Technical Specification Group Radio Access Network
Marco Island, USA 4 - 7 June 2002

RP#16(02) 0421

TSG_Doc_Num	Specification	CR_Num	Revision_Num	3G_Release	CR_Subject	CR_Category	Cur_Ver_Num	New_Ver_Num	Tdoc_Num	WorkItem
RP-020421	25.401	048		Rel-5	Corrections on ATM-IP interoperability scenarios	F	5.2.0	5.3.0	R3-021186	ETRAN-Iptrans
RP-020421	25.401	052		Rel-5	Introduction of IP transport in UTRAN	F	5.2.0	5.3.0	R3-021280	ETRAN-iptrans
RP-020421	25.401	053	2	Rel-5	Independence of RNL and TNL	F	5.2.0	5.3.0	R3-021667	ETRAN-Iptrans
RP-020421	25.413	466	1	Rel-5	IPv4-IPv6 interworking for data forwarding	F	5.0.0	5.1.0	R3-021544	ETRAN-IPTrans
RP-020421	25.933	001	2	Rel-5	IP-ALCAP: The ITU-T Solution	F	5.0.0	5.1.0	R3-021647	ETRAN-Iptrans

3GPP TSG-RAN WG3 Meeting #28
Gyeongju, Korea, 13-17 May 2002

R3-021186

CR-Form-v3

CHANGE REQUEST

⌘	25.401	CR 048	⌘ rev		⌘ Current version:	5.2.0	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [ ] Radio Access Network [X] Core Network [ ]

Title: ⌘	Correction of ATM-IP interoperability scenarios			
Source: ⌘	R-WG3			
Work item code: ⌘	ETRAN-IPTRANS		***Date:*** ⌘	03 May 2002
Category: ⌘	**F**		***Release:*** ⌘	REL-5
	Use one of the following categories: ***F*** *(essential correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(Addition of feature),* ***C*** *(Functional modification of feature)* ***D*** *(Editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.			*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change: ⌘	The scenarios 1 (Dual Stack) and 2 (integrated IWF) are described by incorrect figures: - Figure corresponding to scenario 1 may be interpreted as not involving RNL level i.e. as being a way to perform interworking between the left interface and the right interface. - Figure corresponding to scenario 2 may also be interpreted as not involving the RNL level i.e. the IWU performing the interworking between the left interface and the right interface as if it would be a TNL-IWU over an Iur concerning two RNCs external to the drawing.
Summary of change: ⌘	The two above mentioned figures have been changed accordingly. Impact assessment towards the previous version of the specification (same release): No impact except for implementations that would have interpreted the specification in an incorrect manner. For implementations that have misinterpreted the specification: - This CR has an isolated impact with the previous version of the specification. - This CR has an impact under functional point of view. - The impact can be considered as isolated because it affects one function namely ATM-IP interworking.
Consequences if not approved: ⌘	Ambiguities can remain in the specifications and could lead to incorrect implementations.

Clauses affected:	⌘	11.1		
Other specs affected:	⌘		Other core specifications	⌘
			Test specifications	
			O&M Specifications	
Other comments:	⌘			

How to create CRs using this form:

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1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

11 UTRAN Interfaces

11.1 General Protocol Model for UTRAN Interfaces

11.1.1 General

The general protocol model for UTRAN Interfaces is depicted in figure 10, and described in detail in the following subclauses. The structure is based on the principle that the layers and planes are logically independent of each other. Therefore, as and when required, the standardisation body can easily alter protocol stacks and planes to fit future requirements.

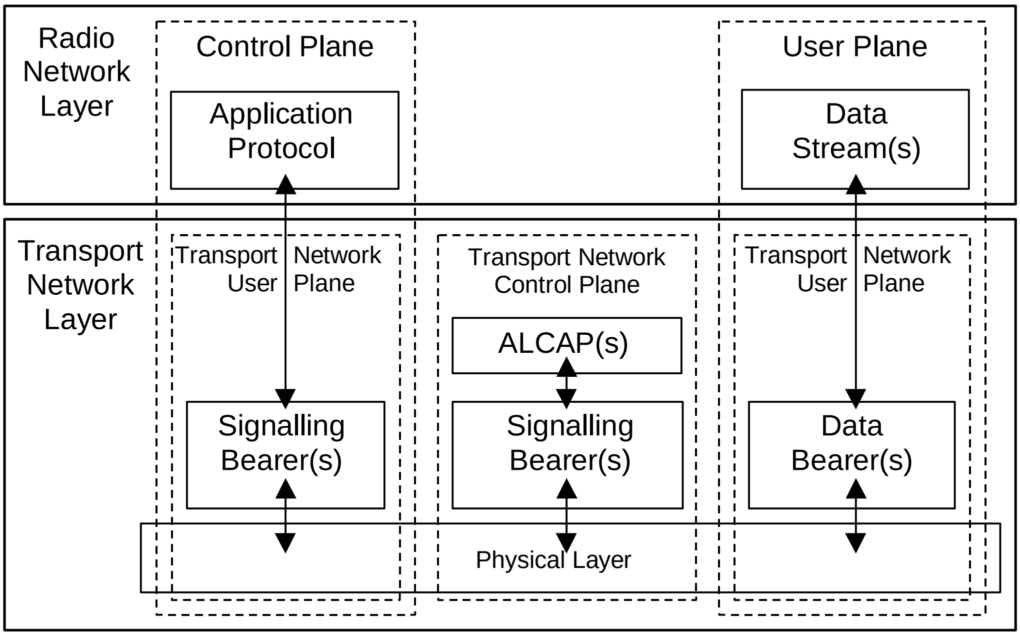


Figure 10: General Protocol Model for UTRAN Interfaces

11.1.2 Horizontal Layers

The Protocol Structure consists of two main layers, Radio Network Layer, and Transport Network Layer. All UTRAN related issues are visible only in the Radio Network Layer, and the Transport Network Layer represents standard transport technology that is selected to be used for UTRAN, but without any UTRAN specific requirements.

11.1.3 Vertical Planes

11.1.3.1 Control Plane

The Control Plane Includes the Application Protocol, i.e. RANAP, RNSAP or NBAP, and the Signalling Bearer for transporting the Application Protocol messages.

Among other things, the Application Protocol is used for setting up bearers for (i.e. Radio Access Bearer or Radio Link) in the Radio Network Layer. In the three plane structure the bearer parameters in the Application Protocol are not directly tied to the User Plane technology, but are rather general bearer parameters.

The Signalling Bearer for the Application Protocol may or may not be of the same type as the Signalling Protocol for the ALCAP. The Signalling Bearer is always set up by O&M actions.

11.1.3.2 User Plane

The User Plane Includes the Data Stream(s) and the Data Bearer(s) for the Data Stream(s). The Data Stream(s) is/are characterised by one or more frame protocols specified for that interface.

11.1.3.3 Transport Network Control Plane

The Transport Network Control Plane does not include any Radio Network Layer information, and is completely in the Transport Layer. It includes the ALCAP protocol(s) that is/are needed to set up the transport bearers (Data Bearer) for the User Plane. It also includes the appropriate Signalling Bearer(s) needed for the ALCAP protocol(s).

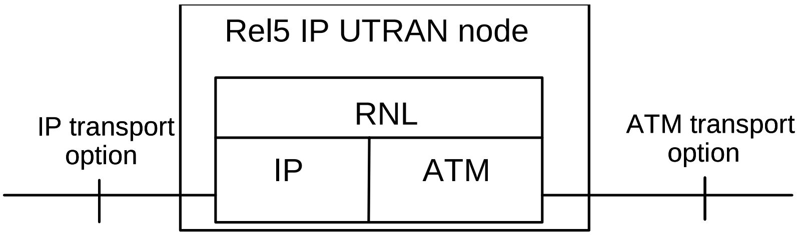
The Transport Network Control Plane is a plane that acts between the Control Plane and the User Plane. The introduction of Transport Network Control Plane makes it possible for the Application Protocol in the Radio Network Control Plane to be completely independent of the technology selected for Data Bearer in the User Plane.

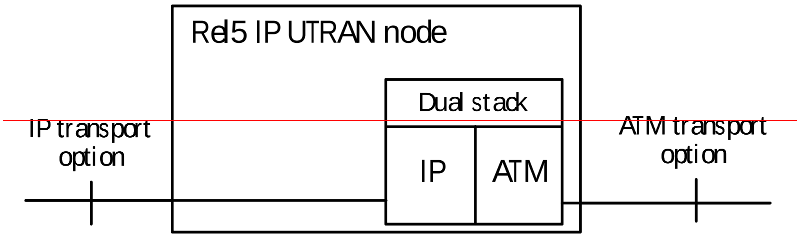
When Transport Network Control Plane is used, the transport bearers for the Data Bearer in the User Plane are set up in the following fashion. First there is a signalling transaction by the Application Protocol in the Control Plane, which triggers the set up of the Data Bearer by the ALCAP protocol that is specific for the User Plane technology.

The independence of Control Plane and User Plane assumes that ALCAP signalling transaction takes place. It should be noted that ALCAP might not be used for all types Data Bearers. If there is no ALCAP signalling transaction, the Transport Network Control Plane is not needed at all. This is the case when pre-configured Data Bearers are used or when the IP UTRAN option is used between two IP UTRAN nodes or between an IP UTRAN node and an IP CN node.

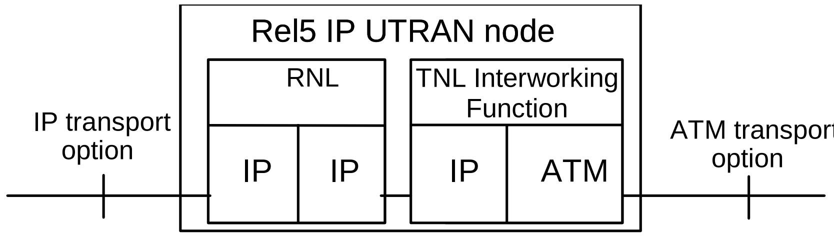
For interworking of an IP UTRAN node with another UTRAN node using only the ATM transport option, an IP ALCAP protocol may be supported depending on the interworking solution selected:

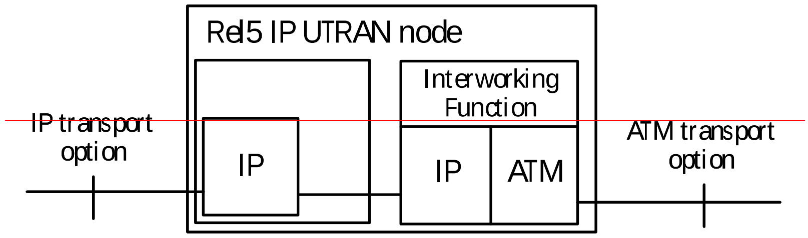
1) ATM/IP Dual Stack supported in the IP UTRAN node. When an ATM/IP dual stack is implemented in the IP UTRAN node, support of an IP ALCAP protocol is not required.



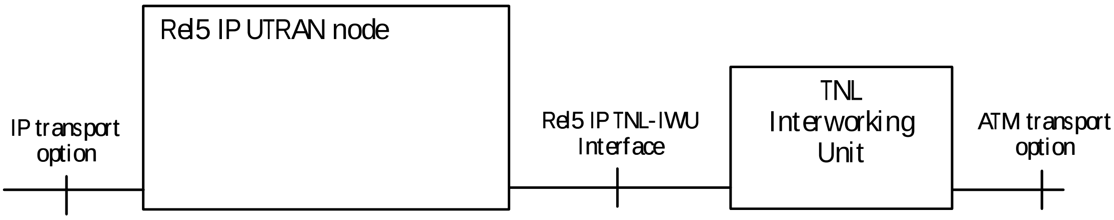


2) Use of an interworking function (IWF) as logical part of the IP UTRAN node. When the IWF is implemented in the IP UTRAN node, support of an IP ALCAP protocol is not required.





3) Use of an interworking unit (IWU) as a separate logical unit. When a separate logical IWU is used to perform the interworking, [19] shall be used as the signalling protocol to control the establishment of the connections between the IP UTRAN node and this IWU.



It should also be noted that the ALCAP protocol(s) in the Transport Network Control Plane is/are not used for setting up the Signalling Bearer for the Application Protocol or for the ALCAP during real time operation.

The Signalling Bearer for the ALCAP may or may not be of the same type as the Signalling Bearer for the Application Protocol. The Signalling Bearer for ALCAP is always set up by O&M actions.

11.1.3.4 Transport Network User Plane

The Data Bearer(s) in the User Plane, and the Signalling Bearer(s) for Application Protocol, belong also to Transport Network User Plane. As described in the previous subclause, the Data Bearers in Transport Network User Plane are directly controlled by Transport Network Control Plane during real time operation, but the control actions required for setting up the Signalling Bearer(s) for Application Protocol are considered O&M actions.

3GPP TSG-RAN WG3 Meeting #29 ***R3-021280***
Gyeongju, Korea, 13th – 17th May 2002

CR-Form-v5.1

CHANGE REQUEST

⌘ **25.401**	**CR** **052**	⌘ **rev** **-** ⌘	Current version: **5.2.0** ⌘

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Proposed change affects: ⌘ (U)SIM [ ] ME/UE [ ] Radio Access Network [X] Core Network [ ]

Title: ⌘	Introduction of IP transport in UTRAN		
Source: ⌘	R-WG3		
Work item code: ⌘	ETRAN-IPTRANS	***Date:*** ⌘	7th May 2002
Category: ⌘	**F**	***Release:*** ⌘	REL-5
	Use one of the following categories: ***F*** *(correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.		*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change: ⌘	The protocol stacks have already been generalized with the term "TNL" to allow IP UTRAN option in addition to ATM UTRAN option. But the corresponding texts still indicate ATM UTRAN option only.
Summary of change: ⌘	The term in the texts "an AAL2 connection" is updated with the generic term "a transport bearer" to allow IP UTRAN option in addition to ATM UTRAN option. Impact assessment towards the previous version of the specification (same release): This CR has isolated impact with previous version of the specification (same release) because it only covers oversights in the corresponding texts to allow IP UTRAN option.
Consequences if not approved: ⌘	IP UTRAN option is not completed in Release 5.

Clauses affected: ⌘	11.2.1, 11.2.2, 11.2.3, 11.2.5, 11.2.6	
Other specs affected: ⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications	
Other comments: ⌘		

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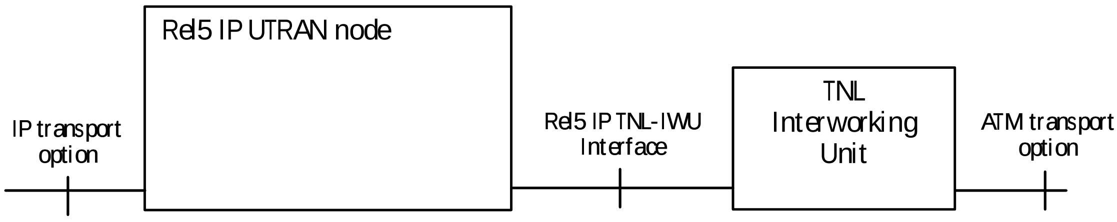
downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3) Use of an interworking unit (IWU) as a separate logical unit. When a separate logical IWU is used to perform the interworking, [19] shall be used as the signalling protocol to control the establishment of the connections between the IP UTRAN node and this IWU.



It should also be noted that the ALCAP protocol(s) in the Transport Network Control Plane is/are not used for setting up the Signalling Bearer for the Application Protocol or for the ALCAP during real time operation.

The Signalling Bearer for the ALCAP may or may not be of the same type as the Signalling Bearer for the Application Protocol. The Signalling Bearer for ALCAP is always set up by O&M actions.

11.1.3.4 Transport Network User Plane

The Data Bearer(s) in the User Plane, and the Signalling Bearer(s) for Application Protocol, belong also to Transport Network User Plane. As described in the previous subclause, the Data Bearers in Transport Network User Plane are directly controlled by Transport Network Control Plane during real time operation, but the control actions required for setting up the Signalling Bearer(s) for Application Protocol are considered O&M actions.

11.2 Protocol Model (Informative)

The following subclause is a informative subclause which aim is to provide an overall picture of how the MAC layer is distributed over Uu, Iub and Iur for the RACH, FACH, DCH, DSCH, HS-DSCH and [TDD USCH].

11.2.1 RACH Transport Channel

Figure 11 shows the protocol stack model for the RACH transport channel when the Controlling and Serving RNC are co-incident.

For the RACH transport channel, Dedicated MAC (MAC-d) uses the services of Common MAC (MAC-c/sh).

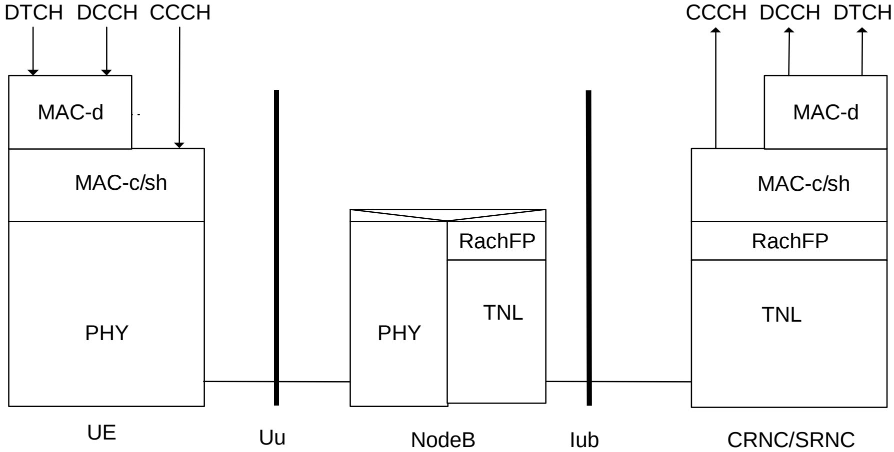


Figure 11: RACH: Coincident Controlling and Serving RNC

The Common MAC (MAC-c/sh) entity in the UE transfers MAC-c/sh PDU to the peer MAC-c/sh entity in the RNC using the services of the Physical Layer.

