initiated retransmitted: resend on failure

- Label: `message_name`

  Label Description: pfcp/gtpu message types n4_session_establishment_req: Session Establishment Request n4_session_establishment_res: Session Establishment Response n4_session_modification_req: Session Modification Request n4_session_modification_res: Session Modification Response n4_session_report_req: Session Report Request n4_session_report_res: Session Report Response n4_session_ppp_lcp_timeout_req: PPP LCP Timeout Request n4_session_ppp_lcp_timeout_res: PPP LCP Timeout Response n4_session_deletion_req: Session Release Request n4_session_deletion_res: Session Release Response n4_association_setup_req: Association Setup Request n4_association_setup_res: Association Setup Response n4_association_update_req: Association Update Request n4_association_update_res: Association Update Response n4_association_release_req: Association Release Request n4_association_release_res: Association Release Response n4_heartbeat_req: Heartbeat Request n4_heartbeat_res: Heartbeat Response n4_node_report_req: Node Report Request n4_node_report_res: Node Report Response

- Label: `upf_name`

  Label Description: upf identifier associated with the request

  Example: Any string

bng_proto_dhcp_total

Description: Total number of GTPU DHCP packets received/transmitted

Sample Query: `'bng_proto_dhcp_total{pkt_type="Gtpu",message_name="IPoE", upf_name="asr9k-1"}'`

Labels:

- Label: `pkt_type`

  Label Description: Type of packet, Value: Gtpu

- Label: `message_direction`

  Label Description: Transmitted or received packet type inbound: Received outbound: Transmitted

- Label: `status`

  Label Description: status of packet processing with values: send, IPCFailure, accepted

- Label: `message_name`

  Label Description: Message Type, Value: IPoE, Dhcpv6OverPPPoE, Dhcpv6OverL2TPLNS

- Label: `upf_name`

  Label Description: upf identifier associated with the request

Example: Any string

bng_proto_pppoe_total

Description: Total number of GTPU PPPOE packets received/transmitted

Sample Query: `'bng_proto_pppoe_total{pkt_type="Gtpu",message_name="PPPoE", upf_name="asr9k-1"}'`

Labels:

- Label: `pkt_type`

  Label Description: Type of packet, Value: Gtpu

- Label: `message_direction`

  Label Description: Transmitted or received packet type inbound: Received outbound: Transmitted

- Label: `status`

  Label Description: status of packet processing with values: send, IPCFailure, accepted

- Label: `message_name`

  Label Description: Message Type, Value: PPPoE, Icmpv6OverPPPoE

- Label: `upf_name`

  Label Description: upf identifier associated with the request

  Example: Any string

bng_proto_l2tp_total

Description: Total number of GTPU L2TP packets received/transmitted

Sample Query: `'bng_proto_l2tp_total{pkt_type="Gtpu",message_name="L2TP", upf_name="asr9k-1"}'`

Labels:

- Label: `pkt_type`

  Label Description: Type of packet, Value: Gtpu

- Label: `message_direction`

  Label Description: Transmitted or received packet type inbound: Received outbound: Transmitted

- Label: `status`

  Label Description: status of packet processing with values: send, IPCFailure, accepted

- Label: `message_name`

  Label Description: Message Type, Value: L2TP

- Label: `upf_name`

  Label Description: upf identifier associated with the request

  Example: Any string

CNBNG UPF Status Category

upf_status

Description: UPF status

Sample Query: `'upf_status{status="Active", upf_name="asr9k-1"}'`

Labels:

- Label: `status`

  Label Description: status values Active: Active state UPF InActive: InActive state UPF Deleting: Deleting state UPF Deleted: Deleted state UPF

- Label: `upf_name`

  Label Description: Userplane ip-address associated with the request

upmgr_statistics

Description: UPF Related Statistics

Sample Query:
`'upmgr_statistics{upf="asr9k-1",message_type="N4AssocRequest",message_direction="Rx"}'`

Labels:

- Label: `upf`

  Label Description: User-plane ip-address/name associated with the request

- Label: `message_type`

  Label Description: UPF related Messages Info N4AssocRequest: UPF Association Request N4AssocResponse: UPF Association Response N4UpdateRequest: UPF Association Update Request N4UpdateResponse: UPF Association Update Response N4ReleaseRequest: UPF Association Release Request N4ReleaseResponse: UPF Association Release Response N4HeartBeatRequest: UPF Heartbeat Request N4HeartBeatResponse: UPF Heartbeat Response

- Label: `message_direction`

  Label Description: Direction of message Rx: Message Received Tx: Message Transmitted

CNBNG Flowcontrol Statistics Category

virtual_message_rate_limit_reached_total

Description: Total number of times the rate limit is reached for virtual id queue

Sample Query:
`'virtual_message_rate_limit_reached_total{interface="n4",msg_type="pfcpresponse",virtual_msg_id="1"}'`

Labels:

- Label: `interface`

  Label Description: Interface Name from the virtual queue config n4: PFCP Interface

- Label: `msg_type`

  Label Description: Message type from the virtual queue config all: This msg type falls under virtual id 1 pfcpresponse: This msg type falls under virtual id 2 lcpkeepalive: This msg type falls under virtual id 4 pfcpkeepalive: This msg type falls under virtual id 3 sessionreport: This msg type falls under virtual id 5

  Example: pfcpresponse, lcpkeepalive, pfcpkeepalive, sessionreport, all

- Label: `virtual_msg_id`

  Label Description: Virtual Message Id of Queue 1: PFCP and GTPU msgs 2: N4 Session Establishment, Modification and Release Response msgs 3: N4 Heartbeat Request and Response, Association Update Response and Node Report Request msgs 4: PPP LCP Keepalive Timeout 5: N4 Session Report Request

virtual_message_reject_total

Description: Total number of rejected virtual messages

Sample Query:

```
'virtual_message_reject_total{interface="n4",msg_type="pfcpresponse",virtual_msg_id="1"}'
```

Labels:

- Label: `interface`

  Label Description: Interface Name from the virtual queue config n4: PFCP Interface

- Label: `msg_type`

  Label Description: Message type from the virtual queue config all: This msg type falls under virtual id 1 pfcpresponse: This msg type falls under virtual id 2 lcpkeepalive: This msg type falls under virtual id 4 pfcpkeepalive: This msg type falls under virtual id 3 sessionreport: This msg type falls under virtual id 5

