



**Universal Mobile Telecommunications System (UMTS);
LTE;
Policy and charging control over Rx reference point
(3GPP TS 29.214 version 15.7.0 Release 15)**



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1 Scope

The present document provides the stage 3 specification of the Rx reference point for the present release. The functional requirements and the stage 2 specifications of the Rx reference point are contained in 3GPP TS 23.203 [2].

The Rx reference point lies between the Application Function (AF) and the Policy and Charging Rule Function (PCRF). In the 5GS the Rx reference point resides between the AF and the Policy Control Function (PCF) as specified in 3GPP TS 23.501 [55] and 3GPP TS 23.503 [56].

NOTE: Interactions between the PCF and the AF using the 5GS Npcf_PolicyAuthorization service (the N5 reference point) are defined in 3GPP TS 29.514 [57].

The Rx interface which is based on RESTful HTTP and XML is specified in 3GPP TS 29.201 [37].

Whenever it is possible the present document specifies the requirements for the protocol by reference to specifications produced by the IETF within the scope of Diameter. Where this is not possible, extensions to Diameter are defined within the present document.

2 References

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- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 23.203: "Policy and Charging Control architecture".
- [3] Void.
- [4] Void.
- [5] 3GPP TS 29.209: "Policy control over Gq interface", latest Rel-6 version.
- [6] Void.
- [7] 3GPP TS 29.211: "Rx Interface and Rx/Gx signalling flows", latest Rel-6 version.
- [8] 3GPP TS 29.212: "Policy and Charging Control (PCC); Reference points".
- [9] 3GPP TS 29.213: "Policy and Charging Control signalling flows and Quality of Service (QoS) parameter mapping".
- [10] Void.
- [11] IETF RFC 3556: "Session Description Protocol (SDP) Bandwidth Modifiers for RTP Control Protocol (RTCP) Bandwidth".
- [12] IETF RFC 4005: "Diameter Network Access Server Application".
- [13] IETF RFC 4566: "SDP: Session Description Protocol".
- [14] IETF RFC 4006: "Diameter Credit Control Application".

- [15] ETSI TS 183 017 v3.2.1: "Telecommunications and Internet Converged Services and Protocols for Advanced Networking (TISPAN); Resource and Admission Control: DIAMETER protocol for session based policy set-up information exchange between the Application Function (AF) and the Service Policy Decision Function (SPDF); Protocol specification".
- [16] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".
- [17] 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on SIP and SDP; Stage 3".
- [18] IETF RFC 3264: "An Offer/Answer Model with the Session Description Protocol (SDP)".
- [19] Void.
- [20] IETF RFC 3162: "Radius and IPv6".
- [21] IETF RFC 5031: "A Uniform Resource Name (URN) for Emergency and Other Well-Known Services".
- [22] Void.
- [23] 3GPP TS 32.240: "Telecommunication management; Charging management; Charging architecture and principles".
- [24] 3GPP TS 32.299: "Telecommunication management; Charging management; Diameter charging applications".
- [25] 3GPP TS 29.229: "Cx and Dx interfaces based on the Diameter protocol; Protocol details"
- [26] 3GPP TS 24.292: "IP Multimedia (IM) Core Network (CN) subsystem Centralized Services (ICS); Stage 3".
- [27] IETF RFC 3959 (December 2004): "The Early Session Disposition Type for the Session Initiation Protocol (SIP)".
- [28] 3GPP TS 23.380: "IMS Restoration Procedures".
- [29] Void.
- [30] Void.
- [31] 3GPP TS 22.153: "Multimedia Priority Service".
- [32] Void.
- [33] 3GPP TS 29.274: "3GPP Evolved Packet System. Evolved GPRS Tunnelling Protocol for EPS (GTPv2)".
- [34] 3GPP TS 29.061: "Interworking between the Public Land Mobile Network (PLMN) supporting packet based services and Packet Data Networks (PDN)".
- [35] IETF RFC 7683: "Diameter Overload Indication Conveyance".
- [36] 3GPP TS 23.468: "Group Services and System Aspects; Group Communication System Enablers for LTE (GCSE LTE)".
- [37] 3GPP TS 29.201: "Representational State Transfer (REST) reference point between Application Function (AF) and Protocol Converter (PC)".
- [38] 3GPP TS 23.003: "Numbering, addressing and identification".
- [39] 3GPP TS 29.273: "3GPP EPS AAA interfaces".
- [40] 3GPP TS 23.682: "Architecture enhancements to facilitate communications with packet data networks and applications".
- [41] 3GPP TS 26.114: "IP Multimedia Subsystem (IMS); Multimedia telephony; Media handling and interaction".

