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Technical Specification

**3rd Generation Partnership Project;
Technical Specification Group Radio Access Network;
Evolved Universal Terrestrial Radio Access Network
(E-UTRAN);
X2 data transport
(Release 11)**



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Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

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 X2 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] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 29.281: "General Packet Radio System (GPRS) Tunneling Protocol User Plane (GTPv1-U)".
- [3] IETF RFC 768 (1980-08): "User Datagram Protocol".
- [4] IETF RFC 2474 (1998-12): "Definition of the Differentiated Services Field (DS Field) in the Ipv4 and Ipv6 Headers".
- [5] IETF RFC 2460 (1998-12): "Internet Protocol, Version 6 (IPv6) Specification".
- [6] IETF RFC 791 (1981-09): "Internet Protocol".
- [7] 3GPP TS 36.401: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Architecture Description".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions below apply. Terms and definitions not defined below can be found in TR 21.905 [1].

E-RAB: Defined in TS 36.401 [7].

X2: logical interface between two eNBs. Whilst logically representing a point to point link between eNBs, the physical realisation need not be a point to point link.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

eNB	E-UTRAN Node B
E-RAB	E-UTRAN Radio Access Bearer

E-UTRAN	Evolved UTRAN
GTP	GPRS Tunnelling Protocol
IP	Internet Protocol
TEID	Tunnel Endpoint Identifier
UDP	User Datagram Protocol

4 Data link layer

Any data link protocol that fulfils the requirements toward the upper layer may be used.

5 X2 interface user plane protocol

5.1 General

The transport layer for data streams over X2 is an IP based Transport. The following figure shows the transport protocol stacks over X2.

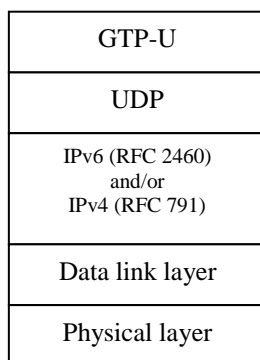


Figure 6.1: Transport network layer for data streams over X2

The GTP-U (TS 29.281 [2]) protocol over UDP over IP shall be supported as the transport for data streams on the X2 interface. The data link layer is as specified in clause 4.

There may be zero or one UL data stream and zero or one DL data stream per E-RAB at the X2 interface.

- The DL data stream is used for DL data forwarding from the source eNB to the target eNB.
- The UL data stream is used for UL data forwarding from the source eNB to the target eNB.

Each data stream is carried on a dedicated transport bearer.

The identity of a transport bearer signalled in the RNL control plane consists of the IP address and the TEID of the corresponding GTP tunnel, allocated by the target eNB (see TS 29.281 [2]).

5.2 GTP-U

The GTP-U (TS 29.281 [2]) protocol shall be used over the X2 interface between two eNBs.

5.3 UDP/IP

The path protocol used shall be UDP (IETF RFC 768 [3]).

The UDP port number for GTP-U shall be as defined in TS 29.281 [2].

The eNBs over the X2 interface shall support fragmentation and assembly of GTP packets at the IP layer.

The eNB shall support IPv6 (IETF RFC 2460 [5]) and/or IPv4 (IETF RFC 791 [6]).

There may be one or several IP addresses in the both eNBs. The packet processing function in the source eNB shall send downstream packets of a given E-RAB to the target eNB IP address (received in X2AP) associated to the DL transport bearer of that particular E-RAB. The packet processing function in the source eNB shall send upstream packets of a given E-RAB to the target eNB IP address (received in X2AP) associated to the UL transport bearer of that particular E-RAB.

The Transport Layer Address signalled in X2AP messages is a bit string of

- a) 32 bits in case of IPv4 address according to IETF RFC 791 [6]; and
- b) 128 bits in case of IPv6 address according to IETF RFC 2460 [5].

5.4 Diffserv code point marking

IP Differentiated Services code point marking (IETF RFC 2474 [4]) shall be supported. The mapping between traffic categories and Diffserv code points shall be configurable by O&M for based on QoS Class Identifier (QCI)/ Label Characteristics and others E-UTRAN traffic parameters. Traffic categories are implementation-specific and may be determined from the application parameters.

Annex A (informative): Change history

TSG#	TSG Doc.	CR	Rev	Subject/Comment	New
38				approved at TSG-RAN and placed under change control	8.0.0
39	RP-080078	0001	-	Editorial correction on 36.424	8.1.0
39	RP-080078	0002	-	Data link layer proposal	8.1.0
40	RP-080302	0003	1	eGTP draft reference for X2 Data Transport	8.2.0
40	RP-080302	0005	-	Define format for TLA signalled in X2AP messages	8.2.0
41	RP-080583	0006	1	X2 transport bearers	8.3.0
42	RP-080845	0007		Correction of SAE Bearer	8.4.0
43	RP-090083	0008		Correction on GTP-U version	8.5.0
09/2009	-	-	-	Creation of Rel-9 version based on v8.5.0	9.0.0
12/2010				Creation of Rel-10 version based on v. 9.0.0	10.0.0
SP-49	SP-100629			Clarification on the use of References (TS 21.801 CR#0030)	10.0.1
52	RP-110684	0009		Correction of references	10.1.0
09/2012				Update to Rel-11 version (MCC)	11.0.0