



Bulk Statistics and Key Performance Indicators

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Feature Summary and Revision History

Summary Data

Table 1: Summary Data

Applicable Product(s) or Functional Area	SMF
Applicable Platform(s)	SMI
Feature Default Setting	Enabled – Always-on
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

Revision History

Table 2: Revision History

Revision Details	Release
First introduced.	Pre-2020.02.0

Feature Description

This chapter provides details of bulk statistics, and Key Performance Indicators (KPIs) used for performance analysis on SMF.

There are two types of bulk statistics:

- Gauge - A snapshot value that shows the statistic at that reporting moment (for example, the number of current PDP contexts, simultaneous Active EPS Bearers). Gauge statistics can increment or decrement continuously.
- Counter - A historic value that shows the statistic that accumulated over time (for example, the total number of CSR requests received). Counter values can only increment except in two cases: rollover, where a counter exceeds its maximum value and rolls over to zero, and reset, where a counter is manually reset to zero.

How it Works

The following bulk statistics are supported in SMF for Attempted, Success, and Failures:

- 4G and WiFi message-level statistics (CREATE, DELETE, UPDATE)
- PCF and CHF message-level statistics
- Handover:
 - 4G to 5G
 - 5G to 4G
 - Voice over New Radio (VoNR)
 - WiFi to NR
 - NR to WiFi
 - WiFi to eNB
 - eNB to WiFi

Supported KPIs

Common Statistics

The following table provides details of KPIs related to common statistics.

KPI Name	Type	Description/Formula	Label
Total PCF Policy Create Attempted	Counter	Total number of PCF Create attempted (%smPolicyCreate%)	status="attempted",dnn,rat_type
Total PCF Policy Create Success	Counter	(%smPolicyCreate%) Total PCF Policy Create Attempted - Total PCF Policy Create Failure	dnn,rat_type

KPI Name	Type	Description/Formula	Label
Total PCF Policy Create Failure	Counter	(%smPolicyCreate%)	status="failed",dnn, rat_type
Total PCF Policy Update Attempted	Counter	(%smPolicyUpdate%)	status="attempted", dnn, rat_type
Total PCF Policy Update Success	Counter	(%smPolicyUpdate%) Total PCF Policy Update Attempted - Total PCF Policy Update Failure	dnn, rat_type
Total PCF Policy Update Failure	Counter	(%smPolicyUpdate%)	status="failed", dnn, rat_type
Total PCF Update Notify Received	Counter	(%smPolicyUpdateNotify%)	status="accepted",dnn, rat_type
Total PCF Update Notify success	Counter	Total PCF Update Notify Received - Total PCF Update Notify failure	dnn, rat_type
Total PCF Update Notify Failure	Counter	(%smPolicyUpdateNotify%)	status="rejected"/status="failed",dnn, rat_type
Total PCF Terminate Attempted	Counter	(%smPolicyTerminate%)	status="attempted", dnn, rat_type
Total PCF Terminate Success	Counter	(%smPolicyTerminate %)	status="success",dnn, rat_type
Total PCF Terminate Failures	Counter	(%smPolicyTerminate%)	status="failure", dnn, rat_type
Total CHF Update Attempted	Counter	(%charging_update%)	status="attempted", dnn, rat_type
Total CHF Update Success	Counter	(%charging_update%)	status="success", dnn, rat_type
Total CHF Update Failure/Timeout	Counter	(%charging_update%)	status="failure", dnn, rat_type
Total CHF terminate Attempted	Counter	(%charging_terminate%)	status="attempted", dnn, rat_type

