

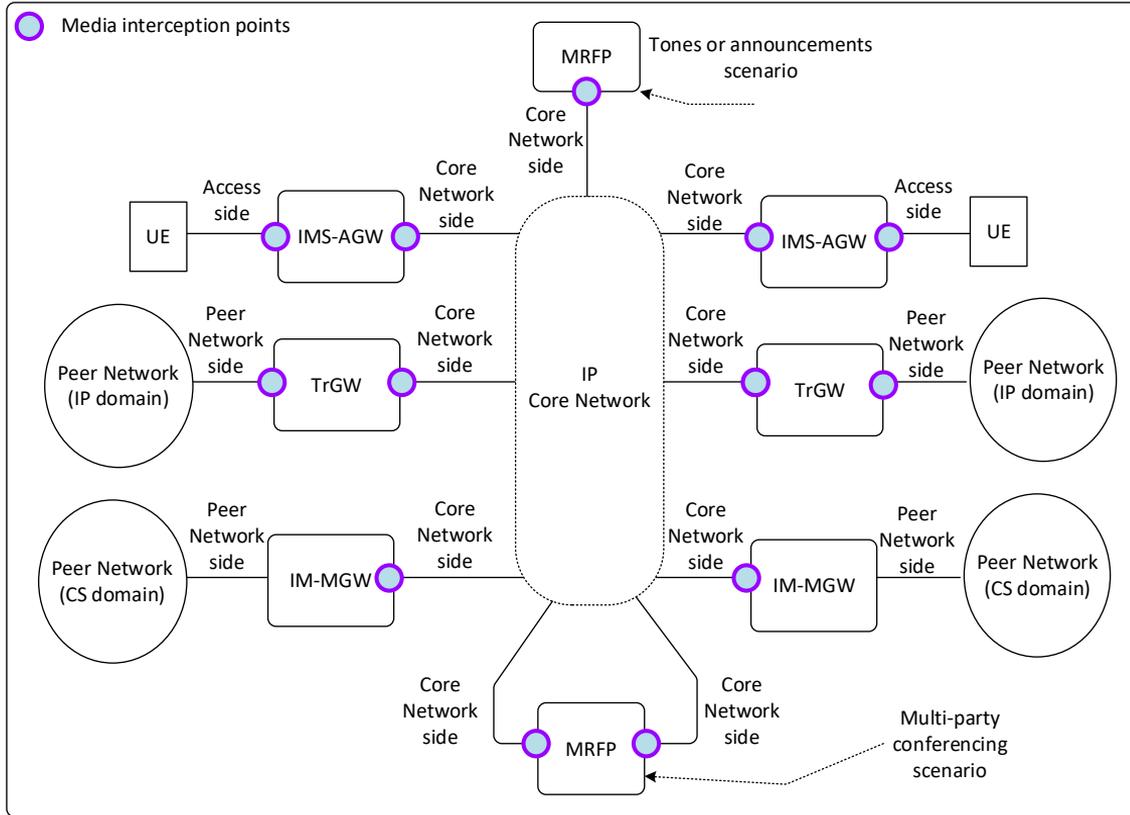
Concepts of LI_T3 and LI_X3

(a presentation)

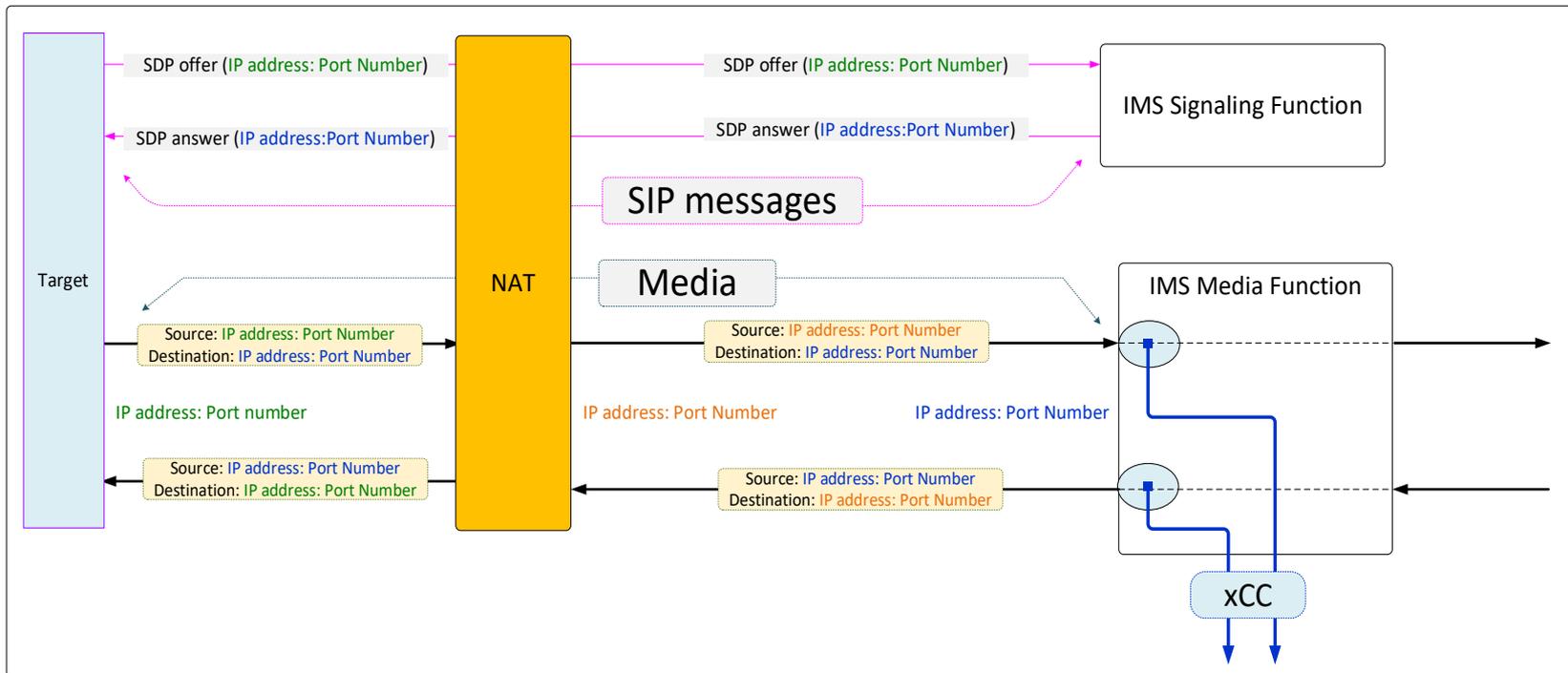
Nagaraja (Nag) Rao; Boca Raton, FL

Concepts (part of these are from
the CR text)

Different media interception points to be supported (this is in the CR)



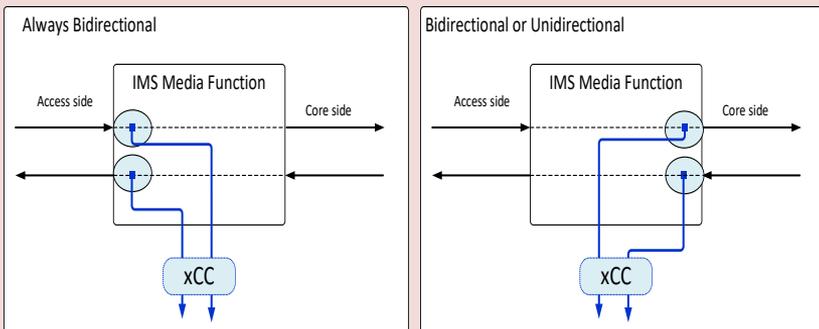
The role of NAT: Network Address Translator (this is part of this presentation only)



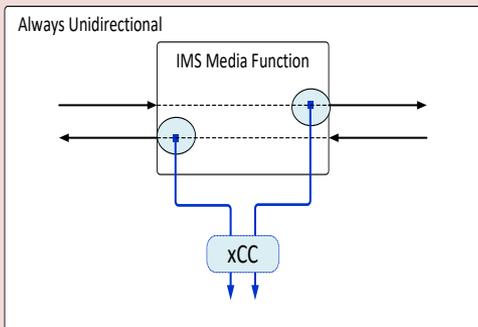
- The NAT works on the IP/UDP layer.
- When NAT is present, the IMS Media Function latches the IP address and UDP port number for RTP streams sent in the reverse direction (RFC 4787)
- The NAT does not change the contents of the payload.