- [42] IETF RFC 5761: "Multiplexing RTP Data and Control Packets on a Single Port".
- [43] IETF RFC 7944: "Diameter Routing Message Priority".
- [44] Void.
- [45] IETF RFC 8101: "IANA Registration of New Session Initiation Protocol (SIP) Resource-Priority Namespace for Mission Critical Push To Talk service".
- [46] 3GPP TS 23.303: "Proximity-based services (ProSe); Stage 2".
- [47] 3GPP TS 29.154: "Service capability exposure functionality over Nt reference point".
- [48] IETF RFC 5009: "Private Header (P-Header) Extension to the Session Initiation Protocol (SIP) for Authorization of Early Media".
- [49] IETF RFC 3948: "UDP Encapsulation of IPsec ESP Packets".
- [50] 3GPP TS 24.302: "Access to the 3GPP Evolved Packet Core (EPC) via non-3GPP access networks; stage 3".
- [51] IETF RFC 8583: "Diameter Load Information Conveyance".
- [52] IETF RFC 6733: "Diameter Base Protocol".
- [53] 3GPP TS 23.167: "IP Multimedia Subsystem (IMS) emergency sessions".
- [54] 3GPP TS 23.379: "Functional architecture and information flows to support Mission Critical Push To Talk (MCPTT); Stage 2".
- [55] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".
- [56] 3GPP TS 23.503: "Policy and Charging Control Framework for the 5G System; Stage 2".
- [57] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".
- [58] 3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".
- [59] 3GPP TS 29.513: "5G System; Policy and Charging Control signalling flows and QoS parameter mapping; Stage 3".
- [60] 3GPP TS 23.280: "Common functional architecture to support mission critical services; Stage 2".
- [61] 3GPP TS 23.281: "Functional architecture and information flows to support Mission Critical Video (MCVideo); Stage 2".
- [62] 3GPP TS 24.182: "IP Multimedia Subsystem (IMS) Customized Alerting Tones (CAT); Protocol specification".
- [63] 3GPP TS 24.147: "Conferencing using the IP Multimedia (IM) Core Network (CN) subsystem; Stage 3".
- [64] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

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:

Application Function (AF): element offering application(s) that use IP bearer resources

NOTE: One example of an AF is the P-CSCF of the IM CN subsystem.

AF Session: application level session established by an application level signalling protocol offered by the AF that requires a session set-up with explicit session description before the use of the service.

NOTE: One example of an application session is an IMS session.

Attribute-Value Pair (AVP): See ETF RFC 6733 [52], corresponds to an Information Element in a Diameter message.

Binding: PCRF process of associating IP flows described in AF Service Information with IP-CAN bearers.

Bit rate: The number of bits (denoted in units of bits, kbits, etc.) that are conveyed or processed per unit of time. The bit rate in bit/s can be abbreviated with bps. This specification uses SI (International System of Units) prefixes as unit prefixes, which strictly refer to the power of 10, and shall not be used for the power of 2. For example, 1 kbit/s represents 1000 bit/s or 1 Mbit/s represents 1000 kbit/s and so on.

IP-CAN bearer: IP transmission path of defined capacity, delay and bit error rate, etc.
See 3GPP TR 21.905 [1] for the definition of bearer.

IP-CAN session: association between a UE and an IP network (for GPRS, APN).

