N9HR LI stage 3 aspects

(scratch pad)

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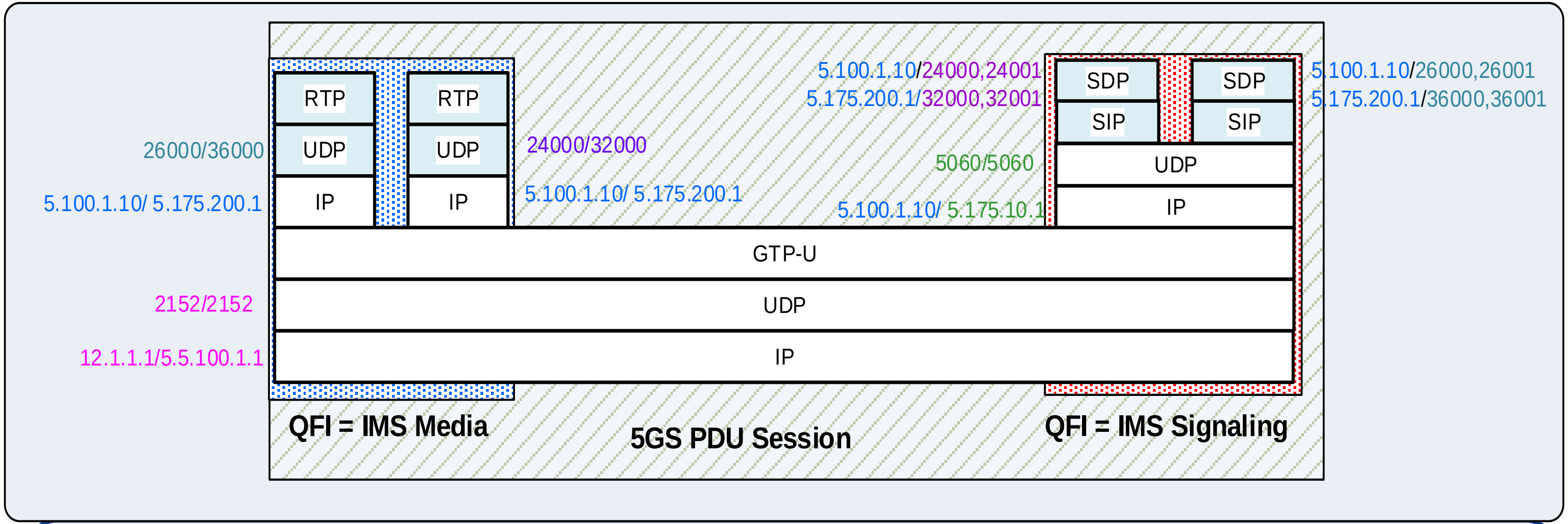
Background/References

UP Packets: IMS signaling and IMS media



- Session #1:
  - SIP ➔ IP address/port numbers in the SDP: 5.100.1.10/26000, 26001 and 5.175.200.1/36000, 36001.
  - RTP ➔ IP address/UDP port numbers: 5.100.1.10/26000, 26001 and 5.175.200.1/36000, 36001.

- Session #2:
  - SIP ➔ IP address/port numbers in the SDP: 5.100.1.10/24000, 24001 and 5.175.200.1/32000, 32001.
  - RTP ➔ IP address/UDP port numbers: 5.100.1.10/24000, 24001 and 5.175.200.1/32000, 32001.

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From TS 29.281, TS 38.415

TS 29.281 (GTP-U):

Annex A (Normative):

PDU session user plane protocol over N9

The PDU session user plane protocol shall be supported over the N9 interface as specified in 3GPP TS 38.415 [31].

TS 38.415 (PDU):

BITS								**Number of octets**
7	6	5	4	3	2	1	0	
PDU Type				Spare				1
PPP	RQI	QoS Flow Identifier						1
PPI			Spare					0 or 1
Padding								0 to 3

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From TS 29.502

Table 6.1.6.2.19-1: Definition of type QosFlowSetupItem

Attribute name	Data type	P	Cardinality	Description
qfi	Qfi	M	1	This IE shall contain the QoS Flow Identifier.
qosRules	Bytes	M	1	This IE shall contain the QoS Rule(s) associated to the QoS flow to be sent to the UE. It shall be encoded as the Qos rules IE specified in clause 9.11.4.13 of 1 24.501 [7].
ebi	EpsBearerId	C	0..1	This IE shall be included when an EPS Bearer ID is allocated for the QoS Flow for interworking with EPS. When present, this IE shall contain the allocated EPS Bearer ID.
qosFlowDescription	Bytes	O	0..1	When present, this IE shall contain the description of the QoS Flow level Qos parameters to be sent to the UE. It shall be encoded as the Qos flow descriptions IE specified in clause 9.11.4.12 of 1 24.501 [7], encoding one single Qos flow description for the QoS flow to be set up.
qosFlowProfile	QosFlowProfile	O	0..1	When present, this IE shall contain the description of the QoS Flow level QoS parameters.

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From TS 29.502

Table 6.1.6.2.22-1: Definition of type QosFlowProfile

Attribute name	Data type	P	Cardinality	Description
5qi	5Qi	M	1	This IE shall contain the 5G QoS Identifier (5QI) of the QoS flow.
nonDynamic5Qi	NonDynamic5Qi	C	0..1	When present, this IE shall indicate the QoS Characteristics for a standardized or pre-configured 5QI for downlink and uplink. See NOTE 1.
dynamic5Qi	Dynamic5Qi	C	0..1	When present, this IE shall indicate the QoS Characteristics for a Non-standardised or not pre-configured 5QI for downlink and uplink. See NOTE 1.
arp	Arp	C	0..1	This IE shall be present when establishing a QoS flow; it may be present when modifying a QoS flow. When present, this IE shall contain the Allocation and Retention Priority (ARP) assigned to the QoS flow.
gbrQosFlowInfo	GbrQosFlowInformation	C	0..1	This IE shall be present when establishing a GBR QoS flow or if the GBR QoS flow information is modified.
rqa	ReflectiveQoSAttribute	O	0..1	This IE may be present for a non-GBR QoS flow and it shall be ignored otherwise. When present, it shall indicate whether certain traffic on this QoS flow may be subject to Reflective QoS.
additionalQosFlowInfo	AdditionalQosFlowInfo	O	0..1	This IE may be present for a non-GBR QoS flow. When present, this IE indicates that traffic for this QoS flow is likely to appear more often than traffic for other flows established for the PDU session. See clause 9.3.1.12 of 3GPP TS 38.413 [9].
NOTE 1: Either the nonDynamic5Qi IE or the dynamic5Qi IE may be present when establishing a QoS flow. Either the nonDynamic5Qi IE or the dynamic5Qi IE may be present when modifying a QoS flow; when present, the received nonDynamic5Qi IE or dynamic5Qi IE shall replace any value received previously for this IE.				

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From TS 29.502

Table 5.5.4.3-1: Definition of type Dynamic5Qi

Attribute name	Data type	P	Cardinality	Description	Applicability
resourceType	QosResourceType	M	1	Defines the 5QI resource type. See clause 5.5.3.6.	
priorityLevel	5QiPriorityLevel	M	1	Defines the 5QI Priority Level. See clause 5.5.2.	
packetDelayBudget	PacketDelBudget	M	1	Defines the packet delay budget. See clause 5.5.2.	
packetErrRate	PacketErrRate	M	1	Defines the packet error rate. See clause 5.5.2.	
averWindow	AverWindow	C	0..1	Defines the averaging window. See clause 5.5.2. This IE shall be present only for a GBR QoS flow or a Delay Critical GBR QoS flow.	
maxDataBurstVol	MaxDataBurstVol	C	0..1	Defines the maximum data burst volume. See clause 5.5.2. This IE shall be present for a Delay Critical GBR QoS flow.	

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From TS 29.502

Table 5.5.4.4-1: Definition of type NonDynamic5Qi

Attribute name	Data type	P	Cardinality	Description	Applicability
priorityLevel	5QiPriorityLevel	O	0..1	Defines the 5QI Priority Level. See clause 5.5.2. When present, it contains the 5QI Priority Level value that overrides the standardized or pre-configured value.	
averWindow	AverWindow	O	0..1	Defines the averaging window. See clause 5.5.2. This IE may be present for a GBR QoS flow or a Delay Critical GBR QoS flow. When present, it contains the Averaging Window that overrides the standardized or pre-configured value.	
maxDataBurstVol	MaxDataBurstVol	O	0..1	Defines the maximum data burst volume. See clause 5.5.2. This IE may be present for a Delay Critical GBR QoS flow. When present, it contains the Maximum Data Burst Volume value that overrides the standardized or pre-configured value.	