Media interception options (this is part of this presentation only)

Interception at one side of the IMS Media Function



Interception at both sides of the IMS Media Function



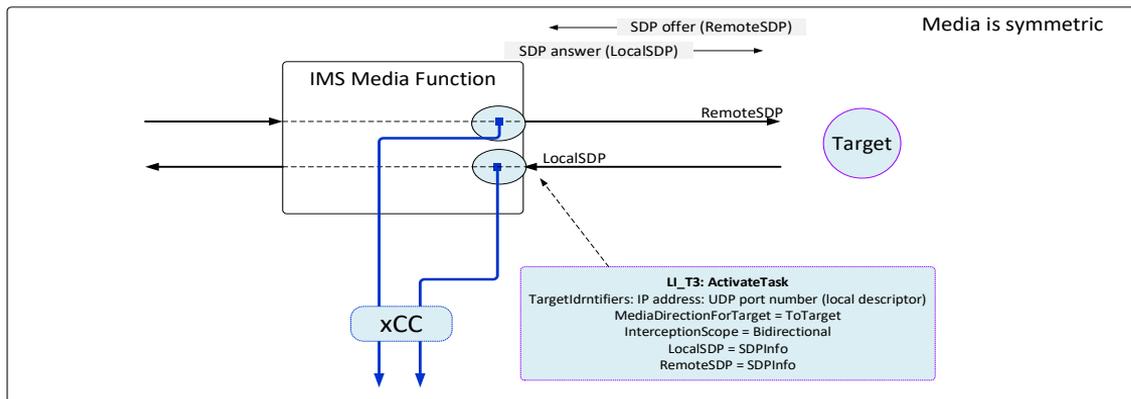
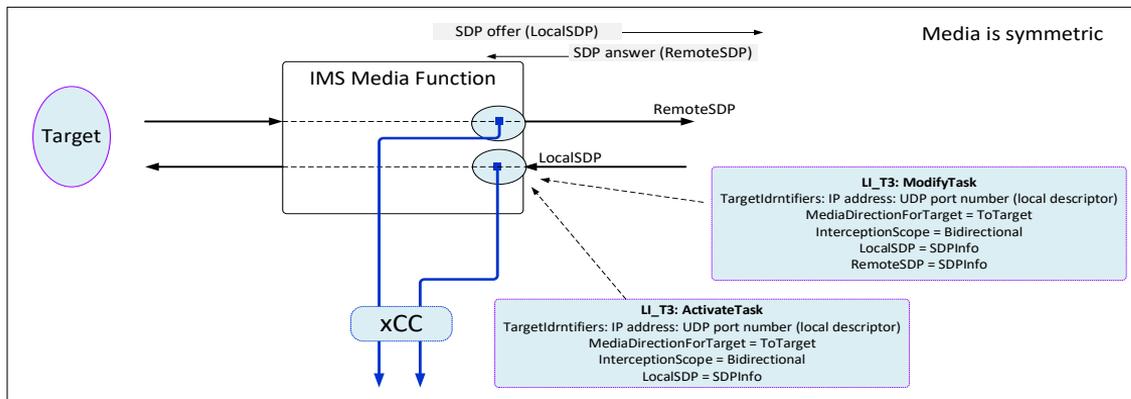
CC-POI in IMS-AGW, TrGW, IM-MGW or MRFP:

- Interception is done on one side.
- Bidirectional or Unidirectional:
 - Bidirectional:
 - One ActivateTask over LI_T3.
 - Source and Destination addresses swap for incoming and outgoing media.
 - Unidirectional:
 - Two ActivateTasks over LI_T3.
 - Interception is based on destination addresses.
 - Source and Destination addresses may not be swapped for incoming and outgoing media.

Special case:

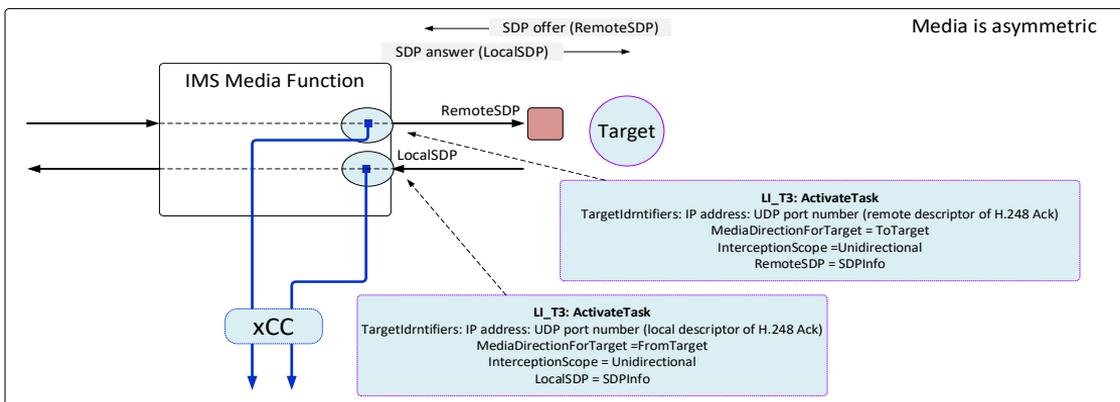
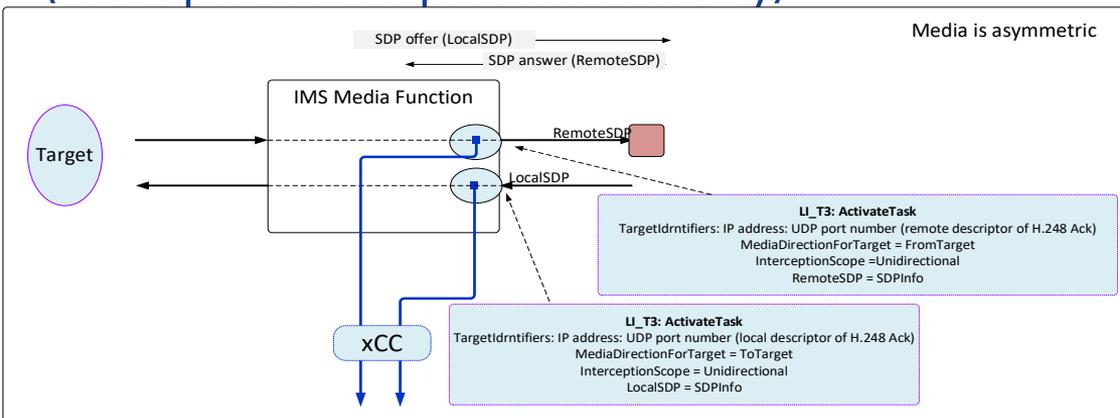
- Interception is done on both sides of IMS media function.
- Unidirectional:
 - Two ActivateTasks over LI_T3.
 - Separate Destination addresses.

MediaDirectionForTarget, InterceptionScope for symmetric case (this is part of this presentation only)



- MediaDirectionForTarget:
 - Media destined to the target identifier is to target or from target.
 - Note that CC-POI has no clue which side is the target.
 - CC-TF has to help CC-POI in the trigger.
- InterceptionScope: Bidirectional
 - The destination IP address:UDP Port Number and source IP address:UDP port number are swapped for the media in two directions.
- LocalSDP: SDP expected on incoming streams.
- RemoteSDP: SDP expected from the remote end.
- ModifyTask is used to only provide the RemoteSDP

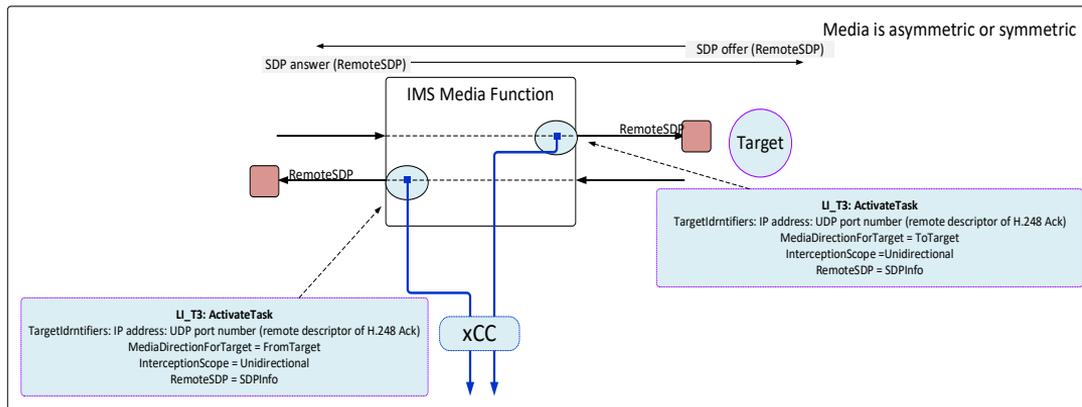
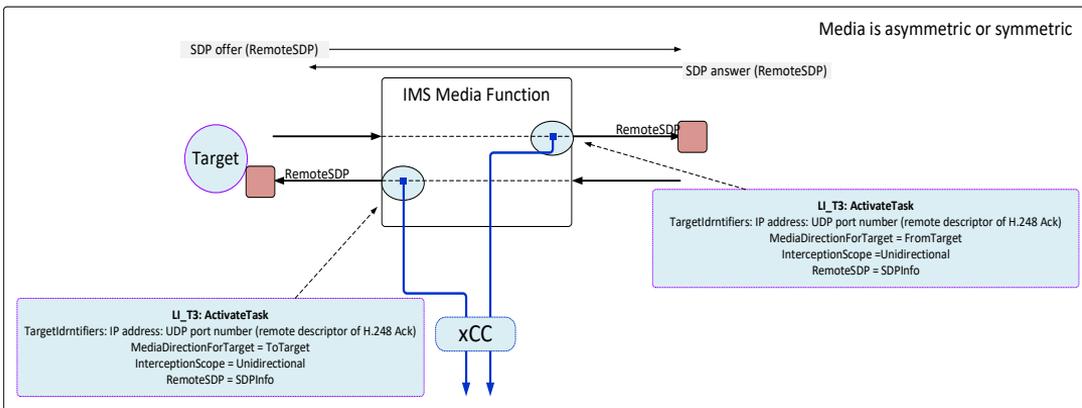
MediaDirectionForTarget, InterceptionScope for asymmetric case (this is part of this presentation only)



- Two ActivateTasks – separate for each direction of media.
- MediaDirectionForTarget:
 - Media destined to the target identifier is to target or from target.
 - Note that CC-POI has no clue which side is the target.
 - CC-TF has to help CC-POI in the trigger.
- InterceptionScope: Unidirectional
 - The target identifier is destination destination IP address:UDP Port Number for each direction (separate).
- LocalSDP: SDP expected on incoming streams.
- RemoteSDP: SDP expected from the remote end.

MediaDirectionForTarget, InterceptionScope for the case of interception at two sides

(this is part of this presentation only)



- The media is presumed to pass through the IMS Media Function.
- Two ActivateTasks: separate for each interception point.
- MediaDirectionForTarget:
 - Media destined to the target identifier is to target or from target.
 - Note that CC-POI has no clue which side is the target.
 - CC-TF has to help CC-POI in the trigger.
- InterceptionScope: Unidirectional
 - The target identifier is destination destination IP address:UDP Port Number for each direction (separate).
- RemoteSDP: SDP expected from the remote end.

