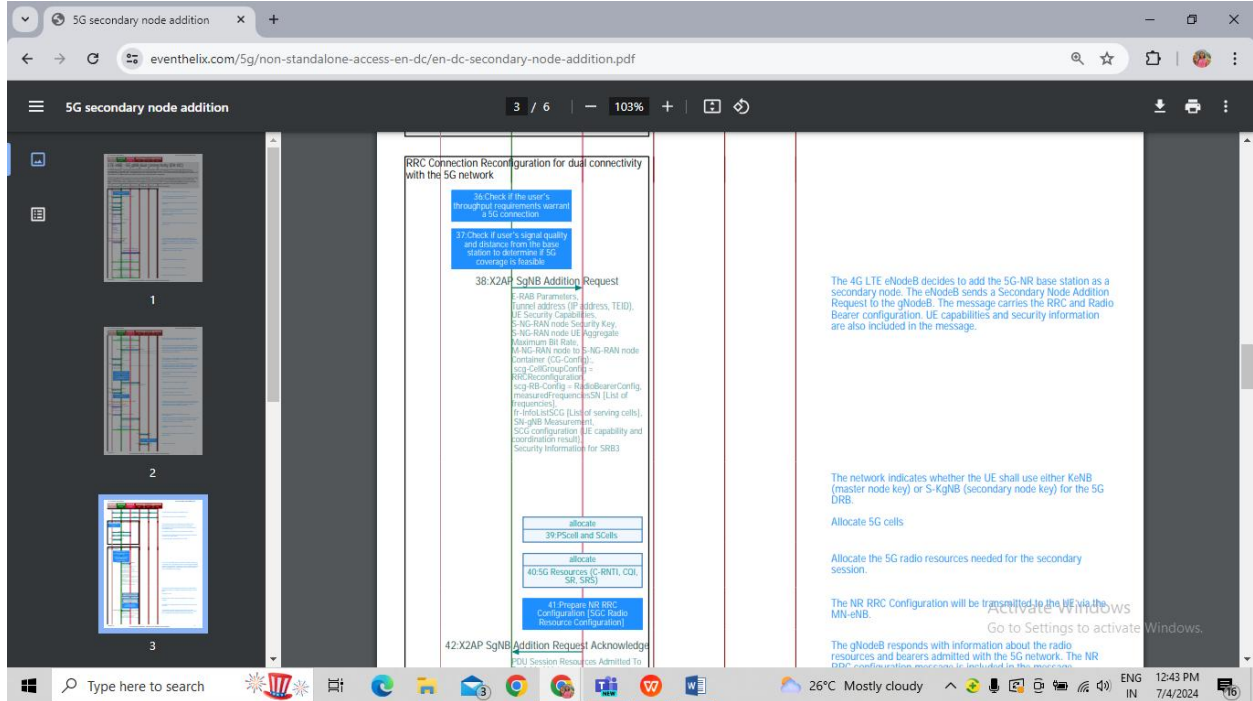


ASSIGNMENT-03-DAY-01

1. SgNB Addition Request



LTE eNodeB --> 5G-NR gNodeB

Row number : 263

Source address : 172.16.60.16

Destination address : 172.17.33.19

tcpdump_5G_nsa_working_logs.pcap

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Apply a display filter ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
258	73.600155	172.16.60.16	172.17.33.19	SCTP	100	HEARTBEAT_ACK
259	73.791996	172.17.31.27	172.17.31.28	SCTP	100	HEARTBEAT
260	73.792026	172.17.31.28	172.17.31.27	SCTP	100	HEARTBEAT_ACK
261	74.624016	172.17.31.27	172.17.31.28	SCTP	100	HEARTBEAT
262	74.624050	172.17.31.28	172.17.31.27	SCTP	100	HEARTBEAT_ACK
263	75.376050	172.16.60.16	172.17.33.19	X2AP	480	SgNBAdditionRequest
264	75.376050	172.16.60.16	172.17.33.19	SCTP	476	DATA (TSN=0) (retransmission)
265	75.480021	172.17.35.26	172.17.35.27	EIAP	168	BearerContextSetupRequest
266	75.480291	172.17.35.27	172.17.35.26	EIAP	168	SACK (Ack=0, Arwnd=2048000) , BearerContextSetupResponse
267	75.490324	172.17.31.28	172.17.31.27	FIAP	448	UEContextSetupRequest
268	75.492465	172.17.31.27	172.17.31.28	FIAP	432	SACK (Ack=0, Arwnd=2048000) , UEContextSetupResponse
269	75.585001	172.17.33.19	172.16.60.16	SCTP	64	SACK (Ack=0, Arwnd=2048000)
270	75.585007	172.17.33.19	172.16.60.16	SCTP	68	SACK (Ack=0, Arwnd=2048000)
271	75.648369	172.17.35.26	172.17.35.27	EIAP	148	SACK (Ack=0, Arwnd=2048000) , BearerContextModificationRequest