An Interworking Function (IWF) in the Node B interworks the RACH frame received by the PHY entity into the RACH Frame Protocol (RACH FP) entity.

The RACH Frame Protocol entity adds header information to form a RACH FP PDU that is transported to the RNC over ~~an AAL2 connection~~a transport bearer.

At the RNC, the RACH FP entity delivers the MAC-c/sh PDU to the MAC-c/sh entity.

Figure 12 shows the protocol model for the RACH transport channel with separate Controlling and Serving RNC. In this case, Iur RACH Frame Protocol (RACH FP) is used to interwork the Common MAC (MAC-c/sh) at the Controlling RNC with the Dedicated MAC (MAC-d) at the Serving RNC.

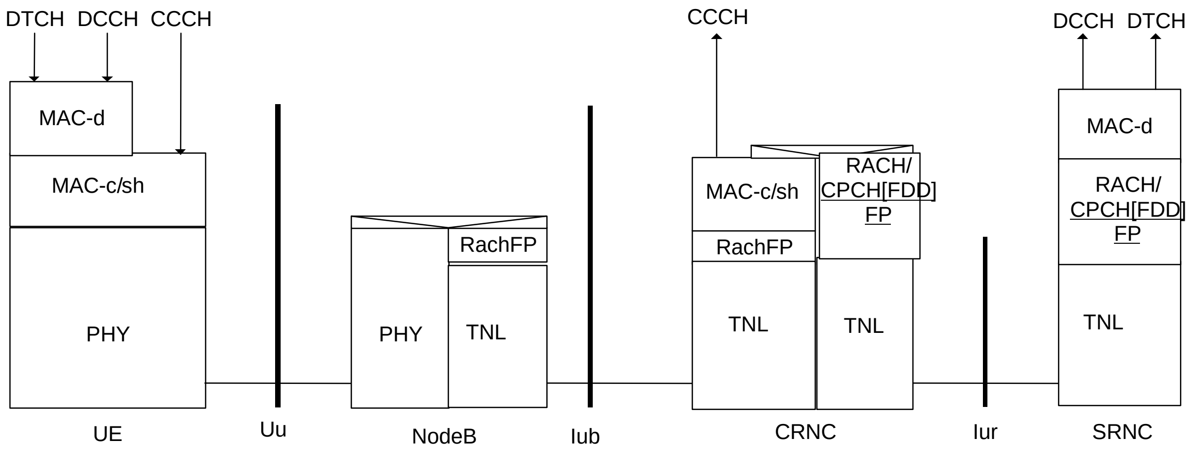


Figure 12: RACH: Separate Controlling and Serving RNC

11.2.2 CPCH [FDD] Transport Channel

Figure 13 shows the protocol model for the CPCH [FDD] transport channel when the Controlling and Serving RNC are co-incident.

For the CPCH [FDD] transport channel, Dedicated MAC (MAC-d) uses the services of Common MAC (MAC-c/sh).

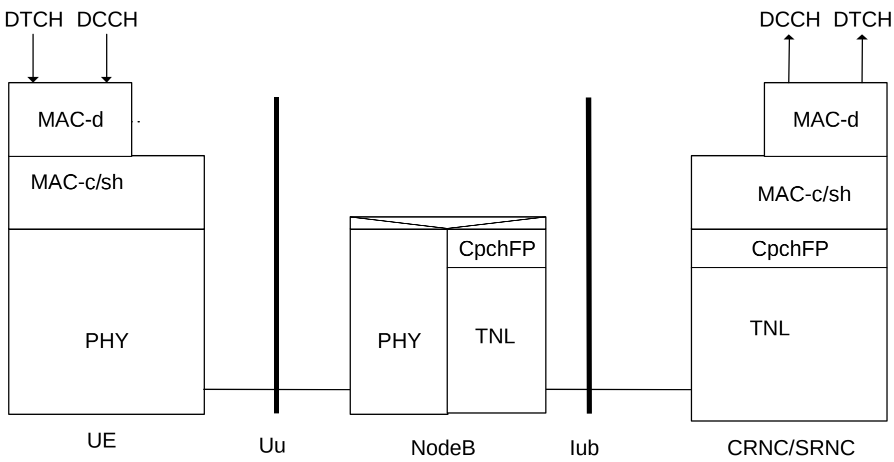


Figure 13: CPCH [FDD]: Coincident Controlling and Serving RNC

The Common MAC (MAC-c/ sh) entity in the UE transfers MAC-c PDU to the peer MAC-c entity in the RNC using the services of the Physical Layer.

An Interworking Function (IWF) in the Node B interworks the CPCH [FDD] frame received by the PHY entity into the CPCH [FDD] Frame Protocol (CPCH FP) entity.

The CPCH [FDD] Frame Protocol entity adds header information to form a CPCH [FDD] FP PDU which is transported to the RNC over ~~an AAL2 connection~~a transport bearer.

At the RNC, the CPCH [FDD] FP entity delivers the MAC-c PDU to the MAC-c entity.

Figure 14 shows the protocol model for the CPCH [FDD] transport channel with separate Controlling and Serving RNC. In this case, Iur CPCH [FDD] Frame Protocol (CpchFP) is used to interwork the Common MAC (MAC-c/sh) at the Controlling RNC with the Dedicated MAC (MAC-d) at the Serving RNC.

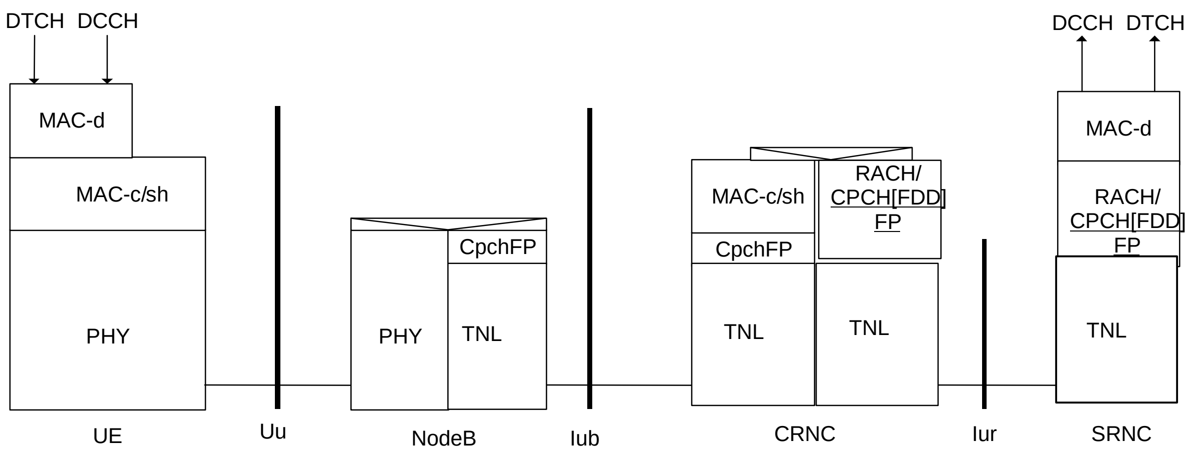


Figure 14: CPCH [FDD]: Separate Controlling and Serving RNC

11.2.3 FACH Transport Channel

Figure 15 shows the protocol model for the FACH transport channel when the Controlling and Serving RNC are co-incident.

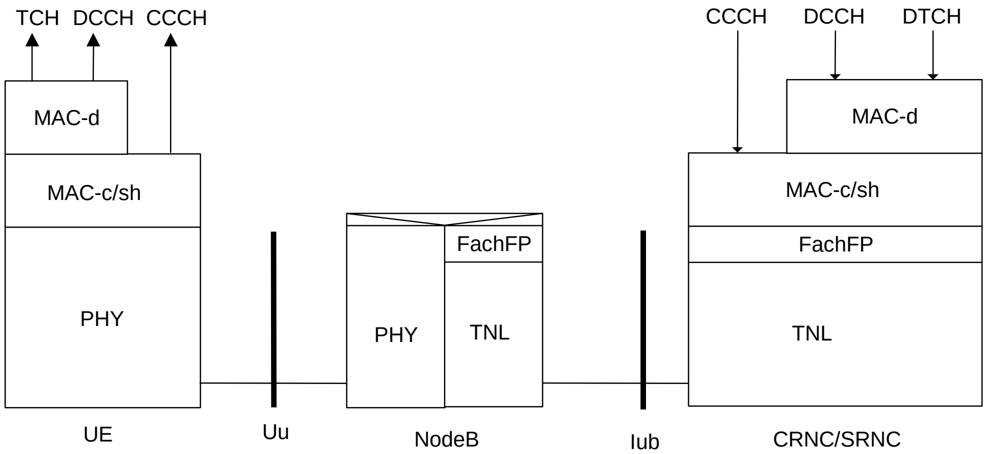


Figure 15: FACH Co-incident Controlling and Serving RNC

The Common MAC (MAC-c/sh) entity in the RNC transfers MAC-c PDU to the peer MAC-c entity in the UE using the services of the FACH Frame Protocol (FACH FP) entity.

The FACH Frame Protocol entity adds header information to form a FACH FP PDU which is transported to the Node B over ~~an AAL2 connection~~a transport bearer.

An Interworking Function (IWF) in the Node B interworks the FACH frame received by FACH Frame Protocol (FACH FP) entity into the PHY entity.

FACH scheduling is performed by MAC-c/sh in the CRNC.

Figure 16 shows the protocol model for the FACH transport channel with separate Controlling and Serving RNC. In this case, Iur FACH Frame Protocol is used to interwork the Common MAC (MAC-c) at the Controlling RNC with the Dedicated MAC (MAC-d) at the Serving RNC.

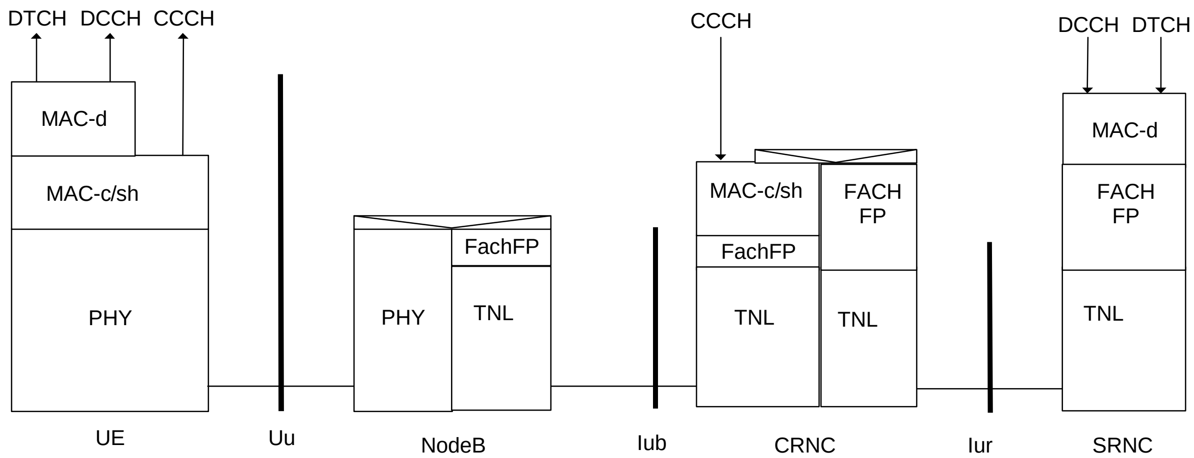


Figure 16: FACH: Separate Controlling and Serving RNC

11.2.4 DCH Transport Channel

Figure 17 shows the protocol model for the DCH transport channel when the Controlling and Serving RNC are co-incident.

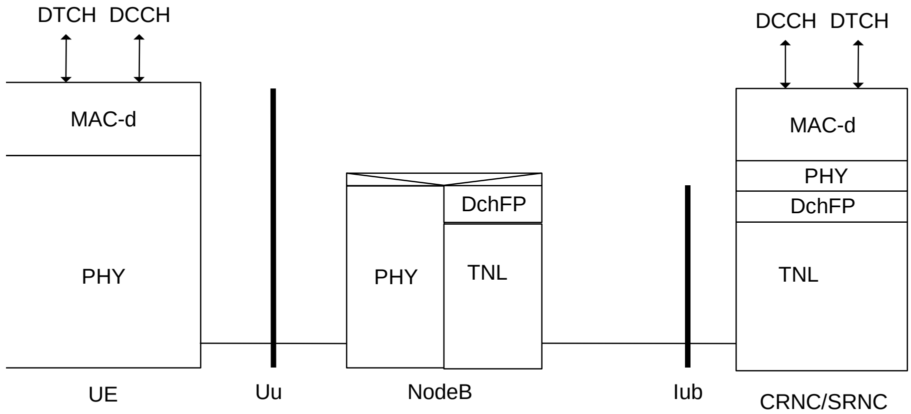


Figure 17: DCH: Co-incident Controlling and Serving RNC

The DCH transport channel introduces the concept of distributed PHY layer.

An Interworking Function (IWF) in the Node B interworks between the DCH Frame Protocol (DCH FP) entity and the PHY entity.

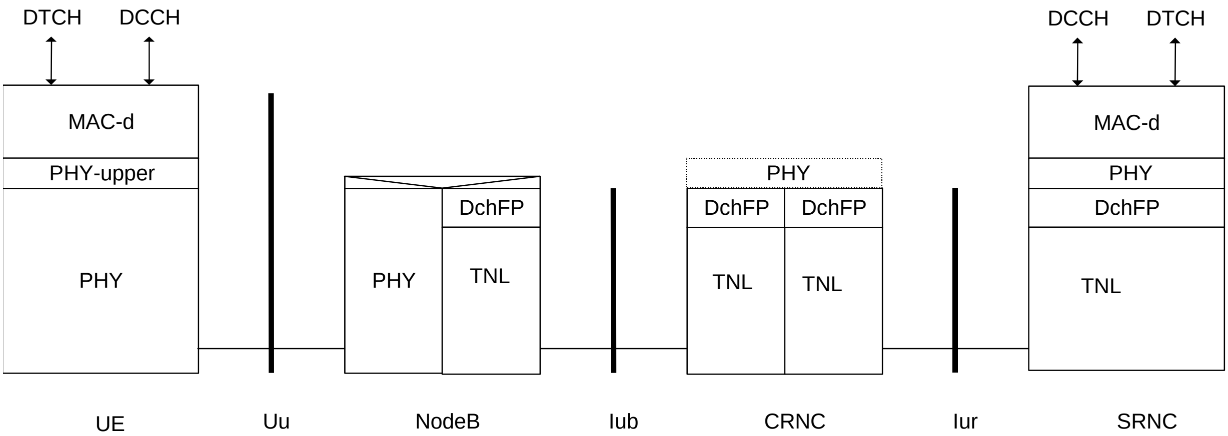


Figure 18: DCH: Separate Controlling and Serving RNC

Figure 18 shows the protocol model for the DCH transport channel with separate Controlling and Serving RNC. In this case, the Iub DCH FP is terminated in the CRNC and interworked with the Iur DCH FP through a PHY function. This function performs optional soft handover or can be a null function.

11.2.5 DSCH Transport Channel

Figure 19 shows the protocol model for the DSCH transport channel when the Controlling and Serving RNC are co-incident.

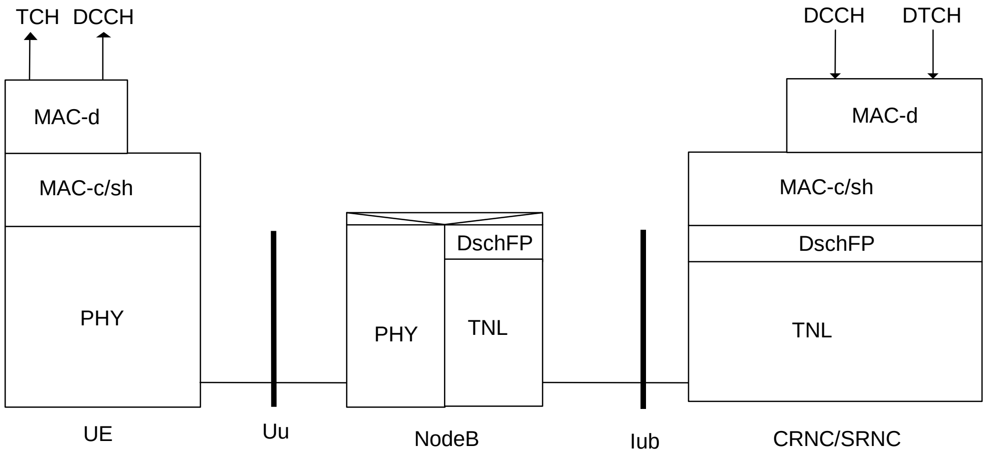


Figure 19: DSCH Co-incident Controlling and Serving RNC

The Shared MAC (MAC-c/sh) entity in the RNC transfers MAC-c/sh PDU to the peer MAC-c/sh entity in the UE using the services of the DSCH Frame Protocol (DSCH FP) entity. The DSCH FP entity adds header information to form a DSCH FP PDU that is transported to the Node B over ~~an AAL2 connection~~a transport bearer.

