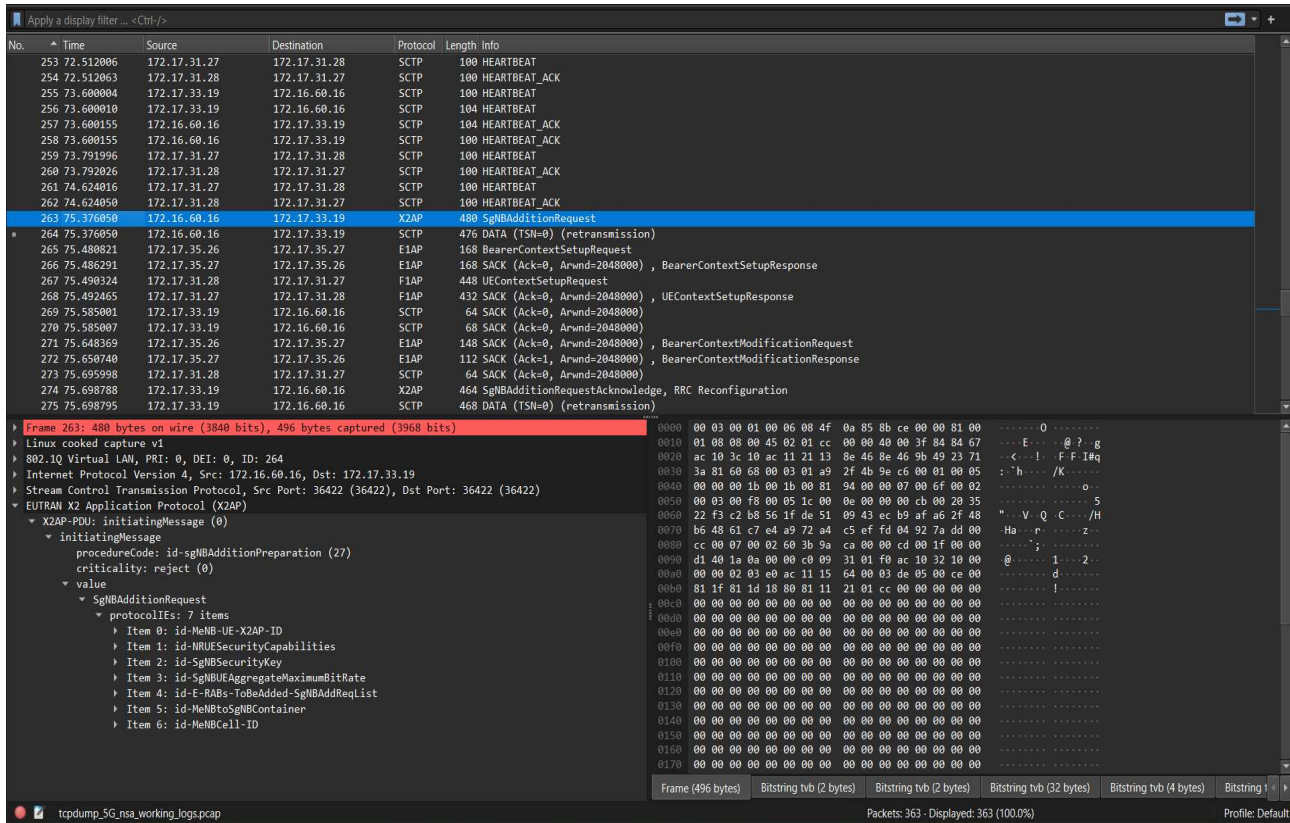


NMS Assignment-3 (04-07)

1. SgNBAddition Request



The image shows a Wireshark packet capture of an SgNBAdditionRequest. The packet list on the left shows a sequence of HEARTBEAT and SgNBAdditionRequest packets. The selected packet (No. 263) is an SgNBAdditionRequest from 172.16.60.16 to 172.17.33.19. The packet details pane shows the following structure:

- 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
 - procedureCode: id-SgNBAdditionPreparation (27)
 - criticality: reject (0)
 - value
 - SgNBAdditionRequest
 - protocolIDs: 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

The packet bytes pane shows the raw data of the SgNBAdditionRequest, including the protocol IDs and the request details.

