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TECHNICAL SPECIFICATION

LTE;
Evolved Universal Terrestrial
Radio Access Network (E-UTRAN)
and Wireless Local Area Network (WLAN);
Xw data transport
(3GPP TS 36.464 version 14.2.0 Release 14)

Reference

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Keywords

LTE

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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 Xw interface for LTE/WLAN Aggregation (LWA) and enhanced LTE WLAN Radio Level Integration with IPsec Tunnel (eLWIP).

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.

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[1]   3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2]   3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2".

[3]   3GPP TS 36.465: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless LAN (WLAN); Xw interface user plane protocol".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

LTE-WLAN Aggregation: Defined in TS 36.300 [2].

LWA bearer: Defined in TS 36.300 [2].

LWIP bearer: Defined in TS 36.300 [2].

LWIP Operation: Defined in TS 36.300 [2].

Xw: logical interface between eNB and WT.

WLAN Termination: Defined in TS 36.300 [2].

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP 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 3GPP TR 21.905 [1].

eNB	E-UTRAN Node
LWA	LTE-WLAN Aggregation
LWIP	LTE WLAN Radio Level Integration with IPsec Tunnel
WT	WLAN Termination

4 Data link layer

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

5 Xw interface user plane protocol

5.1 General

The transport layer for data streams over Xw is an IP based Transport. The following figure shows the transport protocol stacks over Xw.
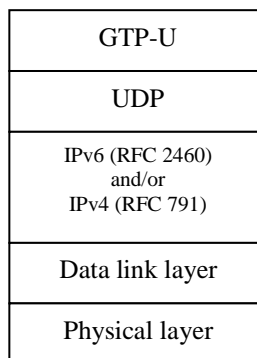
GTP-U
UDP
IPv6 (RFC 2460) and/or IPv4 (RFC 791)
Data link layer
Physical layer

Figure 5.1: Transport network layer for data streams over Xw

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

For LWA bearers, there may be one UL data stream and there may be one DL data stream per E-RAB at the Xw interface. For LWIP bearers, there may be one UL data stream and there may be one DL data stream per UE at the Xw interface.

- The DL data stream is used for DL user data forwarding from the eNB to the WT.

- The UL data stream is used for carrying the UL flow control feedback (if flow control is supported) and for UL user data forwarding from the WT to the eNB.

Each data stream is carried on a dedicated transport bearer.

If supported, the WT may use the DRB Identifier in the LWA PDU header of the UL data stream to identify the dedicated UL 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 node (see TS 29.281 [2]).

5.2 GTP-U

The GTP-U (TS 29.281 [2]) protocol shall be used over the Xw interface between eNB and WT.

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 eNB and the WT over the Xw interface shall support fragmentation and assembly of GTP packets at the IP layer.

The eNB and the WT shall support IPv6 (IETF RFC 2460 [5]) and/or Ipv4 (IETF RFC 791 [6]).

LWA:

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

LWIP:

There may be one or several IP addresses in both the eNB and the LWIP-SeGW. The packet processing function in the source eNB shall send downstream packets corresponding to a given LWIP bearer to the target LWIP-SeGW IP address (received in XwAP) associated to the DL transport bearer of that particular GTP-U TEID. The packet processing function in the source LWIP-SeGW shall send upstream packets corresponding to a given UE to the target eNB IP address (received in XwAP) associated to the UL transport bearer of that particular GTP-U TEID.

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

  a) 32 bits in case of Ipv4 address according to IETF RFC 791 [6]; or

  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.

5.5 LTE-WLAN Aggregation

For the LWA bearer option

  - the GTP-U (TS 29.281 [2]) protocol over UDP over IP shall be supported as the transport for the downlink and uplink user data streams of LWA PDUs and the uplink flow control feedback stream on the Xw interface. The GTP-U PDU may include a Xw RAN Container with flow control information as specified in TS 36.465 [3] which is carried in the GTP-U extension header. The transport bearer is identified by the GTP-U TEID (TS 29.281 [2]) and the IP address of the eNB and WT respectively. There is one UL data stream and there is one DL data stream per E-RAB at the Xw interface:

    - The DL data stream is used for DL user data transmission from the eNB to the WT.