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From GSMA IR.92 and NG.114

GSMA IR.92:

- A default bearer must be created when the UE creates the PDN connection to the IMS well-known APN, as defined in 3GPP specifications. A standardized QCI value of five (5) must be used for the default bearer. It is used for IMS SIP signaling.
- The dedicated bearer for Conversational Voice must utilize the standardized QCI value of one (1) and have the associated characteristics as specified in 3GPP TS 23.203 [4].

GSMA NG.114 (draft):

- A QoS flow associated with the default QoS rule must be created by the network when the UE creates the PDU session to the IMS well known APN/DNN, as defined in 3GPP specifications. A standardised 5QI value of five (5) must be used for the QoS flow associated with the default QoS rule. This QoS flow is used for IMS SIP signalling.
- The GBR QoS flow for Conversational Voice must utilise the standardised 5QI value of one (1) and have the associated characteristics as specified in 3GPP TS 23.501 [4].

Note 1:A single QoS flow is used to multiplex the media streams from multiple concurrent voice sessions; this is necessary in some supplementary services (e.g. CW, CONF).

Note 2:The sharing of a single QoS flow for all voice media streams means that the same 5QI and/or ARP value are used for all voice media streams of an IMS session.

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Enabling the BBIFF and LI_X1 – Initial configuration, Option B or Option C

X1 element	MCO	N9HR LI	Comment
ADMF Identifier	M	-	
NE Identifier	M	SMF	
Message Timestamp	M	-	
Version	M	-	
X1 transaction Id	C	-	

X1 element	MCO	N9HR LI	Comment
XID	M	-	
Target Identifier	M	NSSAI + N9HR DNN, IMS signaling	Value is something new
Delivery Type	M	X2andX3	Limited to PDU session established, modified and IMS signaling packets
List of DIDs	M	LMISF	
List of mediation details	C	Not used	
Correlation Id	O	Not used	
Implicit Deactivation Allowed	O	Not used	
Task Detail Extensions	O	Not used	

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Triggering BBIFF and LI_T3 – IMS signaling capture

X1 element	MCO	N9HR LI	Comment
ADMF Identifier	M	-	
NE Identifier	M	SMF	
Message Timestamp	M	-	
Version	M	-	
X1 transaction Id	C	-	

X1 element	MCO	N9HR LI	Comment
XID	M	-	
Target Identifier	M	PFCP Session Id, IMS signaling related QFI	
Delivery Type	M	X3only	
List of DIDs	M	LMISF	
List of mediation details	C	Not used	
Correlation Id	O	Not used	
Implicit Deactivation Allowed	O	Not used	
Task Detail Extensions	O	Not used	

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Triggering BBIFF and LI_T3 – IMS media capture

X1 element	MCO	N9HR LI	Comment
ADMF Identifier	M	-	
NE Identifier	M	SMF	
Message Timestamp	M	-	
Version	M	-	
X1 transaction Id	C	-	

X1 element	MCO	N9HR LI	Comment
XID	M	-	
Target Identifier	M	PFCP Session Id, IMS media related QFI	
Delivery Type	M	X3only	
List of DIDs	M	LMISF	
List of mediation details	C	Not used	
Correlation Id	O	Not used	
Implicit Deactivation Allowed	O	Not used	
Task Detail Extensions	O	Not used	

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LI_X2 and LI_X2_lite for N9HR-LI

X2 element		N9HR LI	Comment
Version		-	
PDU type		X2	
Payload length, format, direction		-	
XID		-	
Correlation Id		-	

X2 element	MCO	N9HR LI	Comment
sUPI, sUPIUnautheticated, pEI, gPSI	C	-	Not needed
pDUSessionId	M	pDUSessionId	Needed
gTPTunnelId	M	gTPTunnelId	Okay
pDUSessionType	M	-	Not needed
nSSAI, uEEndPoint, non3GPPAccessEndPoint,	C	-	Not needed
Location	C	location	Needed
dNN	M	dNN	Okay
aMFID, sMFURIID, requestType, accessType, rATType, sMPPDUDNReqeust	C	-	Not needed
UPF Id	C	UPF Id	Needed (** New **)

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Options referenced:

Initial configuration options:

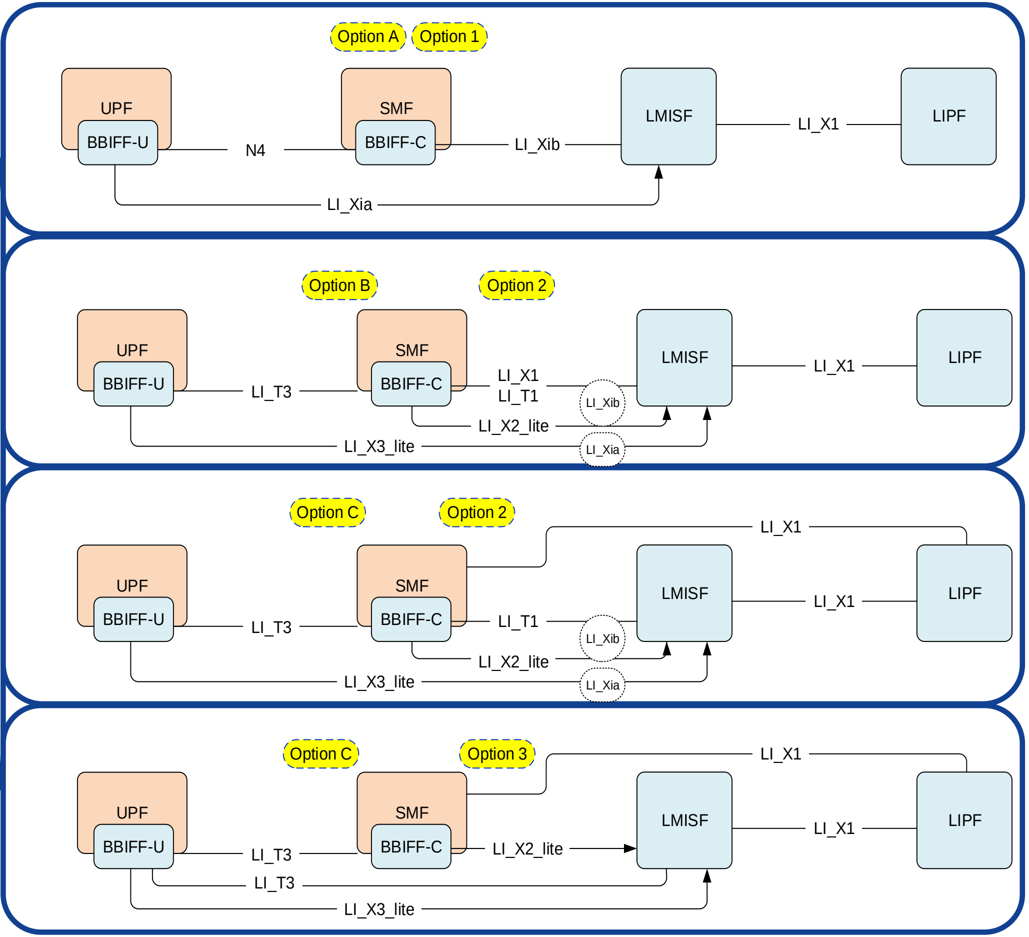
A. S8HR LI model – LI_Xib, LI_Xia

B. Using the existing or enhanced interfaces:
LI_X1, LI_T1, LI_T3, LI_X2_lite, LI_X3_lite.
Initial configuration by LMISF. ← preferred.

C. same as Option B except that the initial
configuration is by LIPF. ← preferred.

IMS Media interception triggering options:

1. S8HR model goes with Option A.
2. LMISF uses LI_T1 and BBIFF-C uses LI-T3
← preferred.
3. LMISF triggers BBIFF-U directly using LI_T3
← should not to be considered, included here
only to show the analysis.