An Interworking Function (IWF) in the Node B interworks the DSCH frame received by DSCH FP entity into the PHY entity. DSCH scheduling is performed by MAC-c/sh in the CRNC.

Figure 20 shows the protocol model for the DSCH transport channel with separate Controlling and Serving RNC. In this case, Iur DSCH Frame Protocol is used to interwork the MAC-c/sh at the Controlling RNC with the MAC-d at the Serving RNC.

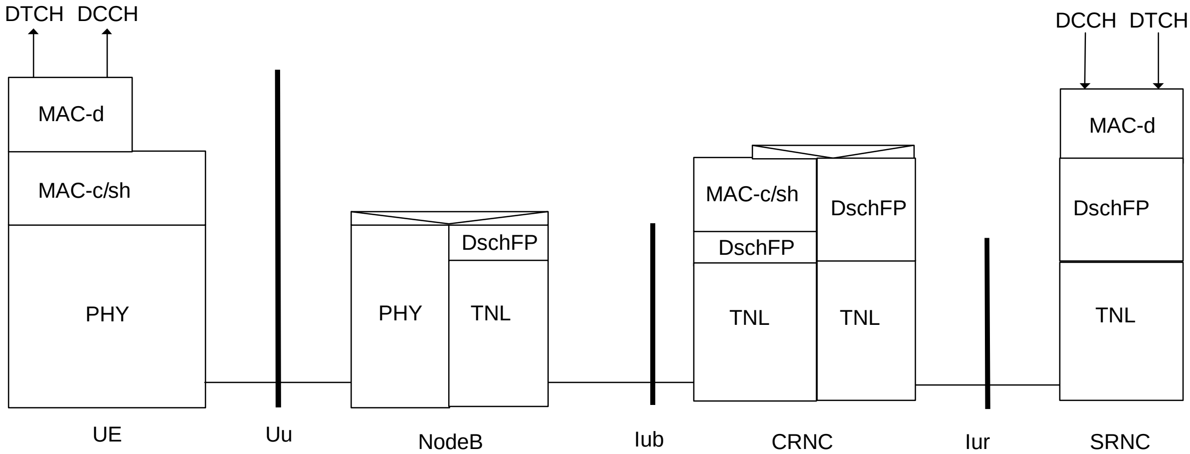


Figure 20: DSCH: Separate Controlling and Serving RNC

11.2.6 USCH Transport Channel [TDD]

Figure 21 shows the protocol model for the USCH transport channel when the Controlling and Serving RNC are co-incident.

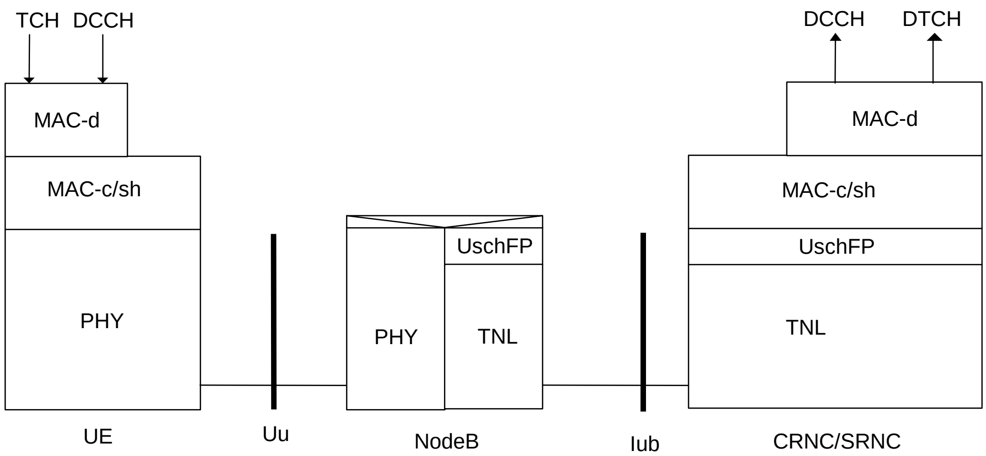


Figure 21: USCH Co-incident Controlling and Serving RNC

The Shared MAC (MAC-c/sh) entity in the RNC *receives* MAC-c/sh PDU *from* the peer MAC-c/sh entity in the UE using the services of the Interworking Function in the Node B, and the USCH Frame Protocol (USCH FP) entity. The USCH FP entity *in the Node B* adds header information to form a USCH FP PDU that is transported to the *RNC* over ~~an AAL2 connection~~a transport bearer.

An Interworking Function (IWF) in the Node B interworks *the received USCH PHY entity into an USCH frame to be transmitted by the USCH FP entity over the Iub interface*. USCH scheduling is performed by MAC-c/sh in UE and by C-RRC in the CRNC.

Figure 22 shows the protocol model for the USCH transport channel with separate Controlling and Serving RNC. In this case, Iur USCH Frame Protocol is used to interwork the MAC-c/sh at the Controlling RNC with the MAC-d at the Serving RNC.

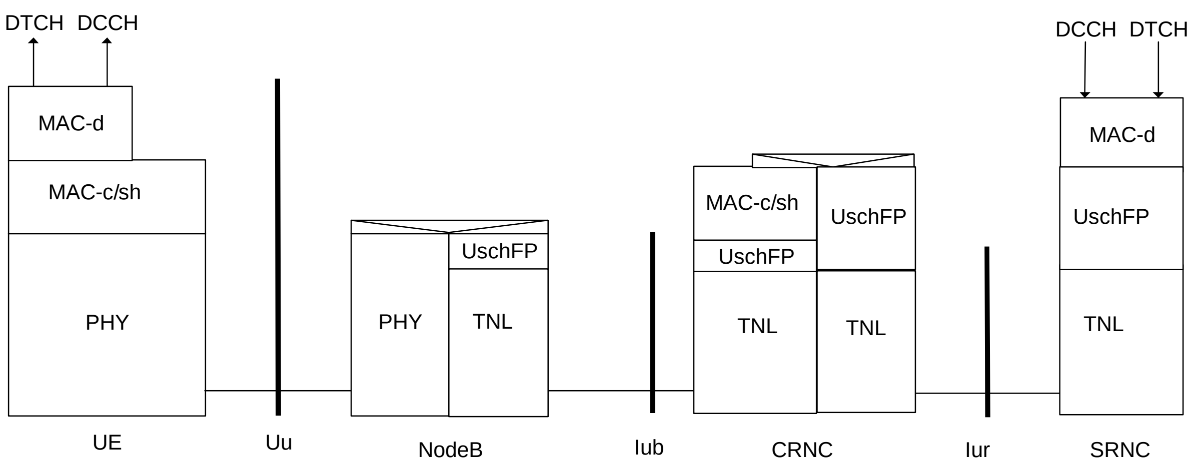


Figure 22: USCH: Separate Controlling and Serving RNC

11.2.7 HS-DSCH Transport Channel

Figure 23 shows the protocol model for the HS-DSCH transport channel when the Controlling and Serving RNC are co-incident.

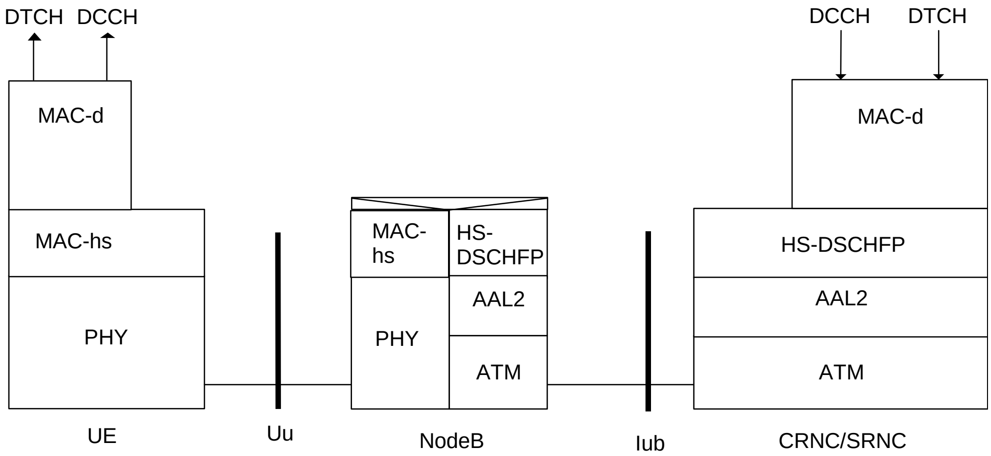


Figure 23: HS-DSCH Co-incident Controlling and Serving RNC

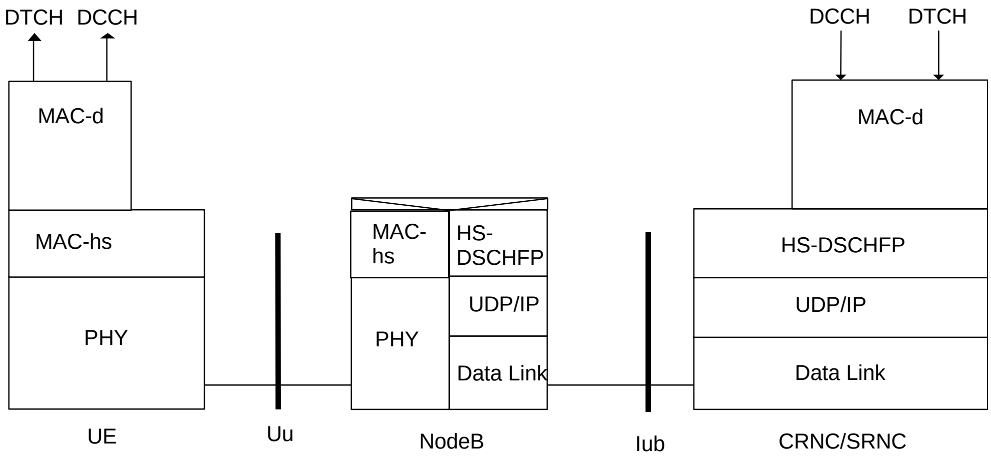


Figure 23a: HS-DSCH Co-incident Controlling and Serving RNC

The High Speed MAC (MAC-hs) entity in the Node B transfers MAC-hs PDU to the peer MAC-hs entity in the UE over the Uu interface. The Dedicated MAC (MAC-d) entity in the RNC transfers MAC-d PDUs to the MAC-hs in the Node B using the services of the HS-DSCH Frame Protocol (HS-DSCH FP) entity. The HS-DSCH FP entity adds header information to form a HS-DSCH FP PDU that is transported to the Node B over a transport bearer.

A Relaying Function in the Node B relays the HS-DSCH frame received by HS-DSCH FP entity to the MAC-hs entity. HS-DSCH scheduling is performed by MAC-hs in the Node B.

Figure 24 shows the protocol model for the HS-DSCH transport channel with separate Controlling and Serving RNC. In this case, Iur HS-DSCH Frame Protocol is used to interwork the Flow Control function at the Controlling RNC with the MAC-d at the Serving RNC. Also in this case, Iub HS-DSCH Frame Protocol is used to interwork the MAC-hs at the Node B with the Flow Control function at the Controlling RNC.

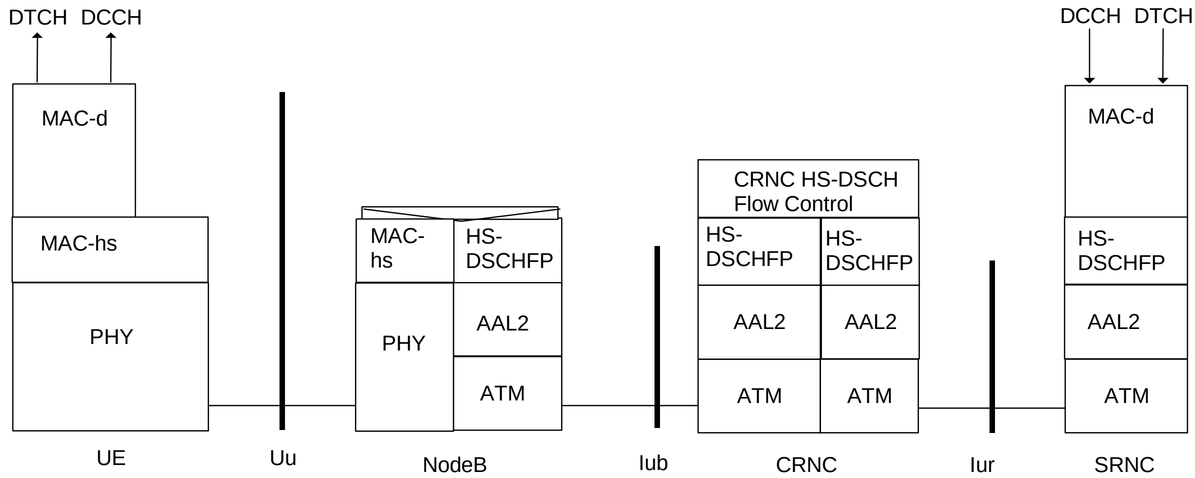


Figure 24: HS-DSCH: Separate Controlling and Serving RNC (configuration with CRNC flow control)

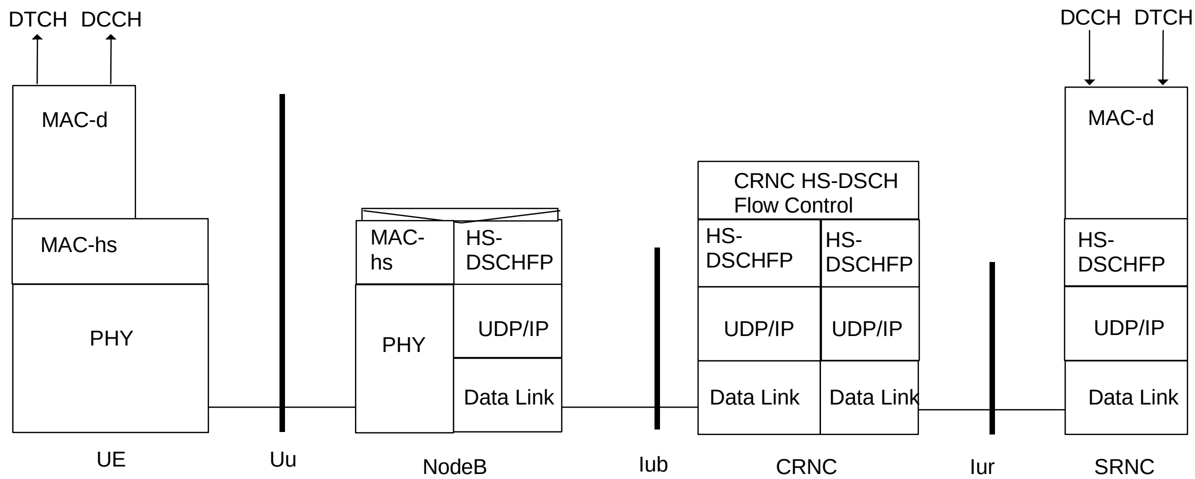


Figure 24a: HS-DSCH: Separate Controlling and Serving RNC (configuration with CRNC flow control)

Figure 25 shows the protocol model for the HS-DSCH transport channel with the Drift RNC being bypassed. In this case, the CRNC does not have any user plane function for the HS-DSCH. MAC-d in SRNC is located directly above MAC-hs in Node B, i.e. in the HS-DSCH user plane the SRNC is directly connected to the Node B, thus bypassing the CRNC.

