

MME - KPI Analysis Report

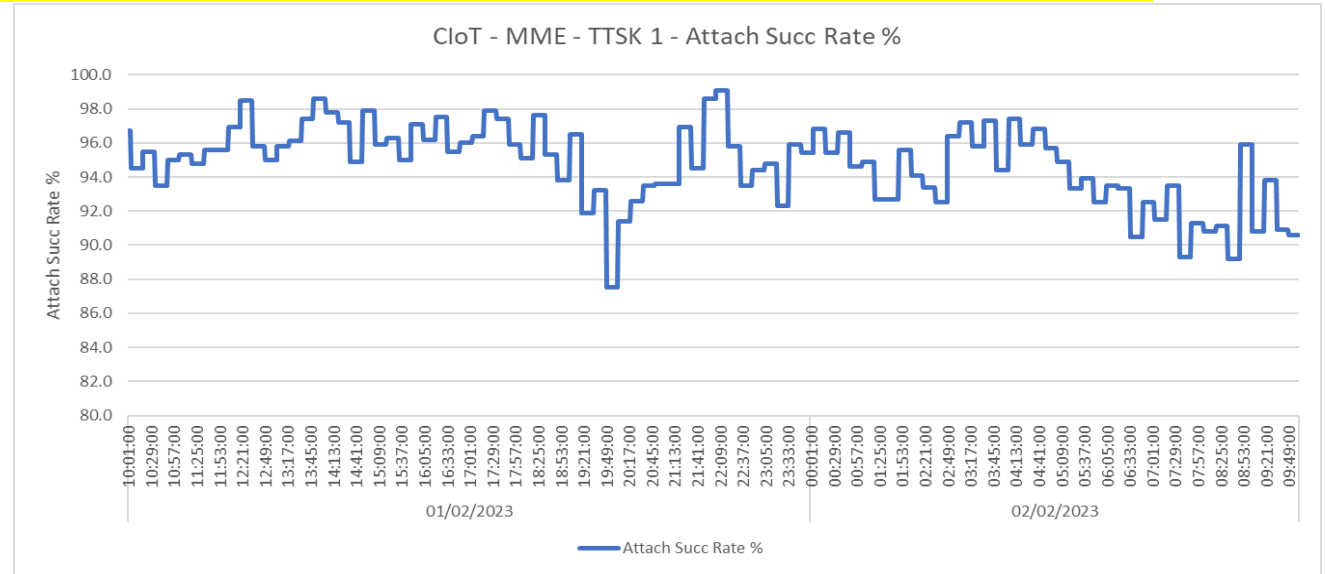
Attach Success Rate %

Feb 2nd , 2023

MME - KPI Analysis Report - Attach Success Rate %

Current Trend Attach Success Rate, average 94 %

Collecting from Grafana, 10 AM Feb 1st ~ 10 AM 2nd, 2023



KPI Formula for Attach SR % :

NUMERATOR:

(LTE_MM_ATTACH_FAIL_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_EPS_ATTACH_FAIL_EMM_CAUSE_11_E + LTE_MM_ATTACH_FAIL_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_EPS_ATTACH_FAIL_EMM_CAUSE_15_E +
LTE_MM_ATTACH_FAIL_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_EPS_ATTACH_FAIL_EMM_CAUSE_19_E + LTE_MM_ATTACH_FAIL_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_EPS_ATTACH_FAIL_EMM_CAUSE_8_E +
LTE_MM_ATTACH_FAIL_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_EMERGENCY_ATTACH_FAIL_EMM_CAUSE_8_E +
LTE_MM_ATTACH_FAIL_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_EMERGENCY_ATTACH_FAIL_EMM_CAUSE_19_E +
LTE_MM_ATTACH_FAIL_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_EMERGENCY_ATTACH_FAIL_EMM_CAUSE_15_E
+LTE_MM_ATTACH_FAIL_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_EMERGENCY_ATTACH_FAIL_EMM_CAUSE_11_E +
LTE_MM_ATTACH_FAIL_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_COMB_ATTACH_FAIL_EMM_CAUSE_8_E +LTE_MM_ATTACH_FAIL_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_COMB_ATTACH_FAIL_EMM_CAUSE_19_E +
LTE_MM_ATTACH_FAIL_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_COMB_ATTACH_FAIL_EMM_CAUSE_15_E +LTE_MM_ATTACH_FAIL_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_COMB_ATTACH_FAIL_EMM_CAUSE_11_E +
LTE_MM_ATTACH_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_EPS_ATTACH_SUCC_E +LTE_MM_ATTACH_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_COMB_ATTACH_SUCC_E +
LTE_MM_ATTACH_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_EMERG_ATTACH_SUCC_E)