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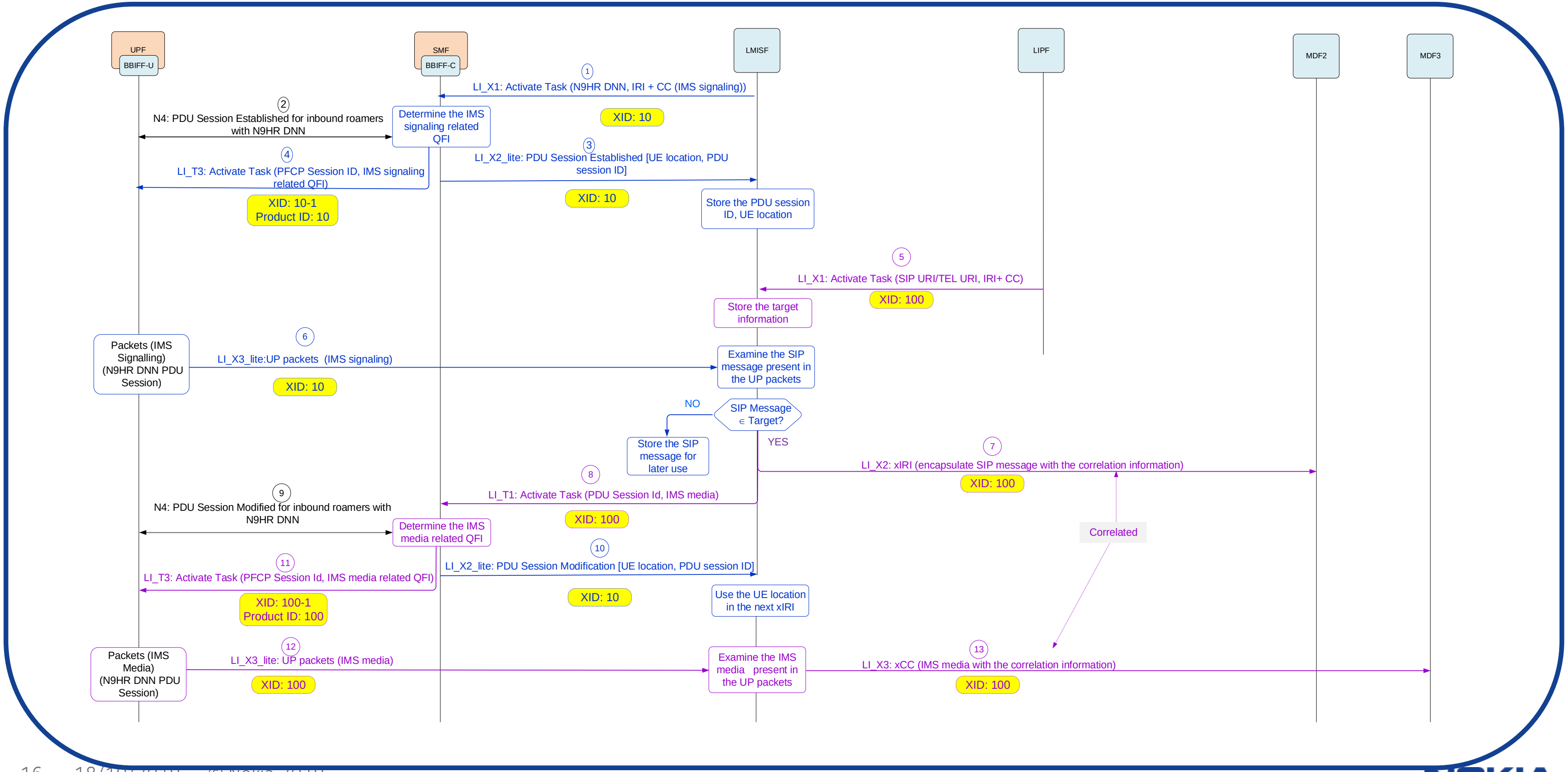
Flows
(Option 2)

XID Usage – Option B, Option 2 – approach 1



UPF
BBIFF-U
SMF
BBIFF-C
LMISF
LIPF
MDF2
MDF3

① LI_X1: Activate Task (N9HR DNN, IRI + CC (IMS signaling))
XID: 10

② N4: PDU Session Established for inbound roamers with N9HR DNN

Determine the IMS signaling related QFI

③ LI_X2_lite: PDU Session Established [UE location, PDU session ID]
XID: 10

④ LI_T3: Activate Task (PFCP Session ID, IMS signaling related QFI)
XID: 10-1
Product ID: 10

Store the PDU session ID, UE location

⑤ LI_X1: Activate Task (SIP URI/TEL URI, IRI+ CC)
XID: 100

Store the target information

Packets (IMS Signalling) (N9HR DNN PDU Session)

⑥ LI_X3_lite:UP packets (IMS signaling)
XID: 10

Examine the SIP message present in the UP packets

SIP Message ∊ Target?
NO
Store the SIP message for later use
YES

⑦ LI_X2: xIRI (encapsulate SIP message with the correlation information)
XID: 100

⑧ LI_T1: Activate Task (PDU Session Id, IMS media)
XID: 100

⑨ N4: PDU Session Modified for inbound roamers with N9HR DNN

Determine the IMS media related QFI

Correlated

⑩ LI_X2_lite: PDU Session Modification [UE location, PDU session ID]
XID: 10

⑪ LI_T3: Activate Task (PFCP Session Id, IMS media related QFI)
XID: 100-1
Product ID: 100

Use the UE location in the next xIRI

Packets (IMS Media) (N9HR DNN PDU Session)

⑫ LI_X3_lite: UP packets (IMS media)
XID: 100

Examine the IMS media present in the UP packets

⑬ LI_X3: xCC (IMS media with the correlation information)
XID: 100

- Can we use Modify Task and XID: 10 in step 9? → shown in the approach 2

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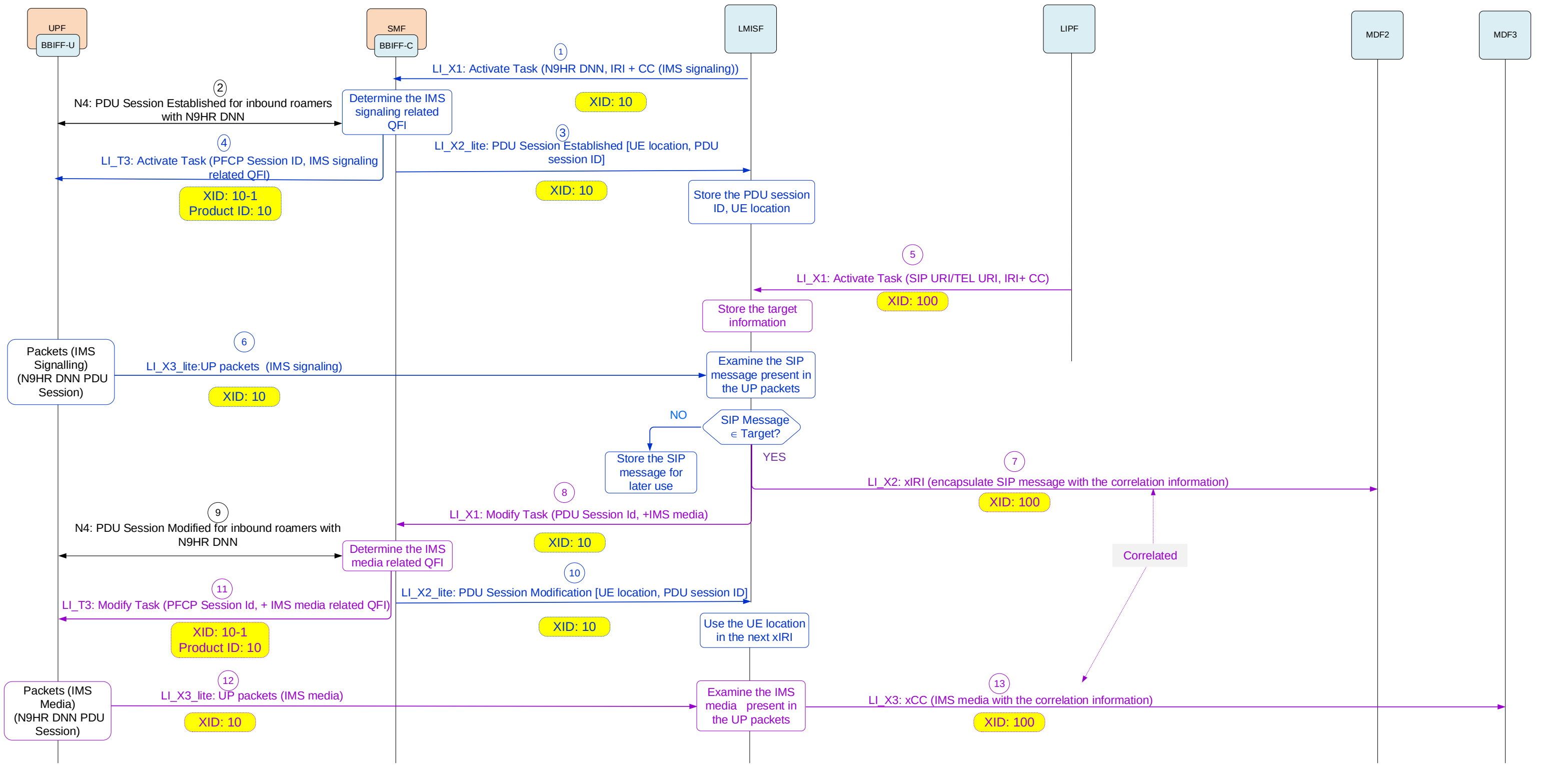
XID Usage – Option B, Option 2 – approach 2