ActivateTask (this is in the CR)

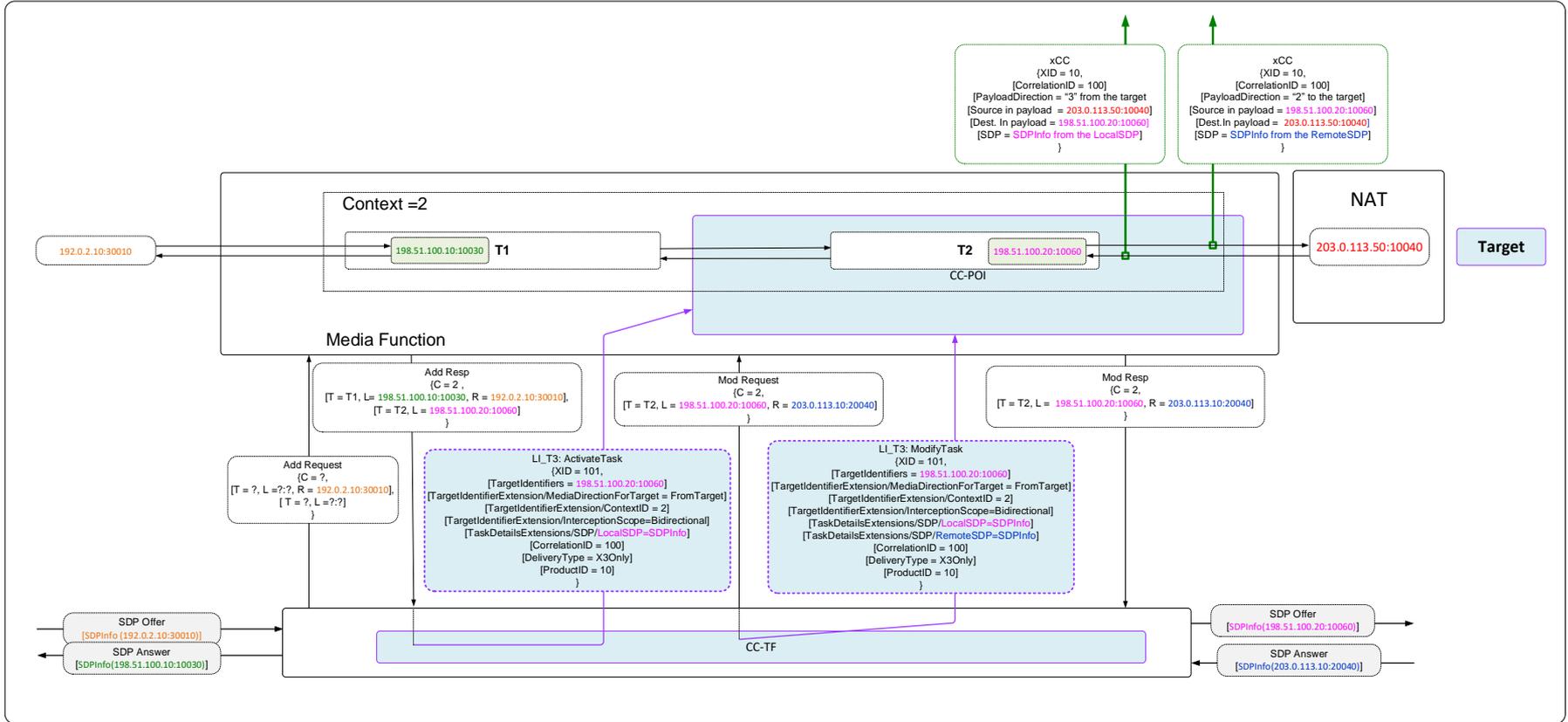
ETSI TS 103 221-1 [7] field name	Description	M/C/O
XID	Allocated by the CC-TF as per ETSI TS 103 221-1 [7].	M
TargetIdentifiers	IP address and the UDP port number are to be used at the CC-POI in identifying the IMS media that needs to be intercepted. See table 7.12.5.X-2.	M
DeliveryType	Set to "X3Only".	M
ListOfDIDs	Shall give the DID of the MDF3 to which the xCC should be delivered. The delivery endpoint is configured using the CreateDestination message as described in ETSI TS 103 221-1 [7] clause 6.3.1 prior to the task activation.	M
CorrelationID	This value is set by the CC-TF and shall be same as the value to be used in the xCC generated at the CC-POI.	M
ProductID	Shall be set to the XID of the Task Object associated with the interception at the CC-TF. This value shall be used by the CC-POI to fill the XID field of xCC sent over LI_X3 to the MDF3.	M
TaskDetailsExtensions/SDP	See table 7.12.5.X.2-3.	M

Extensions (these are in the CR)

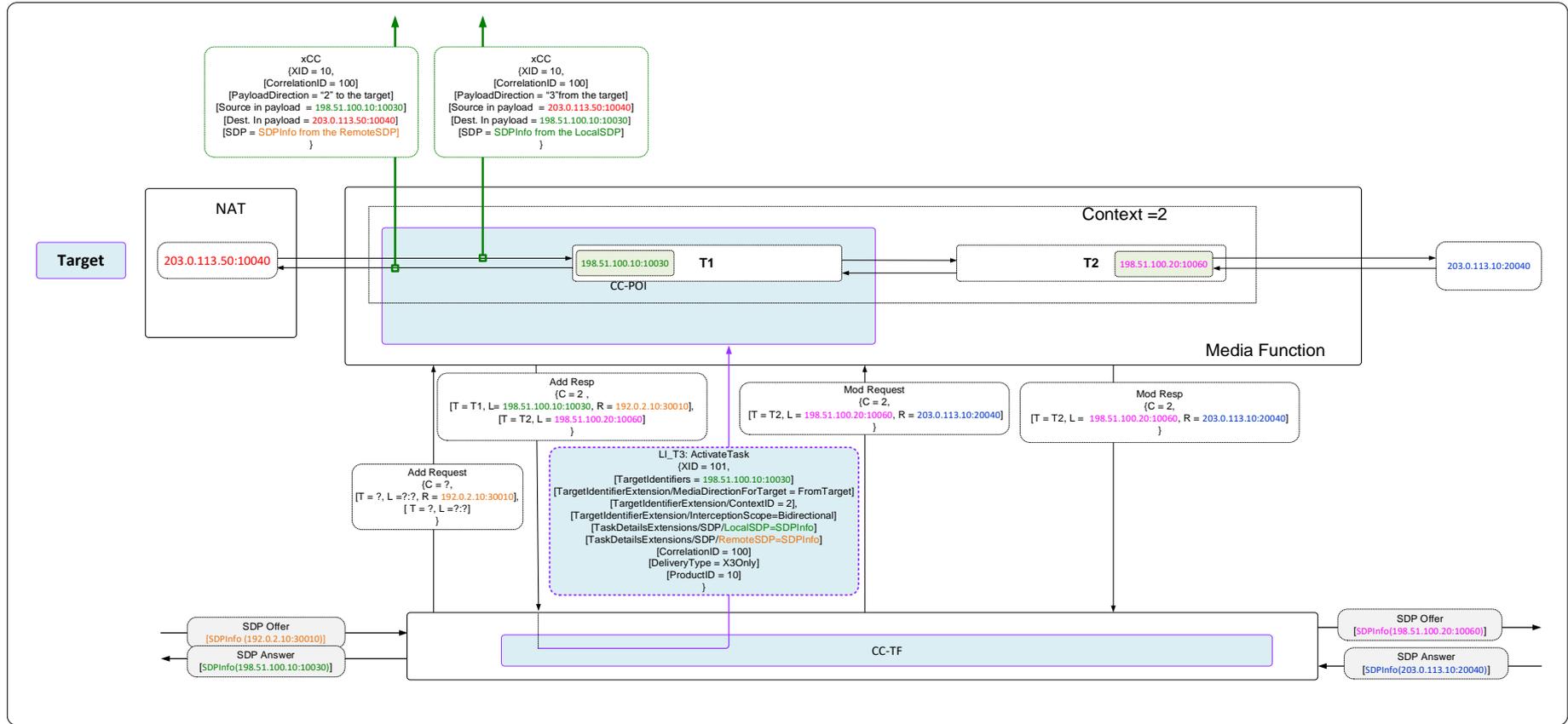
Identifier type	Owner	ETSI TS 103 221-1 [7] TargetIdentifier type	Definition
IPv4 Address	ETSI	IPv4Address	ETSI TS 103 221-1 [7]
IPv6 Address	ETSI	IPv6Address	ETSI TS 103 221-1 [7]
UDP Port Number	ETSI	UDPPort	ETSI TS 103 221-1 [7]
H248 Context ID	3GPP	TargetIdentifierExtension/H248ContextID	H248ContextID (see XSD Schema)
Media Direction For Target	3GPP	TargetIdentifierExtension/MediaDirectionForTarget	MediaDirectionForTarget (see XSD Schema)
Interception Scope	3GPP	TargetIdentifierExtension/InterceptionScope	InterceptionScope (see XSD Schema)

Extensions field name	Description	M/C/O
LocalSDP	SDP sent to the remote end of the session (see paragraph below)	C
RemoteSDP	SDP received from the remote end of the session (see paragraph below)	C