KPI Name	Type	Description/Formula	Label
Total CHF terminate Success	Counter	(%charging_terminate%)	status="success", dnn, rat_type
Total CHF terminate Failure	Counter	(%charging_terminate%)	status="failure", dnn, rat_type
Total 5gto4g Handover Attempted	Counter	pdn_5g_4g_handover pdn_5g_4g_handover_dft pdn_5g_4g_handover_idft	status="attempted"
Total 5gto4g Handover Success	Counter	pdn_5g_4g_handover pdn_5g_4g_handover_dft pdn_5g_4g_handover_idft	status="success"
Total 5gto4g Handover Failure	Counter	pdn_5g_4g_handover pdn_5g_4g_handover_dft pdn_5g_4g_handover_idft	status="failure", reason="idft_setup_failure" reason="mbr_setup_failure" reason="upf_failure"
Total 4gto5g Handover Attempted	Counter	n26_4g_to_5g_handover n26ho_4g_5g_dft n26ho_4g_5g_idft n26_4g_to_5g_im_mobility	status="attempted"
Total 4gto5g Handover Success	Counter	n26_4g_to_5g_handover n26ho_4g_5g_dft n26ho_4g_5g_idft n26_4g_to_5g_im_mobility	status="success"
Total 4gto5g Handover Failure	Counter	n26_4g_to_5g_handover n26ho_4g_5g_dft n26ho_4g_5g_idft n26_4g_to_5g_im_mobility	status="failure" reason="n26ho_4g_5g_n1n2_transfer_failure" reason="disc_n26_4g_5g_ho_udm_reg_failed" reason="disc_n26_4g_5g_ho_n4_modify_failed"
Total EPSFB Attempted	Counter	eps_fb_5g_4g_handover_dft eps_fb_5g_4g_handover_idft eps_fb_ded_brr	status="attempted",

KPI Name	Type	Description/Formula	Label
Total EPSFB Success	Counter	eps_fb_5g_4g_handover_dft eps_fb_5g_4g_handover_idft eps_fb_ded_brr	status="success",
Total EPSFB Failure	Counter	eps_fb_5g_4g_handover_dft eps_fb_5g_4g_handover_idft eps_fb_ded_brr	status="failure", reason="idft_setup_failure" reason="mbr_setup_failure" reason="upf_failure" reason="sgw_failure"
Total NRtoWifi Attempted	Counter	nr_to_untrusted_wifi_handover pdn_5g_4g_handover pdn_5g_4g_handover_dft pdn_5g_4g_handover_idft	status="attempted"
Total NRtoWifi Success	Counter	nr_to_untrusted_wifi_handover pdn_5g_4g_handover pdn_5g_4g_handover_dft pdn_5g_4g_handover_idft	status="success"
Total NRtoWifi Failure	Counter	nr_to_untrusted_wifi_handover pdn_5g_4g_handover pdn_5g_4g_handover_dft pdn_5g_4g_handover_idft	status="failure", reason="nr_to_untrusted_wifi_invalid_json" reason="nr_to_untrusted_wifi_invalid_paa" reason="nr_to_untrusted_wifi_invalid_msg" reason="nr_to_untrusted_wifi_pcf_failed" reason="nr_to_untrusted_wifi_n40_failed" reason="nr_to_untrusted_wifi_n4_failed" reason="nr_to_untrusted_wifi_pcf_failed_post_cb" reason="nr_to_untrusted_wifi_n40_failed_post_cb" reason="nr_to_untrusted_wifi_n4_failed_post_cb" reason="nr_to_untrusted_wifi_cbr_failed" reason="nr_to_untrusted_wifi_n1n2_release_failed" reason="nr_to_untrusted_wifi_n4_failed_post_ho" reason="nr_to_untrusted_wifi_pcf_update_failed_post_ho" reason="nr_to_untrusted_wifi_chf_update_failed_post_ho"

KPI Name	Type	Description/Formula	Label
Total WifitoNR Attempted	Counter	n26_4g_to_5g_handover n26ho_4g_5g_dft n26ho_4g_5g_idft	status="attempted"
Total WifitoNR Success	Counter	n26_4g_to_5g_handover n26ho_4g_5g_dft n26ho_4g_5g_idft	status="success"
Total WifitoNR Failure	Counter	n26_4g_to_5g_handover n26ho_4g_5g_dft n26ho_4g_5g_idft	status="failure"
Total eNBtoWifi Attempted	Counter	enb_to_untrusted_wifi_handover	status="attempted"
Total eNBtoWifi Success	Counter	enb_to_untrusted_wifi_handover	status="success"