/

DENOMINATOR:

((LTE_MM_ATTACH_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_EPS_ATTACH_ATT_E + LTE_MM_ATTACH_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_COMB_ATTACH_ATT_E +
LTE_MM_ATTACH_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_EMERG_ATTACH_ATT_E + LTE_MM_ATTACH_IMSI_PLMN_ID_IMSI_PLMN_ID_MM_ATTACH_NAS_REDIRECTED_ATT_E)

-

(LTE_MM_ATTACH_IMSI_PLMN_ID_MM_INIT_ATTACH_NAS_REDIRECT_IMSI_E + LTE_MM_ATTACH_IMSI_PLMN_ID_MM_INIT_ATTACH_NAS_REDIRECT_UE_USAGE_TYPE_E))

MME - KPI Analysis Report - Attach Success Rate %

Troubleshooting 1:

- We running trace using TCP dump and log in Jan 27th, 2023,
- for 10 Minute, 00:08 AM ~ 0:15 AM JST Time

Message Type	Val Attempt
Attach Request	215
Attach Accept	53
Attach complete	42
Attach Reject	168



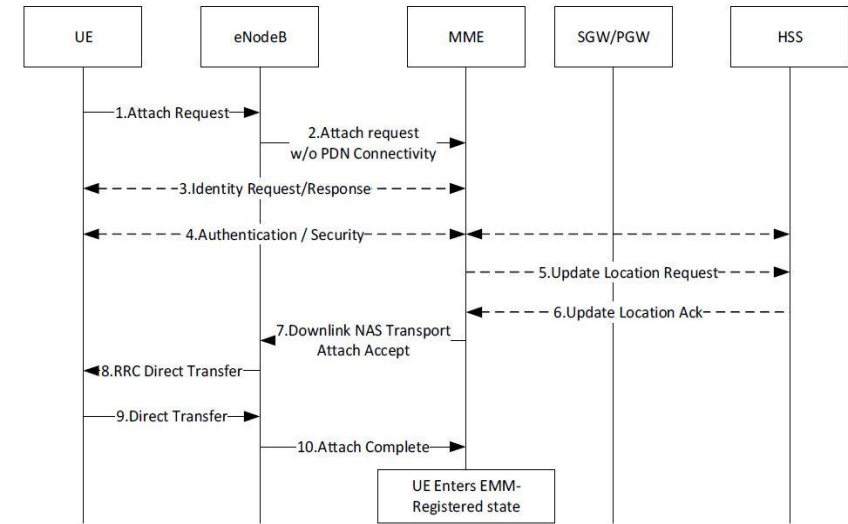
summary_pcap_at
tach_response



pcap_attach_requ
_accept_reject_com



Reject Cause	Count of Cause
EPS services and non-EPS services not allowed (8)	165
ESM failure (19)	3



Analysis

First concern we are checking cause code that was found during testing whether any cause triggering low attach success rate.

We found from attach request 215 , response attach reject total 168, and total 42.

From Reject 168 we found 165 Attach reject Cause 8 EMM_CAUSE_8_E, and 3 reject cause EMM_CAUSE_19_E.

From Attach Request 215 count, we got attach complete response 42, And Attach Reject 168, and if we sum total (reject + complete) is 210 count.

So if we subtract from attach request 215 – 210 than it missing 5 count without no info / response

From Here we are checking where are these 5 count, since the all attach reject is already include in numerator

