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650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
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Contents

Foreword

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1 Scope

The present document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the UTRAN Iu interface.

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] ITU-T Recommendation I.361 (1995-11): "B-ISDN ATM layer specification".

[2] ITU-T Recommendation I.363.2 (2000-11): "B-ISDN ATM Adaptation layer specification: Type 2 AAL".

[3] ITU-T Recommendation I.363.5 (1996-08): "B-ISDN ATM Adaptation layer specification: Type 5 AAL".

[4] ITU-T Recommendation I.366.1 (1998-06): "Segmentation and Reassembly Service Specific Convergence Sublayer for the AAL type 2".

[5] ITU-T Recommendation E.164 (1997-05): "The international public telecommunication numbering plan".

[6] ITU-T Recommendation Q.2110 (1994-07): "B-ISDN ATM adaptation layer - Service Specific Connection Oriented Protocol (SSCOP)".

[7] ITU-T Recommendation Q.2140 (1995-02): "B-ISDN ATM adaptation layer - Service Specific Coordination Function for Support of Signalling at the Network Node Interface (SSCF-NNI)".

[8] ITU-T Recommendation Q.2150.1 (1999-12): "AAL type 2 signalling transport converter on broadband MTP".

[9] ITU-T Recommendation Q.2210 (1996-07): "Message transfer part level 3 functions and messages using the services of ITU-T Recommendation Q.2140".

[10] ITU-T Recommendation Q.2630.1 (1999-12): "AAL type 2 signalling protocol (Capability Set 1)".

[11] ITU-T Recommendation X.213 (1995-11): "Information technology - Open systems interconnection - Network Service Definitions".

[12] IETF RFC 768 (1980-08): "User Datagram Protocol".

[13] IETF RFC 791 (1981-09): "Internet Protocol".

[14] IETF RFC 2684 (1999-09): "Multiprotocol Encapsulation over ATM Adaptation Layer 5".

[15] IETF RFC 2225 (1998-04): "Classical IP and ARP over ATM".

[16] IETF RFC 2460 (1998-12): "Internet Protocol, Version 6 (IPv6) Specification".

[17] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp interface ".

[18] IETF RFC 793 (1981-09): "Transmission Control Protocol".

[19] IETF RFC 2474 (1998-12): "Definition of the Differentiated Services Field (DS Field) in the Ipv4 and Ipv6 Headers".

[20] ITU-T Implementor's guide (1999-12) for recommendation Q.2210 (1996-07).

[21] ITU-T Recommendation Q.2630.2 (2000-12): "AAL type 2 signalling protocol (Capability Set 2)".

[22] IETF RFC 1889 (1996-01): "RTP: A Transport Protocol for Real Time Applications".

[23] IETF RFC 1890 (1996-01): "RTP Profile for Audio and Video Conferences with Minimal Control".

[24] 3GPP TS 25.415: "UTRAN Iu Interface User Plane Protocols"

[25] IETF RFC 1661 (1994-07): "The Point-to-Point Protocol (PPP)".

[26] IETF RFC 1662 (1994-07): "PPP in HDLC-like Framing".

[27] IETF RFC 2507 (1999-02): "IP header compression".

[28] IETF RFC 1990 (1996-08): "The PPP Multilink Protocol (MP)".

[29] IETF RFC 2686 (1996-09): "The Multi-Class Extension to Multi-Link PPP".

[30] IETF RFC 2509 (1999-02): "IP Header Compression over PPP".

[31] Void

[32] IETF RFC 3153 (2001-08): "PPP Multiplexing".

[33] IETF RFC 2364 (1998-07): "PPP over AAL5".

[34] IETF RFC 3031 (2001-01): "Multiprotocol Label Switching Architecture".

[35] ITU-T Recommendation E.191 (2000-03): "B-ISDN addressing".