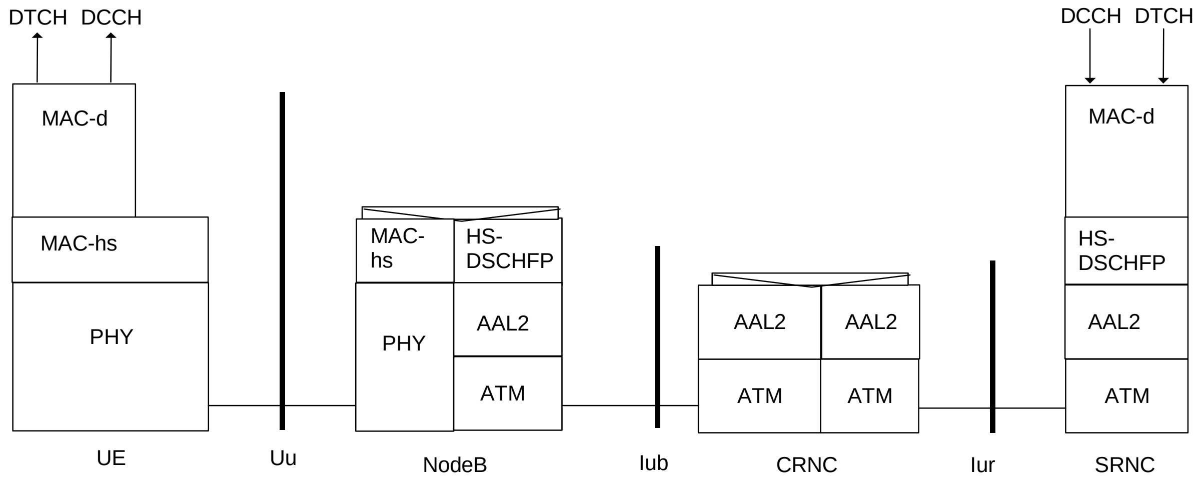


Figure 25: HS-DSCH: Serving RNC with bypassed Controlling RNC (configuration without CRNC flow control)

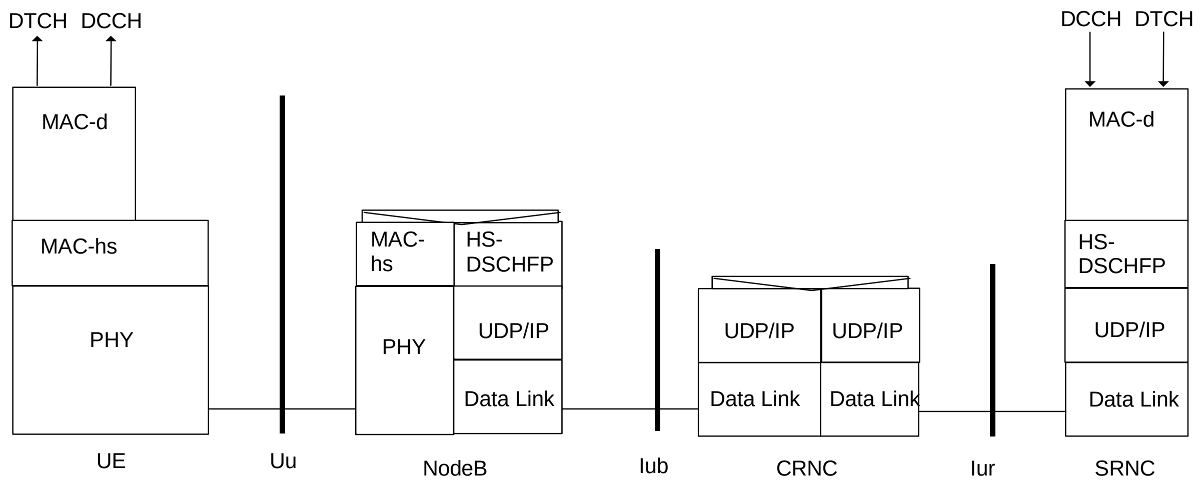


Figure 25a: HS-DSCH: Serving RNC with bypassed Controlling RNC (configuration without CRNC flow control)

12 UTRAN Performance Requirements

12.1 UTRAN delay requirements

Void.

CR-Form-v6.1

CHANGE REQUEST

⌘	**25.401**	**CR 053**	⌘ **rev**	**2**	⌘	Current version:	**5.2.0** ⌘
	Spec Title:	UTRAN Overall Description					⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [ ] Radio Access Network [X] Core Network [X]

Title: ⌘	Independence of RNL and TNL			
Source: ⌘	R-WG3			
Work item code: ⌘	ETRAN-IPtrans		***Date:*** ⌘	May 2002
Category: ⌘	**F**		***Release:*** ⌘	REL-5
	Use one of the following categories: ***F*** *(correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.			*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change: ⌘	Some inconsistencies need to be corrected as these might lead to misinterpretations. Chapter 6.1.8.2 : The 4th paragraph below table 1 can be interpreted that the RNL shall have knowledge of the NSAP structure. This needs to be corrected. Chapter 11.1.3.3 : The 2nd paragraph states that the introduction of a Transport Network Control Plane makes the application protocol completely independent of the U-plane transport technology. As indepence from the underlying transport technology is a key requirement, the 3rd paragraph, stating the fact that the Transport Network Control Plane is not utilised in some cases, contradicts the principle stated in the 2nd paragraph. Therefore the whole paragraph has been reworded in the way that it is stated that the introduction of an Transport Network Control Plane is performed in a way that the RNL is kept completly independent of the chosen technology for the user data transport bearers.
Summary of change: ⌘	The indicated chapters have been reworded in order to clearly specify how the independence between RNL and TNL with regards to the Transport Network Control Plane is kept. Impact Analysis: Impact assessment towards the previous version of the specification (same release): This CR has [no impact] with the previous version of the specification (same release) because the inconsistency between the actual protocol implementation and the overall UTRAN architecture specification has not been corrected on protocol or functional level
Consequences if ⌘	The RNL might be allowed to interpret the NSAP structure.

not approved:		It could be assumed that the existence of an ALCAP is mandatory if the independence of the RNL from the underlying transport technology shall be kept.

Clauses affected:	⌘	6.1.8.2, 11.1.3.3			
Other specs	⌘	☐	Other core specifications	⌘	
Affected:		☐	Test specifications		None
		☐	O&M Specifications		
Other comments:	⌘				

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

6.1.8.2 Transport Network Control Plane identifiers

ALCAP identifiers are used in the Control plane and may be used in User Plane in the actual data transmission using the transport link. The ALCAP identifier identifies the transport link according to the naming conventions defined for the transport link type in question. Both ends of the reference point of the ALCAP shall memorise the ALCAP identifier during the lifetime of the transport link. Each ALCAP identifier can be binded to an Application Part identifier.

The ALCAP identifiers vary depending on the transport link type.

Table 2 indicates examples of the identifiers used for different transmission link types.

Table 2: Examples of the identifiers used for different transmission link types

Transmission link type	ALCAP Identifier
AAL2	AAL2 Path ID + CID
GTP over IP	IP address + TEID
UDP over IP	IP address + UDP port

The communication of ALCAP identifiers is made in two ways:

When an ALCAP is used, the transport layer address is communicated via the Radio Network Layers protocols (NBAP, RNSAP, RANAP…) and the ALCAP identifiers are communicated through the Transport Network Control Plane only.

When no ALCAP is used, the ALCAP identifiers are communicated via the Radio Network Layers protocols (NBAP, RNSAP, RANAP…).

In both cases, the transport layer address (e.g. IP address) is ~~passed transparently from the Radio Network Layer to the Transport Network Layer using~~ encapsulated by the Transport Network Layer in the NSAP structure as defined in [Annex A of [15], [16]], transported transparently on ~~for~~ Iub, Iur and Iu-CS and passed transparently from the Radio Network Layer to the Transport Network Layer. The NSAP structure (encapsulation) is only used ~~in the radio network layer,~~ in order to provide to the TNL explicit identification of the type of the TNL address that is being conveyed by the given RNL protocol. It is then the responsibility of the Transport Network Layer to interpret this structure (e.g. to determine accordingly if the requested network type is ATM or IP).

On the Iu-PS, the NSAP structure is not used in RANAP but the 'straight IP addressing' shall be used.

The following scheme depicts the encapsulation of a native IPv6 address in NSAP structure when conveyed in RANAP, RNSAP and NBAP.

Octet 1	octet 2	octet 3	octet 4
AFI=35 (IANA)	ICP=0 (embedded IPv6)		**IPv6 (byte 1)**
IPv6 (bytes 2-5)			
IPv6 (bytes 6-9)			
IPv6 (bytes 10-13)			
IPv6 (bytes 14-16)			0 0 0 0 0 0 0 0

Figure 6A: IPv6 address embedded in NSAP structure in RANAP/RNSAP/NBAP.

11.1.3.3 Transport Network Control Plane

The Transport Network Control Plane does not include any Radio Network Layer information, and is completely in the Transport Layer. It includes the ALCAP protocol(s) that is/are needed to set up the transport bearers (Data Bearer) for the User Plane. It also includes the appropriate Signalling Bearer(s) needed for the ALCAP protocol(s).

The Transport Network Control Plane is a plane that acts between the Control Plane and the User Plane. The introduction of Transport Network Control Plane is performed in a way that~~makes it possible for~~ the Application Protocol in the Radio Network Control Plane is kept~~to be~~ completely independent of the technology selected for Data Bearer in the User Plane. Indeed, the decision to actually use an ALCAP protocol is completely kept within the Transport Network Layer.

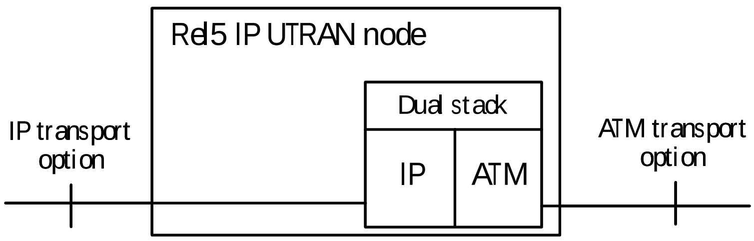
It should be noted that ALCAP might not be used for all types Data Bearers. If there is no ALCAP signalling transaction, the Transport Network Control Plane is not needed at all. This is the case when pre-configured Data Bearers are used or when the IP UTRAN option is used between two IP UTRAN nodes or between an IP UTRAN node and an IP CN node.

When Transport Network Control Plane is used, the transport bearers for the Data Bearer in the User Plane are set up in the following fashion. First there is a signalling transaction by the Application Protocol in the Control Plane, which triggers the set up of the Data Bearer by the ALCAP protocol that is specific for the User Plane technology.

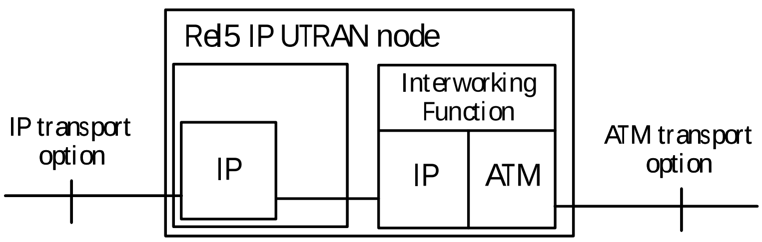
~~The independence of Control Plane and User Plane assumes that ALCAP signalling transaction takes place. It should be noted that ALCAP might not be used for all types Data Bearers. If there is no ALCAP signalling transaction, the Transport Network Control Plane is not needed at all. This is the case when pre-configured Data Bearers are used or when the IP UTRAN option is used between two IP UTRAN nodes or between an IP UTRAN node and an IP CN node.~~

For interworking of an IP UTRAN node with another UTRAN node using only the ATM transport option, an IP ALCAP protocol may be supported depending on the interworking solution selected:

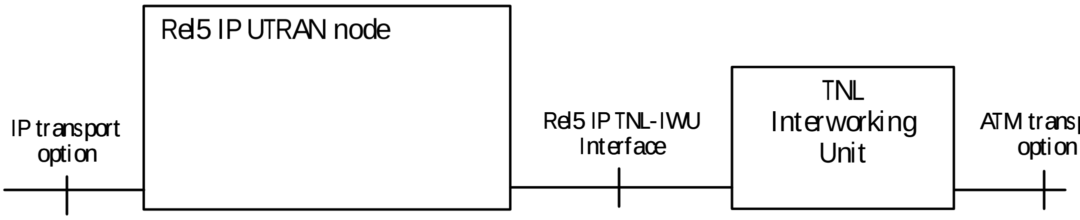
1) ATM/IP Dual Stack supported in the IP UTRAN node. When an ATM/IP dual stack is implemented in the IP UTRAN node, support of an IP ALCAP protocol is not required.



2) Use of an interworking function (IWF) as logical part of the IP UTRAN node. When the IWF is implemented in the IP UTRAN node, support of an IP ALCAP protocol is not required.



3) Use of an interworking unit (IWU) as a separate logical unit. When a separate logical IWU is used to perform the interworking, [19] shall be used as the signalling protocol to control the establishment of the connections between the IP UTRAN node and this IWU.



It should also be noted that the ALCAP protocol(s) in the Transport Network Control Plane is/are not used for setting up the Signalling Bearer for the Application Protocol or for the ALCAP during real time operation.

The Signalling Bearer for the ALCAP may or may not be of the same type as the Signalling Bearer for the Application Protocol. The Signalling Bearer for ALCAP is always set up by O&M actions.

3GPP TSG-RAN3 Meeting #29
GyeongJu, Korea, 13 – 17 May 2002

Tdoc R3-021544

CR-Form-v5

CHANGE REQUEST

⌘	**25.413**	**CR**	**466**	⌘ **rev**	**1**	⌘	Current version:	**5.0.0**	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [ ] Radio Access Network [X] Core Network [X]

Title: ⌘	IPv4 – IPv6 interworking for data forwarding		
Source: ⌘	R-WG3		
Work item code: ⌘	ETRAN-IPTrans	***Date:*** ⌘	2002-05-02
Category: ⌘	**F**	***Release:*** ⌘	REL-5
	Use one of the following categories: ***F*** *(correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.		*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change: ⌘	If the Source RNC is a Rel4 RNC using IPv4 and the Target RNC is a Rel5 RNC using IPv6, data forwarding cannot be made from the Source RNC to the Target RNC directly. It was agreed during RAN3#28 to allow the possibility of having both an IPv4 address and an IPv6 address in the Relocation Request Acknowledge and Relocation Command messages.
Summary of change: ⌘	A second optional pair of Transport Layer Address and Iu Transport association is added to the Relocation Request Acknowledge and Relocation Command messages. Impact assessment towards the previous version of the specification (same release): This CR has isolated impact towards the previous version of the specification (same release). This CR has an impact under functional point of view since it allows the Target RNC to provide two pairs of TLA and Transport Association, and if two pairs are provided then the Source RNC may chose which one to use. The impact can be considered isolated because it only affects the transfer of address to be used for data forwarding. If the CN or Source RNC does not implement this CR then only the first pair of TLA and Transport Association will be received by the Source RNC.
Consequences if not approved: ⌘	Data forwarding between R99 (or Rel-4) RNC and Rel-5 RNC using IPv6 may not work.

Clauses affected: ⌘	8.6.2, 8.7.2, 9.1.11, 9.1.12, 9.3.3	
Other specs affected: ⌘	[ ] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘

Other comments: ⌘	

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.6 Relocation Preparation

8.6.1 General

The purpose of the Relocation Preparation procedure is to prepare relocation of SRNS either with involving UE or without involving UE. The relocation procedure shall be co-ordinated in all Iu signalling connections existing for the UE in order to allow Relocation co-ordination in the target RNC. The procedure uses connection oriented signalling.

The source RNC shall not initiate the Relocation Preparation procedure for an Iu signalling connection if a Prepared Relocation exists in the RNC for that Iu signalling connection or if a Relocation Preparation procedure is ongoing for that Iu signalling connection.

8.6.2 Successful Operation

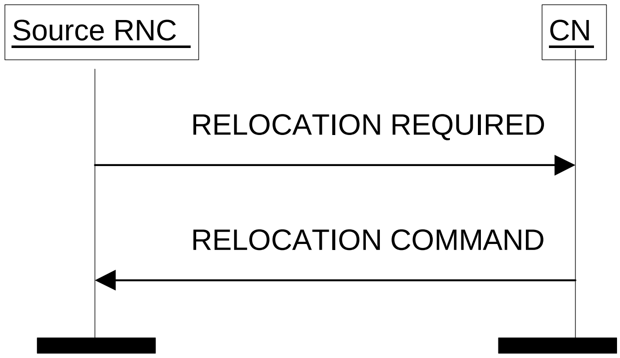

Figure 1: Relocation Preparation procedure. Successful operation.

The source RNC shall initiate the procedure by generating RELOCATION REQUIRED message. The source RNC shall decide whether to initiate the intra-system Relocation or the inter-system handover. In case of intra-system Relocation the source RNC shall indicate in the *Source ID* IE the RNC-ID of the source RNC and in the *Target ID* IE the RNC-ID of the target RNC. In case of inter-system handover the source RNC shall indicate in the *Source ID* IE the Service Area Identifier and in the *Target ID* IE the cell global identity of the cell in the target system. The source RNC shall indicate the appropriate cause value for the Relocation in the *Cause* IE. Typical cause values are "Time critical Relocation", "Resource optimisation relocation", "Relocation desirable for radio reasons" , "Directed Retry", "Reduce Load in Serving Cell".

The source RNC shall determine whether the relocation of SRNS shall be executed with or without involvement of UE. The source RNC shall set the *Relocation Type* IE accordingly to "UE involved in relocation of SRNS " or "UE not involved in relocation of SRNS ".

In case of intra-system Relocation, the source RNC shall include in the RELOCATION REQUIRED message the *Source RNC to Target RNC Transparent Container* IE. This container shall include the *Relocation Type* IE and the number of Iu signalling connections existing for the UE by setting correctly the *Number of Iu Instances* IE . If available, this container shall further include the *Chosen Integrity Protection Algorithm* IE and the *Integrity Protection Key* IE. If ciphering is active, this container shall include, for ciphering information of signalling data, the *Chosen Encryption Algorithm* IE and the *Ciphering Key* IE, for ciphering information of CS user data the *Chosen Encryption Algorithm CS* IE and for ciphering information of PS user data the *Chosen Encryption Algorithm PS* IE. This container shall include the *RRC Container* IE. If the *Relocation Type* IE is set to "UE not involved in relocation of SRNS" and the UE is using DCH(s), DSCH(s) or USCH(s), the *Source RNC to Target RNC Transparent Container* IE shall include the mapping between each RAB subflow and transport channel identifier(s), i.e. if the RAB is carried on a DCH(s), the DCH ID(s) shall be included, and when it is carried on DSCH(s) or USCH(s), the DSCH ID(s) or USCH ID(s) respectively shall be included. If the *Relocation Type* IE is set to "UE not involved in relocation of SRNS", the *d-RNTI* IE shall be included in the *Source RNC to Target RNC Transparent Container* IE. If the *Relocation Type* IE is set to "UE involved in relocation of SRNS", the *Target Cell ID* IE shall be included in the *Source RNC to Target RNC Transparent Container* IE.