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PCAP Trace

s1ap.ENB_UE_S1AP_ID == 62944 s1ap.MME_UE_S1AP_ID == 527527				
Source	Destination	Protocol	Length	Info
40b:c042:22a1:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-EPS	204	InitialUEMessage, Attach request, PDN connectivity request
40b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	152	SACK (Ack=2450371214, Arwnd=106496) , DownlinkNASTransport, Identity request
40b:c042:22a1:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-EPS	152	UplinkNASTransport, Identity response
40b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	164	SACK (Ack=2450371215, Arwnd=106496) , DownlinkNASTransport, Authentication request
40b:c042:22a1:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-EPS	152	UplinkNASTransport, Authentication response
40b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	144	SACK (Ack=2450371216, Arwnd=106496) , DownlinkNASTransport, Security mode command
40b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	128	DownlinkNASTransport, Security mode command
40b:c042:22a1:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-EPS	152	UplinkNASTransport, Security mode complete
40b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	136	SACK (Ack=2450371217, Arwnd=106496) , DownlinkNASTransport, ESM information request
40b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	120	DownlinkNASTransport, ESM information request
40b:c042:22a1:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-EPS	152	UplinkNASTransport, Security mode complete
40b:c042:22a1:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-EPS	180	UplinkNASTransport, ESM information response
40b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	280	SACK (Ack=2450371219, Arwnd=106496) , DownlinkNASTransport, Attach accept, Activate default EPS bearer
40b:c042:22a1:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-EPS	196	SACK (Ack=1318636686, Arwnd=524108) , UplinkNASTransport, ESM information response
40b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	264	DownlinkNASTransport, Attach accept, Activate default EPS bearer context request
40b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	264	DownlinkNASTransport, Attach accept, Activate default EPS bearer context request
40b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP	108	UEContextReleaseCommand [NAS-cause=detach]
40b:c042:22a1:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP	140	SACK (Ack=1318636689, Arwnd=524288) , UEContextReleaseComplete

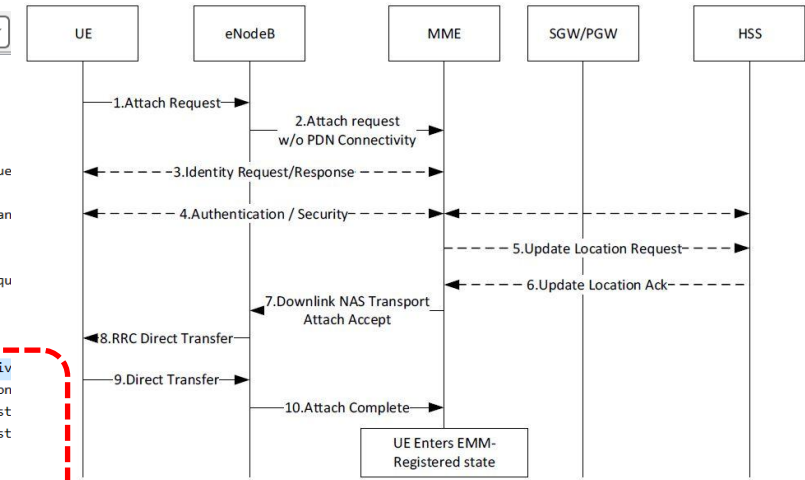


pcap_no_attach_c
complete

Analysis

Based on our checking, we found in those 5-missing response, is due to UE/eNB doesn't send attach complete after attach accept was send by MME. One sample for missing eNB (ip: 240b:c042:22a1:1021:0:311:0:1) response we can see as above (filter PCAP s1ap.ENB_UE_S1AP_ID == 62944||s1ap.MME_UE_S1AP_ID == 527527), we see above after attach accept has been send by MME to eNB, there is no response from eNB for information that attach complete or not. Below we can see comparison message between with or without attach complete from eNB

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PCAP Trace

Analysis

At left is comparison between message “with vs without attach complete” from eNB to MME.