[36] 3GPP TS 25.401: "UTRAN overall description".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

Access Link Control Application Part (ALCAP): generic name for the transport signalling protocols used to set-up and teardown transport bearers

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AAL	ATM Adaptation Layer
AESA	ATM End System Address
ALCAP	Access Link Control Application Part
ARP	Address Resolution Protocol
ATM	Asynchronous Transfer Mode
CN	Core Network
GTP	GPRS Tunnelling Protocol
HDLC	High-level Data Link Control
IP	Internet Protocol

LC	Link Characteristics
LIS	Logical IP Subnet
MTP3b	Message Transfer Part level 3 for Q.2140
NSAP	Network Service Access Point
PDU	Protocol Data Unit
PPP	Point-to-Point Protocol
RFC	Request For Comment
RNC	Radio Network Controller
RTCP	Real-time Transport Control Protocol
RTP	Real-time Transport Protocol
SA	Service Area
SABP	Service Area Broadcast Protocol
SABS	Service Area Broadcast Service
SAR	Segmentation and Reassembly
SCSF-NNI	Service Specific Coordination Function-Network Node Interface
SSCOP	Service Specific Connection Oriented Protocol
SSCS	Service Specific Convergence Sublayer
SSRC	Synchronisation Source
TCP	Transmission Control Protocol
TEID	Tunnel Endpoint Identifier
UDP	User Datagram Protocol
VC	Virtual Circuit

4 Data Link Layer

4.1 ATM Transport Option

ATM shall be used in the transport network user plane and the transport network control plane according to ITU-T Recommendation I.361 [1]. The structure of the cell header used in the UTRAN Iu interface is the cell header format and encoding at NNI (see figure 3/I.361).

4.2 IP Transport Option

An RNC/CN-node supporting IP transport option on the Iu interface shall support PPP protocol with HDLC framing (IETF RFC 1661 [25], IETF RFC 1662 [26]).

NOTE: This does not preclude the single implementation and use of any other protocols (e.g. PPPMux /AAL5/ ATM (IETF RFC 3153 [32], IETF RFC 2364 [33]), PPP/AAL2/ATM, Ethernet, MPLS/ATM (IETF RFC 3031 [34]), etc.) fulfilling the UTRAN requirements toward the upper layers.

An RNC/CN-node supporting IP transport option on the Iu interface and having interfaces connected via low bandwidth PPP links like E1/T1/J1 shall also support IP Header Compression (IETF RFC 2507 [27]) and the PPP extensions ML/MC-PPP (IETF RFC 1990 [28], IETF RFC 2686 [29]). In this case the negotiation of header compression (IETF RFC 2507 [27]) over PPP shall be performed via IETF RFC 2509 [30].

5 Circuit switched domain

5.1 Transport network user plane

5.1.1 General

There are two options for the transport layer for data streams over Iu-CS:

1) ATM based Transport (ATM transport option)

2) IP based Transport (IP transport option)

The following figure shows the protocol stacks of the two options.

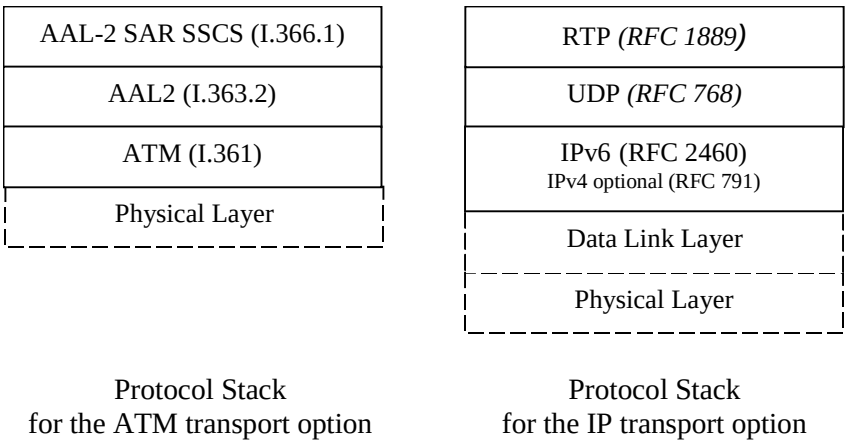

Figure 1. Transport network layer for data streams over Iu-CS.