  Example: pfcpresponse, lcpkeepalive, pfcpkeepalive, sessionreport, all

- Label: `virtual_msg_id`

  Label Description: Virtual Message Id of Queue 1: PFCP and GTPU msgs 2: N4 Session Establishment, Modification and Release Response msgs 3: N4 Heartbeat Request and Response, Association Update Response and Node Report Request msgs 4: PPP LCP Keepalive Timeout 5: N4 Session Report Request

- Label: `cause`

  Label Description: Drop Cause VirtualMsgQueueFull: Virtual message queue (channel) is full PendingRequestsLimitReached: Pending requests limit is reached

- Label: `virtual_msg_reject_code`

  Label Description: drop code from the virtual queue config

incoming_drop_queued_total

Description: Total number of incoming queued request dropped

Sample Query:

```
'incoming_drop_queued_total{interface="n4",local_address="10.1.0.1",protocol="Udp",peer_address="10.1.0.2",cause="DispatcherQueueFull",queue_id="1"}'
```

Labels:

- Label: `interface`

  Label Description: Interface Name from the virtual queue config N4: PFCP Interface

- Label: `local_address`

  Label Description: Local Address

  Example: Any string

- Label: `peer_address`

  Label Description: Peer Address

  Example: Any string

- Label: `cause`

  Label Description: Drop Cause

  Example: DispatcherQueueFull, DispatcherQueueNotAvailable, DispatcherRetryRequestDrop, DispatcherThresholdRequestDrop

incoming_queued_rate_limit_reached_total

Description: Total number of incoming rate limit hit count

Sample Query: `'incoming_queued_rate_limit_reached_total{interface="n4", protocol="Udp",queue_id="1"}'`

Labels:

- Label: `interface`

  Label Description: Interface Name from the virtual queue config N4: PFCP Interface

- Label: `local_address`

  Label Description: Local Address

  Example: Any string

- Label: `peer_address`

  Label Description: Peer Address

  Example: Any string

- Label: `cause`

  Label Description: Drop Cause

  Example: DispatcherQueueFull, DispatcherQueueNotAvailable, DispatcherRetryRequestDrop, DispatcherThresholdRequestDrop

CNBNG IPAM Statistics Category

ipam_address_events_total

Description: Total number of IPAM Address events

Sample Query:

```
'ipam_address_events_total{pool="p1",event_type="Allocation",allocation_type="dynamic",address_type="IPv4",ipam_dp_key="dp1"}'
```

Labels:

- Label: `pool`

  Label Description: name of the pool associated with the request

  Example: Any string

- Label: `event_type`

  Label Description: type of event associated with the request

  Example: Allocation/Release

- Label: `allocation_type`

  Label Description: type of allocation associated with the request

  Example: static/dynamic

- Label: `address_type`

  Label Description: address type associated with the request

  Example: IPv4/IPv6NA/IPv6PD

- Label: `ipam_dp_key`

  Label Description: upf identifier associated with the request

  Example: Any string

- Label: `gr_instance_id`

  Label Description: GR instance ID

  Example: GR instance ID

- Label: `dnn`

  Label Description: This is the tag that is passed to IPAM it can be poolName or any group-tag string

  Example: Any string

- Label: `for_remote_smf`

  Label Description: Set to true when the allocation is for GR that this is non-local cluster

  Example: true/false

ipam_chunk_events_total

Description: Total number of IPAM Address Chunk events

Sample Query:

```
'ipam_chunk_events_total{pool="p1",event_type="Allocation",address_type="IPv4",ipam_dp_key="dp1"}'
```

Labels:

- Label: `pool`

  Label Description: name of the pool associated with the request

Example: Any string

- Label: `event_type`

  Label Description: type of event associated with the request

  Example: Allocation/Release

- Label: `address_type`

  Label Description: address type associated with the request

  Example: IPv4/IPv6NA/IPv6PD

- Label: `ipam_dp_key`

  Label Description: upf identifier associated with the request

  Example: Any string

- Label: `gr_instance_id`

  Label Description: GR instance ID

  Example: GR instance ID

- Label: `dnn`

  Label Description: This is the tag that is passed to IPAM it can be poolName or any group-tag string

  Example: Any string

- Label: `for_remote_smf`

  Label Description: Set to true when the allocation is for GR that this is non-local cluster

  Example: true/false

- Label: `quarantined`

  Label Description: If the chunk delete is failed on UP then the chunk is marked quarantined

  Example: true/false

ipam_address_allocations_current

Description: Current state of IPAM Address allocations

Sample Query:

```
'ipam_address_allocations_current{pool="p1",allocation_type="dynamic",address_type="IPv4",ipam_dp_key="dp1"}'
```

Labels:

- Label: `pool`

  Label Description: name of the pool associated with the request

  Example: Any string

- Label: `allocation_type`

  Label Description: type of allocation associated with the request

  Example: static/dynamic

- Label: `address_type`

  Label Description: address type associated with the request

  Example: IPv4/IPv6NA/IPv6PD

- Label: `ipam_dp_key`

  Label Description: upf identifier associated with the request

  Example: Any string

- Label: `gr_instance_id`

  Label Description: GR instance ID

  Example: GR instance ID

- Label: `dnn`

  Label Description: This is the tag that is passed to IPAM it can be poolName or any group-tag string

  Example: Any string

- Label: `for_remote_smf`

  Label Description: Set to true when the allocation is for GR that this is non-local cluster

  Example: true/false

ipam_chunk_allocations_current

Description: Current state of IPAM Address Chunk allocations

Sample Query: `'ipam_chunk_allocations_current{pool="p1",address_type="IPv4",ipam_dp_key="dp1"}'`

Labels:

- Label: `pool`

  Label Description: name of the pool associated with the request

  Example: Any string

- Label: `address_type`

  Label Description: address type associated with the request

  Example: IPv4/IPv6NA/IPv6PD

- Label: `ipam_dp_key`

  Label Description: upf identifier associated with the request

  Example: Any string

- Label: `gr_instance_id`

  Label Description: GR instance ID

  Example: GR instance ID

- Label: `dnn`

  Label Description: This is the tag that is passed to IPAM it can be poolName or any group-tag string

Example: Any string

- Label: `for_remote_smf`

  Label Description: Set to true when the allocation is for GR that this is non-local cluster