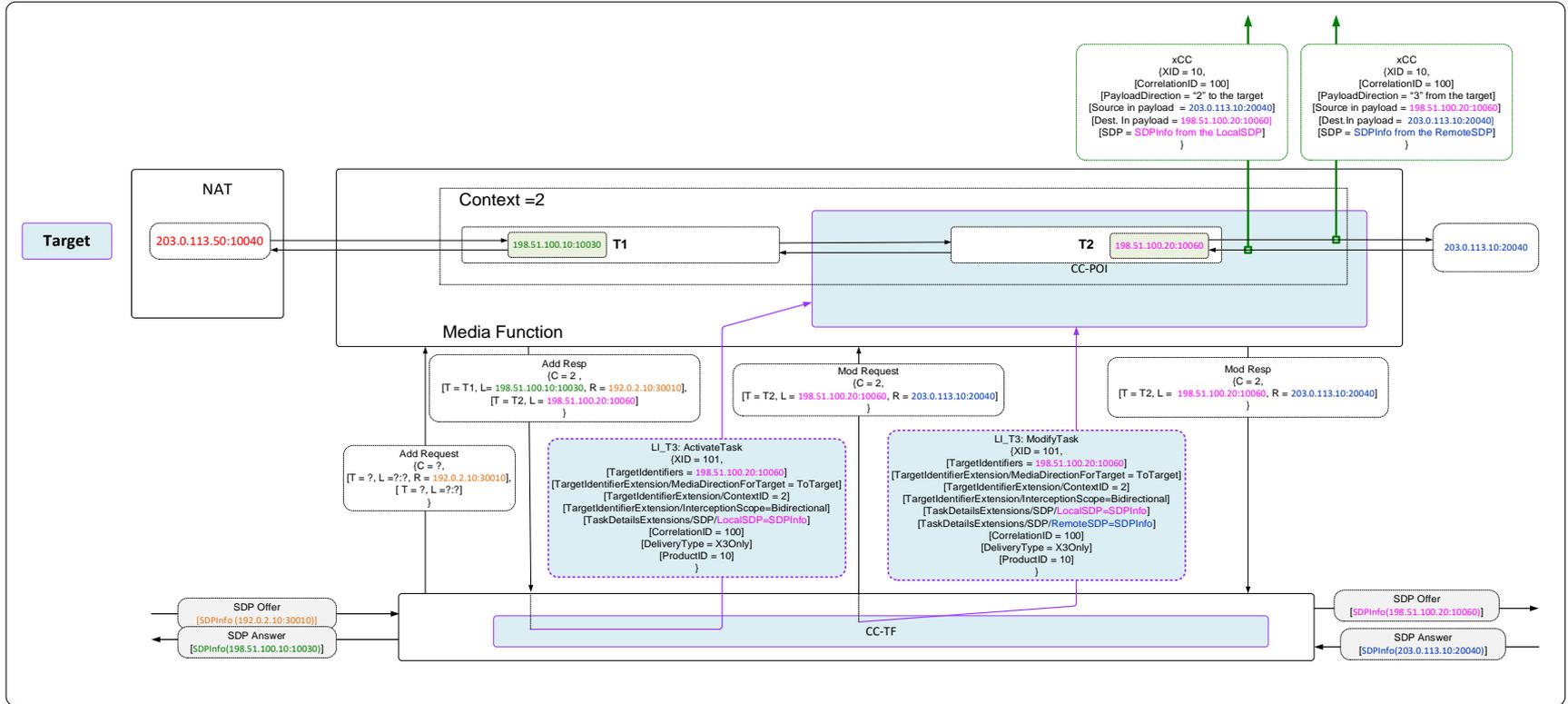
Interception at the access side (IMS-AGW) – terminating session to target



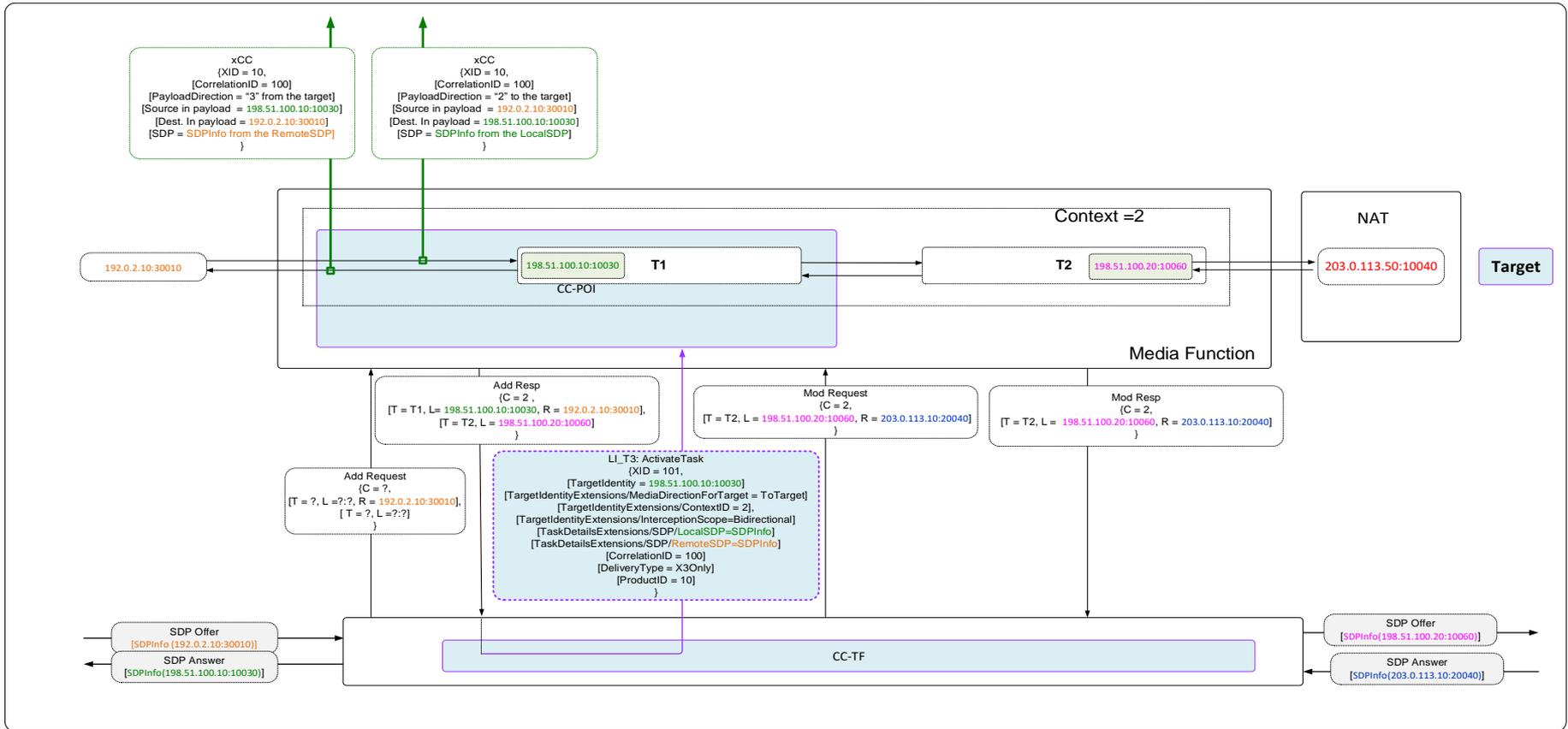
Interception at the access side (IMS-AGW) – originating session from target



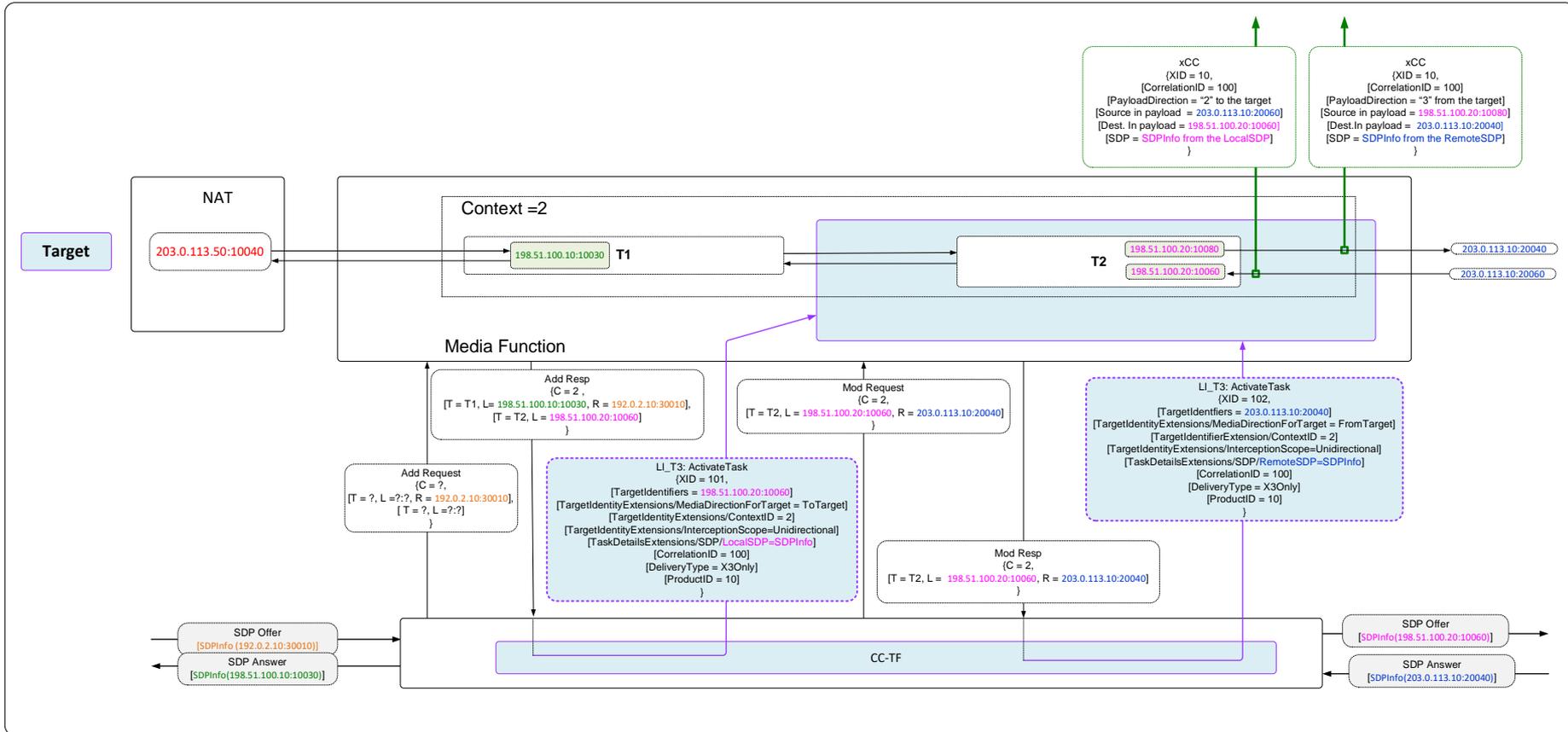
Interception at the core side (IMS-AGW) – originating session from target