5.1.2 ATM Transport Option

5.1.2.1 ATM Adaptation Layer 2

5.1.2.1.1 AAL2-Segmentation and Reassembly Service Specific Convergence Sublayer (I.366.1)

Service Specific Segmentation and Reassembly (SSSAR) sublayer of ITU-T Recommendation I.366.1 [4] is used for the segmentation and reassembly of AAL2 SDUs (i.e., only SSSAR is used from ITU-T Recommendation I.366.1).

5.1.2.1.2 AAL2-specification (I.363.2)

AAL2 shall be used according to ITU-T Recommendation I.363.2 [2].

5.1.3 IP Transport Option

5.1.3.1 General

In the IP transport option RTP over UDP over IP shall be supported as the transport for data streams on the Iu-CS interface. The data link layer is as specified in subclause 4.2.

The transport bearer is identified by the UDP port number and the IP address (source UDP port number, destination UDP port number, source IP address, destination IP address).

The source IP address and destination IP address exchanged via RANAP on the Iu-CS interface shall use the NSAP structure. See sub clause 6.1.8.2 in TS 25.401 [36].

5.1.3.2 UDP/IP

The path protocol used shall be UDP (IETF RFC 768 [12]).

An IP RNC/CN-node shall support IPv6. The support of IPv4 is optional.

NOTE: This does not preclude single implementation and use of IPv4.

IP dual stack support is recommended for the potential transition period from IPv4 to IPv6 in the transport network.

There may be one or several IP addresses in the RNC and in the CN. The packet processing function in the CN shall send downstream packets of a given RAB to the RNC IP address / UDP port (received in RANAP) associated to that particular RAB. The packet processing function in the RNC shall send upstream packets of a given RAB to the CN IP address / UDP port (received in RANAP) associated to that particular RAB. If there is no RNC IP address / UDP port yet associated to the packet processing function in the CN for a RAB not yet finally set-up, the packet processing function in the CN for that RAB shall extract the source IP address / UDP port from the first received IP packet to identify the peer IP/UDP entity. The packet processing function in the RNC shall use the same source IP address / UDP port as is sent to CN in RANAP.

The RNC/CN-node shall use two consecutive port numbers for the RTP bearer and for the optional RTCP connection that transport a single Iu UP connection. Two such consecutive port numbers are termed “port number block” in what follows. The first port number shall be even and shall be assigned to the RTP protocol. The next port number shall be assigned to the RTCP protocol. This port shall be reserved even if the optional RTCP protocol is not used.

Each RNC/CN-node shall administer the port numbers it intends to use for RTP/RTCP port number blocks.

5.1.3.3 RTP

RTP (IETF RFC 1889 [22]) shall be applied.

5.1.3.3.1 RTP Header

The RTP Header Fields shall be used as described in the following subclauses:

5.1.3.3.1.1 Version

RTP Version 2 shall be used.

5.1.3.3.1.2 Padding

Padding shall not be used.

5.1.3.3.1.3 Extension

The RTP Header shall not have an extension.

5.1.3.3.1.4 Contributing Source (CSRC) count

There are zero CSRCs.

5.1.3.3.1.5 Marker Bit

The marker bit is ignored.

5.1.3.3.1.6 Payload Type

A dynamic Payload Type (IETF RFC 1890 [23]) shall be used. Values in the Range between 96 and 127 shall be used. The value shall be ignored in the receiving entity.

5.1.3.3.1.7 Sequence Number

The sequence number shall be supplied by the source of an RTP PDU. The sink of an RTP PDU may ignore the sequence number or it may use it to obtain statistics about the link quality and / or to correct out-of-sequence delivery, e.g. by dropping out-of-sequence packets.

5.1.3.3.1.8 Timestamp

The timestamp shall be supplied by the source of an RTP PDU. A clock frequency of 16000 Hz shall be used. The sink of an RTP PDU may ignore the timestamp or it may use it to obtain statistics about the link quality and / or to correct jitter.