> Frame 263: 480 bytes on wire (3840 bits), 496 bytes captured (3968 bits)

> Linux cooked capture v1

> 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 264

> Internet Protocol Version 4, Src: 172.16.60.16, Dst: 172.17.33.19

> Stream Control Transmission Protocol, Src Port: 36422 (36422), Dst Port: 36422 (36422)

> EUTRAN X2 Application Protocol (X2AP)

> X2AP-PDU: InitiatingMessage (0)

> initiatingMessage (0)

> procedureCode: id-sgNBAdditionPreparation (27)

> criticality: reject (0)

> value

> SgNBAdditionRequest

> protocolIEs: 7 items

- > Item 0: id-MeNB-UE-X2AP-ID
- > Item 1: id-NRUESecurityCapabilities
- > Item 2: id-SgNBSecurityKey
- > Item 3: id-SgNBUEAggregateMaximumBitRate
- > Item 4: id-E-RABs-ToBeAdded-SgNBAddReqList
- > Item 5: id-MeNBtoSgNBContainer
- > Item 6: id-MeNBCell-ID

Frame (496 bytes) Bitstring tvb (2 bytes) Bitstring tvb (2 bytes) Bitstring tvb (32 bytes) Bitst

tcpdump_5G_nsa_working_logs.pcap

Type here to search

26°C Mostly cloudy

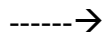
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7/4/2024

2. SgNB Addition Request Acknowledge

5G-NR gNodeB



LTE eNodeB

Row number : 274

Source address : 172.17.33.19

Destination address : 172.17.60.17

tcpdump_5G_nsa_working_logs.pcap

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No.	Time	Source	Destination	Protocol	Length	Info
270	75.585007	172.17.33.19	172.16.60.16	SCTP	68	SACK (Ack=0, Arwnd=2048000)
271	75.648369	172.17.35.26	172.17.35.27	EIAP	148	SACK (Ack=0, Arwnd=2048000) , BearerContextModificationRequest
272	75.650740	172.17.35.27	172.17.35.26	EIAP	112	SACK (Ack=1, Arwnd=2048000) , BearerContextModificationResponse
273	75.695998	172.17.31.28	172.17.31.27	SCTP	64	SACK (Ack=0, Arwnd=2048000)
274	75.698788	172.17.33.19	172.16.60.16	X2AP	464	SgNBAdditionRequestAcknowledge, RRC Reconfiguration
275	75.698795	172.17.33.19	172.16.60.16	SCTP	468	DATA (TSN=0) (retransmission)
276	75.775355	172.16.60.16	172.17.33.19	X2AP	120	SgNBReconfigurationComplete, RRC Reconfiguration Complete
277	75.775355	172.16.60.16	172.17.33.19	SCTP	116	SACK (Ack=0, Arwnd=8388608) DATA (TSN=1) (retransmission)
278	75.853285	172.17.31.27	172.17.31.28	FIAP	104	UEContextModificationRequired
279	75.854083	172.17.33.19	172.16.60.16	X2AP	120	SgNBModificationRequired
280	75.854811	172.17.33.19	172.16.60.16	SCTP	124	SACK (Ack=1, Arwnd=2048000) DATA (TSN=1) (retransmission)
281	75.854965	172.16.60.16	172.17.33.19	X2AP	132	SNStatusTransfer
282	75.854965	172.16.60.16	172.17.33.19	SCTP	128	SACK (Ack=1, Arwnd=8388571) DATA (TSN=2) (retransmission)
283	75.855995	172.17.35.26	172.17.35.27	SCTP	64	SACK (Ack=1, Arwnd=2048000)

Frame 274: 464 bytes on wire (3712 bits), 480 bytes captured (3840 bits)