In case of inter-system handover to GSM the RNC:

- shall include *MS Classmark 2* and *MS Classmark 3* IEs received from the UE in the RELOCATION REQUIRED message to the CN.
- shall include the *Old BSS to New BSS* IE within the RELOCATION REQUIRED message only if the information is available.

The source RNC shall send the RELOCATION REQUIRED message to the CN and the source RNC shall start the timer $T_{RELOCprep.}$

When the preparation including resource allocation in the target system is ready and the CN has decided to continue the relocation of SRNS, the CN shall send RELOCATION COMMAND message to the source RNC and the CN shall start the timer $T_{RELOCcomplete}$.

If the *Target RNC To Source RNC Transparent Container* IE or the *L3 information* IE is received by the CN from the relocation target, it shall be included in the RELOCATION COMMAND message.

The RELOCATION COMMAND message may also contain the *Inter-System Information Transparent Container* IE.

For each RAB successfully established in the target system and originating from the PS domain, the RELOCATION COMMAND message shall contain at least one pair of Iu transport address and Iu transport association to be used for the forwarding of the DL N-PDU duplicates towards the relocation target. If more than one pair of Iu transport address and Iu transport association is included, the source RNC shall select one of the pairs to be used for the forwarding of the DL N-PDU duplicates towards the relocation target. Upon reception of the RELOCATION COMMAND message from the PS domain, the source RNC shall start the timer $T_{DATAfwd.}$

The Relocation Preparation procedure is terminated in the CN by transmission of RELOCATION COMMAND message.

If the target system (including target CN) does not support all existing RABs, the RELOCATION COMMAND message shall contain a list of RABs indicating all the RABs that are not supported by the target system. This list is contained in the *RABs to Be Released* IE. The source RNC shall use this information to avoid transferring associated contexts where applicable and may use this information e.g. to decide if to cancel the relocation or not. The resources associated with these not supported RABs shall not be released until the relocation is completed. This is in order to make a return to the old configuration possible in case of a failed or cancelled relocation.

Upon reception of RELOCATION COMMAND message the source RNC shall stop the timer $T_{RELOCprep}$, RNC shall start the timer $T_{RELOCOverall}$ and RNC shall terminate the Relocation Preparation procedure. The source RNC is then defined to have a Prepared Relocation for that Iu signalling connection.

When Relocation Preparation procedure is terminated successfully and when the source RNC is ready, the source RNC should trigger the execution of relocation of SRNS.

Interactions with other procedures:

If, after RELOCATION REQUIRED message is sent and before the Relocation Preparation procedure is terminated, the source RNC receives a RANAP message initiating an other connection oriented RANAP class 1 or class 3 procedure (except IU RELEASE COMMAND message, which shall be handled normally) via the same Iu signalling connection, the source RNC shall either:

1. cancel the Relocation Preparation procedure i.e. execute Relocation Cancel procedure with an appropriate value for the *Cause* IE, e.g. "Interaction with other procedure", and after successful completion of Relocation Cancel procedure, the source RNC shall continue the initiated RANAP procedure;

or

2. terminate the initiated RANAP procedure without any changes in UTRAN by sending appropriate response message with the cause value “Relocation Triggered” to the CN. The source RNC shall then continue the relocation of SRNS.

If during the Relocation Preparation procedure the source RNC receives a DIRECT TRANSFER message it shall be handled normally.

If during the Relocation Preparation procedure the source RNC receives connection oriented RANAP class 2 messages (with the exception of DIRECT TRANSFER message) it shall decide to either execute the procedure immediately or suspend it. In the case the relocation is cancelled the RNC shall resume any suspended procedures (if any).

After Relocation Preparation procedure is terminated successfully, all RANAP messages (except IU RELEASE COMMAND message, which shall be handled normally) received via the same Iu signalling bearer shall be ignored by the source RNC.

8.7 Relocation Resource Allocation

8.7.1 General

The purpose of the Relocation Resource Allocation procedure is to allocate resources from target RNS for a relocation of SRNS. Procedure shall be co-ordinated in all Iu signalling connections existing for the UE. The procedure uses connection oriented signalling.

8.7.2 Successful Operation

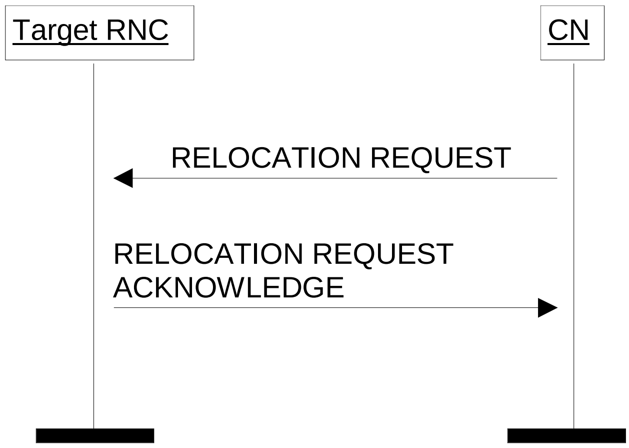

Figure 2: Relocation Resource Allocation procedure. Successful operation.

The CN shall initiate the procedure by generating RELOCATION REQUEST message. In a UTRAN to UTRAN relocation, this message shall contain the information (if any) required by the UTRAN to build the same RAB configuration as existing for the UE before the relocation. The CN may indicate that RAB QoS negotiation is allowed for certain RAB parameters and in some cases also which alternative values to be used in the negotiation.

The CN shall transmit the RELOCATION REQUEST message to target RNC and the CN shall start the timer $T_{RELOCalloc.}$

When a RELOCATION REQUEST message is sent from a CN node towards an RNC for which the sending CN node is not the default CN node, the *Global CN-ID* IE shall be included.

Upon reception of the RELOCATION REQUEST message, the target RNC shall initiate allocation of requested resources.

The RELOCATION REQUEST message shall contain following IEs

- *Permanent NAS UE Identity* IE (if available)
- *Cause*
- *CN Domain Indicator*
- *Source RNC To Target RNC Transparent Container*
- *Iu Signalling Connection Identifier*
- *Integrity Protection Information* IE (if available)

For each RAB requested to relocate (or to be created e.g. in the case of inter-system handover), the message shall contain following IEs:

- *RAB-ID*
- *NAS Synchronisation Indicator* IE (if the relevant NAS information is provided by the CN)

- *RAB parameters*
- *User Plane Information*
- *Transport Layer Address*
- *Iu Transport Association*
- *Data Volume Reporting Indication* (only for PS)
- *PDP Type Information* (only for PS)

The RELOCATION REQUEST message may include following IEs:

- *Encryption Information*

For each RAB requested to relocate the message may include following IEs:

- *Service Handover*.
- *Alternative RAB Parameter Values*.

The following information elements received in RELOCATION REQUEST message require the same special actions in the RNC as specified for the same IEs in the RAB Assignment procedure:

- *RAB-ID*
- *User plane Information*(i.e. required User Plane Mode and required User Plane Versions)
- *Priority level, queuing and pre-emption indication*
- *Service Handover*

If the RELOCATION REQUEST message includes the *PDP Type Information* IE, the UTRAN may use this IE to configure any compression algorithms.

The *Cause* IE shall contain the same value as the one received in the related RELOCATION REQUIRED message.

The *Iu Signalling Connection Identifier* IE contains an Iu signalling connection identifier which is allocated by the CN, and which the RNC is required to store and remember for the duration of the Iu connection.

The *Global CN-ID* IE contains the identity of the CN node that sent the RELOCATION REQUEST message, and it shall, if included, be stored together with the Iu signalling connection identifier. If the *Global CN-ID* IE is not included, the RELOCATION REQUEST message shall be considered as coming from the default CN node for the indicated CN domain.

Following additional actions shall be executed in the target RNC during Relocation Resource Allocation procedure:

If the *Relocation Type* IE is set to "UE involved in relocation of SRNS":

- The target RNC may accept a requested RAB only if the RAB can be supported by the target RNC.
- Other RABs shall be rejected by the target RNC in the RELOCATION REQUEST ACKNOWLEDGE message with an appropriate value for *Cause* IE, e.g. "Unable to Establish During Relocation".
- The target RNC shall include information adapted to the resulting RAB configuration in the target to source RNC transparent container to be included in the RELOCATION REQUEST ACKNOWLEDGE message sent to the CN. If the target RNC supports triggering of the Relocation Detect procedure via the Iur interface, the RNC shall assign a d-RNTI for the context of the relocation and include it in the container. If two CNs are involved in the relocation of SRNS, the target RNC may, however, decide to send the container to only one CN.
- If any alternative RAB parameter values have been used when allocating the resources, these RAB parameter values shall be included in the RELOCATION REQUEST ACKNOWLEDGE message within the *Assigned RAB Parameter Values* IE.

If the *Relocation Type* IE is set to "UE not involved in relocation of SRNS":

- The target RNC may accept a RAB only if the radio bearer(s) for the RAB either exist(s) already, and can be used for the RAB by the target RNC, or does not exist before the relocation but can be established in order to support the RAB in the target RNC.
- If existing radio bearers are not related to any RAB that is accepted by target RNC, the radio bearers shall be ignored during the relocation of SRNS and the radio bearers shall be released by radio interface protocols after completion of relocation of SRNS.
- If any alternative RAB parameter values have been used when allocating the resources, these RAB parameter values shall be included in the RELOCATION REQUEST ACKNOWLEDGE message within the *Assigned RAB Parameter Values* IE. It should be noted that the usage of alternative RAB parameter values is not applicable to the UTRAN initiated relocation of type "UE not involved in relocation of SRNS".

After all necessary resources for accepted RABs including the initialised Iu user plane, are successfully allocated, the target RNC shall send RELOCATION REQUEST ACKNOWLEDGE message to the CN.

For each RAB successfully setup the RNC shall include following IEs:

- *RAB ID*
- *Transport Layer Address* (when no ALCAP has been used)
- *Iu Transport Association* (when no ALCAP has been used)

Two pairs of *Transport Layer Address* IE and *Iu Transport Association* IE may be included for RABs established towards the PS domain.

For each RAB the RNC is not able to setup during Relocation Resource Allocation the RNC shall include the *RAB ID* IE and the *Cause* IE within the *RABs Failed To Setup* IE. The resources associated with the RABs indicated as failed to set up shall not be released in the CN until the relocation is completed. This is in order to make a return to the old configuration possible in case of a failed or cancelled relocation.

The RELOCATION REQUEST ACKNOWLEDGE message sent to by the CN shall, if applicable and if not sent via the other CN domain, include the *Target RNC To Source RNC Transparent Container* IE .This container shall be transferred by CN to the source RNC or the external relocation source while completing the Relocation Preparation procedure.

If the target RNC supports cell load-based inter-system handover, then in the case of inter-system handover, the *New BSS to Old BSS Information* IE may be included in the RELOCATION REQUEST ACKNOWLEDGE message.

If the *Integrity Protection Information* IE was included in the RELOCATION REQUEST message, the RNC shall include the *Chosen Integrity Protection Algorithm* IE within the RELOCATION REQUEST ACKNOWLEDGE message, if the *Encryption Information* IE was included, the RNC shall include the *Chosen Encryption Algorithm* IE.

If one or more of the RABs that the target RNC has decided to support can not be supported by the CN, then these failed RABs shall not be released towards the target RNC until the relocation is completed.

If the *NAS Synchronisation Indicator* IE is contained in the RELOCATION REQUEST message, the target RNC shall pass it to the source RNC within the *RRC Container* IE contained in the *Target RNC to Source RNC Transparent Container* IE.

Transmission and reception of RELOCATION REQUEST ACKNOWLEDGE message terminates the procedure in the UTRAN and the CN respectively.

Before reporting the successful outcome of the Relocation Resource allocation procedure, the RNC shall have executed the initialisation of the user plane mode as requested by the CN in the *User Plane Mode* IE. If the RNC can not initialise the requested user plane mode for any of the user plane mode versions in the *UP Mode Versions* IE according to the rules for initialisation of the respective user plane mode versions, as described in [6], the RAB Relocation shall fail with the cause value "RNC unable to establish all RFCs".

9.1.11 RELOCATION REQUEST ACKNOWLEDGE

This message is sent by the target RNC to inform the CN about the result of the resource allocation for the requested relocation.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	reject
Target RNC To Source RNC Transparent Container	O		9.2.1.30		YES	ignore
New BSS To Old BSS Information	O		9.2.1.47	Defined in [11].	YES	ignore
RABs Setup List	O				YES	reject
>RABs Setup Item IEs		1 to <maxnoofRABs>			EACH	reject
>>RAB ID	M		9.2.1.2		-	
>>Transport Layer Address	O		9.2.2.1	IPv6 or IPv4 address if no other TLA included. IPv4 address if other TLA included.	-	
>>Iu Transport Association	O		9.2.2.2	Related to TLA above.		
>>Assigned RAB Parameter Values	O		9.2.1.44		YES	ignore
>>Transport Layer Address	O		9.2.2.1	IPv6 address if included.	YES	ignore
>>Iu Transport Association	O		9.2.2.2	Related to TLA above.	YES	ignore
RABs Failed To Setup List	O				YES	ignore
>RABs Failed To Setup Item IEs		1 to <maxnoofRABs>			EACH	ignore
>>RAB ID	M		9.2.1.2		-	
>>Cause	M		9.2.1.4		-	
Chosen Integrity Protection Algorithm	O		9.2.1.13	Indicates the Integrity Protection algorithm that will be used by the target RNC.	YES	ignore
Chosen Encryption Algorithm	O		9.2.1.14	Indicates the Encryption algorithm that will be used by the target RNC.	YES	ignore
Criticality Diagnostics	O		9.2.1.35		YES	ignore

Range bound	Explanation
maxnoofRABs	Maximum no. of RABs for one UE. Value is 256.

9.1.12 RELOCATION COMMAND

This message is sent by the CN to source RNC to inform that resources for the relocation are allocated in target RNC.

Direction: CN → RNC.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	reject
Target RNC To Source RNC Transparent Container	O		9.2.1.30		YES	reject
Inter-System Information Transparent Container	O		9.2.1.48		YES	ignore
L3 Information	O		9.2.1.31	Defined in [11].	YES	ignore
RABs To Be Released List	O				YES	ignore
>RABs To Be Released Item IEs		1 to <maxnoofRABs>			EACH	ignore
>>RAB ID	M		9.2.1.2		-	
RABs Subject To Data Forwarding List	O				YES	ignore
>RABs Subject To Data Forwarding Item IEs		1 to <maxnoofRABs>			EACH	ignore
>>RAB ID	M		9.2.1.2		-	
>>Transport Layer Address	M		9.2.2.1	IPv6 or IPv4 address if no other TLA included. IPv4 address if other TLA included.	-	
>>Iu Transport Association	M		9.2.2.2	Related to TLA above.	-	
>>Transport Layer Address	O		9.2.2.1	IPv6 address if included.	YES	ignore
>>Iu Transport Association	O		9.2.2.2	Related to TLA above.	YES	ignore
Criticality Diagnostics	O		9.2.1.35		YES	ignore

Range bound	Explanation
maxnoofRABs	Maximum no. of RABs for one UE. Value is 256.