5.1.3.3.1.9 Synchronisation Source (SSRC)

The source of an RTP PDU shall supply a SSRC. The sink of an RTP PDU may ignore the SSRC if it does not use RTCP.

5.1.3.3.1.10 CSRC list

This list is empty.

5.1.3.3.2 RTP Payload

A single Iu UP PDU, as described in TS 25.415 [24], shall be transported as RTP payload.

5.1.3.4 RTCP

RTCP (IETF RFC 1889 [22]) may be applied. RTCP over UDP (IETF RFC 768 [12]) over IPv6 (IETF RFC 2460 [16]) shall be used (IPv4 (IETF RFC 791 [13]) may be used optionally). The use of the RTCP protocol is optional. The receiving entity may ignore incoming RTCP PDUs.

Figure 1a shows the protocol stack for the transport of RTCP. The above Sections about IP and UDP shall also apply for the transport of RTCP.

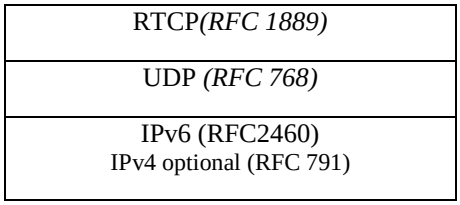

Figure 1a. RTCP Protocol stack for data stream transport on Iu-CS.

5.1.3.5 Diffserv code point marking

IP Differentiated Services code point marking (IETF RFC 2474 [19]) shall be supported. The mapping between traffic categories and Diffserv code points shall be configurable by O&M for each traffic category. Traffic categories are implementation-specific and may be determined from the application parameters.

5.2 Transport network control plane

5.2.1 General

The following figure shows the protocol stack for transport signalling over Iu-CS in ATM based transport (ATM transport option). An ALCAP protocol is not required when both UTRAN and CN nodes are using the IP based transport (IP transport option).

The protocol stack for IP-ALCAP in IP to ATM interworking case is defined in chapter 5.3.3 of this Technical Specification.

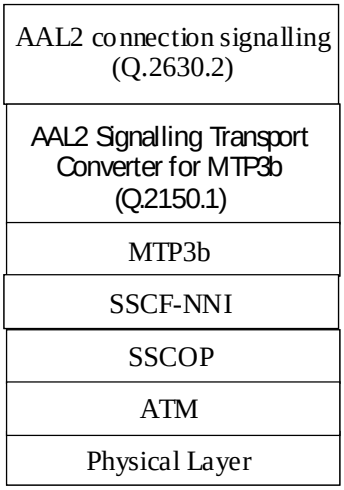

Figure 2. Signalling bearer for ALCAP on Iu-CS interface.

5.2.2 Transport Signalling for the ATM Transport Option

5.2.2.1 Signalling protocol (ALCAP)

5.2.2.1.1 AAL2 Signalling Protocol (Q.2630.2)

In the ATM transport option ITU-T Recommendation Q.2630.2 [21] shall be used for establishing AAL2 connections towards the circuit switched domain. ITU-T Recommendation Q.2630.2 [21] adds new optional capabilities to ITU-T Recommendation Q.2630.1 [10].

The AAL2 transport layer uses the embedded E.164 or other AESA variants of the NSAP addressing formats ITU-T Rec. X.213 [11], and ITU-T Recommendation E.191 [35]. Native E.164 addressing (ITU-T Recommendation E.164 [5]) shall not be used.

Binding ID provided by the radio network layer shall be copied in SUGR parameter of ESTABLISH request primitive of ITU-T Recommendation Q.2630.2 [21].

The Link Characteristics parameter (LC) shall be included in the Establish Request message and in the Modification Request message of AAL2 signalling protocol.

5.2.2.2 Signalling transport converter

5.2.2.2.1 AAL2 MTP3B Signalling Transport Converter (Q.2150.1)

The AAL2 MTP3b Signalling Transport Converter shall be used according to ITU-T Recommendation Q.2150.1 [8].