UPF
BBIFF-U
SMF
BBIFF-C
LMISF
LIPF
MDF2
MDF3

① LI_X1: Activate Task (N9HR DNN, IRI + CC (IMS signaling))
XID: 10

② N4: PDU Session Established for inbound roamers with N9HR DNN

Determine the IMS signaling related QFI

③ LI_X2_lite: PDU Session Established [UE location, PDU session ID]
XID: 10

④ LI_T3: Activate Task (PFCP Session ID, IMS signaling related QFI)
XID: 10-1
Product ID: 10

Store the PDU session ID, UE location

⑤ LI_X1: Activate Task (SIP URI/TEL URI, IRI+ CC)
XID: 100

Store the target information

Packets (IMS Signalling) (N9HR DNN PDU Session)

⑥ LI_X3_lite:UP packets (IMS signaling)
XID: 10

Examine the SIP message present in the UP packets

SIP Message ∊ Target?
NO
Store the SIP message for later use
YES

⑦ LI_X2: xIRI (encapsulate SIP message with the correlation information)
XID: 100

⑧ LI_X1: Modify Task (PDU Session Id, +IMS media)
XID: 10

⑨ N4: PDU Session Modified for inbound roamers with N9HR DNN

Determine the IMS media related QFI

Correlated

⑩ LI_X2_lite: PDU Session Modification [UE location, PDU session ID]
XID: 10

⑪ LI_T3: Modify Task (PFCP Session Id, + IMS media related QFI)
XID: 10-1
Product ID: 10

Use the UE location in the next xIRI

Packets (IMS Media) (N9HR DNN PDU Session)

⑫ LI_X3_lite: UP packets (IMS media)
XID: 10

Examine the IMS media present in the UP packets

⑬ LI_X3: xCC (IMS media with the correlation information)
XID: 100

- Step 8 and 12 is adding the capture for UP packets with IMS media related QFI
- LI_X1 is used in step 8 – thus modifying the architecture. See the next figure.

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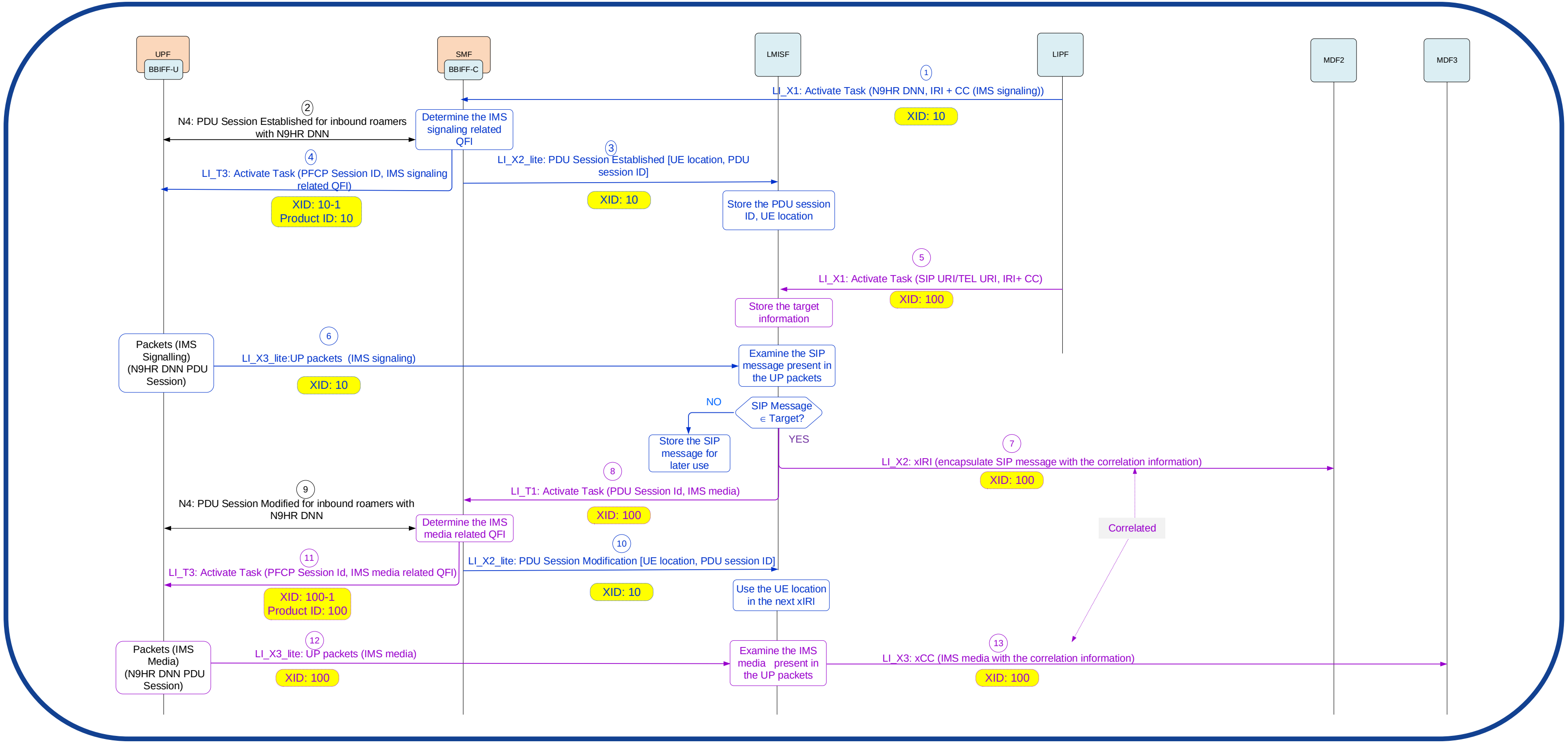
XID Usage – Option C, Option 2



UPF
BBIFF-U
SMF
BBIFF-C
LMISF
LIPF
MDF2
MDF3

① LI_X1: Activate Task (N9HR DNN, IRI + CC (IMS signaling))
XID: 10

② N4: PDU Session Established for inbound roamers with N9HR DNN

Determine the IMS signaling related QFI

③ LI_X2_lite: PDU Session Established [UE location, PDU session ID]
XID: 10

Store the PDU session ID, UE location

④ LI_T3: Activate Task (PFCP Session ID, IMS signaling related QFI)
XID: 10-1
Product ID: 10

⑤ LI_X1: Activate Task (SIP URI/TEL URI, IRI+ CC)
XID: 100

Store the target information

Packets (IMS Signalling) (N9HR DNN PDU Session)

⑥ LI_X3_lite:UP packets (IMS signaling)
XID: 10

Examine the SIP message present in the UP packets

SIP Message ∊ Target?
NO
Store the SIP message for later use
YES

⑦ LI_X2: xIRI (encapsulate SIP message with the correlation information)
XID: 100

⑧ LI_T1: Activate Task (PDU Session Id, IMS media)
XID: 100

⑨ N4: PDU Session Modified for inbound roamers with N9HR DNN

Determine the IMS media related QFI

⑩ LI_X2_lite: PDU Session Modification [UE location, PDU session ID]
XID: 10

Use the UE location in the next xIRI

⑪ LI_T3: Activate Task (PFCP Session Id, IMS media related QFI)
XID: 100-1
Product ID: 100

Correlated

Packets (IMS Media) (N9HR DNN PDU Session)

⑫ LI_X3_lite: UP packets (IMS media)
XID: 100

Examine the IMS media present in the UP packets

⑬ LI_X3: xCC (IMS media with the correlation information)
XID: 100

- Should the LMISF be told about the XID 10?