9.3.3 PDU Definitions

```
-- **************************************************************
--
-- PDU definitions for RANAP.
--
-- **************************************************************

RANAP-PDU-Contents {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
umts-Access (20) modules (3) ranap (0) version1 (1) ranap-PDU-Contents (1) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- **************************************************************
--
-- IE parameter types from other modules.
--
-- **************************************************************

IMPORTS
    BroadcastAssistanceDataDecipheringKeys,
    LocationRelatedDataRequestType,
    DataVolumeReference,
    CellLoadInformation,
    AreaIdentity,
    CN-DomainIndicator,
    Cause,
    CriticalityDiagnostics,
    ChosenEncryptionAlgorithm,
    ChosenIntegrityProtectionAlgorithm,
    ClassmarkInformation2,
    ClassmarkInformation3,
    DL-GTP-PDU-SequenceNumber,
    DL-N-PDU-SequenceNumber,
    DataVolumeReportingIndication,
    DRX-CycleLengthCoefficient,
    EncryptionInformation,
    GlobalCN-ID,
    GlobalRNC-ID,
    IntegrityProtectionInformation,
    InterSystemInformation-TransparentContainer,
    IuSignallingConnectionIdentifier,
    IuTransportAssociation,
    KeyStatus,
    L3-Information,
    LAI,
    LastKnownServiceArea,
```

```
    NAS-PDU,
    NAS-SynchronisationIndicator,
    NewBSS-To-OldBSS-Information,
    NonSearchingIndication,
    NumberOfSteps,
    OMC-ID,
    OldBSS-ToNewBSS-Information,
    PagingAreaID,
    PagingCause,
    PDP-TypeInformation,
    PermanentNAS-UE-ID,
    RAB-ID,
    RAB-Parameters,
    RAC,
    RelocationType,
    RequestType,
    Requested-RAB-Parameter-Values,
    SAI,
    SAPI,
    Service-Handover,
    SourceID,
    SourceRNC-ToTargetRNC-TransparentContainer,
    TargetID,
    TargetRNC-ToSourceRNC-TransparentContainer,
    TemporaryUE-ID,
    TraceReference,
    TraceType,
    UnsuccessfullyTransmittedDataVolume,
    TransportLayerAddress,
    TriggerID,
    UE-ID,
    UL-GTP-PDU-SequenceNumber,
    UL-N-PDU-SequenceNumber,
    UP-ModeVersions,
    UserPlaneMode,
    Alt-RAB-Parameters,
    Ass-RAB-Parameters
FROM RANAP-IEs


    PrivateIE-Container{},
    ProtocolExtensionContainer{},
    ProtocolIE-ContainerList{},
    ProtocolIE-ContainerPair{},
    ProtocolIE-ContainerPairList{},
    ProtocolIE-Container{},
    RANAP-PRIVATE-IES,
    RANAP-PROTOCOL-EXTENSION,
    RANAP-PROTOCOL-IES,
    RANAP-PROTOCOL-IES-PAIR
FROM RANAP-Containers
```

```
	maxNrOfDTs,
	maxNrOfErrors,
	maxNrOfIuSigConIds,
	maxNrOfRABs,
	maxNrOfVol,

	id-AreaIdentity,
	id-Alt-RAB-Parameters,
	id-Ass-RAB-Parameters,
	id-BroadcastAssistanceDataDecipheringKeys,
	id-LocationRelatedDataRequestType,
	id-CN-DomainIndicator,
	id-Cause,
	id-ChosenEncryptionAlgorithm,
	id-ChosenIntegrityProtectionAlgorithm,
	id-ClassmarkInformation2,
	id-ClassmarkInformation3,
	id-CriticalityDiagnostics,
	id-DRX-CycleLengthCoefficient,
	id-DirectTransferInformationItem-RANAP-RelocInf,
	id-DirectTransferInformationList-RANAP-RelocInf,
	id-DL-GTP-PDU-SequenceNumber,
	id-EncryptionInformation,
	id-GlobalCN-ID,
	id-GlobalRNC-ID,
	id-IntegrityProtectionInformation,
	id-InterSystemInformation-TransparentContainer,
	id-IuSigConId,
	id-IuSigConIdItem,
	id-IuSigConIdList,
	id-IuTransportAssociation,
	id-KeyStatus,
	id-L3-Information,
	id-LAI,
	id-LastKnownServiceArea,
	id-NAS-PDU,
	id-NewBSS-To-OldBSS-Information,
	id-NonSearchingIndication,
	id-NumberOfSteps,
	id-OMC-ID,
	id-OldBSS-ToNewBSS-Information,
	id-PagingAreaID,
	id-PagingCause,
	id-PermanentNAS-UE-ID,
	id-RAB-ContextItem,
	id-RAB-ContextList,
	id-RAB-ContextFailedtoTransferItem,
	id-RAB-ContextFailedtoTransferList,
	id-RAB-ContextItem-RANAP-RelocInf,
	id-RAB-ContextList-RANAP-RelocInf,
```

```
    id-RAB-DataForwardingItem,
    id-RAB-DataForwardingItem-SRNS-CtxReq,
    id-RAB-DataForwardingList,
    id-RAB-DataForwardingList-SRNS-CtxReq,
    id-RAB-DataVolumeReportItem,
    id-RAB-DataVolumeReportList,
    id-RAB-DataVolumeReportRequestItem,
    id-RAB-DataVolumeReportRequestList,
    id-RAB-FailedItem,
    id-RAB-FailedList,
    id-RAB-FailedtoReportItem,
    id-RAB-FailedtoReportList,
    id-RAB-ID,
    id-RAB-ModifyList,
    id-RAB-ModifyItem,
    id-RAB-QueuedItem,
    id-RAB-QueuedList,
    id-RAB-ReleaseFailedList,
    id-RAB-ReleaseItem,
    id-RAB-ReleasedItem-IuRelComp,
    id-RAB-ReleaseList,
    id-RAB-ReleasedItem,
    id-RAB-ReleasedList,
    id-RAB-ReleasedList-IuRelComp,
    id-RAB-RelocationReleaseItem,
    id-RAB-RelocationReleaseList,
    id-RAB-SetupItem-RelocReq,
    id-RAB-SetupItem-RelocReqAck,
    id-RAB-SetupList-RelocReq,
    id-RAB-SetupList-RelocReqAck,
    id-RAB-SetupOrModifiedItem,
    id-RAB-SetupOrModifiedList,
    id-RAB-SetupOrModifyItem,
    id-RAB-SetupOrModifyList,
    id-RAC,
    id-RelocationType,
    id-RequestType,
    id-SAI,
    id-SAPI,
    id-SourceID,
    id-SourceRNC-ToTargetRNC-TransparentContainer,
    id-TargetID,
    id-TargetRNC-ToSourceRNC-TransparentContainer,
    id-TemporaryUE-ID,
    id-TraceReference,
    id-TraceType,
    id-TransportLayerAddress,
    id-TriggerID,
    id-UE-ID,
    id-UL-GTP-PDU-SequenceNumber
FROM RANAP-Constants;
```

****** LOTS OF UNAFFECTED ASN.1 DESCRIPTION FROM SECTION 9.3.3 NOT SHOWN ******

```
-- **************************************************************
--
-- Relocation Command
--
-- **************************************************************

RelocationCommand ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {RelocationCommandIEs} },
    protocolExtensions      ProtocolExtensionContainer { {RelocationCommandExtensions} }            OPTIONAL,
    ...
}

RelocationCommandIEs RANAP-PROTOCOL-IES ::= {
    { ID id-TargetRNC-ToSourceRNC-TransparentContainer
                            CRITICALITY reject  TYPE TargetRNC-ToSourceRNC-TransparentContainer PRESENCE optional   } |
    { ID id-L3-Information              CRITICALITY ignore  TYPE L3-Information             PRESENCE optional } |
    { ID id-RAB-RelocationReleaseList       CRITICALITY ignore  TYPE RAB-RelocationReleaseList      PRESENCE optional } |
    { ID id-RAB-DataForwardingList          CRITICALITY ignore  TYPE RAB-DataForwardingList      PRESENCE optional } |
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics         PRESENCE optional },
    ...
}

RAB-RelocationReleaseList               ::= RAB-IE-ContainerList { {RAB-RelocationReleaseItemIEs} }

RAB-RelocationReleaseItemIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-RelocationReleaseItem       CRITICALITY ignore  TYPE RAB-RelocationReleaseItem      PRESENCE mandatory   },
    ...
}

RAB-RelocationReleaseItem ::= SEQUENCE {
    rAB-ID                      RAB-ID,
    iE-Extensions                   ProtocolExtensionContainer { {RAB-RelocationReleaseItem-ExtIEs} }        OPTIONAL,
    ...
}

RAB-RelocationReleaseItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RAB-DataForwardingList                  ::= RAB-IE-ContainerList { {RAB-DataForwardingItemIEs} }

RAB-DataForwardingItemIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-DataForwardingItem          CRITICALITY ignore  TYPE RAB-DataForwardingItem      PRESENCE mandatory   },
    ...
}
```

```
RAB-DataForwardingItem ::= SEQUENCE {
    rAB-ID                      RAB-ID,
    transportLayerAddress               TransportLayerAddress,
    iuTransportAssociation              IuTransportAssociation,
    iE-Extensions                   ProtocolExtensionContainer { {RAB-DataForwardingItem-ExtIEs} }        OPTIONAL,
    ...
}

RAB-DataForwardingItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 5 to allow transfer of a second pair of TLA and association --
    {ID id-TransportLayerAddress    CRITICALITY ignore  EXTENSION TransportLayerAddress PRESENCE optional},
    {ID id-IuTransportAssociation   CRITICALITY ignore  EXTENSION IuTransportAssociation    PRESENCE optional},
    ...
}

RelocationCommandExtensions RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 5 to enable Inter RAN Load Information Exchange over Iu --
    { ID id-InterSystemInformation-TransparentContainer     CRITICALITY ignore  EXTENSION InterSystemInformation-TransparentContainer
    PRESENCE optional   },
    ...
}
```

******   LOTS OF UNAFFECTED ASN.1 DESCRIPTION FROM SECTION 9.3.3 NOT SHOWN   ******

```
-- **************************************************************
--
-- Relocation Request Acknowledge
--
-- **************************************************************

RelocationRequestAcknowledge ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {RelocationRequestAcknowledgeIEs} },
    protocolExtensions      ProtocolExtensionContainer { {RelocationRequestAcknowledgeExtensions} }       OPTIONAL,
    ...
}

RelocationRequestAcknowledgeIEs RANAP-PROTOCOL-IES ::= {
    { ID id-TargetRNC-ToSourceRNC-TransparentContainer
                            CRITICALITY ignore  TYPE TargetRNC-ToSourceRNC-TransparentContainer PRESENCE optional   } |
    { ID id-RAB-SetupList-RelocReqAck       CRITICALITY ignore  TYPE RAB-SetupList-RelocReqAck       PRESENCE optional} |
    { ID id-RAB-FailedList              CRITICALITY ignore  TYPE RAB-FailedList             PRESENCE optional }|
    { ID id-ChosenIntegrityProtectionAlgorithm  CRITICALITY ignore  TYPE ChosenIntegrityProtectionAlgorithm     PRESENCE optional } |
    { ID id-ChosenEncryptionAlgorithm       CRITICALITY ignore  TYPE ChosenEncryptionAlgorithm       PRESENCE optional } |
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics          PRESENCE optional },
    ...
}

RAB-SetupList-RelocReqAck               ::= RAB-IE-ContainerList { {RAB-SetupItem-RelocReqAck-IEs} }
```

```
RAB-SetupItem-RelocReqAck-IEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-SetupItem-RelocReqAck       CRITICALITY reject  TYPE RAB-SetupItem-RelocReqAck       PRESENCE mandatory   },
    ...
}

RAB-SetupItem-RelocReqAck ::= SEQUENCE {
    rAB-ID                      RAB-ID,
    transportLayerAddress               TransportLayerAddress   OPTIONAL,
    iuTransportAssociation              IuTransportAssociation  OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {RAB-SetupItem-RelocReqAck-ExtIEs} }        OPTIONAL,
    ...
}

RAB-SetupItem-RelocReqAck-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 4 to enable RAB Quality of Service negotiation over Iu --
    {ID id-Ass-RAB-Parameters   CRITICALITY ignore      EXTENSION Ass-RAB-Parameters        PRESENCE optional} ,
-- Extension for Release 5 to allow transfer of a second pair of TLA and association --
    {ID id-TransportLayerAddress    CRITICALITY ignore  EXTENSION TransportLayerAddress PRESENCE optional},
    {ID id-IuTransportAssociation   CRITICALITY ignore  EXTENSION IuTransportAssociation    PRESENCE optional},
    ...
}

RAB-FailedList                      ::= RAB-IE-ContainerList { {RAB-FailedItemIEs} }

RAB-FailedItemIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-FailedItem              CRITICALITY ignore  TYPE RAB-FailedItem             PRESENCE mandatory   },
    ...
}

RAB-FailedItem ::= SEQUENCE {
    rAB-ID                      RAB-ID,
    cause                       Cause,
    iE-Extensions                   ProtocolExtensionContainer { {RAB-FailedItem-ExtIEs} }       OPTIONAL,
    ...
}

RAB-FailedItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RelocationRequestAcknowledgeExtensions RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 5 to enable Inter RAN Load Information Exchange over Iu --
    {ID id-NewBSS-To-OldBSS-Information     CRITICALITY ignore  EXTENSION NewBSS-To-OldBSS-Information     PRESENCE optional    },
    ...
}
```

****** LOTS OF UNAFFECTED ASN.1 DESCRIPTION FROM SECTION 9.3.3 NOT SHOWN ******

```
END
```

3GPP TSG-RAN WG3 Meeting #29
Gyeongju, Korea, 13th – 17th May 2002

TDoc R3-021647

CR-Form-v6.1

CHANGE REQUEST

⌘	**TR 25.933**	**CR**	**001**	⌘ **rev**	**2** ⌘	Current version: **5.0.0** ⌘
	Spec Title:	IP Transport in UTRAN				⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [ ] Radio Access Network [X] Core Network [X]

Title: ⌘	IP-ALCAP: The ITU-T Solution		
Source: ⌘	R-WG3		
Work item code: ⌘	ETRAN-Iptrans	***Date:*** ⌘	May 2002
Category: ⌘	**F**	***Release:*** ⌘	REL-5
	Use one of the following categories: ***F*** *(correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.		*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change: ⌘ The section "IP/ATM Interworking Solutions" which contains the description of the solution with separate IWU and standardised Bearer Control Protocol needs to reflect the latest progress. It is proposed to update TR25.933 covering two main points:

- Clarification of scope of new Bearer Control Protocol, named "Q.IP-ALCAP"
- Inclusion of recent findings in ITU-T SG11
- Definition of the terms used in figure 6-xa
- Inclusion of figure showing which entities have served users (figure 6-xb)
- Correction of figure 6-42 to show protocol interworking
- Addition of AESA variants of NSAP address
- Explicit mentioning of the QoS parameters (Bit rate, SDU size, TNL QoS Class)
- Reference to ITU-T TRQ added

revision 1:

- adding references of TRQ.AAL2IP.iw, an ITU-report and the presented draft Q.IP-ALCAP
- clarifying the scope of an AAL2 Served user in TRQ.AAL2IP.iw
- figure 6.xa now refers to the scope of TRQ.AAL2IP.iw
- replacing "switch" by "service endpoints" beneath figure 6.42

revision 2:

- in 6.10.5.2.1 description of the A2IP link was corrected.
- for figure 6-xb a clarification is given that the "A2IP Signalling" entity denotes the signalling endpoint for the "Q.IP-ALCAP".

Summary of change: ⌘ - Subsection 6.10.4: IWU is not necessarily an UMTS node

		- Subsection 6.10.5.2: Insertion of scope of ITU-T work and related information
Consequences if not approved:	⌘	The representation of IP/ATM Interworking Solutions in TR25.933 is incomplete Isolated impact analysis: This CR is isolated because it only affects one UTRAN functionality, namely the interworking functionality between IP/ATM Backwards compatibility: This CR is backwards compatible because no decision on protocol application fpr IP/ATM IWU has been made before, i.e. there is no standardised protocol existing yet

Clauses affected:	⌘	2, 6.10.4, 6.10.5.2			
Other specs affected:	⌘	☐	Other core specifications	⌘	
		☐	Test specifications		none
		☐	O&M Specifications		
Other comments:	⌘				

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] IP-Transport in UTRAN Work Task Description, as agreed at TSG RAN#6

[2] 3GPP TS 25.401: "UTRAN Overall Description".

[3] 3GPP TS 25.410: "UTRAN Iu Interface: General Aspects and Principles".

[4] 3GPP TS 25.412: "UTRAN Iu interface signalling transport".

[5] 3GPP TS 25.420: "UTRAN Iur Interface: General Aspects and Principles".

[6] 3GPP TS 25.422: "UTRAN Iur interface signalling transport".

[7] 3GPP TS 25.430: "UTRAN Iub Interface: General Aspects and Principles".

[8] 3GPP TS 25.427: "UTRAN Iur and Iub interface user plane protocols for DCH data streams".

[9] IETF RFC 1812: "Requirements for IP Version 4 Routers", June 1995.

[10] R. Pazhyannur, I. Ali, Craig Fox, "PPP Multiplexed Frame Option", <draft-ietf-pppext-pppmux-01.txt>, October 2, 2000.

NOTE 1: Expired: April 2, 2001. New reference: RFC 3153.

[11] IETF RFC 1661 (STD 51): "The Point-to-Point Protocol (PPP)", W. Simpson, Ed., July 1994.

[12] IETF RFC 1662 (STD 51): "PPP in HDLC-like Framing", W. Simpson, Ed., July 1994.

[13] IETF RFC 2508: "Compressing IP/UDP/RTP Headers for Low-Speed Serial Links", S. Casner, V. Jacobson, February 1999.

[14] IETF RFC 2509: "IP Header Compression over PPP", M. Engan, S. Casner, C. Bromann, February 1999.

[15] IETF RFC 2364: "PPP Over AAL5", G. Gross, M. Kaycee, A. Lin, J. Stephens, July 1998.

[16] IETF RFC 2661: "Layer Two Tunneling Protocol "L2TP"", W. Townsley, A. Valencia, A. Rubens, G. Pall, G. Zorn, B. Palter, August 1999.

[17] Bruce Thompson, Tmima Koren, Dan Wing, "Tunneling multiplexed Compressed RTP (TCRTP)", <draft-ietf-avt-tcrtp.01.txt>, July 12, 2000.

NOTE 2: Expired: March 2001. New draft: draft-ietf-avt-tcrtp-03.txt, Expired January 2002.

[18] Andrew J. Valencia, "L2TP Header Compression (L2TPHC), <draft-ietf-l2tpext-l2tphc-01.txt>, April 2000**.**

NOTE 3: Expired: October 2000. New draft: draft-ietf-l2tpext-l2tphc-03.txt, but expired May 2001. A new version will be available till the end.