  Example: true/false

- Label: `quarantined`

  Label Description: When chunk operation on UP fails and the chunk is not released/allocated on IPAM

  Example: true/false

ipam_reconcile_with_cdl

Description: Total number of IP that are reconciled with CDL

Sample Query: `'sum(ipam_reconcile_with_cdl{}) by (address_type)'`

Labels:

- Label: `pool`

  Label Description: name of the pool associated with the request

  Example: Any string

- Label: `address_type`

  Label Description: address type associated with the request

  Example: IPv4/IPv6NA/IPv6PD

- Label: `ipam_dp_key`

  Label Description: upf identifier associated with the request

  Example: Any string

- Label: `gr_instance_id`

  Label Description: GR instance ID

  Example: GR instance ID

- Label: `dnn`

  Label Description: This is the tag that is passed to IPAM it can be poolName or any group-tag string

  Example: Any string

- Label: `reconcile_trigger`

  Label Description: Origin for the reconcile trigger can be NM Restart or via cli(Audit) or role switchover(RoleSwitchOver)

  Example: Restart/Audit/RoleSwitchOver

- Label: `quarantined`

  Label Description: When chunk operation on UP fails and the chunk is not released/allocated on IPAM

  Example: true/false

ipam_role_switch_over

Description: Stats for Geo Role switch over happens

Sample Query: `'ipam_role_switch_over{gr_instance_id="1"}'`

Labels:

- Label: `gr_instance_id`

  Label Description: GR instance ID

  Example: GR instance ID

- Label: `event_type`

  Label Description: Set based on the GR becomes Active or StandBy on cluster

  Example: Active/StandBy

ipam_quarantine_statistics

Description: Total number of IP's that are quarantined in IPAM

Labels:

- Label: `pool`

  Label Description: name of the pool associated with the request

  Example: Any string

- Label: `address_type`

  Label Description: address type associated with the request

  Example: IPv4/IPv6NA/IPv6PD

- Label: `ipam_dp_key`

  Label Description: upf identifier associated with the request

  Example: Any string

- Label: `gr_instance_id`

  Label Description: GR instance ID

  Example: GR instance ID

- Label: `type`

  Label Description: Total address in quarantine queue and the queue sizes

  Example: start_batch_qsize/end_batch_qsize/avg_qtime_secs/pop_count_qtime/pop_count_qsize

ipam_quarantine_chunks_statistics

Description: Counter for chunks quarantine

Labels:

- Label: `rpc_counter_type`

Label Description: Type of request Buffered/Processed

- Label: `pool`

  Label Description: name of the pool associated with the request

  Example: Any string

- Label: `address_type`

  Label Description: address type associated with the request

  Example: IPv4/IPv6NA/IPv6PD

- Label: `ipam_dp_key`

  Label Description: upf identifier associated with the request

  Example: Any string

- Label: `gr_instance_id`

  Label Description: GR instance ID

  Example: GR instance ID

- Label: `qtLabel`

  Label Description: Reason for quarantine route_sync_failed/quarantined_chunk

ipam_address_pool_total

Description: Total address configured for Pool

Labels:

- Label: `dnn`

  Label Description: This is the tag that is passed to IPAM it can be poolName or any group-tag string

  Example: Any string

- Label: `pool`

  Label Description: name of the pool associated with the request

  Example: Any string

- Label: `address_type`

  Label Description: address type associated with the request

  Example: IPv4/IPv6NA/IPv6PD

- Label: `gr_instance_id`

  Label Description: GR instance ID

  Example: GR instance ID

ipam_static_request_statistics

Description: Total Static-ip Mapping Requests received

Labels:

- Label: `event_type`

  Label Description: type of event associated with the request

  Example: Allocation/Release

ipam_alarms_stats

Description: IPAM Alarm notification

Labels:

- Label: `dnn`

  Label Description: This is the tag that is passed to IPAM it can be poolName or any group-tag string

  Example: Any string

- Label: `pool`

  Label Description: name of the pool associated with the request

  Example: Any string

- Label: `ipam_dp_key`

  Label Description: upf identifier associated with the request

  Example: Any string

- Label: `address_type`

  Label Description: address type associated with the request

  Example: IPv4/IPv6NA/IPv6PD

- Label: `gr_instance_id`

  Label Description: GR instance ID

  Example: GR instance ID

- Label: `stats_type`

  Label Description: Type of alarm this is triggered

  Example: AlarmAddrRangeExhaust

CNBNG GR Statistics Category

geo_RejectedRoleChanged_total

Description: GR Rejected Request coming to standby instance

Sample Query:
`'geo_RejectedRoleChanged_total{GRInstanceNumber="Instance.1",RejectedCount="200"}'`

Labels:

- Label: `RejectedCount`

Label Description: Rejected Count

- Label: `GRInstanceNumber`

  Label Description: GR Instance Number

geo_MaintenanceMode_info

Description: GR maintenanceMode gauge

Sample Query: `'geo_MaintenanceMode_info{MaintenanceMode="false"}'`

Labels:

- Label: `MaintenanceMode`

  Label Description: Maintenance Mode

  Example: true,false

geo_monitoring_total

Description: GR replication Operation

Sample Query: `'geo_monitoring_total{ControlActionNameType="TriggerGRApi"}'`

Labels:

- Label: `ControlActionType`

  Label Description: Control Action Type

  Example: AdminRemoteMessageActionType, AdminRoleChangeActionType, AdminMonitoringActionType

- Label: `ControlActionNameType`

  Label Description: Control Action Name Type

  Example: RemoteMsgGetSitestatus, TriggerGRApi, GeoMonitoring, MonitorPod, RemoteMsgNotifyFailover, RemoteMsgGetSiteRoleDetails, RemoteMsgHeartbeat, GeoMonitoring, ResetRoleApi, AutoStandbyErrorToStandbyRoleChangeActionType

- Label: `AdminNode`

  Label Description: Node name

  Example: all, 1, 2

- Label: `status`

  Label Description: status

  Example: success,fail,remote status unavailable, unmarshalling error,geo maintenance DISABLED using CLI,geo maintenance ENABLE using CLI

- Label: `status_code`

  Label Description: status Code

  Example: 1002100110101011

CNBNG CP Audit Category

pppoe_recon_cp_events_total

Description: CP audit events in PPPoE

Sample Query: `'sum(pppoe_recon_cp_events_total) by (upf_name)'`

Labels:

- Label: `upf_name`

  Label Description: UPF ID

  Example: asr9k-1

- Label: `event`

  Label Description: type of event which can be found: Audited session is present in sm. not-found: Audited session is not present in sm."

pppoe_audit_confirmation_total

Description: CP audit events in PPPoE

Sample Query: `'sum(pppoe_audit_confirmation_total) by (event)'`

Labels:

- Label: `event`

  Label Description: type of event which can be no-session: Session audited in sm is not present in pppoe. session-fetch-failed: Session audited in sm is not present in pppoe. match: Session audited in sm is present in pppoe with matching audit id. mis-match: Session audited in sm is present in pppoe with wrong audit id.