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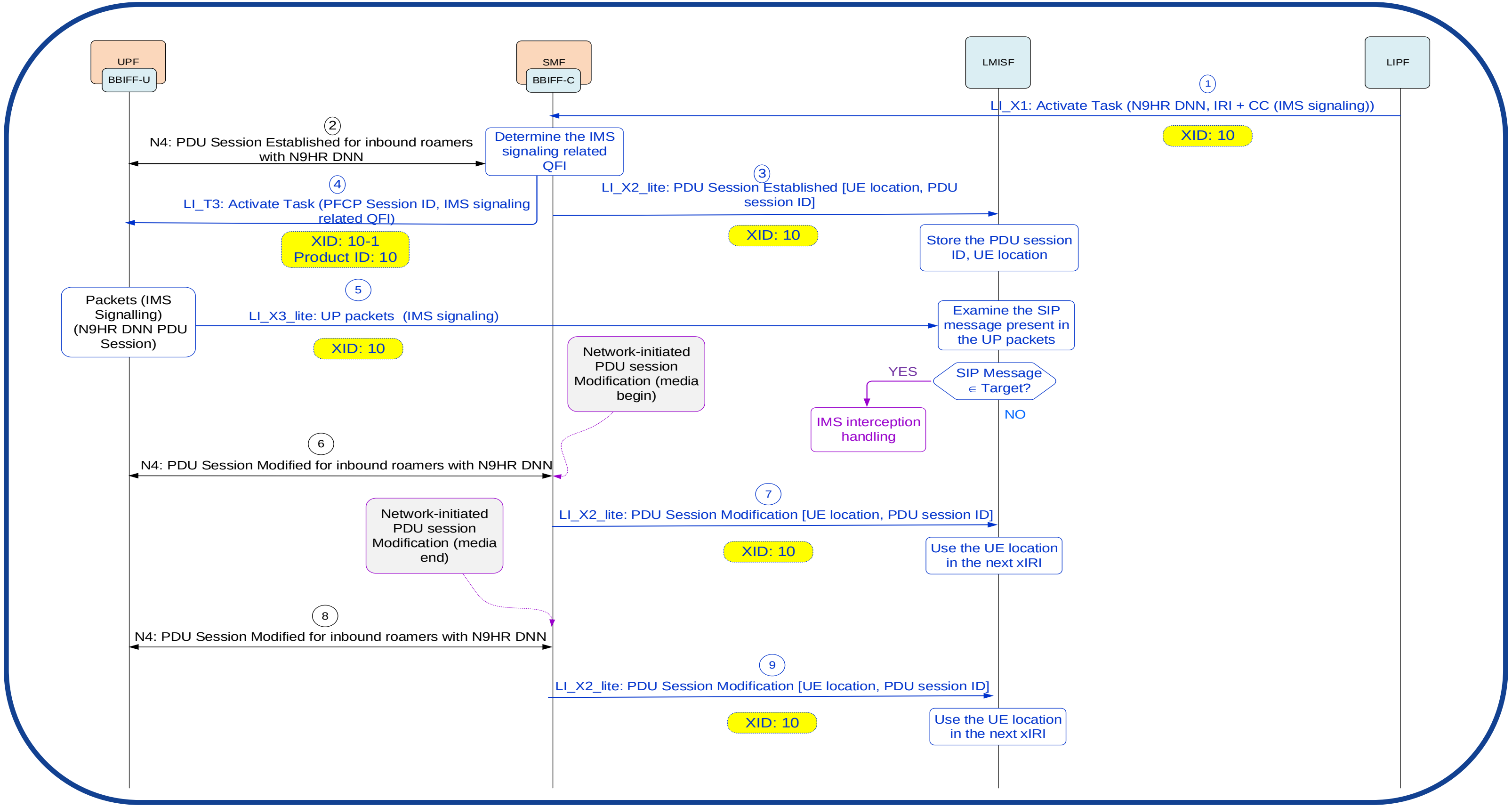
Flows
(Interesting scenarios)

No IMS interception



UPF

BBIFF-U

SMF

BBIFF-C

LMISF

LIPF

① LI_X1: Activate Task (N9HR DNN, IRI + CC (IMS signaling))

XID: 10

② N4: PDU Session Established for inbound roamers with N9HR DNN

Determine the IMS signaling related QFI

③ LI_X2_lite: PDU Session Established [UE location, PDU session ID]

XID: 10

④ LI_T3: Activate Task (PFCP Session ID, IMS signaling related QFI)

XID: 10-1
Product ID: 10

Store the PDU session ID, UE location

Packets (IMS Signalling) (N9HR DNN PDU Session)

⑤ LI_X3_lite: UP packets (IMS signaling)

XID: 10

Examine the SIP message present in the UP packets

Network-initiated PDU session Modification (media begin)

SIP Message ∊ Target?

YES

IMS interception handling

NO

⑥ N4: PDU Session Modified for inbound roamers with N9HR DNN

⑦ LI_X2_lite: PDU Session Modification [UE location, PDU session ID]

XID: 10

Use the UE location in the next xIRI

Network-initiated PDU session Modification (media end)

⑧ N4: PDU Session Modified for inbound roamers with N9HR DNN

⑨ LI_X2_lite: PDU Session Modification [UE location, PDU session ID]

XID: 10

Use the UE location in the next xIRI

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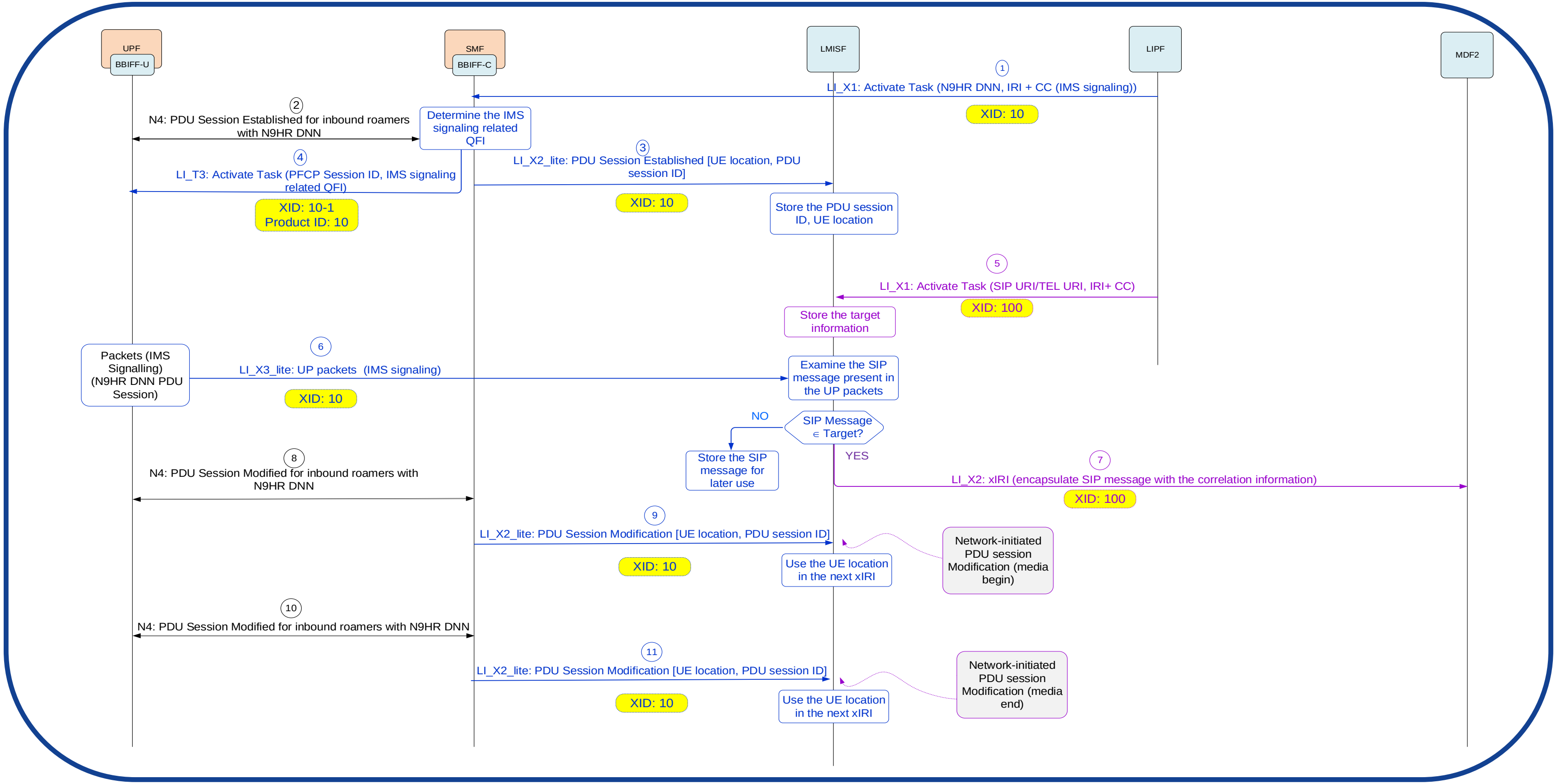
IRI only interception



UPF

BBIFF-U

SMF

BBIFF-C

LMISF

LIPF

MDF2

① LI_X1: Activate Task (N9HR DNN, IRI + CC (IMS signaling))

XID: 10

② N4: PDU Session Established for inbound roamers with N9HR DNN

Determine the IMS signaling related QFI

③ LI_X2_lite: PDU Session Established [UE location, PDU session ID]

XID: 10

Store the PDU session ID, UE location

④ LI_T3: Activate Task (PFCP Session ID, IMS signaling related QFI)

XID: 10-1
Product ID: 10

⑤ LI_X1: Activate Task (SIP URI/TEL URI, IRI+ CC)

XID: 100

Store the target information

Packets (IMS Signalling) (N9HR DNN PDU Session)

⑥ LI_X3_lite: UP packets (IMS signaling)

XID: 10

Examine the SIP message present in the UP packets

SIP Message ∈ Target?