[19] Tmima Koren, Stephen Casner, Patrick Ruddy, Bruce Thompson, Alex Tweedly, Dan Wing, John Geevarghese, "Enhancements to IP/UDP/RTP Header Compression", <draft-ietf-avt-crtp-enhance-01.txt>, November 17, 2000.

NOTE 4: Expired: June 2001. New draft in progress.

[20] IETF RFC 1990: "The PPP Multilink Protocol (MP)".

[21] IETF RFC 2686: "The Multi-Class Extension to Multi-Link PPP".

[22] "A Lightweight IP Encapsulation Scheme", draft-chuah-avt-lipe-02.txt, M. Chuah, E. J. Hernandez-Valencia, December 2000.

NOTE 5: Expired: June 2001. There is no new version.

[23] IETF RFC 3031: "Multi-Protocol Label Switching Architecture" , January 2001.[24] IETF RFC 2719: "Framework Architecture for Signaling Transport", October 1999.

[25] IETF RFC 2960: "Stream Control Transmission Protocol", October 2000.

[26] J. Loughney,G. Sidebottom, Guy Mousseau, S.Lorusso, SS7 SCCP-User Adaptation Layer (SUA), <draft-ietf-sigtran-sua-02.txt>, 04 October 2000.

NOTE 6: Expired: 4 May 2001. New draft: draft-ietf-sigtran-sua-06.txt, expired 15 December 2001.

[27] IETF RFC 2460: "Internet Protocol, Version 6 (Ipv6) Specification", December 1998.

[28] IETF RFC 2462: "Ipv6 Stateless Address Autoconfiguration", December 1998.

[29] "An overview of the introduction of IPV6 in the Internet", IETF draft-ietf-ngtrans-introduction-to-ipv6-transition-04, July 2000.

NOTE 7: Expired. New draft: draft-ietf-ngtrans-introduction-to-ipv6-transition-06.txt, expired on August 2001.

[30] "Transition Mechanisms for Ipv6 Hosts and Routers", draft-ietf-ngtrans-mech-06, March 2000.

NOTE 8: Expired. RFC 2893, August 2000.

[31] "MPLS Support of Differentiated Services", draft-ietf-mpls-diff-ext-07.txt, IETF work in progress, August 2000.

NOTE 9: Expired February, 2001. New draft: draft-ietf-mpls-diff-ext-09.txt, expired September 2001.

[32] "Tunneling Multiplexed Compressed RTP in MPLS", draft-theimer-tcrtp-mpls-00.txt, IETF work in progress, June 2000.

NOTE 10: Expired. There is no new version.

[33] "Frame Relay Fragmentation Implementation Agreement, FRF.12" http://www.frforum.com/5000/Approved/FRF.12/frf12.doc.

[34] "Simple Header Compression", draft-swallow-mpls-simple-hdr-compress-00.txt, March 2000, work in progress

NOTE 11: Expired. There is no new version.

[35] IETF RFC 2687: "PPP in a Real-time Oriented HDLC-like Framing".

[36] "COPS Usage for MPLS/Traffic Engineering", draft-franr-mpls-cops-00.txt, July 2000, work in progress.

NOTE 12: Expired. There is no new version.

[37] "Constraint-Based LSP Setup using LDP", draft-ietf-mpls-cr-ldp-04.txt, July 2000, work in progress.

NOTE 13: Expired February 2001. New draft: draft-ietf-mpls-cr-ldp-05.txt, expired August 2001.

[38] "RSVP-TE: Extensions to RSVP for LSP Tunnels", draft-ietf-mpls-rsvp-lsp-tunnel-07.txt, August 2000, work in progress

NOTE 14: Expired March 2001. New draft: draft-ietf-mpls-rsvp-lsp-tunnel-08.txt, expired August 2001.

[39] "MPLS/IP Header Compression", draft-ietf-mpls-hdr-comp-00.txt, July 2000, work in progress.

NOTE 15: Expired. There is no new version.

[40] R3-010181: "Comparison CIP/MPLS".

[41] "MPLS/IP Header Compression over PPP", draft-ietf-mpls-hdr-comp-over-ppp-00.txt, July 2000, work in progress.

NOTE 16: Expired. There is no new version.

[42] IETF RFC 768: "User Datagram Protocol".

[43] 3GPP TS 21.133: "3G security; Security threats and requirements".

[44] IETF RFC 2401: "Security Architecture for the Internet Protocol", November 1998.

[45] IETF RFC 2408: "Internet Security Association and Key Management Protocol (ISAKMP)", November 1998.

[46] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp interface".

[47] draft-larzon-udplite-03, "The UDP Lite protocol".

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[48] 3GPP TR 23.910: "Circuit switched data bearer services".

[49] IETF RFC 791 (9/1981): "Internet Protocol".

[50] 3GPP TR 29.903: "Feasibility study on SS7 signalling transportation in the core network with SCCP-User Adaptation (SUA)".

[51] IETF RFC 2507: "IP Header Compression", M. Degermark, B. Nordgren, S. Pink , February 1999.

[52] ITU-T Recommendation Q.2630.1: "AAL Type 2 Signalling Protocol (Capability Set 1)".

[53] ITU-T Recommendation Q.2150.3: "Signalling Transport Converter on SCTP".

[54] IETF RFC 2205: "Resource ReSerVation Protocol (RSVP); Version 1 Functional Specification".

[55] IETF RFC 2210: "The use of RSVP with IETF Integrated Services".

[56] IETF RFC 2996: "Format of the RSVP DCLASS Object".

[57] IETF RFC 2543: "SIP: Session Initiation Protocol".

[58] IETF RFC 2327: "SDP: Session Description Protocol".

[59] IETF RFC 1889: "RTP: A Transport Protocol for Real-Time Applications".

[60] 3GPP TS 25.411: "UTRAN Iu interface Layer 1".

[61] ISO/IEC 8348: "Information technology – Open Systems Interconnection – Network service definition".

[62] ISO/IEC 8348/Amd.1: "Information technology – Open Systems Interconnection – Network service definition Amendment 1: Addition of the Internet protocol address format identifier",

[63] draft-ietf-sigtran-sua-08.txt

[64] IETF RFC 2893: "Transition Mechanisms for Ipv6 hosts and Routers", August 2000.

[65] IETF RFC 2874: "DNS Extensions to Support IPv6 Address Aggregation and Renumbering", July 2000.

[66] IETF Draft "On overview of the introduction of IPv6 in the internet" <draft-ietf-ngtrans-introduction-to-ipv6-transition-06.txt>. February 2001

[x1] ITU-T SG11: TD GEN/11-49r1 “Draft Signalling Requirements for AAL Type 2 to IP Interworking (TRQ.AAL2IP.iw)” February 2002

[x2] ITU-T SG11: TD GEN/11-54r3 “Report of Q.6/11, Joint Qs.6 & 9/11 and Q.9/11 discussions” March 2002

[x3] 3GPP TSG RAN WG3: R3-021366 “A2IP Signalling Protocol (Q.IPALCAP Spec draft)” May 2002

6.10.4 UTRAN Architecture considerations

The following figures show the Iur interface where an IP UTRAN node is introduced. They are shown as interworking examples for the purpose of this discussion. In figure 6-36, a R99 SRNC is shown with an Iur interface to an IP DRNC. In figure 6-37, an IP SRNC is shown with an Iur interface to a R99 DRNC.

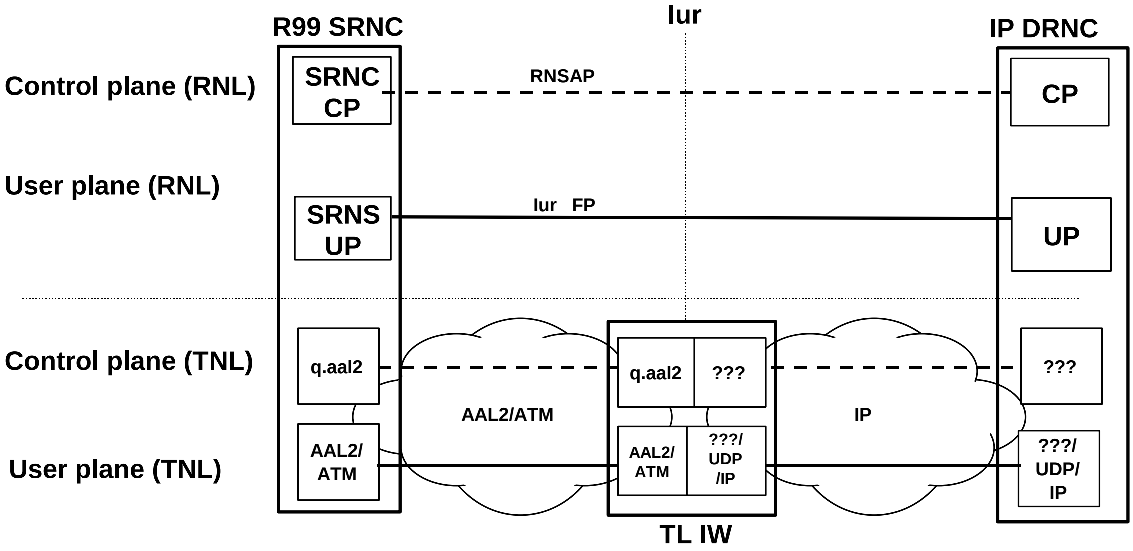

Figure 6-36: Transport network layer interworking with release '99 SRNC

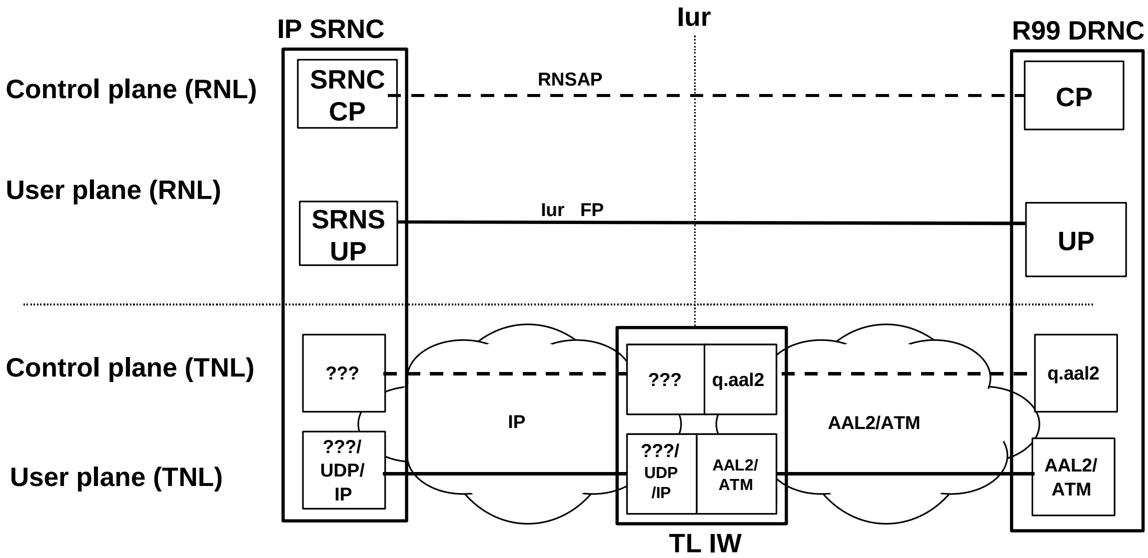

Figure 6-37: Transport network layer interworking with IP SRNC

These figures show the separation between the RNL control plane, the RNL user plane, the TNL control plane, and the TNL user plane. The IP protocols and the need for a TNL control plane protocol in the IP domain are yet to be determined so they are shown with question marks.

The following statements concerning interworking can be made based on the discussion and examples above:

1) IP and AAL2/ATM UTRAN nodes use different address and flow identification types. The appropriate types must be provided to the appropriate nodes when establishing a transport bearer.

2) A release '99 SRNC will initiate q.aal2 connection signalling and expect a response when establishing a transport bearer.

3) A release '99 DRNC will expect to receive q.aal2 connection signalling when a transport bearer is being established by the SRNC.

4) A transport network interworking function is required in the transport network. This function could be implemented in a third ~~UMTS~~ node with both IP and AAL2/ATM interfaces, for example.

6.10.5 ATM/IP Interworking solution proposals.

6.10.5.1 Bearer control proposal using IETF SIP/SDP

For exchanging transport layer information between IP UTRAN nodes, the RNL signalling should be used (RANAP, RNSAP, NBAP) without a Transport Network Control Protocol.

For establishing transport connections between an IP UTRAN node and an ATM UTRAN node, a Transport Network Layer interworking function should be used in the transport network. This function would be implemented in a third node (such as an RNC) that has both ATM and IP interfaces.

In order to interwork with the q.aal2 signalling used by the AAL2/ATM node, an IP ALCAP will be used.

6.10.5.1.1 Description

It is proposed to use Session Initiation Protocol (SIP) signalling with Session Description Protocol (SDP) parameters. SDP [58] supports both IP and ATM parameters. SIP [57] is proposed since it is an IETF signalling protocol and is used to carry SDP.

Since a node must know what type of interface to communicate with, a Network Type parameter should be added to the RNL signalling. The following table shows how the Network Type parameter is used.

R'99	R5 IP	R5 ATM	Action
SRNC	DRNC		**R5** DRNC knows the SRNC is R'99 because of missing transport parameters in RL setup req. **R5** IP RNC does interworking steps.
DRNC	SRNC		SRNC sends IP transport parameters that R'99 DRNC will ignore. SRNC must know that it is receiving ATM parameters. Absence of network type in response will indicate that it is R'99. **R5** IP RNC does interworking steps.
SRNC		DRNC	R5 DRNC knows SRNC is R'99 because of missing transport parameters in RL setup req.
DRNC		SRNC	SRNC sends ATM network type parameter that R'99 DRNC will ignore. SRNC must know that it is receiving ATM parameters from DRNC. Absence of network type will indicate that it is R'99.
	SRNC	DRNC	SRNC sends IP transport parameters. SRNC must know that it is receiving ATM parameters. It can know this from the network type parameter in DRNC response. SRNC then performs interworking steps.
	DRNC	SRNC	SRNC sends ATM network type. R5 DRNC knows its ATM from the network type and performs interworking steps.

6.10.5.1.2 Bearer control between IP and ATM nodes signalling examples

The following figures provide signalling diagrams that show how the interworking can be achieved with this proposal. The Iur is shown as an example. UDP ports are shown for connection identifiers as an example

.

6.10.5.2 Bearer Control proposal using a new protocol ("Q.IP-ALCAP"), optimised for concatenation with AAL Type 2 links based on Q.2630

The discussion of the TNL interworking functionality in clauses 6.10.2.2 and 6.10.4 6.10.5.1 shows that a transport network layer interworking functionality (TNL IWU) is needed as well as a signalling protocol for bearer control (IP-ALCAP).

A standardized transport network control protocol is beneficial to operators that have multi-vendor environments and one interworking function may be used by several RNCs, although they are from different vendors.

Also from the discussion in 6.10.2.2 and 6.10.4, it becomes clear that the interworking functionality is part of the TNL. According to the principles of 3GPP and in particular RAN WG3, specification of new TNL protocols should preferably be done within other groups, e.g. IETF or ITU-T.

As depicted in figures 6-36 and 6-37, the TNL IWU uses Q.2630.2 for communication with the R99/Rel-4 UTRAN nodes. In order to ease implementation of such TNL IWU, the bearer control protocol for the IP-part of the connection will be as close to Q.2630.2 as possible. Related activities where started in ITU-T/SG11 as ITU-T was found to be the suited organisation to specify this new bearer control protocol.

Currently (March 2002), ITU-T has started to investigate the requirements for such protocol. As no name for the new protocol has been defined in ITU-T yet, we will use the term "Q.IP-ALCAP" in this section to refer to this approach.

From perspective mentioned above, it is desirable that "Q.IP-ALCAP" fulfils the following requirements:

- Highly consistent with Q.2630.2 due to implementation related reasons described above
- Support of embedded E.164 addresses or AESA variant of NSAP also for IP nodes (To allow IP nodes to address R99/Rel-4 ATM nodes)
- Support of the generic IP-QoS parameters as agreed in section 7.9 for solution (3), i.e. Bit rate, SDU size, TNL QoS Class

The following subsections of 6.10.5.2 will give details on the "Q.IP-ALCAP" proposal. As ITU-T is working in parallel to 3GPP TSG RAN WG3, additional information can be found in their documentation (the topic is handled in ITU-T SG11, Question 15).

Regarding the schedule of the work in ITU-T and 3GPP, it may be desirable to hold intermediate versions of "Q.IP-ALCAP" in 3GPP, until the final version of this protocol is approved by ITU-T SG11. Details how to handle such intermediate specification are to be determined.

6.10.5.2.1 Overall Scenario for "Q.IP-ALCAP" Description

The following figure 6-xa gives an overview on the application of "Q.IP-ALCAP" in IP/AAL2 interworking. It shows the user plane of an "A2IP connection" which is the concatenation of AAL2 type links ("AAL2 link" in figure 6-xa) with an IP link ("A2IP link" in figure 6-xa). Figure 6-xa is exactly the scenario as depicted in TRQ.AAL2IP.iw [x1] which was (according to [x2]) accepted as a baseline text specifying requirements by ITU-T.