Linux cooked capture v1

Internet Protocol Version 4, Src: 172.17.33.19, Dst: 172.16.60.16

Stream Control Transmission Protocol, Src Port: 36422 (36422), Dst Port: 36422 (36422)

EUTRAN X2 Application Protocol (X2AP)

X2AP-PDU: successfulOutcome (1)

procedureCode: id-SgNBAdditionPreparation (27)

criticality: reject (0)

value

SgNBAdditionRequestAcknowledge

protocolIEs: 4 items

- Item 0: id-MeNB-UE-X2AP-ID
- Item 1: id-SgNB-UE-X2AP-ID
- Item 2: id-E-RABs-Admitted-ToBeAdded-SgNBAddReqAckList
- Item 3: id-SgNBtoMeNBContainer

Frame (480 bytes) Bitstring tvb (4 bytes) Bitstring tvb (4 bytes) Bitstring tvb (4 bytes) Bitstr

tcpcap_5G_nsa_working_logs.pcap

Type here to search

Nifty midcap +0.69%

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3. RRC Connection Reconfiguration Complete for 5G-NR Bearer

5G secondary node addition

4 / 6 100% +

eventhelix.com/5g/non-standalone-access-en-dc/en-dc-secondary-node-addition.pdf

3

4

5

Information

45 Extract C-RNTI from new UE identity to the reconfiguration with SgNB

46 Prepare the NR RRC Reconfiguration Complete message

47 RRC Connection Reconfiguration Complete

48 X2AP SgNB Reconfiguration Complete

eNodeB starts copying data to the gNodeB

49 SN Status Transfer

50 Data

51 Buffering data

Path update procedure

52 SIAP E-RAB Modification Indication

53 GTPv2-C Modify Bearer Request

Extract the C-RNTI assigned for 5G access.

This message will be sent via the LTE RRC Connection Reconfiguration Complete message.

The UE signals the receipt of the RRC Connection Reconfiguration to the LTE eNodeB. The message carries the 'NR RRC Reconfiguration Complete' message meant for the SgNB.

The 4G eNodeB informs the secondary node (gNodeB) about the reconfiguration complete. The 'NR RRC Reconfiguration Complete' message is delivered to the SgNB via the 'MeNB to SgNB' container.

eNodeB informs the gNodeB about the PDCP SN and HFN for all the bearers that are being transferred to 5G.

SCW is sending data to the MN-eNB. The MN-eNB keeps forwarding that data to the SgNB.

At this point, the gNodeB is buffering the data as the UE has not established the 5G path.

Notify the MME that the data bearer is being switched from 4G-LTE to 5G-NR.

MME updates the bearer at the SCW.

NASDAQ +0.88%

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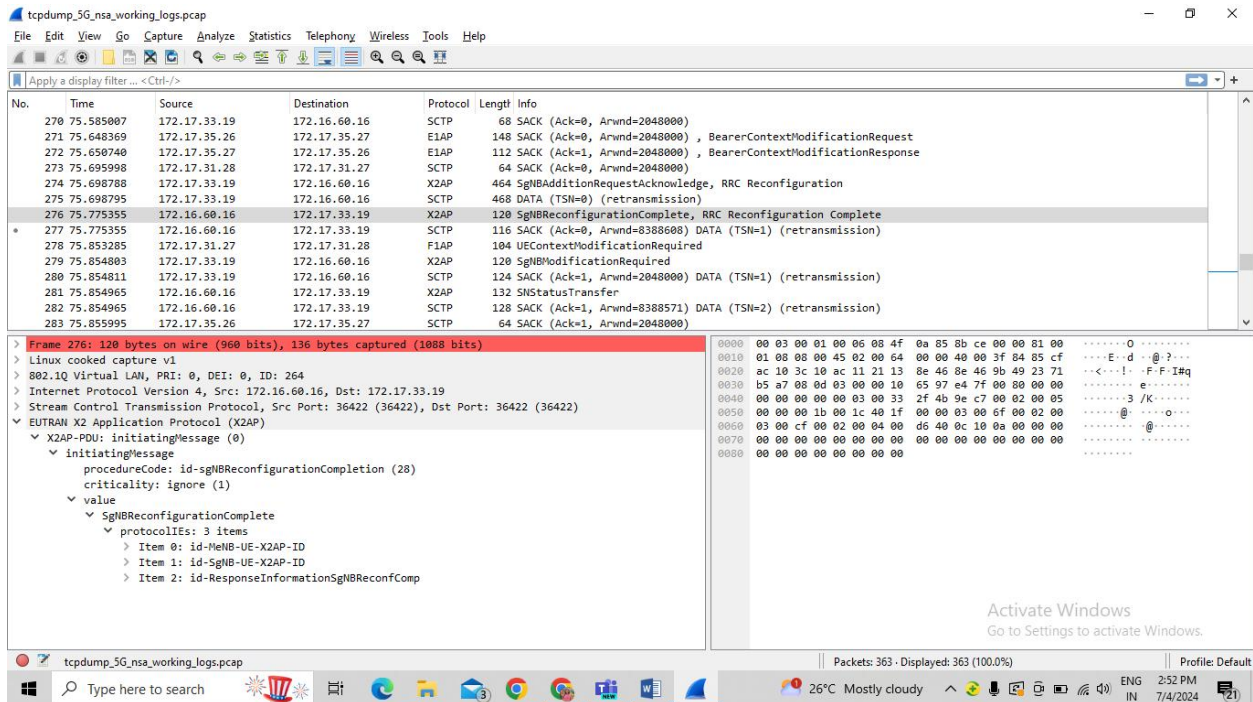
----->