LTE eNodeB --> 5G-NRgNodeB
Row No : 263
Source IP address : 172.16.60.16
Destination IP address : 172.17.33.19

2. SgNBAddition Request Acknowledge

Apply a display filter: <Ctrl-F>

No.	Time	Source	Destination	Protocol	Length	Info
264	75.376050	172.16.60.16	172.17.33.19	SCTP	476	DATA (TSN=0) (retransmission)
265	75.480821	172.17.35.26	172.17.35.27	EIAP	168	BearerContextSetupRequest
266	75.486291	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
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=838608) 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=838608) 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)

Frame 274: 464 bytes on wire (3712 bits), 480 bytes captured (3840 bits) on interface v1

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)

successfulOutcome

procedureCode: id-sgNBAdditionPreparation (27)

criticality: reject (0)

value

SgNBAdditionRequestAcknowledge

protocolIIs: 4 items

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

Frame (480 bytes) | Bitstring tvb (4 bytes) | Bitstring tvb (4 bytes) | Bitstring tvb (4 bytes) | Bitstring tvb (4 bytes) | Unaligned

Packets: 363 - Displayed: 363 (100.0%) | Profile: Default

5G-NR gNodeB --> LTE eNodeB

Row No : 274

Source IP address : 172.17.33.19

Destination IP address : 172.17.60.17

3. RRCConnection Reconfiguration Complete for 5G-NR Bearer

Apply a display filter: <Ctrl-F>

No.	Time	Source	Destination	Protocol	Length	Info
264	75.376050	172.16.60.16	172.17.33.19	SCTP	476	DATA (TSN=0) (retransmission)
265	75.480821	172.17.35.26	172.17.35.27	EIAP	168	BearerContextSetupRequest
266	75.486291	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
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	SCTP	116	SACK (Ack=0, Arwnd=838608) DATA (TSN=1) (retransmission)
277	75.775355	172.16.60.16	172.17.33.19	SCTP	116	SACK (Ack=0, Arwnd=838608) 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=838608) 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)

Frame 276: 120 bytes on wire (960 bits), 136 bytes captured (1088 bits) on interface v1

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-sgNBReconfigurationCompletion (28)

criticality: ignore (1)

value

SgNBReconfigurationComplete

protocolIIs: 3 items

- Item 0: id-MeNB-UE-X2AP-ID
- Item 1: id-SgNB-UE-X2AP-ID
- Item 2: id-ResponseInformationSgNBReconfComp

Frame (136 bytes) | Bitstring tvb (4 bytes) | Bitstring tvb (4 bytes) | Bitstring tvb (4 bytes) | Bitstring tvb (4 bytes) | Unaligned

Packets: 363 - Displayed: 363 (100.0%) | Profile: Default

LTE-5GNR UE -----> LTE eNodeB
Row No : 276
Source IP address : 172.17.33.19
Destination IP address : 172.17.60.17

4. SNStatus Transfer

No.	Time	Source	Destination	Protocol	Length	Info
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	XZAP	404	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	XZAP	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	75.854803	172.17.33.19	172.16.60.16	XZAP	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	75.854905	172.16.60.16	172.17.33.19	XZAP	132	SNStatusTransfer
282	75.854905	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
291	76.360005	172.17.31.27	172.17.31.28	SCTP	100	HEARTBEAT
292	76.360034	172.17.31.28	172.17.31.27	SCTP	100	HEARTBEAT_ACK
293	76.391996	172.17.35.26	172.17.35.27	SCTP	64	SACK (Ack=3, Arwnd=2048000)
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 (XZAP)						
XZAP-PDU: InitiatingMessage (0)						
InitiatingMessage						
procedureCode: id-snStatusTransfer (4)						
criticality: ignore (1)						
value						
SNStatusTransfer						
protocolIDs: 4 items						
Item 0: id-Old-eNB-UE-XZAP-ID						
Item 1: id-New-eNB-UE-XZAP-ID						
Item 2: id-e-RABs-SubjectToStatusTransfer-List						
Item 3: id-SgNB-UE-XZAP-ID						
0000	60 83 00 01 00 06 08 4f	0a 85 8b ce 00 00 81 000.....			
0010	01 08 00 00 45 02 00 70	00 00 40 00 3f 84 85 c3	...E p @ ?...			
0020	ac 10 3c 19 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 03 00 3d	2f 4b 9e c8 00 01 00 06	f.....= /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 4b 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 08 00 04 01	f0 ac 11 22 13 0c 00".....			
0090	80 04 20 0f				

LTE-5GNR UE -----> LTE eNodeB
Row No : 281
Source IP address : 172.16.60.16
Destination IP address : 172.17.33.19