    - The UL data stream is used for UL user data transmission and UL flow control feedback transmission from the WT to the eNB.

  - the packet processing function in the eNB shall send downstream packets corresponding to a given E-RAB to the WT IP address (received in XwAP) associated to the DL transport bearer of that particular E-RAB. The packet processing function in the WT shall send upstream packets corresponding to a given E-RAB to the eNB IP address (received in XwAP) associated to the UL transport bearer of that particular E-RAB or the E-RAB with the lowest E-RAB ID.

  - in addition, user data forwarding (from WT to eNB) may be performed by eNB providing another GTP-U TEID to receive the DL data forwarded by the WT.

5.6 LTE WLAN Radio Level Integration with IPsec Tunnel

For the LWIP bearer option

  - the GTP-U (TS 29.281 [2]) protocol over UDP over IP shall be supported as the transport for the downlink and uplink user data streams of LWIP PDUs and the uplink flow control feedback stream on the Xw interface. The

GTP-U PDU includes a Xw RAN Container with flow control information as specified in TS 36.465 [3] which is carried in the GTP-U extension header. The transport bearer is identified by the GTP-U TEID (TS 29.281 [2]) and the IP address of the eNB and LWIP-SeGW respectively. There is one UL data stream and there is one DL data stream per UE at the Xw interface:

- The DL data stream is used for DL user data transmission from the eNB to the LWIP-SeGW.

- The UL data stream is used for UL user data transmission and UL flow control feedback transmission from the LWIP-SeGW to the eNB.

- the packet processing function in the eNB shall send downstream packets corresponding to all LWIP bearers to the LWIP-SeGW IP address (received in XwAP) associated to the DL transport bearer of that particular GTP-U TEID. The packet processing function in the LWIP-SeGW shall send upstream packets corresponding to all LWIP bearers to the eNB IP address (received in XwAP) associated to the UL transport bearer of that particular GTP-U TEID.

Annex A (informative): Change history

Date	Meeting	TDoc.	CR	Rev	Cat	Subject/Comment	New version
2015-08	RAN3#89	R3-151596				Draft skeleton TR	0.0.1
2015-09	RAN3#89-bis	R3-152213				TR number update	0.0.2
2015-11	RAN3#90	R3-152419				TR number update	0.1.0
2015-11	RAN3#90	R3-152906				Agreements from RAN3#90	0.2.0
2016-01	RAN3#AH	R3-160006				TR number update	1.1.0
2016-02	RAN3#AH	R3-160149				Agreements from RAN3#AH	1.2.0
2016-02	RAN3#91	R3-160157				TR number update	1.3.0
2016-02	RAN3#91	R3-160456				Agreements from RAN3#91	1.4.0
2016-03	71	RP-160436				MCC cleanup, presented for approval in RAN#71	2.0.0
2016-03	71					Upgraded to Rel-13 and placed under change control	13.0.0
2016-06	72	RP-161046	1	1	F	Rapporteur updates – miscellaneous corrections	13.1.0
2016-09	73	RP-161550	5		F	Correction of the LWA PDU type	13.2.0
2017-03	RAN#75	RP-170535	0009		B	Enabling uplink data bearers	14.0.0
2017-03	RAN#75	RP-170543	0010	1	B	Enabling LWIP support over Xw	14.0.0
2017-06	RAN#76	RP-171324	011	-	F	Clarification of the use of the RAN Container	14.1.0
2017-09	RP-77	RP-171982	0013	1	A	Change of the name of the GTP container	14.2.0

History

Document history		
V14.0.0	April 2017	Publication
V14.1.0	August 2017	Publication
V14.2.0	October 2017	Publication