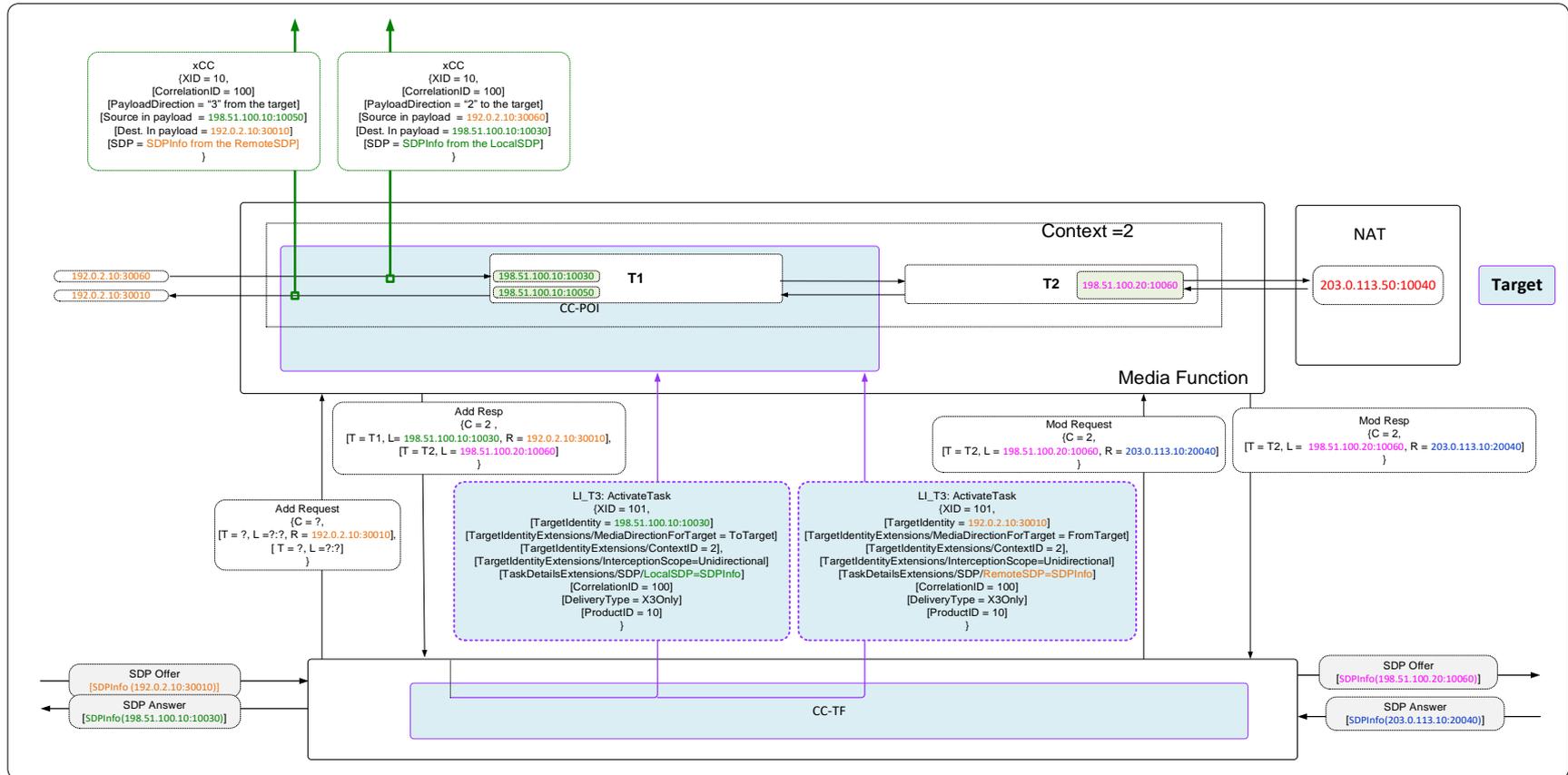
Interception at the core side (IMS-AGW) – terminating session to target



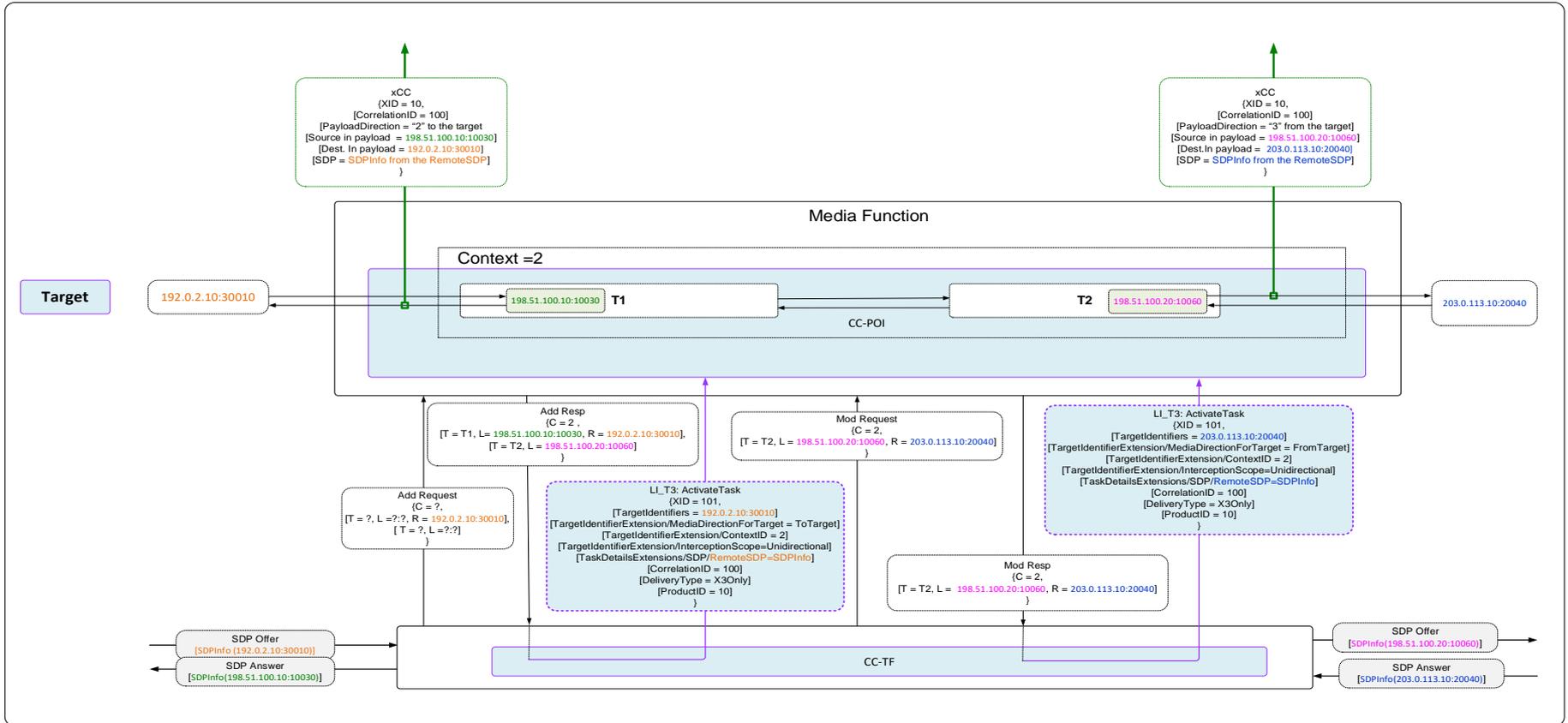
Interception at the core side (IMS-AGW) – originating session from target (Unidirectional)