NO

Store the SIP message for later use

YES

⑦ LI_X2: xIRI (encapsulate SIP message with the correlation information)

XID: 100

⑧ N4: PDU Session Modified for inbound roamers with N9HR DNN

⑨ LI_X2_lite: PDU Session Modification [UE location, PDU session ID]

XID: 10

Use the UE location in the next xIRI

Network-initiated PDU session Modification (media begin)

⑩ N4: PDU Session Modified for inbound roamers with N9HR DNN

⑪ LI_X2_lite: PDU Session Modification [UE location, PDU session ID]

XID: 10

Use the UE location in the next xIRI

Network-initiated PDU session Modification (media end)

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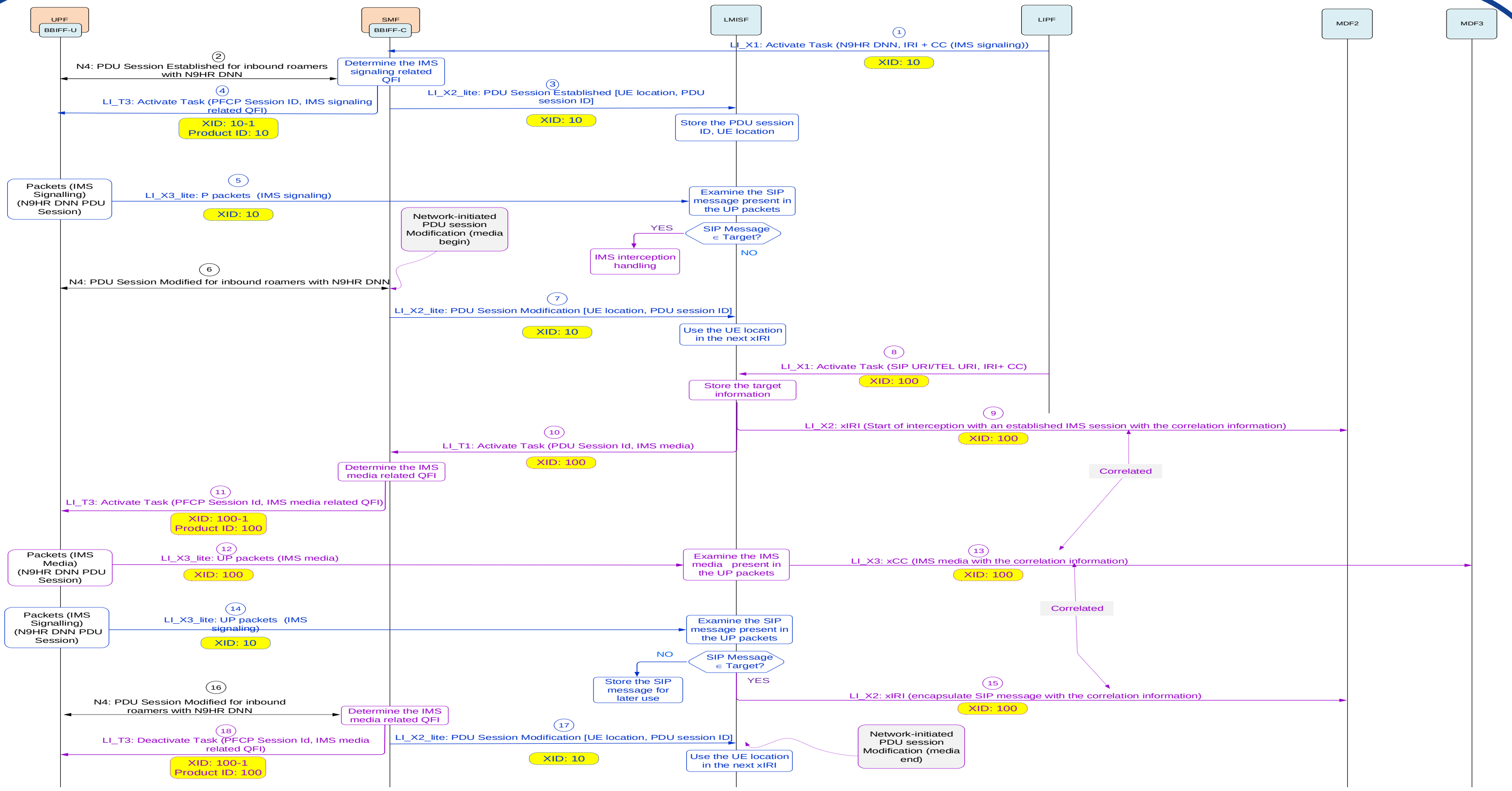
IRI + CC interception start on an established IMS session



UPF
BBIFF-U
SMF
BBIFF-C
LMISF
LIPF
MDF2
MDF3

① LI_X1: Activate Task (N9HR DNN, IRI + CC (IMS signaling))
XID: 10

② N4: PDU Session Established for inbound roamers with N9HR DNN

Determine the IMS signaling related QFI

③ LI_X2_lite: PDU Session Established [UE location, PDU session ID]
XID: 10

④ LI_T3: Activate Task (PFCP Session ID, IMS signaling related QFI)
XID: 10-1
Product ID: 10

Store the PDU session ID, UE location

Packets (IMS Signalling) (N9HR DNN PDU Session)

⑤ LI_X3_lite: P packets (IMS signaling)
XID: 10

Examine the SIP message present in the UP packets

SIP Message ∊ Target?
YES
IMS interception handling
NO

Network-initiated PDU session Modification (media begin)

⑥ N4: PDU Session Modified for inbound roamers with N9HR DNN

⑦ LI_X2_lite: PDU Session Modification [UE location, PDU session ID]
XID: 10

Use the UE location in the next xIRI

⑧ LI_X1: Activate Task (SIP URI/TEL URI, IRI+ CC)
XID: 100

Store the target information

⑨ LI_X2: xIRI (Start of interception with an established IMS session with the correlation information)
XID: 100

⑩ LI_T1: Activate Task (PDU Session Id, IMS media)
XID: 100

Determine the IMS media related QFI

Correlated

⑪ LI_T3: Activate Task (PFCP Session Id, IMS media related QFI)
XID: 100-1
Product ID: 100

Packets (IMS Media) (N9HR DNN PDU Session)

⑫ LI_X3_lite: UP packets (IMS media)
XID: 100

Examine the IMS media present in the UP packets

⑬ LI_X3: xCC (IMS media with the correlation information)
XID: 100

Correlated

Packets (IMS Signalling) (N9HR DNN PDU Session)

⑭ LI_X3_lite: UP packets (IMS signaling)
XID: 10

Examine the SIP message present in the UP packets

SIP Message ∊ Target?
NO
Store the SIP message for later use
YES

⑮ LI_X2: xIRI (encapsulate SIP message with the correlation information)
XID: 100

⑯ N4: PDU Session Modified for inbound roamers with N9HR DNN

Determine the IMS media related QFI

⑰ LI_X2_lite: PDU Session Modification [UE location, PDU session ID]
XID: 10

⑱ LI_T3: Deactivate Task (PFCP Session Id, IMS media related QFI)
XID: 100-1
Product ID: 100

Use the UE location in the next xIRI

Network-initiated PDU session Modification (media end)