In this scenario, "Q.IP-ALCAP" shall support the establishment, maintenance, modification, and clearing of IP links as part of a concatenation of AAL type 2 links with an IP link in a mixed AAL type 2 and IP environment. The IP part of such a concatenated link is denoted in the figure as "A2IP link".The shaded area of figure 6-xa thus also shows the scope of TRQ.AAL2IP.iw [x1].

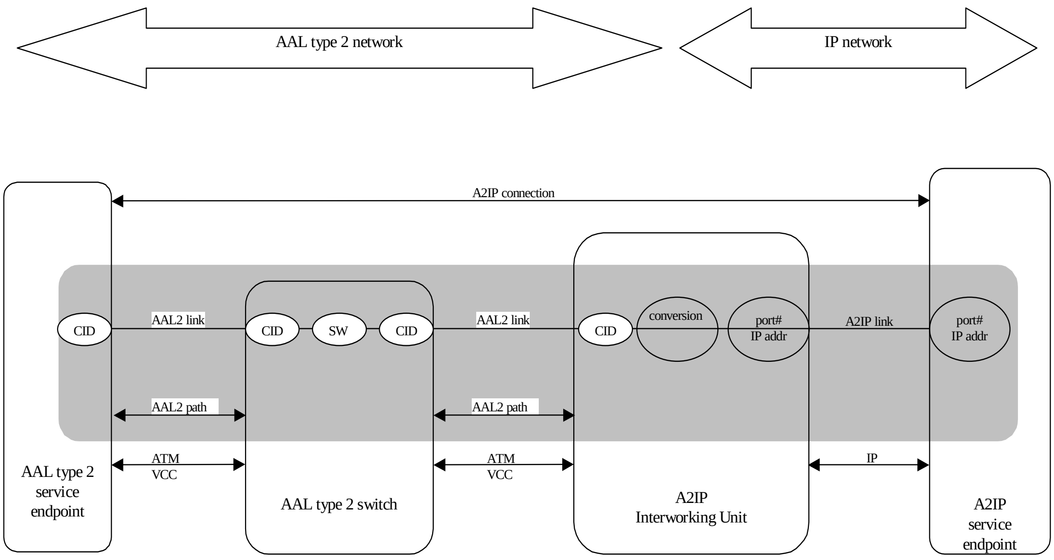

Figure 6-xa: Scope of TRQ.AAL2IP.iw [x1]

Figure 6-xb gives additional details of the layering of the signalling protocols and visualises again the positions of served users in this scenario. The "A2IP Signalling" entities in figure 6-xb denote the signalling endpoints for the "Q.IP-ALCAP". Note, that in the course of work on "Q.IP-ALCAP" the scope of an "AAL2 Served User" has been extended in a way that it can be the user of an AAL2 type signalling protocol or A2IP type signalling protocol. The primitives exchanged between an "AAL2 Served User" and an "A2IP signalling" entity will differ from the primitives described in Q.2630.

Note: A draft Q.IP-ALCAP was provided for information in [x3].

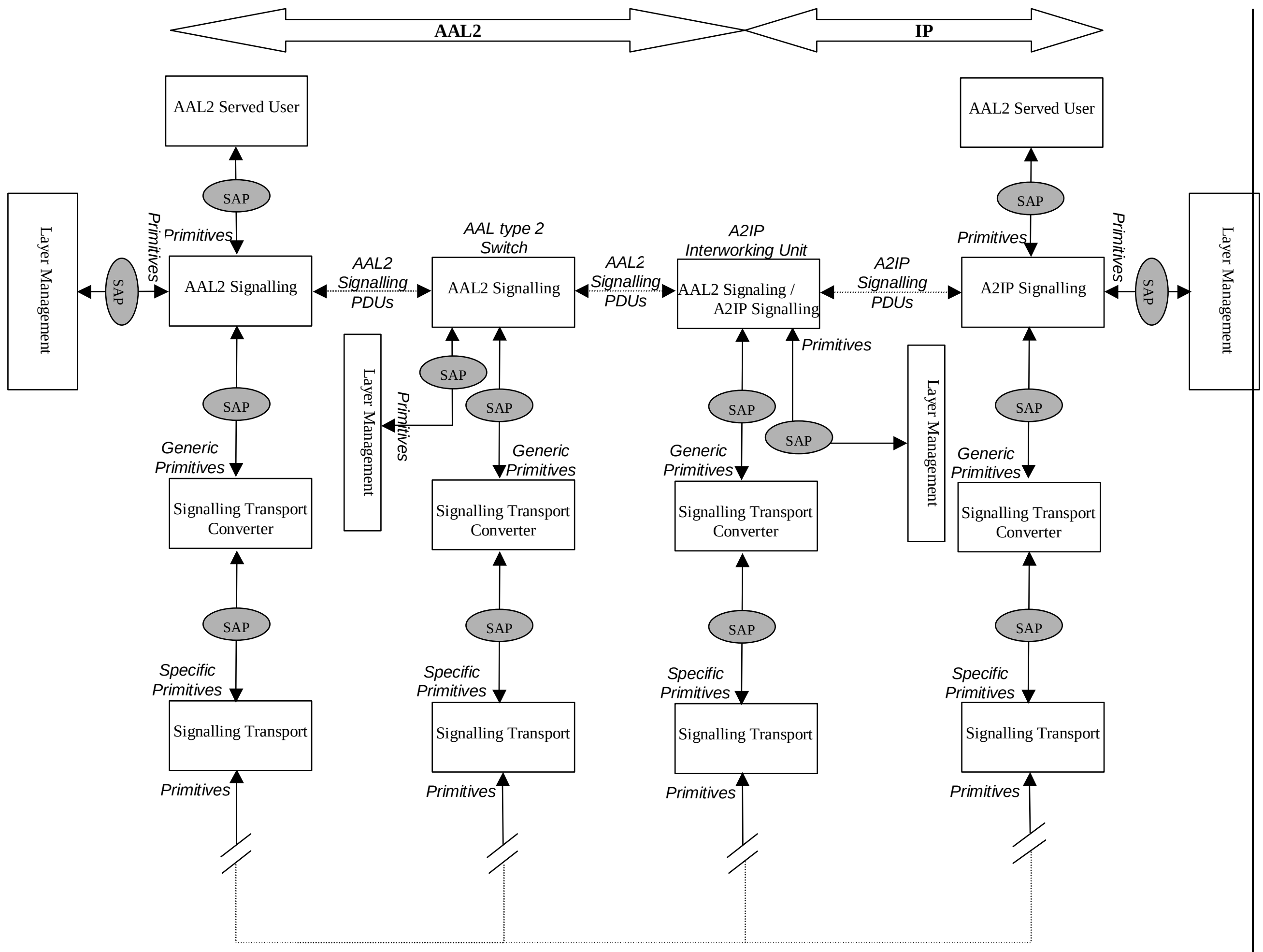

Figure 6-xb: Detailed Layering of Signalling for AAL2/IP Interworking

The definitions corresponding to terms used in figures 6-xa and 6-xb are:

A2IP connection: The logical concatenation of one or more AAL type 2 links and A2IP links between an AAL type 2 service endpoint and an A2IP service endpoint. From the perspective of a Q.2630.1and Q.2630.2 AAL type 2 service endpoint, an A2IP connection is seen as an AAL type 2 connection.

A2IP link: The logical user plane communication facility between two A2IP nodes. An A2IP link is designated by a pair of IP address/port number combinations.

A2IP node: An A2IP service endpoint or an A2IP Interworking Unit.

A2IP interworking function: Functions residing in a A2IP interworking unit providing the bridge between an AAL type 2 signalling entity and an A2IP signalling entity.

A2IP Interworking Unit: Interworking unit providing the conversion from AAL type 2 bearer to IP bearer (RTP[59]/UDP[42] or UDP[42] only). The Interworking Unit terminates AAL type 2 links and A2IP links. There is no served user associated with an A2IP Interworking Unit. From UTRAN perspective, this unit is the Release 5 TNL Interworking Unit.

A2IP service endpoint: A termination point of the IP part of an A2IP connection. There is an AAL type 2 served user associated with an A2IP service endpoint.

AAL type 2 served user: The user of an AAL type 2 or A2IP signalling protocol.

A2IP signalling protocol: Control plane functions for establishing and releasing A2IP connections and the maintenance functions associated with the A2IP signalling.

6.10.5.2.2 Protocol Stack for "Q.IP-ALCAP"

Protocol Stack

As interworking between IP and ATM based RNCs appears only during the migration phase from an ATM based network to an IP based one and only at the boarder between the two network types, the interworking solution – and therefore the selected signalling protocol stack – should be straight-forward.

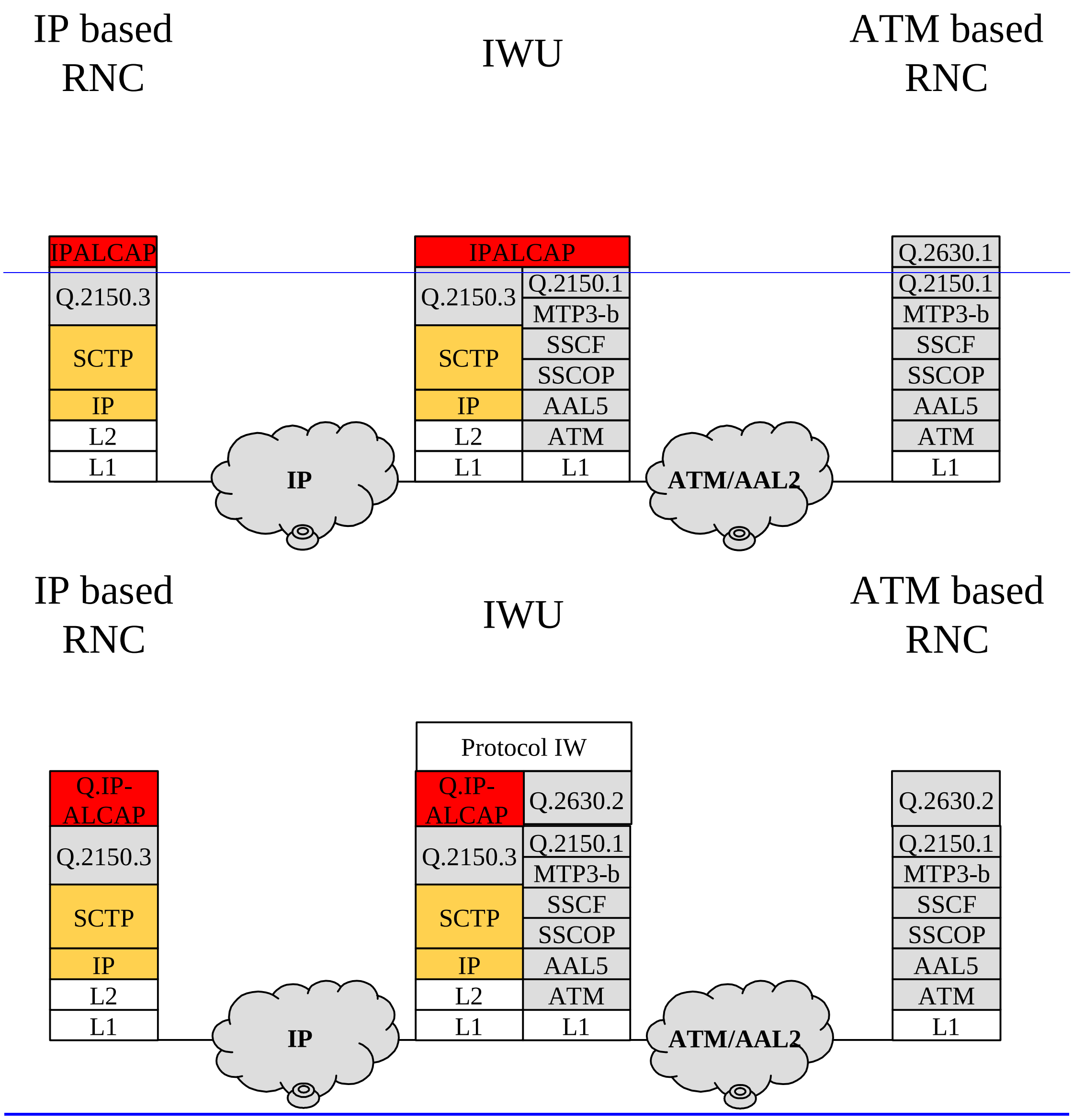

Figure 6-42: Protocol Stack for Transport Network Control Plane Interworking

Figure 6-42 presents the proposed protocol stack within the transport network control plane. ~~[IPALCAP] is denoting a delta specification to [52]. Thereby [IPALCAP], shall enhance [52] by a new message field that contains the IP endpoint identification (e.g. IP-address and UDP-port) and should be specified by 3GPP.~~ The Signalling Transport Converter on SCTP is defined in [53]. ~~This constitutes a further option for transport of AAL type 2 signalling.~~

Benefits of this Protocol Stack

The benefit of that protocol stack is, that most ~~all~~ employed protocols are already in use inside the RAN and the additional specification work ~~on [IPALCAP]~~ is low ~~(in essence one additional parameter, see Annex)~~. Therefore a standardized interworking functionality can be easily introduced into the RAN without the necessity of new protocols. Services provided by AAL2 signalling entities ~~be~~ are unchanged. ~~ALCAP is a simple and efficient signalling protocol that can be easily enhanced for the interworking case.~~ The interworking unit itself can be based on an existing set of AAL type 2 service endpoints ~~switches~~.

6.10.5.2.32 Example: Connection Establishment on Iur

This example shows transport bearer establishment and data on Iur. This shows the case where the legacy RAN is the drift RNS.

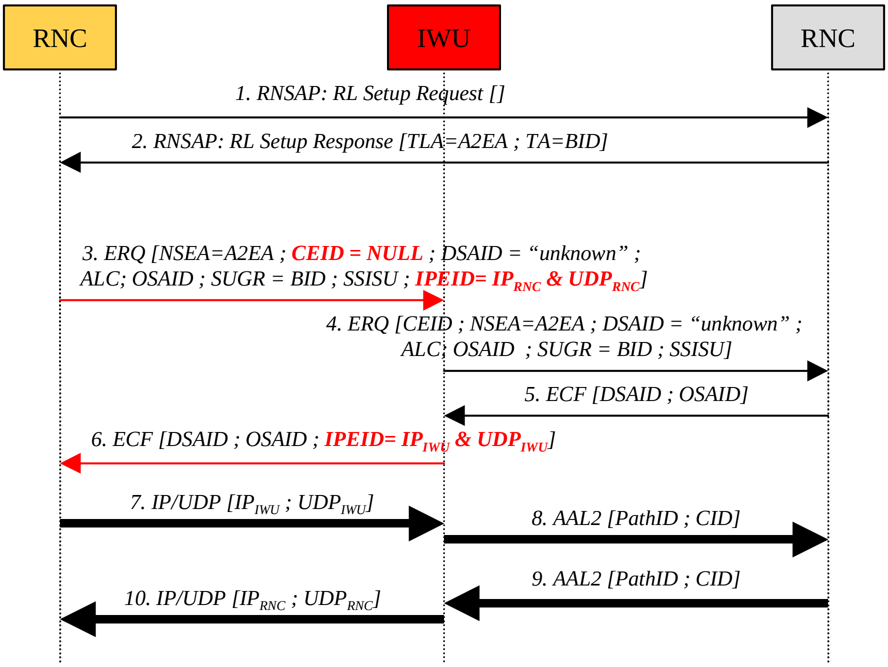

Figure 6-43: Connection Establishment on Iur

1) IP based RNC (serving RNS) initiates establishment of the radio link with RNSAP message Radio Link Setup Request.
2) The legacy RNC node sends RANSAP message Radio Link Setup Response to the IP based RNC containing TLA and TA. TLA contains the ATM endpoint identifier of the ATM based RNC and TA contains an binding ID chosen form the ATM based RNC.
3) The IP based RNC sends an Q.IP-ALCAP establishment request message (ERQ) to the IWU that contains the IP endpoint identifier (IP address and UDP port of the IP based RNC for the new link). The CEID will be set to NULL.
4) The IWU acts as an AAL type 2 switch, but in addition it removes the IPEID and generates the CEID.
5) The CN node sends the connection confirm message (ECF) to the IWU.
6) The IWU acts as an AAL type 2 switch, but in addition it IPEID containing IP address and UDP port of the IWU for the new connection.
7) The IP based RNC sends data to the IWU using the assigned IP address and UDP port.
8) The IWU passes the data on to the ATM based RNC node using the established AAL2 connection.
9) The ATM based RNC node sends data to the IWU using the established AAL2 connection.
10) The IWU passes the data on to the IP based RNC using the assigned IP address and UDP port of the RNC.

Connection release is simply the same as specified in [52]. Connection establishment initiated by the ATM based RNC works respectively.

6.10.5.3 IP-ALCAP based on Q.2630

6.10.5.3.1 Benefits

AAL2 signalling Q.2630 is used as the ALCAP in Rel99, Rel4 and Rel5 ATM UTRAN nodes. So Q.2630 will be in Rel5 UTRAN irrespective of its presence in the Rel5 IP transport option. Q.2630 itself is expected to be a well-known protocol (behaviour, performance, operation&management) by the time it is introduced in any Rel5 IP UTRAN.

IP-ALCAP as a whole is introduced in Rel5 IP transport option only as the control protocol between the IP UTRAN node and the stand-alone ATM/IP interworking unit. In the case where no interworking is required, i.e., there are only