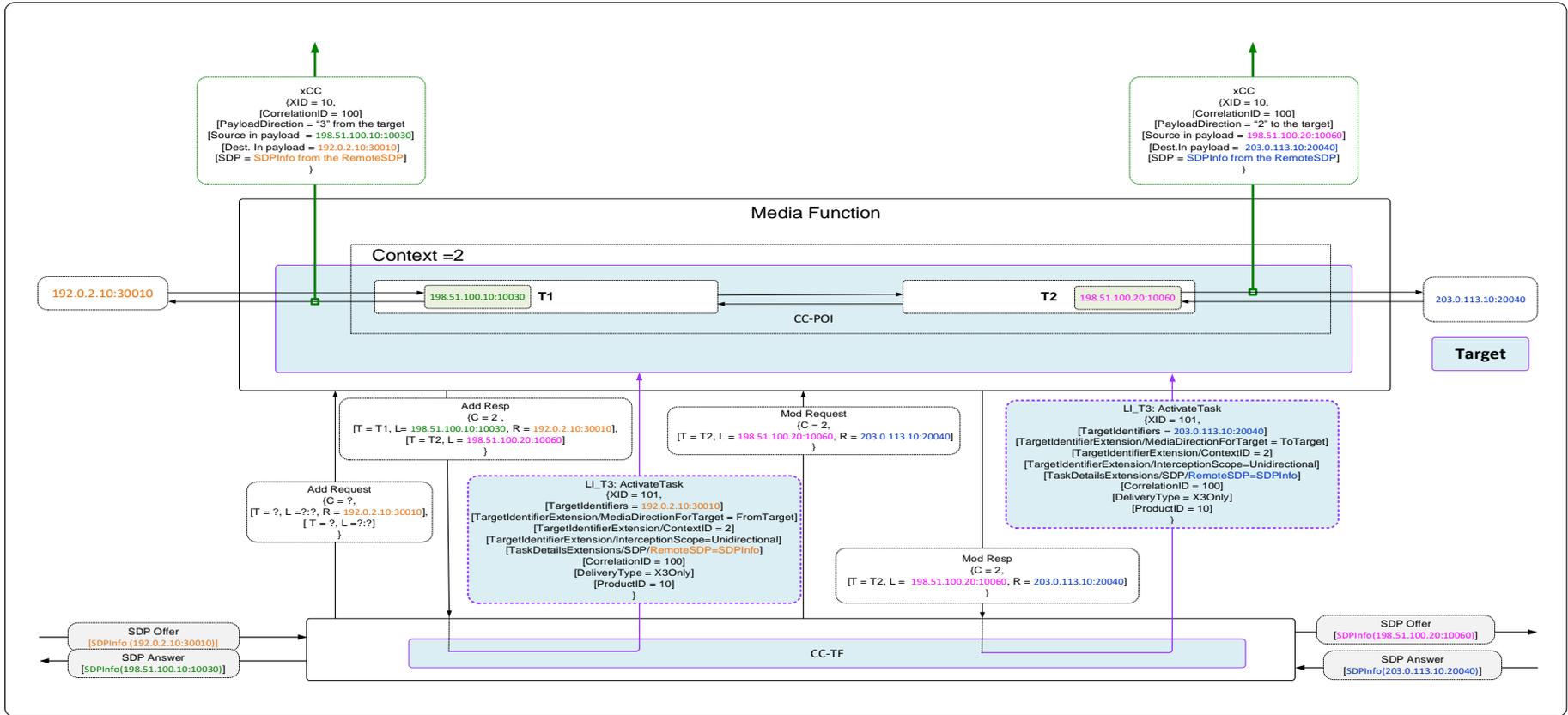
Interception at the core side (IMS-AGW) – terminating session to target (Unidirectional)



Interception at both sides Media NF – originating session from target (Unidirectional)



Interception at both sides Media NF – terminating session to target (Unidirectional)



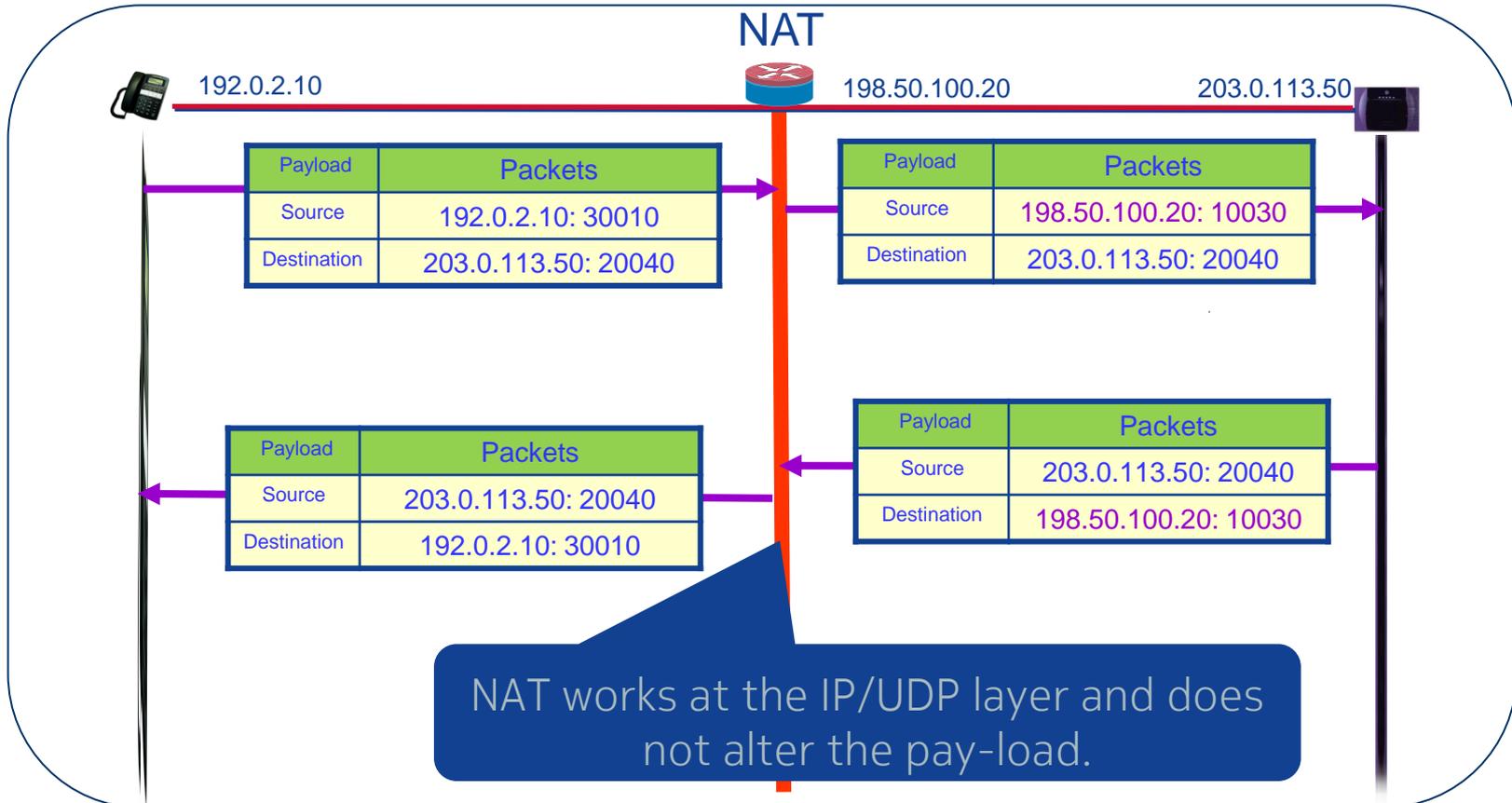
Summary

- LI_T3 trigger is used.
- Target identifiers: IP address and UDP port number.
- Target identifier extensions:
 - MediaDirectionForTarget
 - InterceptionScope
 - H248ContextID
- Task details extensions:
 - SDP
 - LocalSDP
 - RemoteSDP
- Target identifiers and extensions:
 - Used to identify the media to intercept.
 - MediaDirectionForTarget: Used to determine Payload Direction in xCC.
 - InterceptionScope: Bidirectional Vs Unidirectional.
 - H.248ContextID: H.248 context at the IMS Media Function/
- Task details extensions (SDP):
 - Used to populate the SDP Session Description in xCC.
 - LocalSDP:
 - SDP Session Description for Incoming media packets.
 - RemoteSDP:
 - SDP Session Description for outgoing media packets.

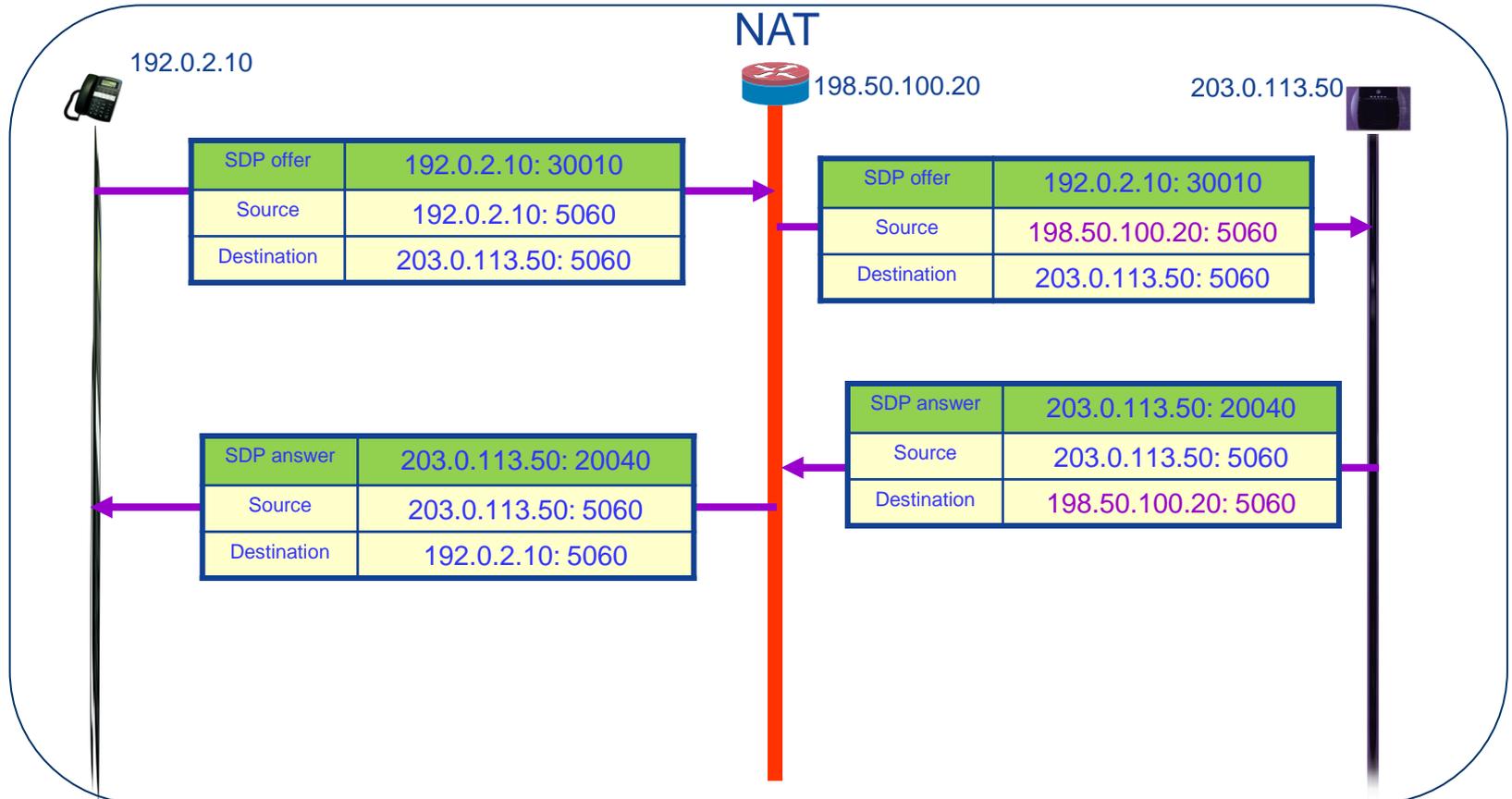
LEAs have to use the IP address and UDP port number of the IP/UDP layer of media packets rather than the IP address and UDP port number seen in the SDP Session Description.