CNBNG PPPOE/PPP Statistics Category

ppp_lcp_packet_events_total

Description: Total number of PPP LCP packets transmitted and received

Sample Query:
`'ppp_lcp_packet_events_total{pkt_type="Conf-Req",upf_name="asr9k-1",port_id="Bundle-Ether1.1"}'`

Labels:

- Label: `pkt_type`

  Label Description: Packet type

  Example: Conf-Req, Conf-Ack, Conf-Nak, Conf-Rej, Term-Req, Term-Ack, Proto-Rej, Code-Rej, Echo-Req, Echo-Rep

- Label: `pkt_direction`

  Label Description: Transmitted or Received packet

  Example: Tx, Rx

- Label: `upf_name`

  Label Description: UPF Name

  Example: Any string

- Label: `port_id`

  Label Description: Access interface Name

  Example: Any string

ppp_lcp_pap_packet_events_total

Description: Total number of PPP LCP PAP packets transmitted and received

Sample Query:

```
'ppp_lcp_pap_packet_events_total{pkt_type="Request",upf_name="asr9k-1",port_id="Bundle-Ether1.1"}'
```

Labels:

- Label: `pkt_type`

  Label Description: Packet type

  Example: Request, Ack, Nack

- Label: `pkt_direction`

  Label Description: Transmitted or Received packet

  Example: Tx, Rx

- Label: `upf_name`

  Label Description: UPF Name

  Example: Any string

- Label: `port_id`

  Label Description: Access interface Name

  Example: Any string

ppp_lcp_chap_packet_events_total

Description: Total number of PPP LCP CHAP packets transmitted and received

Sample Query:

```
'ppp_lcp_chap_packet_events_total{pkt_type="Challenge",upf_name="asr9k-1",port_id="Bundle-Ether1.1"}'
```

Labels:

- Label: `pkt_type`

  Label Description: Packet type

  Example: Challenge, Response, Rep-Success, Rep-Fail

- Label: `pkt_direction`

  Label Description: Transmitted or Received packet

Example: Tx, Rx

- Label: `upf_name`

  Label Description: UPF Name

  Example: Any string

- Label: `port_id`

  Label Description: Access interface Name

  Example: Any string

ppp_ipcp_packet_events_total

Description: Total number of PPP IPCP packets transmitted and received

Sample Query:
```
'ppp_ipcp_packet_events_total{pkt_type="Conf-Req",upf_name="asr9k-1",port_id="Bundle-Ether1.1"}'
```

Labels:

- Label: `pkt_type`

  Label Description: Packet type

  Example: Conf-Req, Conf-Ack, Conf-Nak, Term-Req, Term-Ack, Proto-Rej, Code-Rej, Conf-Rej

- Label: `pkt_direction`

  Label Description: Transmitted or Received packet

  Example: Tx, Rx

- Label: `upf_name`

  Label Description: UPF Name

  Example: Any string

- Label: `port_id`

  Label Description: Access interface Name

  Example: Any string

ppp_ipv6_cp_packet_events_total

Description: Total number of PPP IPv6CP packets transmitted and received

Sample Query:
```
'ppp_ipv6_cp_packet_events_total{pkt_type="Conf-Req",upf_name="asr9k-1",port_id="Bundle-Ether1.1"}'
```

Labels:

- Label: `pkt_type`

  Label Description: Packet type

  Example: Conf-Req, Conf-Ack, Conf-Nak, Term-Req, Term-Ack, Proto-Rej, Code-Rej, Conf-Rej

- Label: `pkt_direction`

Label Description: Transmitted or Received packet

Example: Tx, Rx

- Label: `upf_name`

  Label Description: UPF Name

  Example: Any string

- Label: `port_id`

  Label Description: Access interface Name

  Example: Any string

pppoe_packet_events_total

Description: Total number of PPPoE packets transmitted and received

Sample Query:
`'pppoe_packet_events_total{pkt_type="PADI",upf_name="asr9k-1",port_id="Bundle-Ether1.1"}'`

Labels:

- Label: `pkt_type`

  Label Description: Packet type

  Example: PADI, PADO, PADR, PADS, PADT

- Label: `pkt_direction`

  Label Description: Transmitted or Received packet

  Example: Tx, Rx

- Label: `upf_name`

  Label Description: UPF Name

  Example: Any string

- Label: `port_id`

  Label Description: Access interface Name

  Example: Any string

- Label: `status`

  Label Description: status of packet processing

  Example: Processed | Dropped

ppp_icmpv6_packet_events_total

Description: Total PPPoE ICMPv6 packets

Sample Query: `'ppp_icmpv6_packet_events_total{upf_name="asr9k-1",port_id="Bundle-Ether1.1"}'`

Labels:

- Label: `pkt_type`

Label Description: Packet type

Example: RouterSolicitation, RouterAdvertisement

- Label: `pkt_direction`

  Label Description: Transmitted or Received packet

  Example: Tx, Rx

- Label: `upf_name`

  Label Description: UPF Name

  Example: Any string

- Label: `port_id`

  Label Description: Access interface Name

  Example: Any string

CNBNG PPPOE L2TP Statistics Category

l2tp_packet_events_total

Description: Total L2TP packets

Sample Query: `'l2tp_packet_events_total{upf_name="asr9k-1",pkt_type="ICRQ"}'`

Labels:

- Label: `upf_name`

  Label Description: Router Name

- Label: `pkt_type`

  Label Description: Packet Type

  Example: ICRQ, ICRP, ICCN, CDN, ZLB ACK

- Label: `pkt_direction`

  Label Description: Transmitted or Received packet

  Example: Tx, Rx

CNBNG SRG Statistics Category

srg_events_total

Description: Total number of Srg Add/Remove Events

Sample Query: `'srg_events_total{srg_peerid="Peer1",upf_name="asr9k-1",event="Add"}'`

Labels:

- Label: `srg_peerid`

Label Description: Peer ID

Example: Any String

- Label: `srg_group`

  Label Description: ID of Group

  Example: Any String

- Label: `upf_name`

  Label Description: UPF Name

  Example: Any String

- Label: `event`

  Label Description: event Add/Remove

  Example: Add, Remove

srg_state_change_total

Description: Total number of Srg Node Report received

Sample Query: `'srg_state_change_total{srg_peerid="Peer1", upf_name="asr9k-1", srg_group="group1", role="Active", state="Up"}'`

Labels:

- Label: `srg_peerid`

  Label Description: Peer ID

  Example: Any String

- Label: `upf_name`

  Label Description: ID of UPF

  Example: Any String

- Label: `srg_group`

  Label Description: ID of group

  Example: Any String

- Label: `role`

  Label Description: SRG Role

  Example: Active, Standby, Invalid, NotReady

- Label: `state`

  Label Description: SRG state of UPF

  Example: Up, Down, NotReady

- Label: `inprogress`

  Label Description: SRG Role change state of UPF

Example: yes, no

srg_upf_n4_state_change_total

Description: Total number of Upf n4 state change

Sample Query: `'srg_upf_n4_state_change_total{srg_peerid="Peer1", srg_group="group1", upf_name="asr9k-1", active="yes"}'`

Labels:

- Label: `srg_peerid`

  Label Description: Peer ID

  Example: Any String

- Label: `srg_group`

  Label Description: ID of group

  Example: Any String

- Label: `upf_name`

  Label Description: ID of UPF

  Example: Any String

- Label: `active`

  Label Description: N4 state

  Example: yes, no

srg_role_req_total

Description: Total number of Role change Request

Sample Query: `'srg_role_req_total{srg_peerid="Peer1", upf_name="asr9k-1", srg_group="group1", role="Active"}'`

Labels:

- Label: `srg_peerid`

  Label Description: Peer ID

  Example: Any String

- Label: `upf_name`

  Label Description: ID of UPF

  Example: Any String

- Label: `srg_group`

  Label Description: ID of group

  Example: Any String

- Label: `role`

Label Description: SRG Role

Example: Active, Standby, Invalid, NotReady

- Label: `create`

  Label Description: is first role change request

  Example: yes, no

srg_role_rsp_total

Description: Total number of Role change Response

Sample Query: `'srg_role_rsp_total{srg_peerid="Peer1", upf_name="asr9k-1", srg_group="group1", role="Active", state="Up", result="Success"}'`

Labels:

- Label: `srg_peerid`

  Label Description: Peer ID

  Example: Any String

- Label: `upf_name`

  Label Description: ID of UPF

  Example: Any String

- Label: `srg_group`

  Label Description: ID of group

  Example: Any String

- Label: `role`

  Label Description: SRG Role

  Example: Active, Standby, Invalid, NotReady

- Label: `state`

  Label Description: SRG state of UPF

  Example: Up, Down, NotReady

- Label: `result`

  Label Description: result of role change request

  Example: Success, Failure

- Label: `inprogress`

  Label Description: SRG Role change state of UPF

  Example: yes, no

db_records_total

Description: Total number of Groups and their Srg Role, Srg State and N4 Connection State

Sample Query:
`'avg(db_records_total{session_type=~\"SRG:${srgUpfID}:(Active:Connected:Up|Standby:Connected:(Up|Down))\"})'`

Labels:

- Label: `session_type`

  Label Description: Type of session

  Example: SRG:ASR9K-1:Active:Connected:Up

CNBNG Session Manager Statistics Category

db_records_total

Description: Current number of IPOE/PPPOE sessions

Sample Query: `'db_records_total{session_type="SM:DHCP"}'`

Labels:

- Label: `session_type`

  Label Description: Type of session

  Example: SM:DHCP, SM:DHCP:<upf>, SM:PPPOE, SM:PPPOE:<upf>

smc_pre_events_total

Description: Total number of PRE-events started.

Sample Query: `'smc_pre_events_total{session_type="DHCP", upf_name="asr9k-1", pre_event="session-start"}'`

Labels:

- Label: `session_type`

  Label Description: Type of session

  Example: DHCP, PPPOE

- Label: `upf_name`

  Label Description: UPF Name

  Example: Any string

- Label: `port_id`

  Label Description: Port Identifier

  Example: Any string

- Label: `pre_event`

  Label Description: PRE event name

Example: session-start, session-activate, session-update, session-disconnect, account-update

smc_pre_events_status_total

Description: Total number of execution status of PRE-events.

Sample Query: `'smc_pre_events_status_total{session_type="DHCP", upf_name="asr9k-1", pre_event="session-start", status="success"}'`

Labels:

- Label: `session_type`

  Label Description: Type of session

  Example: DHCP, PPPOE

- Label: `upf_name`

  Label Description: UPF Name

  Example: Any string

- Label: `port_id`

  Label Description: Port Identifier

  Example: Any string

- Label: `pre_event`

  Label Description: PRE event name

  Example: session-start, session-activate, session-update, session-disconnect, account-update

- Label: `status`

  Label Description: PRE event status

  Example: success, error

- Label: `status_code`

  Label Description: PRE event status code

  Example: policySuccess, policySvmApplyFailed, policySubsProfNotFound, policyActionAuthenFailure, policyActionAuthorFailure

CNBNG Accounting Statistics Category

db_records_total

Description: Current number of Subscriber regardless of accounting enable or not

Sample Query: `'db_records_total{session_type="Charging"}'`

Labels:

- Label: `session_type`

  Label Description: Session type

Example: Charging, Charging:<upf>

accounting_message_total

Description: Total number of Start/Stop/Interim Message trigger towards Radius Server

Sample Query:

```
'accounting_message_total{acct_type="Start",upf_name="asr9k-1",service_name="qos1"}'
```

Labels:

- Label: `acct_type`

  Label Description: Accounting Packet type

  Example: Start, Interim, Stop

- Label: `acct_level`

  Label Description: Accounting category

  Example: Session, Service

- Label: `upf_name`

  Label Description: UPF Name

  Example: Any string

- Label: `aaa_profile`

  Label Description: AAA profile used

  Example: Any string

- Label: `service_name`

  Label Description: Name of service

  Example: Any string

- Label: `status`

  Label Description: status of accounting request

  Example: Attempt, Success, Failure

accounting_message_current

Description: Current number of Start/Stop/Interim Message triggered towards Server and Waiting for Response

Sample Query:

```
'accounting_message_current{acct_type="Start",upf_name="asr9k-1",service_name="qos1"}'
```

Labels:

- Label: `acct_type`

  Label Description: Accounting Packet type

  Example: Start, Interim, Stop

- Label: `acct_level`

Label Description: Accounting category

Example: Session, Service

- Label: `upf_name`

  Label Description: UPF Name

  Example: Any string

- Label: `service_name`

  Label Description: Name of service

  Example: Any string

session_usage_report_total

Description: Total number of Usage Report Coming from PFCP per session

Sample Query:

```
'session_usage_report_total{report_type="ChargingFinalUsageReport",upf_name="asr9k-1"}'
```

Labels:

- Label: `report_type`

  Label Description: Usage report type

  Example: ChargingFinalUsageReport, ChargingInterimUsageReport

- Label: `upf_name`

  Label Description: UPF Name

  Example: Any string

- Label: `aaa_profile`

  Label Description: AAA profile used

  Example: Any string

service_usage_report_total

Description: Total number of Usage Report Coming from PFCP per service

Sample Query:

```
'service_usage_report_total{report_type="ChargingFinalUsageReport",upf_name="asr9k-1",service_name="qos1"}'
```

Labels:

- Label: `report_type`

  Label Description: Usage report type

  Example: ChargingFinalUsageReport, ChargingInterimUsageReport

- Label: `upf_name`

  Label Description: UPF Name

  Example: Any string

- Label: `aaa_profile`

  Label Description: AAA profile used

  Example: Any string

- Label: `service_name`

  Label Description: Name of service

  Example: Any string

charging_subscriber_total

Description: Total number of Subscriber regardless of accounting enable or not

Sample Query: `'charging_subscriber_total{upf_name="asr9k-1"}'`

Labels:

- Label: `upf_name`

  Label Description: UPF Name

  Example: Any string

CNBNG L2TP Statistics Category

l2tp_mgr_packet_events_total

Description: Total L2TP packets

Sample Query:
`'l2tp_mgr_packet_events_total{pkt_direction="Rx",pkt_type="CDN",upf_name="lps_lns_asr9k-1"}'`

Labels:

- Label: `upf_name`

  Label Description: Name of user-plane

- Label: `pkt_type`

  Label Description: L2TP Packet Type CDN,HELLO,ICCN,ICRQ,PPP,SCCCN,SCCRQ,StopCCN,ZLB ACK,ICRP,SCCRP

- Label: `pkt_direction`

  Label Description: direction of Packet Rx: Packet Received Tx: Packet Transmitted

l2tp_mgr_ipc_events_total

Description: Total IPC events

Sample Query:
`'l2tp_mgr_ipc_events_total{message_type="SessionIDAllocReq",upf_name="lps_lns_asr9k-1",status="Success"}'`

Labels:

- Label: `upf_name`

Label Description: Name of user-plane

- Label: `message_type`

  Label Description: Type of Message

- Label: `status`

  Label Description: status of Message IPC-failure: IPC Failure Message Success: IPC Success Message Failure: IPC Failure Message

l2tp_mgr_retransmit_packet_events_total

Description: Total L2TP Retransmit packets

Sample Query:
`'l2tp_mgr_retransmit_packet_events_total{pkt_type="HELLO",upf_name="lps_lns_asr9k-1"}'`

Labels:

- Label: `upf_name`

  Label Description: Name of user-plane

- Label: `pkt_type`

  Label Description: Type of Packet CDN,HELLO,ICCN,ICRQ,PPP,SCCCN,SCCRQ,StopCCN,ZLB ACK,ICRP,SCCRP

l2tp_mgr_disconnect_events_total

Description: Total L2TP Disconnect Events

Sample Query:
`'l2tp_mgr_disconnect_events_total{message_type="NoSessionTimeout",upf_name="lps_lns_asr9k-1"}'`

Labels:

- Label: `upf_name`

  Label Description: Name of user-plane

- Label: `message_type`

  Label Description: Type of Message NoSessionTimeout: Nosessiontimeout message RxStopCCNfromLAC: ReceiveStopCCN message from LAC

l2tp_peer_transit_status

Description: L2tp Peer Status

Sample Query: `'l2tp_peer_transit_status{l2tp_instanceid="1", status="StatusDone"}'`

Labels:

- Label: `l2tp_instanceid`

  Label Description: L2TP Pod Instance ID

- Label: `status`

  Label Description: L2TP Pod Instance Peer Transit Status StatusNone,StatusInit,StatusSelfProcessing,StatusRemoteProcessing,StatusDone,StatusUnknown

l2tp_self_transit_status

Description: L2TP Self Transit Status

Sample Query: `'l2tp_self_transit_status{l2tp_instanceid="1", status="StatusDone"}'`

Labels:

- Label: `l2tp_instanceid`

  Label Description: L2TP Pod Instance ID

- Label: `status`

  Label Description: L2TP Pod Instance Self Transit Status StatusNone,StatusInit,StatusSelfProcessing,StatusRemoteProcessing,StatusDone,StatusUnknown

DHCP Statistics Category

dhcp_v4_packet_stats

Description: Total number of DHCPv4 packets received & transmitted

Sample Query: `'sum(dhcp_v4_packet_stats{}) by (pkt_type)'`

Labels:

- Label: `pkt_type`

  Label Description: Type of packet which can be Unspecified, Discover, Offer, Request, Decline, Ack, Nak, Release, Inform, Unknown

- Label: `pkt_direction`

  Label Description: Packet direction In, Out

- Label: `upf_name`

  Label Description: upf identifier associated with the request

- Label: `port_id`

  Label Description: Access Interface

- Label: `srg_peerid`

  Label Description: srg peer id

- Label: `vrf`

  Label Description: Access vrf

dhcp_v6_packet_stats

Description: Total number of DHCPv6 packets received & transmitted

Sample Query: `'sum(dhcp_v6_packet_stats{}) by (pkt_type)'`

Labels:

- Label: `pkt_type`

  Label Description: Type of packet which can be Unspecified, Solicit, Adverstise, Request, Confirm, Renew, Rebind, Reply, Release, Decline, Reconfigure, InformationRequest, RelayForward, RelayReply, Unknown

- Label: `pkt_direction`

  Label Description: Packet direction In, Out

- Label: `upf_name`

  Label Description: upf identifier associated with the request

- Label: `port_id`

  Label Description: Access Interface

- Label: `srg_peerid`

  Label Description: srg peer id

- Label: `vrf`

  Label Description: Access vrf

dhcp_v6_ia_type_packet_stats

Description: Total number of DHCPv6 na/pd packets received & transmitted

Sample Query: `'sum(dhcp_v6_ia_type_packet_stats{}) by (pkt_type, ia_type)'`

Labels:

- Label: `pkt_type`

  Label Description: Type of packet which can be Unspecified, Solicit, Adverstise, Request, Confirm, Renew, Rebind, Reply, Release, Decline, Reconfigure, InformationRequest, RelayForward, RelayReply, Unknown

- Label: `ia_type`

  Label Description: IA Type String IANA, IAPD

- Label: `pkt_direction`

  Label Description: Packet direction In, Out

- Label: `upf_name`

  Label Description: upf identifier associated with the request

- Label: `port_id`

  Label Description: Access Interface

- Label: `srg_peerid`

  Label Description: srg peer id

- Label: `vrf`

  Label Description: Access vrf

dhcp_v4_session_current

Description: current DHCPv4 sessions count

Sample Query: `'sum(dhcp_v4_session_current{upf_name="<upf-name>"}) by (state)'`

Labels:

- Label: `state`

  Label Description: session state can be v4init, v4offered, v4bound

- Label: `upf_name`

  Label Description: upf identifier associated with the request

- Label: `port_id`

  Label Description: Access Interface

- Label: `srg_peerid`

  Label Description: srg peer id

dhcp_v6_session_current

Description: current DHCPv6 sessions count

Sample Query: `'sum(dhcp_v6_session_current{upf_name="<upf-name>"}) by (state)'`

Labels:

- Label: `session_type`

  Label Description: session type can be invalid, ipoe, pppoe, l2tp_lns

- Label: `ia_type`

  Label Description: IA Type String IANA, IAPD

- Label: `state`

  Label Description: session state can be v6Init, v6Advertised, v6Bound

- Label: `upf_name`

  Label Description: upf identifier associated with the request

- Label: `port_id`

  Label Description: Access Interface

- Label: `srg_peerid`

  Label Description: srg peer id

dhcp_session_current

Description: current DHCP sessions count

Sample Query: `'sum(dhcp_session_current{}) by (session_type, afi,upf)'`

Labels:

- Label: `session_type`

  Label Description: session type can be invalid, ipoe, pppoe, l2tp_lns

- Label: `afi`

  Label Description: Afi type String afi:dual, afi:ipv4, afi:ipv6

- Label: `upf_name`

  Label Description: upf identifier associated with the request

- Label: `port_id`

  Label Description: Access Interface

- Label: `srg_peerid`

  Label Description: srg peer id

dhcp_miscellaneous_failure_stats

Description: DHCP miscellaneous failure stats

Sample Query: `'sum(dhcp_miscellaneous_failure_stats {}) by (pkt_type, fail_reason)'`

Labels:

- Label: `afi`

  Label Description: Afi type String AFIINVAL, IPV4, IPV6

- Label: `pkt_type`

  Label Description: session type can be invalid, ipoe, pppoe, l2tp_lns

- Label: `fail_reason`

  Label Description: fail reason can be get_request, unmarshal, validation, decode, emptyRequest, get_request, session_key, leaseReservation_request, get_session, dhcp_profile, basic_validation, pppoe_sublabel, pppoe_sess_cfg, sublabel, sess_attr, sm_create_err, sess_create_auth, sm_state, fsm, sm_action, send, early_trigger, fsm_v4, v4_sess_invalid_holdtimer_expiry, v6_sess_invalid_holdtimer_expiry, v4_sess_invalid_int_holdtimer_expiry, v6_sess_invalid_int_holdtimer_expiry, lease_reservation, err_rsp, v4_sess_invalid, v6_sess_invalid

dhcp_recon_cp_events_total

Description: Total number recon events

Sample Query: `'sum(dhcp_recon_cp_events_total{} by (upf_name)'`

Labels:

- Label: `upf_name`

Label Description: upf identifier associated with the request

- Label: `srg_peerid`

  Label Description: srg peer id

- Label: `event`

  Label Description: event can be success_found, failure_audit_id_mismatch, failure_session_notfound, success_hold, failure_sm_not_connected

dhcp_nm_recon_afi_total

Description: Total number DHCP NM recon Afi type

Sample Query: `'sum(dhcp_nm_recon_afi_total{} by (afi)'`

Labels:

- Label: `afi`

  Label Description: Afi type String can be ipv4, IANA, IAPD

- Label: `upf_name`

  Label Description: upf identifier associated with the request

- Label: `srg_peerid`

  Label Description: srg peer id

dhcp_v6_packet_error_stats

Description: DHCPv6 Packet Error stats

Sample Query: `'sum(dhcp_v6_packet_error_stats{} by (pkt_type)'`

Labels:

- Label: `pkt_type`

  Label Description: Type of packet which can be Unspecified, Solicit, Adverstise, Request, Confirm, Renew, Rebind, Reply, Release, Decline, Reconfigure, InformationRequest, RelayForward, RelayReply, Unknown

- Label: `fail_reason`

  Label Description: fail reason can be sm_disconnect, pppoe_no_sublabel, pppoe_subcfg_read, sublabel_alloc, session_attr_set, sm_create_exchange, sm_create_reject, sm_not_connected, TokenAllocateFailure, fail_sm_action, fail_encode, SessionLess_PacketRx, NAK_Request_in_Init_State, NAK_Failure_in_Init_State, NAK_Failure_in_Offered_State, NAK_Failure_in_Bound_State, packet_encode, get_session, get_profile, timer_set, no_pool_or_tag_name, ip_alloc, release_ip, sublabel_coversion Additional infra error codes. " TODO.. infraErrorCodeStr..[recordPacketErrorDropStats] there are many infra error codes!"