pcap_with_attach_complete

slap.ENB_UE_S1AP_ID == 62944 slap.MME_UE_S1AP_ID == 527527					
No.	Time	Source	Destination	Protocol	Info
557787	2023-01-26 22:09:54,714647	240b:c042:22a1:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-EPS	InitialUEMessage, Attach request, PDN connectivity request
557821	2023-01-26 22:09:54,721254	240b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	SACK (Ack=2450371214, Arwnd=106496), DownlinkNASTransport, Identity request
568431	2023-01-26 22:09:57,272506	240b:c042:22a1:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-EPS	UplinkNASTransport, Identity response
568694	2023-01-26 22:09:57,323595	240b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	SACK (Ack=2450371215, Arwnd=106496), DownlinkNASTransport, Authentication request
			240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-EPS	UplinkNASTransport, Authentication response
			240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	SACK (Ack=2450371216, Arwnd=106496), DownlinkNASTransport, Security mode command
			240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	DownlinkNASTransport, Security mode command
782483	2023-01-26 22:10:48,472531	240b:c042:22a1:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-EPS	UplinkNASTransport, Security mode complete
782837	2023-01-26 22:10:48,545831	240b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	SACK (Ack=2450371217, Arwnd=106496), DownlinkNASTransport, ESM information request
803726	2023-01-26 22:10:53,538319	240b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	DownlinkNASTransport, ESM information request
809571	2023-01-26 22:10:54,872532	240b:c042:22a1:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-EPS	UplinkNASTransport, Security mode complete
812322	2023-01-26 22:10:55,514628	240b:c042:22a1:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-EPS	UplinkNASTransport, ESM information response
812471	2023-01-26 22:10:55,537099	240b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	SACK (Ack=2450371219, Arwnd=106496), DownlinkNASTransport, Attach accept, Activate default EPS bearer context request
812496	2023-01-26 22:10:55,544742	240b:c042:22a1:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-EPS	SACK (Ack=1318636686, Arwnd=524108), UplinkNASTransport, ESM information response
896656	2023-01-26 22:11:15,541290	240b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	DownlinkNASTransport, Attach accept, Activate default EPS bearer context request
978761	2023-01-26 22:11:35,538462	240b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP/NAS-EPS	DownlinkNASTransport, Attach accept, Activate default EPS bearer context request
1061182	2023-01-26 22:11:55,560641	240b:c010:104:27d1:8f28:2:26:3c04	240b:c042:22a1:1021:0:311:0:1	S1AP	UEContextReleaseCommand [NAS-cause=detach]
1061219	2023-01-26 22:11:55,568712	240b:c042:22a1:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP	SACK (Ack=1318636689, Arwnd=524288), UEContextReleaseComplete

slap.ENB_UE_S1AP_ID == 132770 slap.MME_UE_S1AP_ID == 3672725									
No.	Time	Source	Destination	Protocol	Info				
1675955	2023-01-26 22:14:21,21...	240b:c016:5251:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-...	InitialUEMessage, Attach request, PDN connectivity request				
1676041	2023-01-26 22:14:21,23...	240b:c010:104:27d1:8f28:2:26:3c04	240b:c016:5251:1021:0:311:0:1	S1AP/NAS-...	SACK (Ack=1510549705, Arwnd=106496), DownlinkNASTransport, Identity request				
1696201	2023-01-26 22:14:26,00...	240b:c016:5251:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-...	UplinkNASTransport, Identity response				
1696395	2023-01-26 22:14:26,05...	240b:c010:104:27d1:8f28:2:26:3c04	240b:c016:5251:1021:0:311:0:1	S1AP/NAS-...	SACK (Ack=1510549706, Arwnd=106496), DownlinkNASTransport, Authentication request				
1		240b:c010:104:27d1:8f28:2:26:3c04	240b:c016:5251:1021:0:311:0:1	S1AP/NAS-...	UplinkNASTransport, Authentication response				
1		240b:c016:5251:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-...	SACK (Ack=1510549707, Arwnd=106496), DownlinkNASTransport, Security mode command				
1		240b:c010:104:27d1:8f28:2:26:3c04	240b:c016:5251:1021:0:311:0:1	S1AP/NAS-...	UplinkNASTransport, Security mode complete				
1733932	2023-01-26 22:14:35,66...	240b:c010:104:27d1:8f28:2:26:3c04	240b:c016:5251:1021:0:311:0:1	S1AP/NAS-...	SACK (Ack=1510549708, Arwnd=106496), DownlinkNASTransport, ESM information request				
1754578	2023-01-26 22:14:40,66...	240b:c010:104:27d1:8f28:2:26:3c04	240b:c016:5251:1021:0:311:0:1	S1AP/NAS-...	DownlinkNASTransport, ESM information request				
1756072	2023-01-26 22:14:41,05...	240b:c016:5251:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-...	UplinkNASTransport, ESM information response				
1756150	2023-01-26 22:14:41,07...	240b:c010:104:27d1:8f28:2:26:3c04	240b:c016:5251:1021:0:311:0:1	S1AP/NAS-...	SACK (Ack=1510549714, Arwnd=106496), DownlinkNASTransport, Attach accept, Activate default EPS bearer context request				
1756164	2023-01-26 22:14:41,08...	240b:c016:5251:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-...	SACK (Ack=1998840305, Arwnd=524107), UplinkNASTransport, ESM information request				
1839689	2023-01-26 22:15:01,07...	240b:c010:104:27d1:8f28:2:26:3c04	240b:c016:5251:1021:0:311:0:1	S1AP/NAS-...	DownlinkNASTransport, Attach accept, Activate default EPS bearer context request				
1924483	2023-01-26 22:15:21,06...	240b:c010:104:27d1:8f28:2:26:3c04	240b:c016:5251:1021:0:311:0:1	S1AP/NAS-...	DownlinkNASTransport, Attach accept, Activate default EPS bearer context request				
2003930	2023-01-26 22:15:41,07...	240b:c010:104:27d1:8f28:2:26:3c04	240b:c016:5251:1021:0:311:0:1	S1AP	UEContextReleaseCommand [NAS-cause=detach]				
2003950	2023-01-26 22:15:41,07...	240b:c016:5251:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP	SACK (Ack=1998840312, Arwnd=524288), UEContextReleaseComplete				
2050026	2023-01-26 22:15:51,77...	240b:c016:5251:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-...	UplinkNASTransport, Attach complete, Activate default EPS bearer context request				
2050027	2023-01-26 22:15:51,77...	240b:c010:104:27d1:8f28:2:26:3c04	240b:c016:5251:1021:0:311:0:1	S1AP	SACK (Ack=1510549724, Arwnd=106496), ErrorIndication [RadioNetworkK-c				
2050057	2023-01-26 22:15:51,77...	240b:c016:5251:1021:0:311:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-...	SACK (Ack=1998840314, Arwnd=524259), UplinkNASTransport, ESM data transfer				
2050059	2023-01-26 22:15:51,77...	240b:c010:104:27d1:8f28:2:26:3c04	240b:c016:5251:1021:0:311:0:1	S1AP	SACK (Ack=1510549725, Arwnd=106496), ErrorIndication [RadioNetworkK-c				