Backup (on NAT)

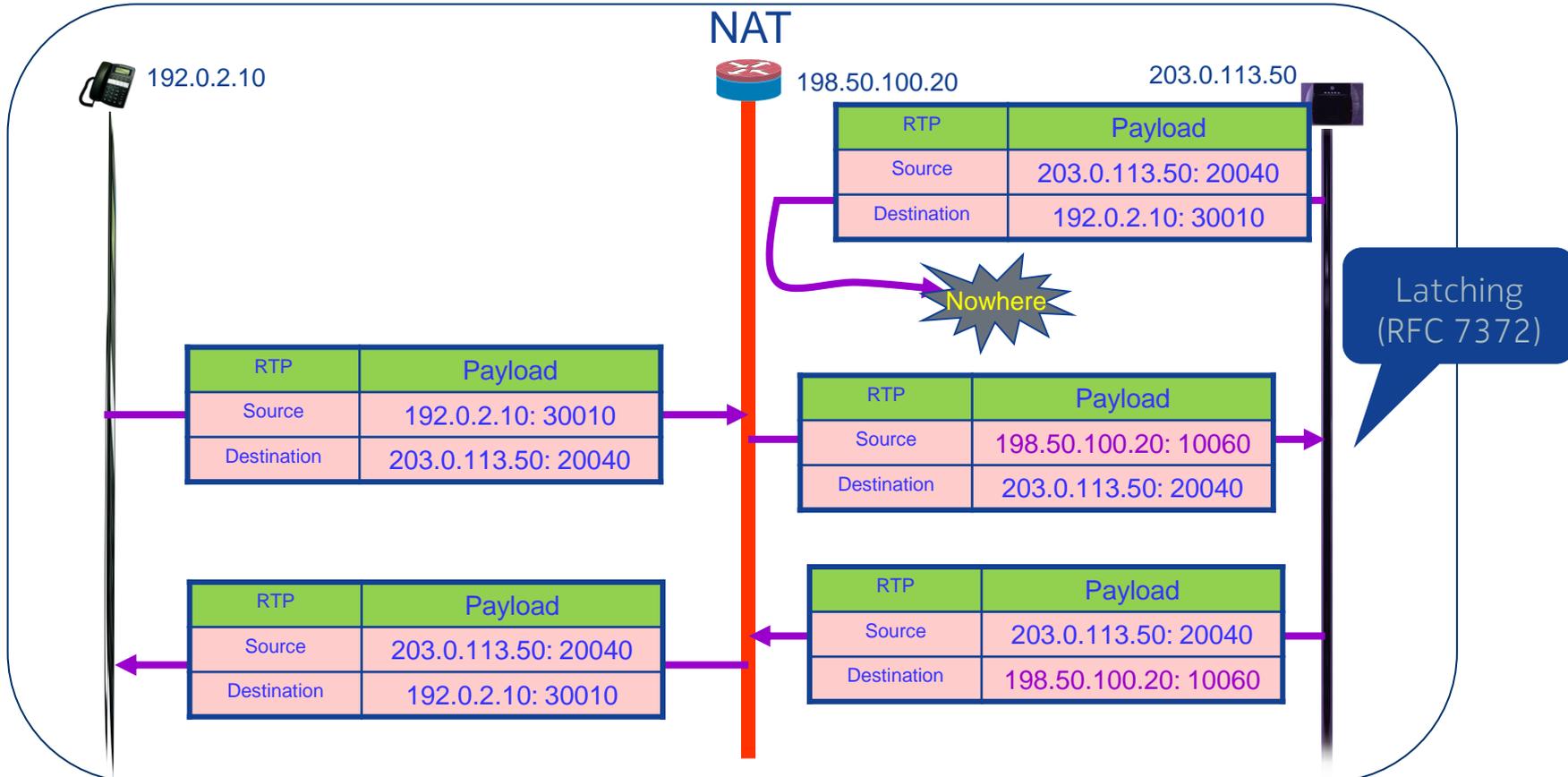
NAT basics



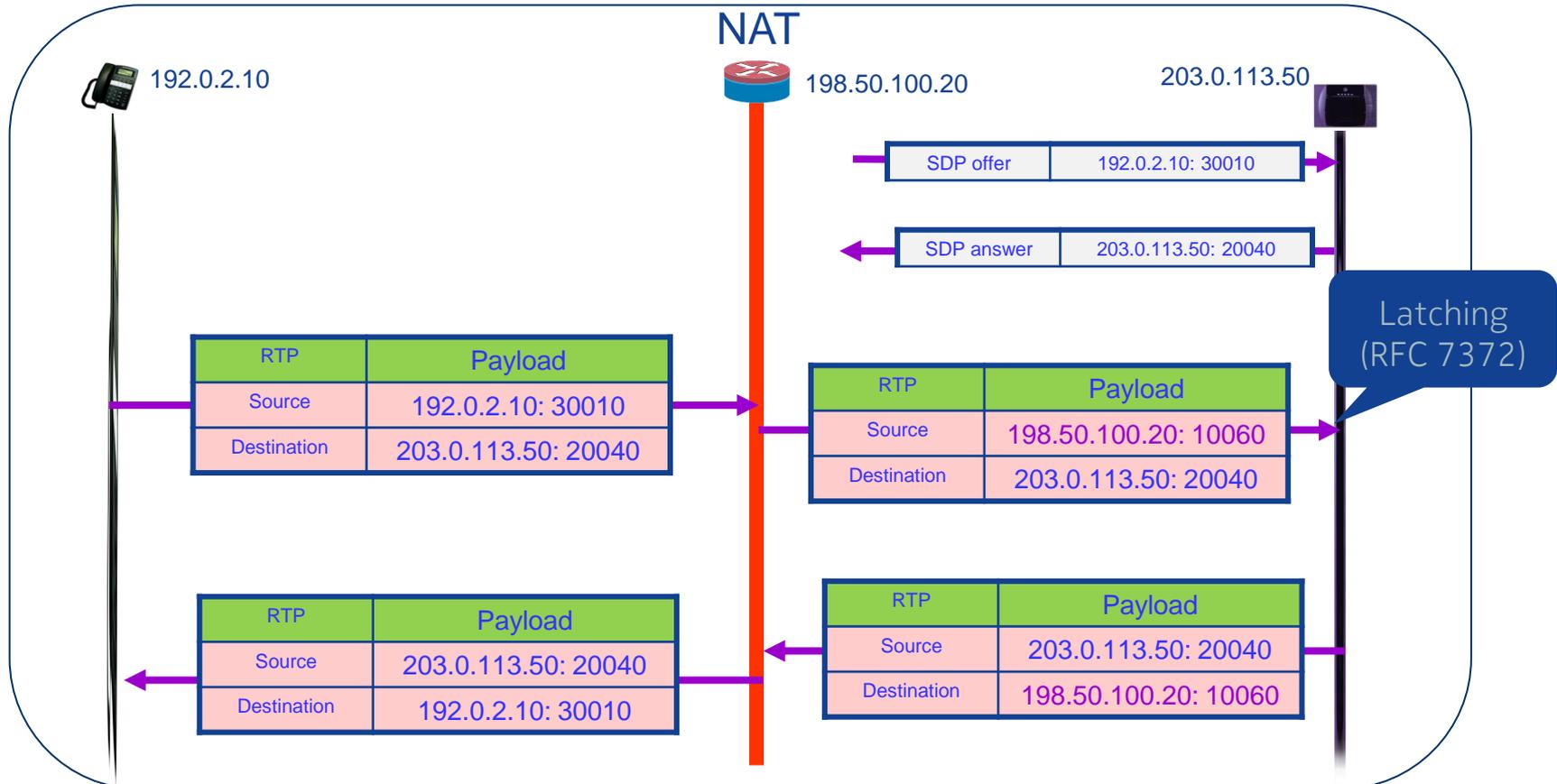
VoIP: SDP Establish



VoIP: Media Transport



VoIP: Comparing to SDP offer with media



RFC 4961: Clause 4

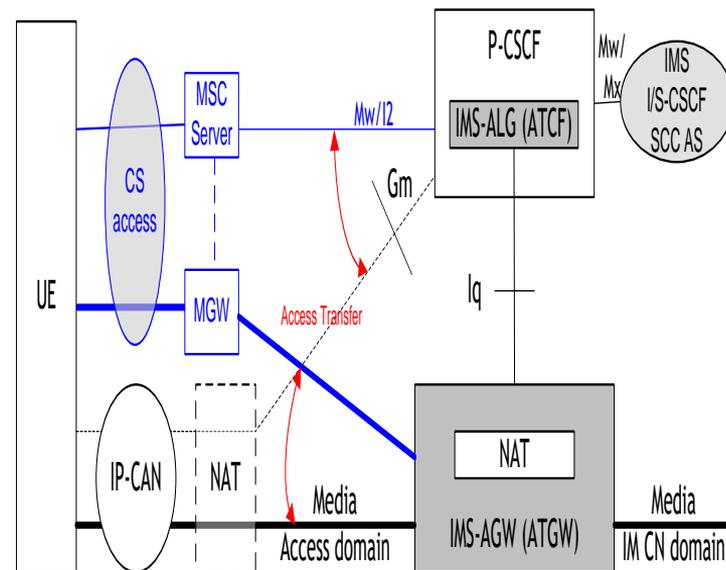
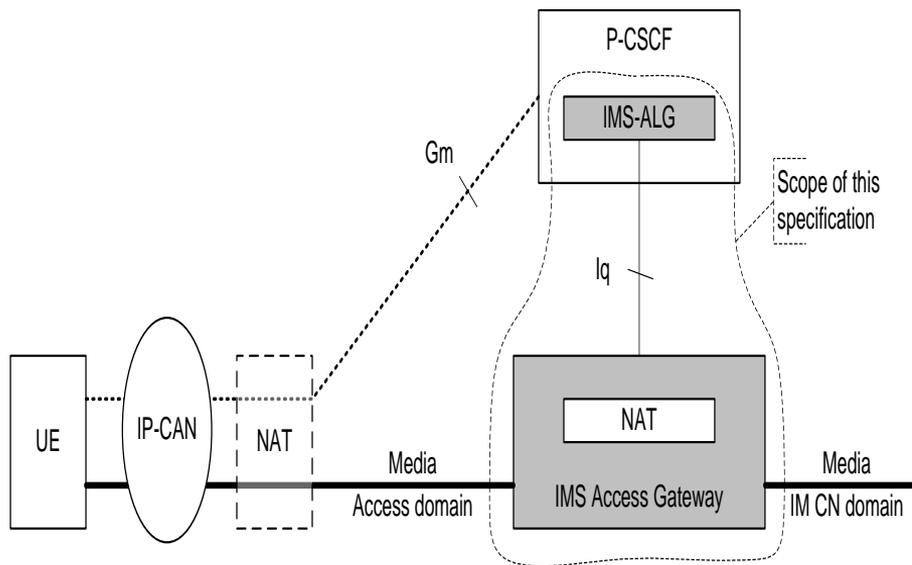
There are two specific instances where **symmetric RTP and symmetric RTCP are REQUIRED:**

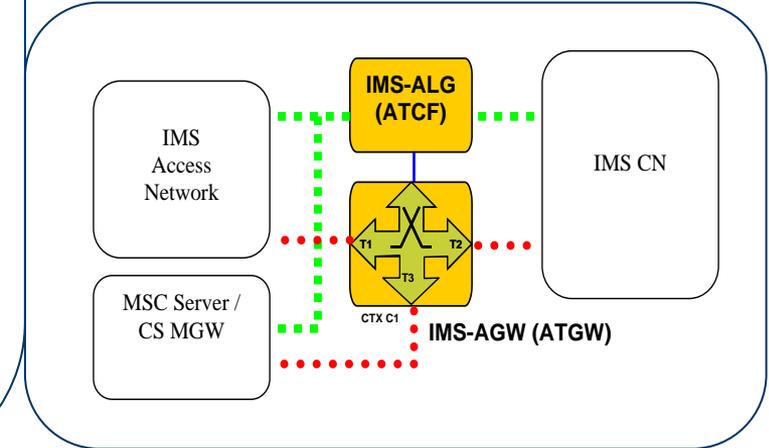
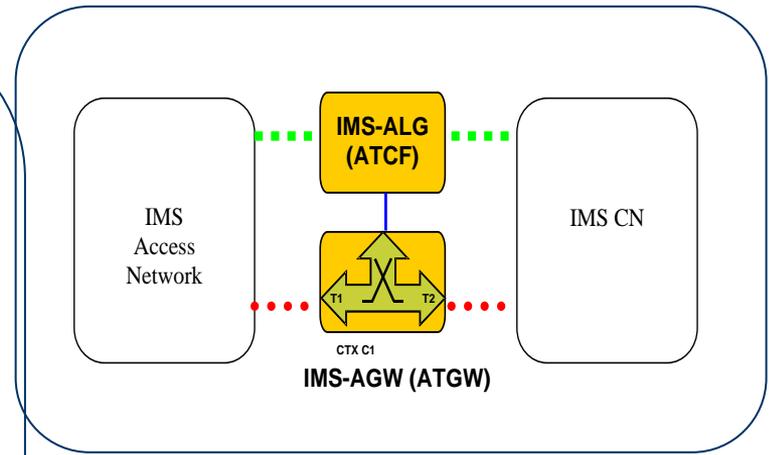
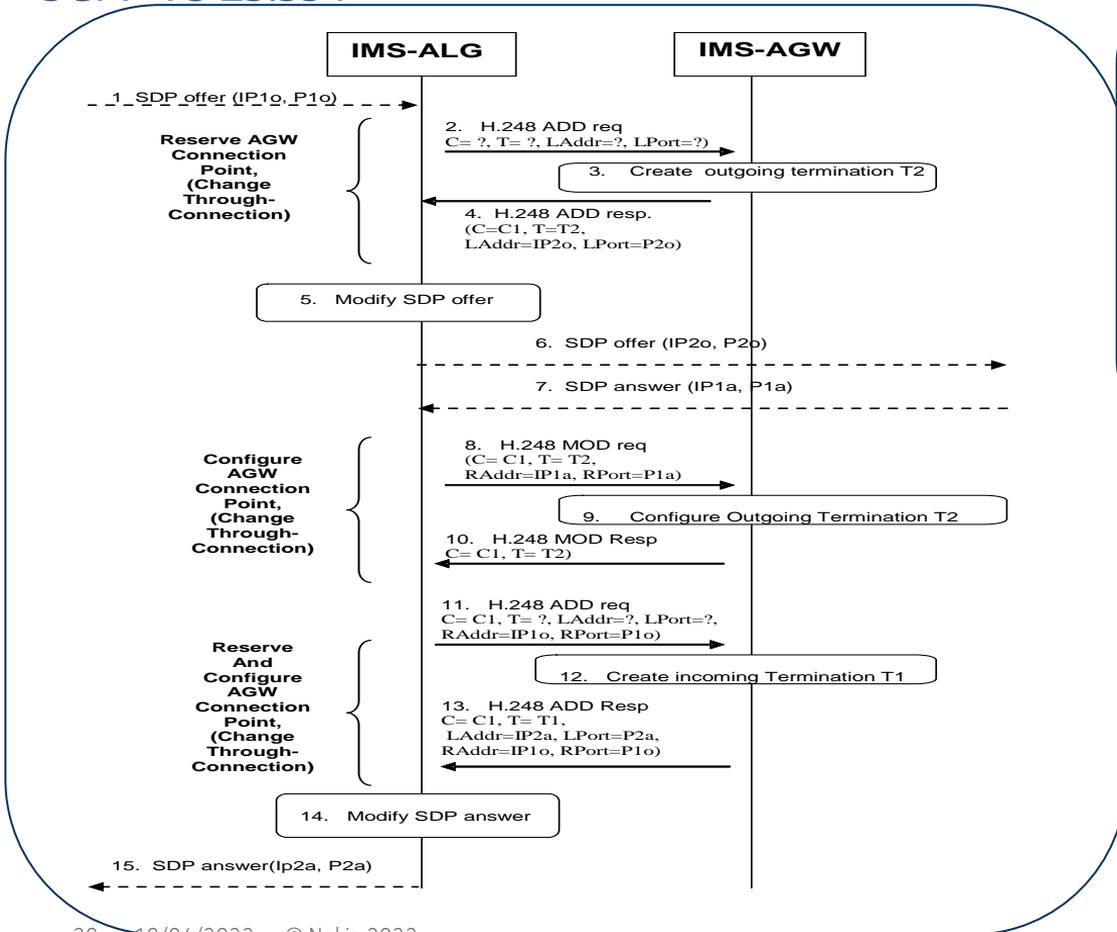
The **first instance is NATs** that lack integrated Application Layer Gateway (ALG) functionality. Such NATs **require that endpoints use symmetric UDP ports to establish bidirectional traffic**. This requirement exists for all types of NATs described in [Section 4 of \[RFC4787\]](#). ALGs are defined in [Section 4.4 of \[RFC3022\]](#).

The **second instance is Session Border Controllers (SBCs)** and other forms of RTP and RTCP relays (e.g., [\[TURN\]](#)). Media relays are necessary to establish bidirectional UDP communication across a NAT that is 'Address-Dependent' or 'Address and Port-Dependent' [\[RFC4787\]](#). However, even with a media relay, symmetric UDP ports are still required to traverse such a NAT.

There are other instances where symmetric RTP and symmetric RTCP are helpful, but not required. For example, if a firewall can expect symmetric RTP and symmetric RTCP, then the firewall's dynamic per-call port filter list can be more restrictive compared to asymmetric RTP and asymmetric RTCP. Symmetric RTP and symmetric RTCP can also ease debugging and troubleshooting.

Other UDP-based protocols can also benefit from common local transmit and receive ports. There are no known cases where symmetric RTP or symmetric RTCP are harmful. **For these reasons**, it is RECOMMENDED that symmetric RTP and symmetric RTCP always be used for bidirectional RTP media streams.





NOKIA