KPI Name	Type	Description/Formula	Label
Total eNBtoWifi Failure	Counter	enb_to_untrusted_wifi_handover	status="failure", reason="enb_to_untrusted_wifi_to_enb_ho_reject" reason="enb_to_untrusted_wifi_to_enb_invalid_sess_state" reason="enb_to_untrusted_wifi_to_enb_invalid_json" reason="enb_to_untrusted_wifi_to_enb_invalid_paa" reason="enb_to_untrusted_wifi_to_enb_invalid_msg" reason="enb_to_untrusted_wifi_to_enb_udm_failed" reason="enb_to_untrusted_wifi_to_enb_n40_failed" reason="enb_to_untrusted_wifi_to_enb_n4_failed" reason="enb_to_untrusted_wifi_to_enb_pcf_failed_post_cb" reason="enb_to_untrusted_wifi_to_enb_mbr_failed" reason="enb_to_untrusted_wifi_to_enb_n4_failed_post_mbr" reason="enb_to_untrusted_wifi_to_enb_n40_failed_post_cb" reason="enb_to_untrusted_wifi_to_enb_n4_failed_post_cb" reason="enb_to_untrusted_wifi_to_enb_n40_failed_post_db" reason="enb_to_untrusted_wifi_to_enb_pcf_failed_post_db" reason="enb_to_untrusted_wifi_to_enb_cbr_failed" reason="enb_to_untrusted_wifi_to_enb_dbr_failed"
Total WifitoeNB Attempted	Counter	untrusted_wifi_to_enb_handover	status="attempted"
Total WifitoeNB Success	Counter	untrusted_wifi_to_enb_handover	status="success",

KPI Name	Type	Description/Formula	Label
Total WifitoeNB Failure	Counter	untrusted_wifi_to_enb_handover	status="failure", reason="enb_to_untrusted_wifi_to_enb_ho_reject" reason="enb_to_untrusted_wifi_to_enb_invalid_sess_state" reason="enb_to_untrusted_wifi_to_enb_invalid_json" reason="enb_to_untrusted_wifi_to_enb_invalid_paa" reason="enb_to_untrusted_wifi_to_enb_invalid_msg" reason="enb_to_untrusted_wifi_to_enb_udm_failed" reason="enb_to_untrusted_wifi_to_enb_n40_failed" reason="enb_to_untrusted_wifi_to_enb_n4_failed" reason="enb_to_untrusted_wifi_to_enb_pcf_failed_post_cb" reason="enb_to_untrusted_wifi_to_enb_mbr_failed" reason="enb_to_untrusted_wifi_to_enb_n4_failed_post_mbr" reason="enb_to_untrusted_wifi_to_enb_n40_failed_post_cb" reason="enb_to_untrusted_wifi_to_enb_n4_failed_post_cb" reason="enb_to_untrusted_wifi_to_enb_n40_failed_post_db" reason="enb_to_untrusted_wifi_to_enb_pcf_failed_post_db" reason="enb_to_untrusted_wifi_to_enb_cbr_failed" reason="enb_to_untrusted_wifi_to_enb_dbr_failed"

4G Subscriber

The following table provides details of KPIs related to 4G subscriber statistics.



Note Labels dnn, qci and rat_type are used to filter the counters. Here, rat_type is eutra.

KPI Name	Type	Description/Formula	Label
Total Active sessions	Gauge	Total number of PDN Contexts (%smf_session_counters%)	dnn, rat_type="eutra"
Total Active Bearers	Gauge	Total number of active Bearers (%total_bearer%)	dnn
Total Active Default Bearers	Gauge	(%total_bearer-dedicated_bearer%)	dnn
Total Active Dedicated Bearers	Gauge	Total number of active Dedicated Bearers (%dedicated_bearer%)	dnn
Total Bearer Creation Attempted	Counter	(%pdn_sess_create+pcf_req_ded_brr_create+eps_fb_ded_brr)	status="attempted",dnn
Total Bearers Creation Success	Counter	(%pdn_sess_create+pcf_req_ded_brr_create+eps_fb_ded_brr)	status="success",dnn
Total Bearers Creation Failure	Counter	(%pdn_sess_create+pcf_req_ded_brr_create+eps_fb_ded_brr)	status="failure",dnn
Total Dedicated Bearers Attempted	Counter	(%pcf_req_ded_brr_create+eps_fb_ded_brr %)	status="attempted",dnn
Total Dedicated Bearers Failure/Rejected	Counter	(%pcf_req_ded_brr_create+eps_fb_ded_brr %)	status="failure",dnn
Total Dedicated Bearers Success	Counter	(%pcf_req_ded_brr_create+eps_fb_ded_brr %)	status="success", dnn, rat_type="eutra"
Total CSR Attempted	Counter	(%pdn_sess_create%)	status="attempted",dnn
Total CSR Failure/Rejected	Counter	(%pdn_sess_create%)	status="failure",dnn,
Total CSR Success	Counter	(%pdn_sess_create%)	status="success",dnn
Total CBR Attempted	Counter	(%create_bearer_request%)	status="attempted",dnn, fiveqi, rat_type="eutra"
Total CBR failure	Counter	(%create_bearer_request%)	status="failure", fiveqi, dnn, rat_type="eutra"
Total CBR success	Counter	(%create_bearer_request%)	status="success",dnn, fiveqi, rat_type="eutra"
Total CBR retransmission rx	Counter	(%create_bearer_request%)	status="retransmit",dnn, fiveqi, rat_type="eutra"