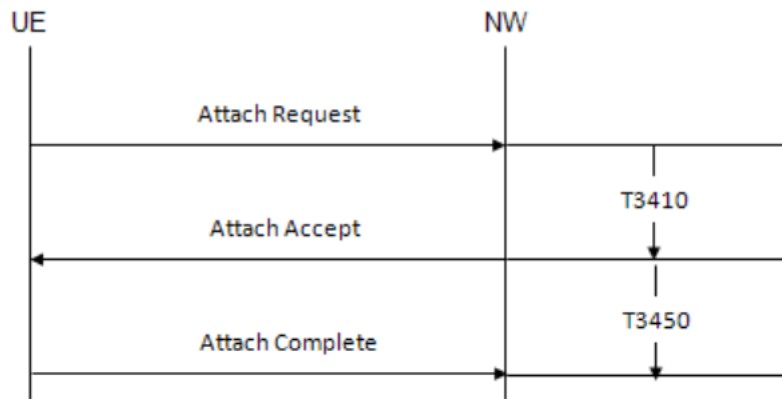
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Troubleshooting 2:

- At Jan 31st 2023, We collect log WRN from system for 15minute interval 20:30~20:45 PM JST, and take curl command output before and after.

Base on wrn log we found **MSGTYPE_MME_T3450_EXPIRY** in state **EPC_MME_EMM_FSM_ST_WAIT_FOR_ATTACH_COMPLETE**. This error coming when Attach Accept send by network and waiting for Attach Complete from eNB but than expiry

```
IMS.log_20230131203158.log.gz:<2023-01-31 20:31:34.657 *WRN* LOG_MMEMGR 62653:63321 0:0><epCMme>[OnMessage(EpCMmeEmmSession.cpp:903:0-634-2-116)] MSGTYPE_MME_T3450_EXPIRY in state EPC_MME_EMM_FSM_ST_WAIT_FOR_ATTACH_COMPLETE user:[440112000077398]
IMS.log_20230131203158.log.gz:<2023-01-31 20:31:54.660 *WRN* LOG_MMEMGR 62653:63321 0:0><epCMme>[OnMessage(EpCMmeEmmSession.cpp:903:0-634-2-116)] MSGTYPE_MME_T3450_EXPIRY in state EPC_MME_EMM_FSM_ST_WAIT_FOR_ATTACH_COMPLETE user:[440112000077398]
IMS.log_20230131203252.log.gz:<2023-01-31 20:32:00.130 *WRN* LOG_MMEMGR 62653:63393 0:0><epCMme>[OnMessage(EpCMmeEmmSession.cpp:903:0-634-7-175)] MSGTYPE_MME_T3450_EXPIRY in state EPC_MME_EMM_FSM_ST_WAIT_FOR_ATTACH_COMPLETE user:[440112000001970]
IMS.log_20230131203252.log.gz:<2023-01-31 20:32:03.839 *WRN* LOG_MMEMGR 62653:63360 0:0><epCMme>[OnMessage(EpCMmeEmmSession.cpp:903:0-634-4-97)] MSGTYPE_MME_T3450_EXPIRY in state EPC_MME_EMM_FSM_ST_WAIT_FOR_ATTACH_COMPLETE user:[440112000054796]
IMS.log_20230131203252.log.gz:<2023-01-31 20:32:14.658 *WRN* LOG_MMEMGR 62653:63321 0:0><epCMme>[OnMessage(EpCMmeEmmSession.cpp:903:0-634-2-116)] MSGTYPE_MME_T3450_EXPIRY in state EPC_MME_EMM_FSM_ST_WAIT_FOR_ATTACH_COMPLETE user:[440112000077398]
```