The association is identified by one UE Ipv4 address and/or one Ipv6 prefix together with a UE identity information, if available, and a PDN represented by a PDN ID (e.g. an APN). An IP-CAN session incorporates one or more IP-CAN bearers. Support for multiple IP-CAN bearers per IP-CAN session is IP-CAN specific. An IP-CAN session exists as long as the related UE Ipv4 address and/or Ipv6 prefix are assigned and announced to the IP network.

IP flow: unidirectional flow of IP packets with the same source IP address and port number and the same destination IP address and port number and the same transport protocol
Port numbers are only applicable if used by the transport protocol.

MPS session: A session for which priority treatment is applied for allocating and maintaining radio and network resources to support the Multimedia Priority Service (MPS). MPS is defined in 3GPP TS 22.153 [31].

Packet flow: A specific user data flow carried through the PCEF. A packet flow can be an IP flow.

PCC rule: set of information enabling the detection of a service data flow and providing parameters for policy control and/or charging control.

RESTful HTTP: is an architectural style consisting of a coordinated set of architectural constraints applied to components, connectors, and data elements, within a distributed hypermedia system applied to the development of web services.

service information: set of information conveyed from the AF to the PCRF over the Rx interface to be used as a basis for PCC decisions at the PCRF, including information about the AF session (e.g. application identifier, type of media, bandwidth, IP address and port number).

service data flow: An aggregate set of packet flows.

3.2 Abbreviations

For the purpose of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply:

5GS	5G System
ADC	Application Detection and Control
AF	Application Function
AS	Application Server
ASP	Application Service Provider
AVP	Attribute Value Pair
CRF	Charging Rules Function
DRMP	Diameter Routing Message Priority
DSCP	Differentiated Services Code Point
GCS	Group Communication Service
GCS AS	Group Communication Service Application Server
IP-CAN	IP Connectivity Access Network
MPS	Multimedia Priority Service
PCC	Policy and Charging Control

PCEF	Policy and Charging Enforcement Function
PCF	Policy Control Function
PCRF	Policy and Charging Rule Function
PDF	Policy Decision Function
P-CSCF	Proxy-Call Session Control Function
PSAP	Public Safety Answering Point
RCAF	RAN Congestion Awareness Function
QoS	Quality of Service
SCEF	Service Capability Exposure Function
SCS	Service Capability Server
SDF	Service Data Flow
SMF	Session Management Function
SPR	Subscriber Profile Repository
TDF	Traffic Detection Function
UDC	User Data Convergence
UE	User Equipment
UDR	User Data Repository
XML	Extensible Markup Language

4 Rx reference point

4.1 Overview

The Rx reference point is used to exchange application level session information:

- and the Application Function (AF); and
- in the 5GS, between the Policy Control Function (PCF) between

the Policy and Charging Rules Function (PCRF) and the Application Function (AF). As defined in the stage 2 specifications (3GPP TS 23.203 [2]), this information is part of the input used by the PCRF for the Policy and Charging Control (PCC) decisions. The PCRF exchanges the PCC rules with the Policy and Charging Enforcement Function (PCEF) and QoS rules with the Bearer Binding and Event Reporting Function (BBERF) as specified in 3GPP TS 29.212 [8].

Policy and Charging Control over Rx interface in the 5GS is specified in annex E.

Signalling flows related to the both Rx and Gx interfaces are specified in 3GPP TS 29.213 [9].

Refer to Annex G of 3GPP TS 29.213 [9] for Diameter overload control procedures over the Rx interface.

Refer to Annex J of 3GPP TS 29.213 [9] for Diameter message priority mechanism procedures over the Rx interface.

Refer to Annex K of 3GPP TS 29.213 [9] for Diameter load control procedures over the Rx interface.

4.2 Rx reference model

The Rx reference point is defined between the PCRF and the AF. The relationships between the different functional entities involved are depicted in figure 4.2.1. The overall PCC architecture is depicted in subclause 3a of 3GPP TS 29.213 [9].



Figure 4.2.1: Rx reference model