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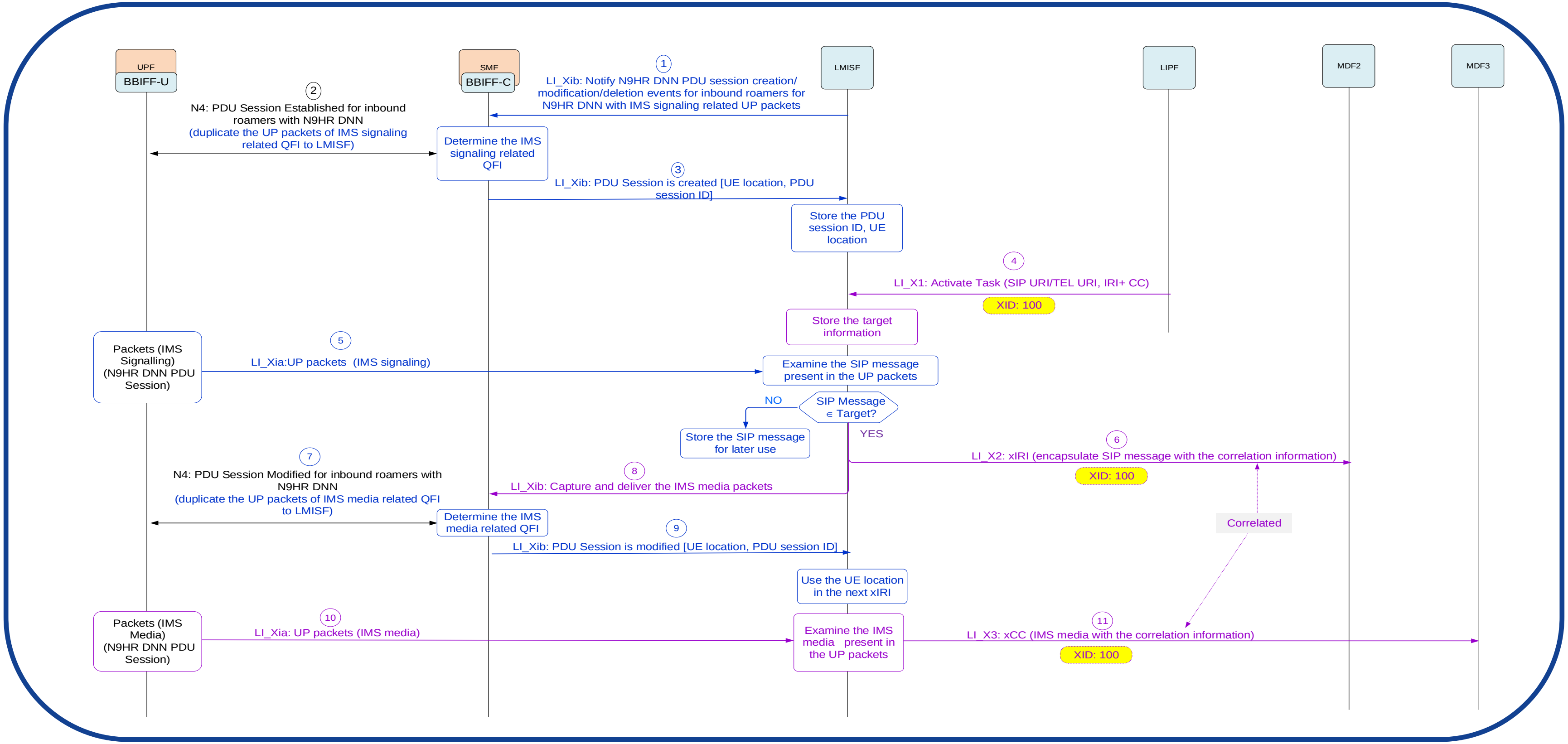
Flows

(Other options: Option 1, Option 3)

XID Usage – Option A, Option 1



UPF
BBIFF-U

SMF
BBIFF-C

LMISF

LIPF

MDF2

MDF3

① LI_Xib: Notify N9HR DNN PDU session creation/ modification/deletion events for inbound roamers for N9HR DNN with IMS signaling related UP packets

② N4: PDU Session Established for inbound roamers with N9HR DNN (duplicate the UP packets of IMS signaling related QFI to LMISF)

Determine the IMS signaling related QFI

③ LI_Xib: PDU Session is created [UE location, PDU session ID]

Store the PDU session ID, UE location

④ LI_X1: Activate Task (SIP URI/TEL URI, IRI+ CC)

XID: 100

Store the target information

Packets (IMS Signalling) (N9HR DNN PDU Session)

⑤ LI_Xia:UP packets (IMS signaling)

Examine the SIP message present in the UP packets

SIP Message ∊ Target?

NO

Store the SIP message for later use

YES

⑥ LI_X2: xIRI (encapsulate SIP message with the correlation information)

XID: 100

⑦ N4: PDU Session Modified for inbound roamers with N9HR DNN (duplicate the UP packets of IMS media related QFI to LMISF)

⑧ LI_Xib: Capture and deliver the IMS media packets

Determine the IMS media related QFI

⑨ LI_Xib: PDU Session is modified [UE location, PDU session ID]

Correlated

Use the UE location in the next xIRI

Packets (IMS Media) (N9HR DNN PDU Session)

⑩ LI_Xia: UP packets (IMS media)

Examine the IMS media present in the UP packets

⑪ LI_X3: xCC (IMS media with the correlation information)

XID: 100

- LI_Xia, LI_Xib are not standardized for S8HR LI.

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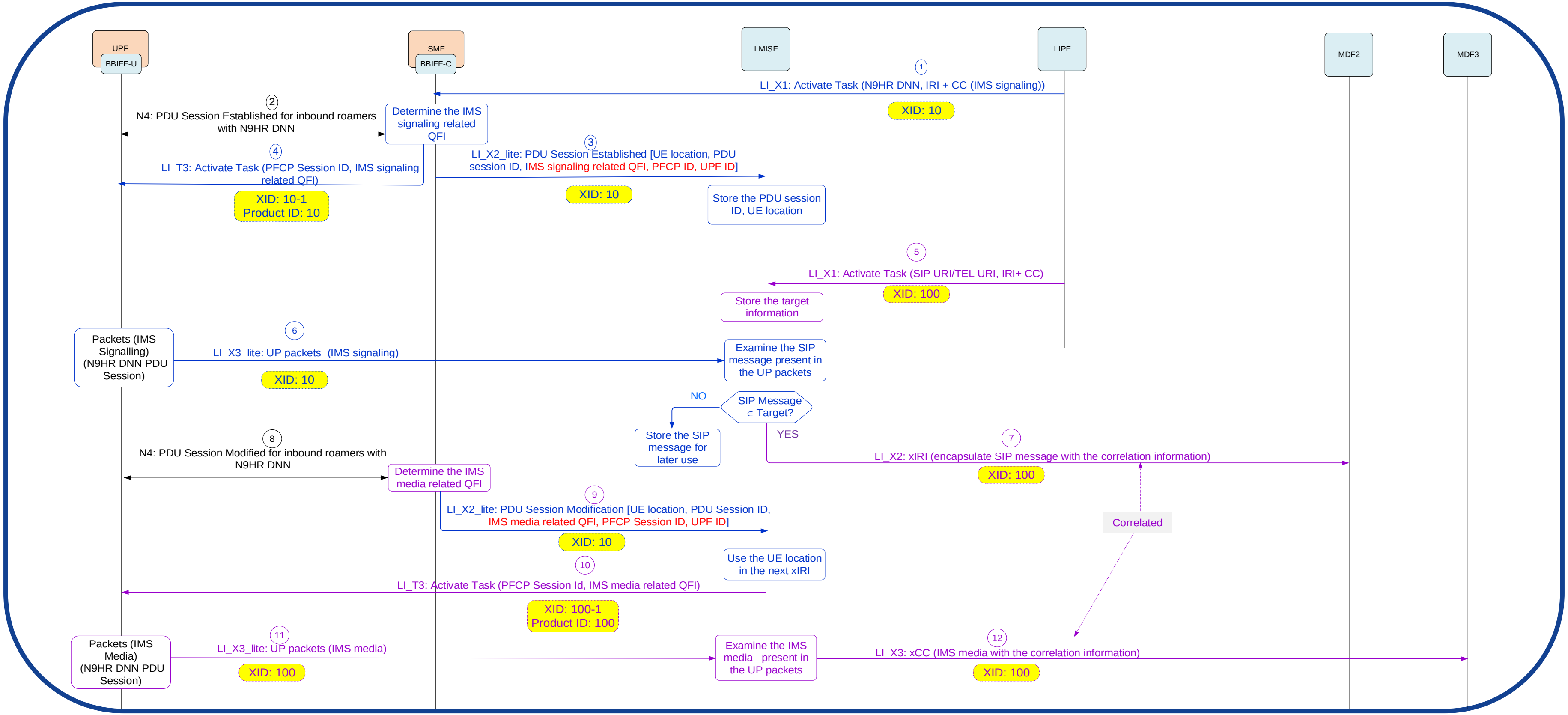
XID Usage – Option C, Option 3A



UPF

BBIFF-U

SMF

BBIFF-C

LMISF

LIPF

MDF2

MDF3

① LI_X1: Activate Task (N9HR DNN, IRI + CC (IMS signaling))

XID: 10

② N4: PDU Session Established for inbound roamers with N9HR DNN

Determine the IMS signaling related QFI

③ LI_X2_lite: PDU Session Established [UE location, PDU session ID, IMS signaling related QFI, PFCP ID, UPF ID]

XID: 10

④ LI_T3: Activate Task (PFCP Session ID, IMS signaling related QFI)

XID: 10-1
Product ID: 10

Store the PDU session ID, UE location

⑤ LI_X1: Activate Task (SIP URI/TEL URI, IRI+ CC)

XID: 100

Store the target information

Packets (IMS Signalling) (N9HR DNN PDU Session)

⑥ LI_X3_lite: UP packets (IMS signaling)

XID: 10

Examine the SIP message present in the UP packets

SIP Message ∊ Target?