ue_attach_comple
te_no_process

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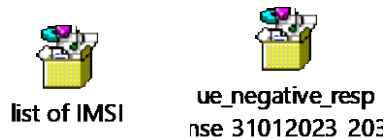
Troubleshooting 3

As per KPI we found S6a Diam Auth error answer 5XXX and base on PCAP it is found
DIAMETER_ERROR_USER_UNKNOWN (5001).

This error is making MME response reject with Cause: EPS services and non-EPS services not allowed (8), and it already include in Attach Succ Rate Calculation formula as Numerator, so it is not suspecting as the contributor in direct for attach Succ rate decrease.

But it can lead UE to do re-try attach and in which can make attach request attempt high and possibility T3450 expired happen

Below attach are the list of IMSI that get issue with 5001, this taken from log 31jan2023 2030PM (string search Negative Response received(Cause Val: 0xbc9))



No.	Time	Source	Destination	Protocol	Info
689430	2023-01-26 22:10:...	240b:c010:104:27d1:8f28:2:26:3c...	240b:c050:251:1021:0:111:0:1	S1AP/NAS-EPS	SACK (Ack=2986736911, Arwnd=106496) , DownlinkNASTransport, Attach reject (EPS services not allowed)
689437	2023-01-26 22:10:...	240b:c010:101:2807:2f01:2:3ff:3...	240b:c010:104:27d1:8f28:2:26:3c03	DIAMETER	SACK (Ack=81, Arwnd=7864320) cmd=3GPP-Authentication-Information Answer(318) flags=P--
689445	2023-01-26 22:10:...	240b:c010:104:27d1:8f28:2:26:3c...	240b:c052:2b1:1021:0:411:0:1	S1AP/NAS-EPS	SACK (Ack=2812928411, Arwnd=106496) , DownlinkNASTransport, Attach reject (EPS services not allowed)
696147	2023-01-26 22:10:...	240b:c010:104:27d1:8f28:2:26:3c...	240b:c0a2:211:1021:0:511:0:1	S1AP/NAS-EPS	SACK (Ack=1692072620, Arwnd=106496) , DownlinkNASTransport, Attach accept, Activate default EPS bearer context
698394	2023-01-26 22:10:...	240b:c0a2:211:1021:0:511:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-EPS	UplinkNASTransport, Attach complete, Activate default EPS bearer context accept
731434	2023-01-26 22:10:...	240b:c031:3221:1021:0:111:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-EPS	InitialUEMessage, Attach request, PDN connectivity request
731455	2023-01-26 22:10:...	240b:c010:104:27d1:8f28:2:26:3c...	240b:c010:101:288c:2f81:2:3ff:301	DIAMETER	cmd=3GPP-Authentication-Information Request(318) flags=RP-- appl=3GPP S6a/S6d(16777251) f
731495	2023-01-26 22:10:...	240b:c010:101:288c:2f81:2:3ff:3...	240b:c010:104:27d1:8f28:2:26:3c03	DIAMETER	SACK (Ack=88, Arwnd=7864320) cmd=3GPP-Authentication-Information Answer(318) flags=P--
731516	2023-01-26 22:10:...	240b:c010:104:27d1:8f28:2:26:3c...	240b:c031:3221:1021:0:111:0:1	S1AP/NAS-EPS	SACK (Ack=585952730, Arwnd=106496) , DownlinkNASTransport, Attach reject (EPS services not allowed)
769854	2023-01-26 22:10:...	240b:c052:6231:1021:0:111:0:1	240b:c010:104:27d1:8f28:2:26:3c04	S1AP/NAS-EPS	InitialUEMessage, Attach request, PDN connectivity request
769905	2023-01-26 22:10:...	240b:c010:104:27d1:8f28:2:26:3c...	240b:c010:101:2807:2f01:2:3ff:301	DIAMETER	cmd=3GPP-Authentication-Information Request(318) flags=RP-- appl=3GPP S6a/S6d(16777251) f
769952	2023-01-26 22:10:...	240b:c010:101:2807:2f01:2:3ff:3...	240b:c010:104:27d1:8f28:2:26:3c03	DIAMETER	SACK (Ack=88, Arwnd=7864320) cmd=3GPP-Authentication-Information Answer(318) flags=P--