LTE eNodeB

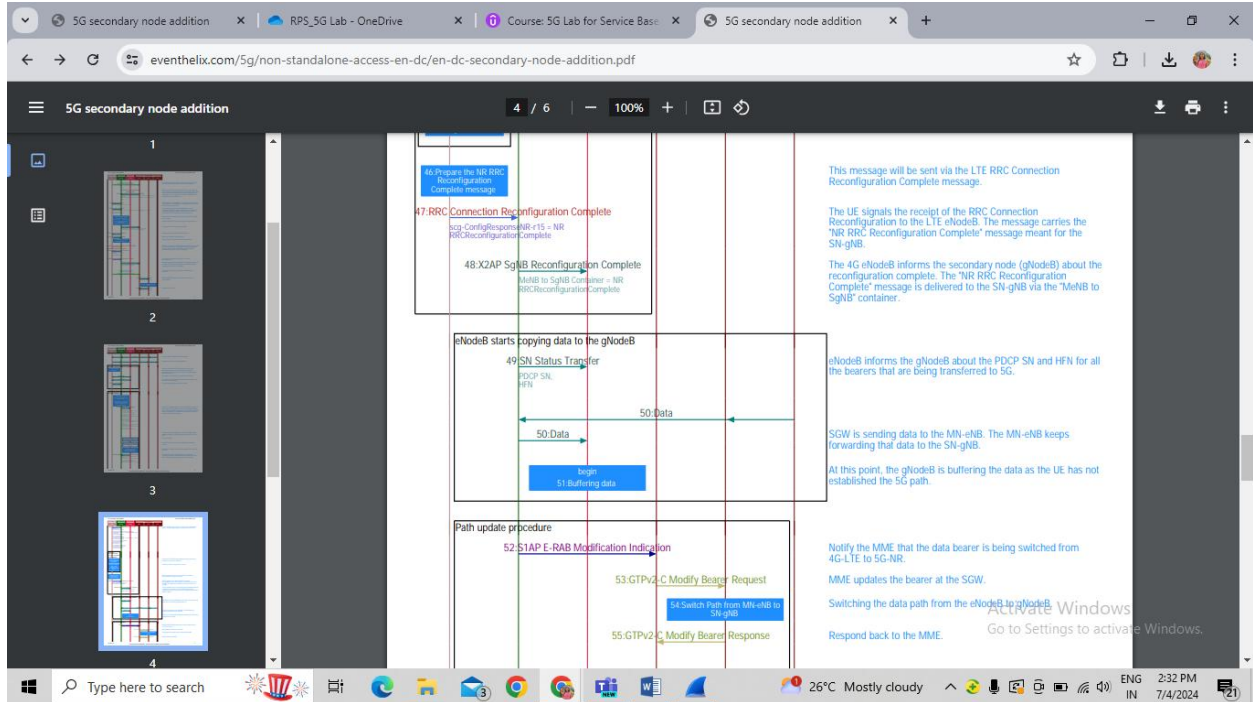
Row number : 276

Source address : 172.17.33.19

Destination address : 172.17.60.17



4. SN Status Transfer



LTE-5G NR UE -----> LTE eNodeB

Row number : 281

Source address : 172.16.60.16

Destination address : 172.17.33.19

tcpdump_5G_nsa_working_logs.pcap

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
277	75.775355	172.16.60.16	172.17.33.19	SCTP	116	SACK (Ack=0, Arwnd=8388608) DATA (TSN=1) (retransmission)
278	75.853285	172.17.31.27	172.17.31.28	FIAP	104	UEContextModificationRequired
279	75.854803	172.17.33.19	172.16.60.16	X2AP	120	SgNBModificationRequired
280	75.854811	172.17.33.19	172.16.60.16	SCTP	124	SACK (Ack=1, Arwnd=2048000) DATA (TSN=1) (retransmission)
281	75.854965	172.16.60.16	172.17.33.19	X2AP	132	SNStatusTransfer
282	75.854965	172.16.60.16	172.17.33.19	SCTP	128	SACK (Ack=1, Arwnd=8388571) DATA (TSN=2) (retransmission)
283	75.855995	172.17.35.26	172.17.35.27	SCTP	64	SACK (Ack=1, Arwnd=2048000)
284	76.011530	172.17.35.26	172.17.35.27	EIAP	120	BearerContextModificationRequest
285	76.014962	172.17.35.27	172.17.35.26	EIAP	108	SACK (Ack=2, Arwnd=2048000), BearerContextModificationResponse
286	76.055998	172.17.33.19	172.16.60.16	SCTP	64	SACK (Ack=2, Arwnd=2048000)
287	76.056004	172.17.33.19	172.16.60.16	SCTP	68	SACK (Ack=2, Arwnd=2048000)
288	76.055999	172.17.31.28	172.17.31.27	SCTP	64	SACK (Ack=1, Arwnd=2048000)
289	76.186207	172.17.35.26	172.17.35.27	EIAP	136	SACK (Ack=2, Arwnd=2048000), BearerContextModificationRequest