KPI Name	Type	Description/Formula	Label
Total DBR Attempted	Counter	(%delete_bearer_request%)	status="attempted",dnn, fiveqi, rat_type="eutra"
Total DBR failure/Rejected	Counter	(%delete_bearer_request%)	status="failure", fiveqi, dnn, rat_type="eutra"
Total DBR success	Counter	(%delete_bearer_request%)	status="success", fiveqi, dnn, fiveqi, rat_type="eutra"
Total DBR retransmission tx	Counter	(%delete_bearer_request%)	status="retransmit", dnn, fiveqi, rat_type="eutra"
Total UBR Attempted	Counter	(%update_bearer_request%)	status="attempted",dnn, fiveqi, rat_type="eutra"
Total UBR failure/Rejected	Counter	(%update_bearer_request%)	status="failure", fiveqi, dnn, rat_type="eutra"
Total UBR Success	Counter	(%update_bearer_request%)	status="success", fiveqi, dnn, rat_type="eutra"
Total UBR retransmission	Counter	(%update_bearer_request%)	status="retransmit",dnn , rat_type="eutra"
Total EPSFB Dedicated Bearers	Counter	(%eps_fb_ded_brr%)	dnn

5G Subscriber

The following table provides details of KPIs related to 5G subscriber statistics.

KPI Name	Type	Description/Formula	Label
Total Active sessions	Gauge	Total number of PDU Contexts (%smf_session_counters%)	dnn, rat_type="nr"
Total Active Flows	Gauge	(%policy_pdu_flows_curent%)	dnn, fiveqi, rat_type="nr"
Total Flow Creation Attempted	Counter	(%policy_pdu_flows_total%)	status="attempted", dnn, fiveqi, rat_type="nr"
Total Flow Creation Success	Counter	(%policy_pdu_flows_total%)	status="success", dnn, fiveqi, rat_type="nr"
Total Flow Creation Failure	Counter	(%policy_pdu_flows_total%)	status="failure", dnn, fiveqi, rat_type="nr"

WiFi Subscriber

The following table provides details of KPIs related to WiFi subscriber statistics.

KPI Name	Type	Description/Formula	Label
Total CSR Attempted	Counter	(%untrusted_wifi_to_enb_handover%)	status="attempted",dnn, rat_type="wlan"
Total CSR failure/Rejected	Counter	(%untrusted_wifi_to_enb_handover%)	status="failure",dnn, rat_type="wlan"
Total CSR success	Counter	(%untrusted_wifi_to_enb_handover%)	status="success",dnn , rat_type="wlan"
Total CBR Attempted	Counter	(%create_bearer_request%)	status="attempted", rat_type="wlan"
Total CBR failure	Counter	(%create_bearer_request%)	status="failure", rat_type="wlan"
Total CBR success	Counter	(%create_bearer_request%)	status="success", rat_type="wlan"
Total DBR Attempted	Counter	(%delete_bearer_request%)	status="attempted", rat_type="wlan"
Total DBR failure/Rejected	Counter	(%delete_bearer_request%)	status="failure", rat_type="wlan"
Total DBR success	Counter	(%delete_bearer_request%)	status="success", rat_type="wlan"