5.2.2.3 MTP3b (Q.2210)

MTP3b shall be used according to ITU-T Recommendation Q.2210 [9] and ITU-T Implementor's guide (12/99) for recommendation Q.2210 [20].

5.2.2.4 SSCF-NNI (Q.2140)

SSCF-NNI shall be used according to ITU-T Recommendation Q.2140 [7].

5.2.2.5 SSCOP (Q.2110)

SSCOP shall be used according to ITU-T Recommendation Q.2110 [6].

5.2.2.6 ATM Adaptation Layer Type 5 (I.363.5)

AAL5 shall be used according to ITU-T Recommendation I.363.5 [3].

5.3 Interworking between ATM and IP Transport Options

5.3.1 Introduction

This clause specifies the interworking between IP and ATM transport options. An RNC/CN-node supporting IP transport option shall provide interworking to a CN-node/RNC supporting only ATM transport option.

5.3.2 Interworking Alternatives

For interworking with a CN-node/RNC supporting only ATM transport option, the RNC/CN-node supporting IP transport option shall additionally support at least one of the following interworking mechanisms:

1) ATM&IP dual stack. An IP-ALCAP protocol is not required in this interworking solution.

   Annex A of this technical specification shows an example of protocols for the case the ATM&IP RNC/CN-node has no ATM connectivity.

2) An Interworking Function (IWF), either internal or external to the RNC/CN node.

   Annex A of this technical specification shows an example of a protocol stack for the case when the IWF is an external unit to the RNC/CN node. Other protocol stacks for this case are not precluded.

6 Packet switched domain

6.1 Transport network user plane

6.1.1 General

There are two options for the transport layer for data streams over Iu-PS:

1) ATM based Transport (ATM transport option)

2) IP based Transport (IP transport option)

The following figure shows the protocol stacks of the two options.

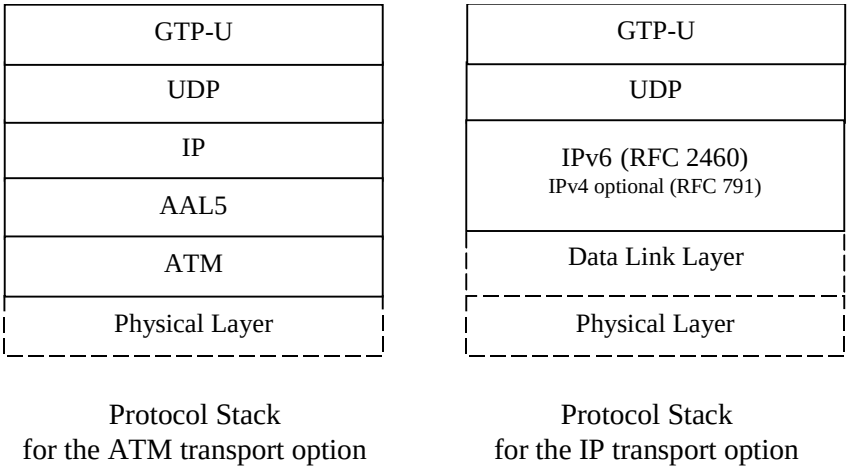

Figure 3. Transport network layer for data streams over Iu-PS.

6.1.2 ATM Transport Option

6.1.2.1 General

In the ATM transport option, the protocol architecture for the User Plane of the Iu interface towards the packet switched domain shall be GTP-U (TS 29.060 [17]) over UDP over IP over AAL5 over ATM. One or several AAL5/ATM permanent VC's may be used as the common layer 2 resources between the UTRAN and the packet switched domain of the CN.

One switched VC may be used per user flow. The standardisation of the procedures and protocols for use of Switched VC is outside the scope of 3GPP.

Congestion control shall be performed over the Iu user plane toward the packet switched domain using buffer management and no flow control.