290	76.188597	172.17.35.27	172.17.35.26	EIAP	108	SACK (Ack=3, Arwnd=2048000), BearerContextModificationResponse

> Frame 281: 132 bytes on wire (1056 bits), 148 bytes captured (1184 bits)

> Linux cooked capture v1

> 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 264

> Internet Protocol Version 4, Src: 172.16.60.16, Dst: 172.17.33.19

> Stream Control Transmission Protocol, Src Port: 36422 (36422), Dst Port: 36422 (36422)

▼ EUTRAN X2 Application Protocol (X2AP)

▼ X2AP-PDU: InitiatingMessage (0)

▼ InitiatingMessage

procedureCode: id-sNStatusTransfer (4)

criticality: ignore (1)

▼ value

▼ SNStatusTransfer

▼ protocolIEs: 4 items

- > Item 0: id-Old-eNB-UE-X2AP-ID
- > Item 1: id-New-eNB-UE-X2AP-ID
- > Item 2: id-E-RABs-SubjectToStatusTransfer-List
- > Item 3: id-SgNB-UE-X2AP-ID

0000 00 03 00 01 00 06 08 4f 0a 85 8b ce 00 00 81 00O.....

0010 01 00 00 00 45 02 00 70 00 00 40 00 3f 04 85 c3E..p.....

0020 ac 10 3c 10 ac 11 21 13 8e 46 8e 46 9b 49 23 71 ...<...!...F.F.I#q

0030 86 66 02 84 03 00 00 10 65 97 e4 80 00 7f ff db .f.....e.....

0040 00 00 00 00 00 03 00 3d 2f 4b 9e c8 00 01 00 06= /K.....

0050 00 00 00 1b 00 04 40 29 00 00 04 00 0a 00 02 00@.....

0060 03 00 09 00 02 00 04 00 12 40 10 00 00 13 40 0b@.....@

0070 05 00 00 01 00 00 00 00 01 00 00 00 cf 00 02 00@.....@

0080 04 00 00 00 00 00 00 04 01 f0 ac 11 22 13 0c 00@.....@

0090 00 04 20 0f

Activate Windows
Go to Settings to activate Windows.

tcpdump_5G_nsa_working_logs.pcap

Packets: 363 · Displayed: 363 (100.0%)

Profile: Default

26°C Mostly cloudy

ENG IN

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7/4/2024