NO

Store the SIP message for later use

YES

⑦ LI_X2: xIRI (encapsulate SIP message with the correlation information)

XID: 100

⑧ N4: PDU Session Modified for inbound roamers with N9HR DNN

Determine the IMS media related QFI

⑨ LI_X2_lite: PDU Session Modification [UE location, PDU Session ID, IMS media related QFI, PFCP Session ID, UPF ID]

XID: 10

Use the UE location in the next xIRI

Correlated

⑩ LI_T3: Activate Task (PFCP Session Id, IMS media related QFI)

XID: 100-1
Product ID: 100

Packets (IMS Media) (N9HR DNN PDU Session)

⑪ LI_X3_lite: UP packets (IMS media)

XID: 100

Examine the IMS media present in the UP packets

⑫ LI_X3: xCC (IMS media with the correlation information)

XID: 100

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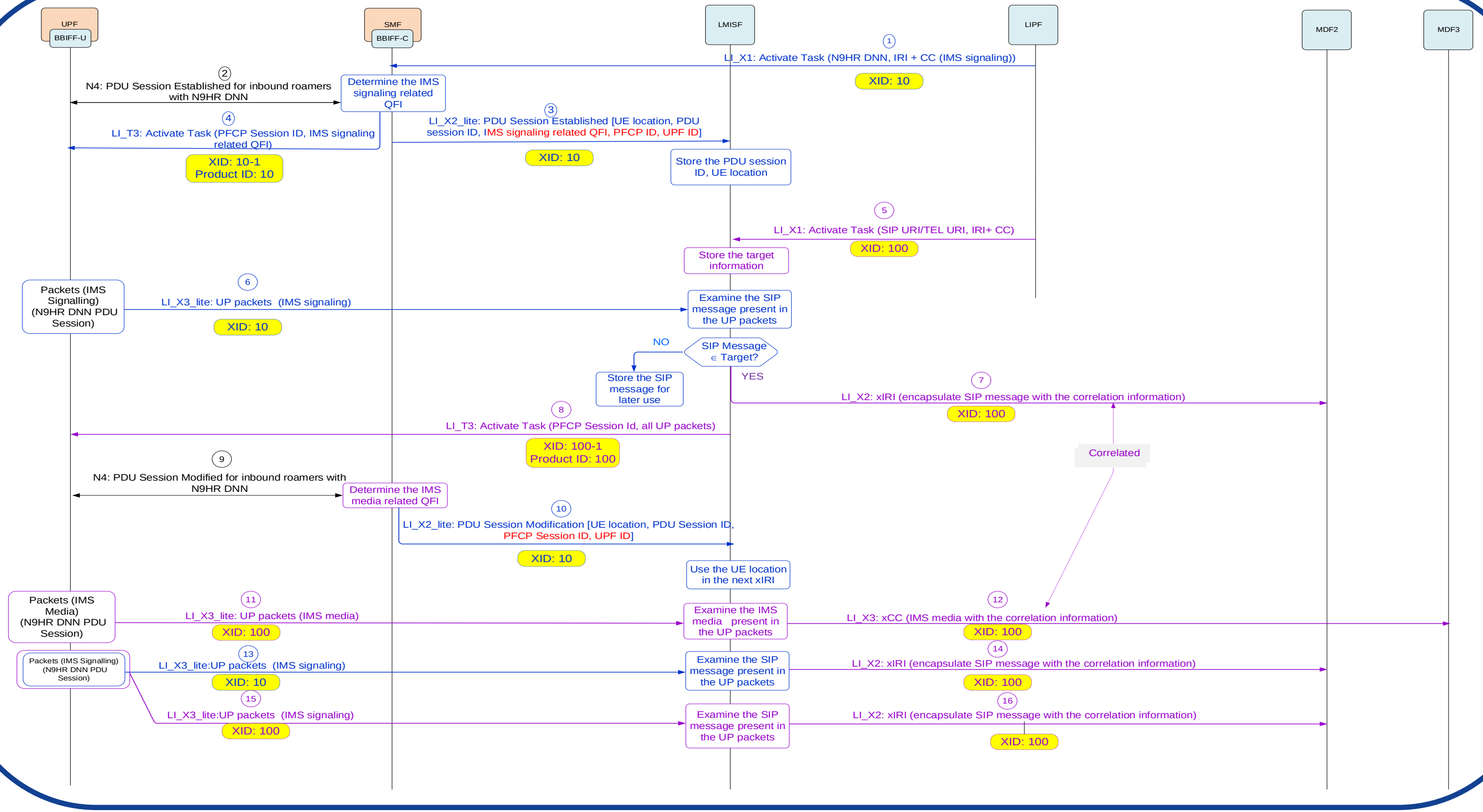
XID Usage – Option C, Option 3B



UPF
BBIFF-U

SMF
BBIFF-C

LMISF

LIPF

MDF2

MDF3

① LI_X1: Activate Task (N9HR DNN, IRI + CC (IMS signaling))

XID: 10

② N4: PDU Session Established for inbound roamers with N9HR DNN

Determine the IMS signaling related QFI

③ LI_X2_lite: PDU Session Established [UE location, PDU session ID, IMS signaling related QFI, PFCP ID, UPF ID]

XID: 10

Store the PDU session ID, UE location

④ LI_T3: Activate Task (PFCP Session ID, IMS signaling related QFI)

XID: 10-1
Product ID: 10

⑤ LI_X1: Activate Task (SIP URI/TEL URI, IRI+ CC)

XID: 100

Store the target information

Packets (IMS Signalling) (N9HR DNN PDU Session)

⑥ LI_X3_lite: UP packets (IMS signaling)

XID: 10

Examine the SIP message present in the UP packets

SIP Message ∈ Target?

NO

Store the SIP message for later use

YES

⑦ LI_X2: xIRI (encapsulate SIP message with the correlation information)

XID: 100

⑧ LI_T3: Activate Task (PFCP Session Id, all UP packets)

XID: 100-1
Product ID: 100

Correlated

⑨ N4: PDU Session Modified for inbound roamers with N9HR DNN

Determine the IMS media related QFI

⑩ LI_X2_lite: PDU Session Modification [UE location, PDU Session ID, PFCP Session ID, UPF ID]

XID: 10

Use the UE location in the next xIRI

Packets (IMS Media) (N9HR DNN PDU Session)

⑪ LI_X3_lite: UP packets (IMS media)

XID: 100

Examine the IMS media present in the UP packets

⑫ LI_X3: xCC (IMS media with the correlation information)

XID: 100

Packets (IMS Signalling) (N9HR DNN PDU Session)

⑬ LI_X3_lite:UP packets (IMS signaling)

XID: 10

Examine the SIP message present in the UP packets

⑭ LI_X2: xIRI (encapsulate SIP message with the correlation information)

XID: 100

⑮ LI_X3_lite:UP packets (IMS signaling)

XID: 100

Examine the SIP message present in the UP packets

⑯ LI_X2: xIRI (encapsulate SIP message with the correlation information)

XID: 100

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Summary

Summary

- New target ID:
  - NSSAI + N9HR DNN is required.
- UP identification:
  - V-SMF receives the QFI along with the QoS Profile (contains the 5QI) during the PDU session establishment/modification phase.
  - BBIFF-C determines the QFI associated with the IMS signaling (5QI = 5) and IMS media (5QI = 1 for voice) before informing the BBIFF-U via LI_T3 for UP packet capture.
- XID:
  - XID used for the initial configuration applies to PDU sessions of all inbound roamers with N9HR.
  - XID used for the IMS media interception is same as the XID provisioned into LMISF as a part of the SIP target intercept infomation.
- Protocols:
  - BBIFF-C uses LI_X2_lite to notify the PDU session related xIRI (only PDU session related events) to LMISF (part of LI_Xib).
  - LMISF uses LI_T1 (based on LI_X1) is to inform BBIFF-C on the need to capture IMS media for the IMS session (part of LI_Xib).
  - BBIFF-U uses LI_X3_lite to deliver the xCC (UP packets) to the LMISF (LI_Xia).
  - BBIFF-C uses LI_T3 to trigger the capture and delivery (to LMISF) of UP packets (LI_BBF).
  - UPF ID may have to be added to the LI_X2_lite interfaces.
  - PDU Session ID may have to be included in the LI_X2_lite and LI_X3_lite interfaces.

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