6.1.2.2 GTP-U

The GTP-U (TS 29.060 [17]) protocol shall be used over the Iu interface toward the packet switched domain.

6.1.2.3 UDP /IP

The path protocol used shall be UDP (IETF RFC 768 [12]), which is specified in RFC 768.

The UDP port number for GTP-U shall be as defined in TS 29.060 [17].

IPv4 (IETF RFC 791 [13]) shall be supported; IPv6 (IETF RFC 2460 [16]) support is optional.

There may be one or several IP addresses in the RNC and in the CN. The packet processing function in the CN shall send downstream packets of a given RAB to the RNC IP address (received in RANAP) associated to that particular RAB. The packet processing function in the RNC shall send upstream packets of a given RAB to the CN IP address (received in RANAP) associated to that particular RAB.

There is one RNC IP address per RNC in the CN associated with one MBMS RAB. This address is received in RANAP at the establishment of the MBMS RAB. The packet processing function in the CN shall send the downstream packets of the MBMS RAB to this associated RNC IP address.

6.1.2.4 ATM Adaptation Layer Type 5 (I.363.5)

AAL5 shall be used according to ITU-T Recommendation I.363.5 [3].

AAL5 virtual circuits shall be used to transport the IP packets across the Iu interface toward the packet switched domain. Multiple VCs may be used over the interface. An association shall be made between a VC and the IP addresses that are related to this VC in the peer node side. This association shall be made using O&M or using "ATM Inverse ARP" when PVCs are used.

When PVCs are used, quality of service differentiation shall only be performed at the IP layer using differentiated services (IETF RFC 2474 [19]).

6.1.2.5 IP/ATM

When the association mentioned in 6.1.2.4 is made using 0&M, the "LLC encapsulation" option of "Multiprotocol Encapsulation over AAL5" shall be used to carry the IP packets over the ATM transport network when PVCs are used.

When the association mentioned in 6.1.2.4 is made using "ATM Inverse ARP", "Classical IP and ARP" over ATM protocols and the "LLC encapsulation" option of "Multiprotocol Encapsulation over AAL5" shall be used to carry the IP packets over the ATM transport network when PVCs are used. "Classical IP and ARP over ATM" is specified in IETF RFC 2225 [15]. "Multiprotocol Encapsulation over AAL5" is specified in IETF RFC 2684 [14].

"Classical IP and ARP over ATM" allows routers to be members of one or more LISs. The CN side of the Iu interface shall provide IP routing functionalities. The RNC side of the Iu interface may provide routing functionalities. If the RNC side of the Iu interface does not provide routing functionalities, the RNC routing tables shall include default route entries.

6.1.3 IP Transport Option

6.1.3.1 General

In the IP transport option GTP-U (TS 29.060 [17]) over UDP over IP shall be supported as the transport for data streams on the Iu-PS interface. The data link layer is as specified in subclause 4.2.

The transport bearer is identified by the GTP-U TEID (TS 29.060 [17]) and the IP address (source TEID, destination TEID, source IP address, destination IP address).

6.1.3.2 GTP-U

The GTP-U (TS 29.060 [17]) protocol shall be used over the Iu interface toward the packet switched domain.

6.1.3.3 UDP /IP

The path protocol used shall be UDP (IETF RFC 768 [12]).

The UDP port number for GTP-U shall be as defined in TS 29.060 [17].

An IP RNC/CN-node shall support IPv6. The support of IPv4 is optional.

NOTE: This does not preclude single implementation and use of IPv4.

IP dual stack support is recommended for the potential transition period from IPv4 to IPv6 in the transport network.

RNC shall support fragmentation and assembly of GTP packets at the IP layer.

There may be one or several IP addresses in the RNC and in the CN. The packet processing function in the CN shall send downstream packets of a given RAB to the RNC IP address (received in RANAP) associated to that particular RAB. The packet processing function in the RNC shall send upstream packets of a given RAB to the CN IP address (received in RANAP) associated to that particular RAB.

