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TECHNICAL SPECIFICATION

5G;
NG-RAN;
NG data transport
(3GPP TS 38.414 version 16.0.0 Release 16)

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Contents

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 NG 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 23.501: "System Architecture for the 5G System; Stage 2".

[3]   3GPP TS 29.281: "General Packet Radio System (GPRS) Tunnelling Protocol User Plane (GTPv1-U)".

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

[5]   IETF RFC 8200 (2017-07): "Internet Protocol, Version 6 (IPv6) Specification".

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

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

[8]   3GPP TS 38.300: "NR and NG-RAN Overall Description Stage 2"

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].

gNB: as defined in TS 38.300 [8].

ng-eNB: as defined in TS 38.300 [8].

NG-RAN node: as defined in TS 38.300 [8].

NG-U: as defined in TS 38.300 [8].

PDU Session: as defined in TS 23.501[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].

5GC	5G Core
5QI	5G QoS Identifier
AMF	Access and Mobility Management Function
GTP	GPRS Tunnelling Protocol
IP	Internet Protocol
NGAP	NG Application Protocol
TEID	Tunnel Endpoint Identifier
UDP	User Datagram Protocol
UPF	User Plane Function

4 Data Link Layer

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

5 NG Interface user plane protocol

5.1 General

Both gNB and ng-eNB can be connected to the 5GC over the NG interface.

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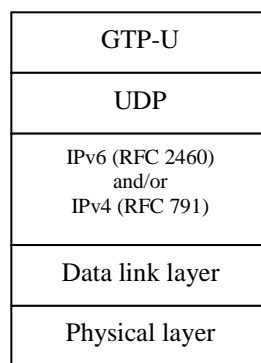
GTP-U
UDP
IPv6 (RFC 2460) and/or IPv4 (RFC 791)
Data link layer
Physical layer

Figure 5.1: Transport network layer for data streams over NG

The GTP-U (TS 29.281 [3]) protocol over UDP over IP shall be supported as the transport for data streams on the NG interface. The data link layer is as specified in clause 4.

The transport bearer is identified by the GTP-U TEID (TS 29.281 [3]) and the IP address (source TEID, destination TEID, source IP address, destination IP address).

5.2 GTP-U

The GTP-U (TS 29.281 [3]) protocol shall be used over the NG-U interface toward the 5GC.

5.3 UDP/IP

The path protocol used shall be UDP (IETF RFC 768 [4]).

The UDP port number for GTP-U shall be as defined in TS 29.281 [3].

The NG-RAN node and the 5GC shall support fragmentation and assembly of GTP packets at the IP layer.

The NG-RAN node and the 5GC shall support IPv6 (IETF RFC 8200 [5]) and/or IPv4 (IETF RFC 791 [6]).

There may be one or several IP addresses in the NG-RAN node and in the 5GC. The packet processing function in the 5GC shall send downstream packets of a given PDU Session to the NG-RAN node IP address (received in NGAP) associated to that particular PDU Session. The packet processing function in the NG-RAN node shall send upstream packets of a given PDU Session to the 5GC IP address (received in NGAP) associated to that particular PDU Session.

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

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 8200 [5]; or

c) 160 bits if both IPv4 and IPv6 addresses are signalled, in which case the IPv4 address is contained in the first 32 bits.

5.4 Diffserv code point marking

IP Differentiated Services code point marking (IETF RFC 2474 [7]) shall be supported. The mapping between traffic categories and Diffserv code points shall be configurable by O&M based on 5QI, the Priority Level (if explicitly signalled), and other NG-RAN traffic parameters (e.g. ARP). Traffic categories are implementation-specific and may be determined from the application parameters.

Annex A (informative):
Change history

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
May 2017	RAN3#96	R3-171514				Initial DraftTS endorsed	0.0.2
October 2017	RAN3#97 bis	R3-174240				Update some texts due to new 5G terminologies Add up "Diffserv code point marking"	0.3.0
January 2018	RAN3-adhoc1801					Incorporate agreed TPs from RAN3-adhoc1801	0.4.0
May 2018	RAN3#100	R3-182642				Covering agreements of RAN3#100	0.5.0
06-2018	RP-80	RP-180787	-	-	-	Presentation to RAN for approval	1.0.0
06-2018	RP-80		-	-	-	Specification approved at TSG-RAN and placed under change control	15.0.0
09-2018	RP-81	RP-181920	0001	-	F	Updated reference to IPv6	15.1.0
2019-07	RP-84	RP-191396	0005	1	F	Use of Priority Level and ARP for the DSCP Derivation at the gNB	15.2.0
2020-07	RP-88-e	RP-201093	0006	1	D	Rapporteur Clean-ups of TS38.414	15.3.0
2020-07	SA-88-e	-	-	-	-	Update to Rel-16 version (MCC)	16.0.0

History

Document history		
V16.0.0	July 2020	Publication