- Label: `ia_type`

  Label Description: IA Type String IANA, IAPD

- Label: `upf_name`

Label Description: upf identifier associated with the request

- Label: `port_id`

  Label Description: Access Interface

- Label: `srg_peerid`

  Label Description: srg peer id

dhcp_ha_packet_drop_stats

Description: DHCP HA Packet Drop stats

Sample Query: `'sum(dhcp_ha_packet_drop_stats{} by (pkt_type)'`

Labels:

- Label: `pkt_type`

  Label Description: Type of packet which can be v4_Unspecified, v4_Discover, v4_Offer, v4_Request, v4_Decline, v4_Ack, v4_Nak, v4_Release, v4_Inform, v4_Unknown v6_INVALID, v6_SOLICIT_Rx , v6_REQUEST_Rx , v6_DECLINE_Rx , v6_RELEASE_Rx, v6_INFORM_Rx, v6_RENEW_Rx, v6_REBIND_Rx, v6_DELETE, v6_FAILURE, v6_TIMER_EXPIRY

- Label: `upf_name`

  Label Description: upf identifier associated with the request

- Label: `port_id`

  Label Description: Access Interface

- Label: `srg_peerid`

  Label Description: srg peer id

- Label: `vrf`

  Label Description: Access vrf

dhcp_up_inactive_packet_drop_stats

Description: DHCP UP Inactive Packet Drop stats

Sample Query: `'sum(dhcp_up_inactive_packet_drop_stats{} by (pkt_type)'`

Labels:

- Label: `pkt_type`

  Label Description: Type of packet which can be (with or without v4_/v6_ prefix) v4_Unspecified, v4_Discover, v4_Offer, v4_Request, v4_Decline, v4_Ack, v4_Nak, v4_Release, v4_Inform, v4_Unknown v6_INVALID, v6_SOLICIT_Rx , v6_REQUEST_Rx , v6_DECLINE_Rx , v6_RELEASE_Rx, v6_INFORM_Rx, v6_RENEW_Rx, v6_REBIND_Rx, v6_DELETE, v6_FAILURE, v6_TIMER_EXPIRY

- Label: `upf_name`

  Label Description: upf identifier associated with the request

- Label: `port_id`

Label Description: Access Interface

- Label: `srg_peerid`

  Label Description: srg peer id

- Label: `vrf`

  Label Description: Access vrf

dhcp_stale_sess_packet_drop_stats

Description: DHCP stale session packet Drop stats

Sample Query: `'sum(dhcp_stale_sess_packet_drop_stats{} by (pkt_type)'`

Labels:

- Label: `pkt_type`

  Label Description: Type of packet which can be v4_Unspecified, v4_Discover, v4_Offer, v4_Request, v4_Decline, v4_Ack, v4_Nak, v4_Release, v4_Inform, v4_Unknown v6_INVALID, v6_SOLICIT_Rx , v6_REQUEST_Rx , v6_DECLINE_Rx , v6_RELEASE_Rx, v6_INFORM_Rx, v6_RENEW_Rx, v6_REBIND_Rx, v6_DELETE, v6_FAILURE, v6_TIMER_EXPIRY

- Label: `upf_name`

  Label Description: upf identifier associated with the request

- Label: `port_id`

  Label Description: Access Interface

- Label: `srg_peerid`

  Label Description: srg peer id

- Label: `vrf`

  Label Description: Access vrf

dhcp_ha_stale_sess_stats

Description: DHCP HA stale session stats

Sample Query: `'sum(dhcp_ha_stale_sess_stats{} by (pkt_type)'`

Labels:

- Label: `pkt_type`

  Label Description: Type of packet which can be Unspecified, Discover, Offer, Request, Decline, Ack, Nak, Release, Inform, Unknown INVALID, SOLICIT_Rx , REQUEST_Rx , DECLINE_Rx , RELEASE_Rx, INFORM_Rx, RENEW_Rx, REBIND_Rx, DELETE, FAILURE, TIMER_EXPIRY

- Label: `upf_name`

  Label Description: upf identifier associated with the request

- Label: `port_id`

  Label Description: Access Interface

- Label: `srg_peerid`

  Label Description: srg peer id

- Label: `vrf`

  Label Description: Access vrf

- Label: `stale_action`

  Label Description: stale action can be untagged, tagged

dhcp_ha_recovery_operation_total

Description: DHCP HA recovery operations selected from CDL flags

Sample Query: `'sum(dhcp_ha_recovery_operation_total{}) by (recovery_source, recovery_operation)'`

Labels:

- Label: `recovery_source`

  Label Description: source that triggered the recovery, can be pod_restart, cpgr_swo, unknown

- Label: `recovery_operation`

  Label Description: recovery operation selected from the CDL flag, can be delete, update

dhcp_ha_recovery_stale_flag_total

Description: Non-recovery DHCP transactions observing a pending CDL recovery flag

Sample Query: `'sum(dhcp_ha_recovery_stale_flag_total{}) by (recovery_operation, message_type)'`

Labels:

- Label: `recovery_operation`

  Label Description: recovery operation still pending on the session, can be delete, update

- Label: `message_type`

  Label Description: client packet or transaction type that observed the stale flag, e.g. v4_Discover, v4_Request, v6_SOLICIT_Rx, v6_REQUEST_Rx, or a DHCP txn type

Disconnect History Statistics Category

session_disconnect_history_total

Description: Session Disconnect history stats

Sample Query: `'sum(session_disconnect_history_total{}) by (disconnect_reason, upf_name, srg_peer_id)'`

Labels:

- Label: `disconnect_reason`

Label Description: session disconnect resaon

- Label: `upf_name`

  Label Description: upf identifier

- Label: `srg_peer_id`

  Label Description: srg peer id

L2TP Tunnel Disconnect History Statistics Category

tunnel_disconnect_history_total

Description: L2TP Tunnel Disconnect history stats

Sample Query: `'sum(tunnel_disconnect_history_total{}) by (disconnect_reason, upf_name)'`

Labels:

- Label: `disconnect_reason`

  Label Description: l2tp tunnel disconnect resaon

- Label: `upf_name`

  Label Description: upf identifier