There is one RNC IP address per RNC in the CN associated with one MBMS RAB. This address is received in RANAP at the establishment of the MBMS RAB. The packet processing function in the CN shall send the downstream packets of the MBMS RAB to this associated RNC IP address.

6.1.3.4 Diffserv code point marking

IP Differentiated Services code point marking (IETF RFC 2474 [19]) shall be supported. The mapping between traffic categories and Diffserv code points shall be configurable by O&M for each traffic category. Traffic categories are implementation-specific and may be determined from the application parameters.

6.2 Transport network control plane

ALCAP is not required over the Iu interface towards the packet switched domain.

7 Broadcast Domain

7.1 Transport network user plane

7.1.1 General

There are two options for the transport layer for data streams over Iu-BC:

1) ATM based Transport (ATM transport option)
2) IP based Transport (IP transport option)

The following figure shows the protocol stacks of the two options.

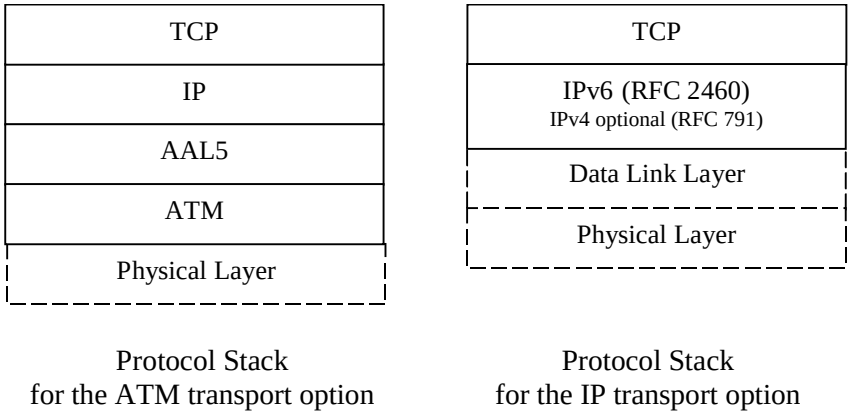

Figure 4. Transport network layer for data streams over Iu-BC.

7.1.2 ATM Transport Option

7.1.2.1 General

In the ATM transport option, the protocol architecture for the Service Area Broadcast Plane of the Iu interface shall be TCP over IP over AAL5 over ATM.

7.1.2.2 TCP/IP

The path protocol used shall be TCP, which is specified in IETF RFC793 [18]. IPv4 (IETF RFC 791 [13]) shall be supported, IPv6 (IETF RFC 2460 [16]) support is optional.

The TCP Destination Port number for SABP messages is 3452. It is the registered port number for SABP.

The 3452 destination port number shall be used by both entities (RNC or CN) whenever it sets up a new TCP connection. When it sends SABP messages on an existing TCP connection, the sending entity (RNC or CN) shall use as TCP destination port number either 3452 if it was the initiator of this TCP connection, or the TCP source port number that was received from the peer entity that had initiated this existing TCP connection.

7.1.2.3 ATM Adaptation Layer Type 5 (I.363.5)

AAL5 shall be used according to ITU-T Recommendation I.363.5.

AAL5 virtual circuits shall be used to transport the IP packets across the Iu interface toward the broadcast domain. Multiple VCs may be used over the interface. An association shall be made between a VC and the IP addresses that are related to this VC in the peer node side. This association shall be made using O&M or using ATM Inverse ARP according to Classical IP over ATM when PVCs are used.

7.1.2.4 IP/ATM

When the association mentioned in 7.1.2.3 is made using O&M, the "LLC encapsulation" option of "Multiprotocol Encapsulation over AAL5" shall be used to carry the IP packets over the ATM transport network when PVCs are used.

When the association mentioned in 7.1.2.3 is made using "ATM Inverse ARP", "Classical IP and ARP over ATM" protocols and the "LLC encapsulation" option of "Multiprotocol Encapsulation over AAL5" shall be used to carry the IP packets over the ATM transport network when PVCs are used. "Classical IP and ARP over ATM" is specified in IETF RFC 2225 [15]. "Multiprotocol Encapsulation over AAL5" is specified in IETF RFC 2684 [14].