[Response Time: 0.011343000 seconds]

- > AVP: Session-Id(263) l=91 f=M- val=ciotmme01-s6b-tt.epc.mnc011.mcc440.3gppnetwork.org;40790;0;28030000007AF20C00000000
- > AVP: Auth-Session-State(277) l=12 f=M- val=NO_STATE_MAINTAINED (1)
- > AVP: Vendor-Specific-Application-Id(260) l=32 f=M-
- > AVP: Origin-Realm(296) l=41 f=M- val=epc.mnc011.mcc440.3gppnetwork.org
- > AVP: Origin-Host(264) l=63 f=M- val=hss-dl01-uhn3ttihs01.epc.mnc011.mcc440.3gppnetwork.org
- > AVP: Experimental-Result(297) l=32 f=M-
 - AVP Code: 297 Experimental-Result
 - > AVP Flags: 0x40, Mandatory: Set
 - AVP Length: 32
- > Experimental-Result: 0000010a4000000c000028af0000012a4000000c00001389
 - > AVP: Vendor-Id(266) l=12 f=M- val=10415
 - > AVP: Experimental-Result-Code(298) l=12 f=M- val=DIAMETER_ERROR_USER_UNKNOWN (5001)
 - AVP Code: 298 Experimental-Result-Code
 - > AVP Flags: 0x40, Mandatory: Set
 - AVP Length: 12
 - Experimental-Result-Code: DIAMETER_ERROR_USER_UNKNOWN (5001)



curl_kpi_30jan2023_2030pm

LTE_DIAM_S6a_DIAM_SND_AUTH_INFO_REQUEST	481
LTE_DIAM_S6a_DIAM_RCV_AUTH_INFO_ANSWER	481
LTE_DIAM_S6a_DIAM_RCV_AUTH_INFO_ANSWER_RC_2001	120
LTE_DIAM_S6a_DIAM_RCV_AUTH_INFO_ANSWER_ERC_5XXX	361
LTE_DIAM_S6a_DIAM_SND_UPDATE_LOCATION_REQUEST	80
LTE_DIAM_S6a_DIAM_RCV_UPDATE_LOCATION_ANSWER	80
LTE_DIAM_S6a_DIAM_RCV_UPDATE_LOCATION_ANSWER_RC_2001	80
LTE_DIAM_S6a_DIAM_SND_PURGE_UE_REQUEST	77
LTE_DIAM_S6a_DIAM_RCV_PURGE_UE_ANSWER	77

MME - KPI Analysis Report - Attach Success Rate %

RCA SUMMARY

Issue Descriptin:

Attach Succ Rate MME TTSK1 was seeing below than target KPI 98.5%

Impact:

In User Experience Device not able / difficult attaching to network

Analysis

1. eNodeB giving no response Attach complete after attach accept has been send from MME to eNB
2. From log we can see incident point 1, was printed in WRN as MSGTYPE_MME_T3450_EXPIRY in state EPC_MME_EMM_FSM_ST_WAIT_FOR_ATTACH_COMPLETE
3. Found Diameter S6a Receive from HSS with error code 5001

Improvement

1. Need to check to eNB/UE (sample ip eNB 240b:c042:22a1:1021:0:311:0:1), why it is not sending attach complete after receive attach accept from MME
2. There will be fix to peg attach fail KPI for T3450 expiry, means if attach complete is not came from UE than it need to peg attach fail KPI with reason T3450 expiry to the counter, and we can add into numerator after that
3. Need to check with HSS team regarding DIAMETER_ERROR_USER_UNKNOWN (5001), whether this Error normal behaviour or is there some issue in HSS side, list of sample problem IMSI is in slide 8