7.1.3 IP Transport Option

7.1.3.1 General

In the IP transport option TCP over IP shall be supported as the transport for data streams on the Iu-BC interface. The data link layer is as specified in subclause 4.2.

The transport bearer is identified by the TCP port number and the IP address (source TCP port number, destination TCP port number, source IP address, destination IP address).

7.1.3.3 TCP /IP

The path protocol used shall be TCP, which is specified in IETF RFC 793 [18].

The TCP Destination Port number for SABP messages is 3452. It is the registered port number for SABP.

The 3452 destination port number shall be used by both entities (RNC or CN) whenever it sets up a new TCP connection. When it sends SABP messages on an existing TCP connection, the sending entity (RNC or CN) shall use as TCP destination port number either 3452 if it was the initiator of this TCP connection, or the TCP source port number that was received from the peer entity that had initiated this existing TCP connection.

An IP RNC/CN-node shall support IPv6. The support of IPv4 is optional.

NOTE: This does not preclude single implementation and use of IPv4.

IP dual stack support is recommended for the potential transition period from IPv4 to IPv6 in the transport network.

7.1.3.4 Diffserv code point marking

IP Differentiated Services code point marking (IETF RFC 2474 [19]) shall be supported. The mapping between traffic categories and Diffserv code points shall be configurable by O&M for each traffic category. Traffic categories are implementation-specific and may be determined from the application parameters.

7.2 Transport network control plane

ALCAP is not required over the Iu interface towards the broadcast domain.

Annex A (informative): IP-ATM Interworking

A.1 Application of IP tunnelling in IP-ATM interworking alternative 1 in case of no direct ATM connectivity at the IP&ATM dual stack RNC/CN-node

One possibility of enabling ATM connectivity to the IP&ATM dual stack RNC/CN-node in the IP-ATM interworking alternative 1 scenario specified in chapter 5.3.2 is to use any ATM emulation over IP protocol from the IETF standards e.g. via tunnelling techniques.

A.2 Application of IP-ALCAP in IP-ATM interworking alternative 2

One example scenario of IP-ATM interworking alternative 2 of section 5.3.2 is to use IP-ALCAP as specified in ITU-T Recommendation Q.2631.1 (10/2003) as the bearer control protocol between the RNC/CN Node and its external IWF. The following figure shows the corresponding protocol stack.

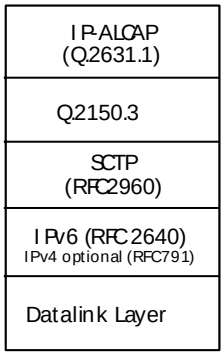

Figure A.1. Protocol stack for IP-ALCAP in IP-ATM interworking alternative 2

Annex B (informative): Change history

Date / TSG	TSG Doc.	CR	Rev	Subject/Comment	New
12/2008	-	-	-	Creation of Rel-8 version based on v7.1.0	8.0.0
12/2009	-	-	-	Creation of Rel-9 version based on v8.0.0	9.0.0
SP-49	SP-100629			Clarification on the use of References (TS 21.801 CR#0030)	9.0.1
03/2011				Creation of Rel-10 version based on v9.0.1	10.0.0
06/2011	RP-110685	0090	-	Reference review outcome in TS 25.414	10.1.0
09/2012				Update to Rel-11 version (MCC)	11.0.0
09/2014				Update to Rel-12 version (MCC)	12.0.0
12/2015				Update to Rel-13 version (MCC)	13.0.0

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2017-03	SA#75					Promotion to Release 14 without technical change	14.0.0
2018-07	SA#80	-	-	-	-	Promotion to Release 15 without technical change	15.0.0
2020-07	SA#88-e	-	-	-	-	Update to Rel-16 version (MCC)	16.0.0

History

Document history		
V16.0.0	August 2020	Publication