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**Universal Mobile Telecommunications System (UMTS);
LTE;
Home Subscriber Server (HSS) diameter interfaces for
interworking with packet data networks and applications
(3GPP TS 29.336 version 15.7.0 Release 15)**



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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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1 Scope

The present document describes the Diameter-based interfaces between the HSS and other network elements involved in the architecture for interworking with packet data networks and applications, such as Machine-Type Communications (MTC).

In particular, this document specifies the S6m interface between the Home Subscriber Server (HSS) and the MTC Interworking Function (MTC-IWF), the S6n interface between the HSS and the MTC-AAA and the S6t interface between the HSS and the Service Capability Exposure Function (SCEF). The procedures over those interfaces are defined in 3GPP TS 23.682 [2].

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 23.682: "Architecture enhancements to facilitate communications with packet data networks and applications".
- [3] Void.
- [4] 3GPP TS 33.210: "3G security; Network Domain Security (NDS); IP network layer security".
- [5] IETF RFC 4960: "Stream Control Transport Protocol".
- [6] 3GPP TS 29.228: "IP multimedia (IM) Subsystem Cx Interface; Signalling flows and Message Elements".
- [7] 3GPP TS 29.229: "Cx and Dx interfaces based on the Diameter protocol; protocol details".
- [8] 3GPP TS 29.173: "Diameter-based SLh interface for Control Plane LCS".
- [9] IETF RFC 5234: "Augmented BNF for Syntax Specifications: ABNF".
- [10] 3GPP TS 29.329: "Sh Interface based on the Diameter protocol".
- [11] 3GPP TS 23.003: "Numbering, addressing and identification".
- [12] 3GPP TS 29.338: "Diameter based protocols to support SMS capable MMEs".
- [13] 3GPP TS 29.368: "Tsp interface protocol between the MTC Interworking Function (MTC-IWF) and Service Capability Server (SCS)".
- [14] 3GPP TS 29.272: "Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol".
- [15] IETF RFC 7683: "Diameter Overload Indication Conveyance".
- [16] 3GPP TS 32.299: "Telecommunication management; Charging management; Diameter charging applications".
- [17] 3GPP TS 29.217: "Congestion Reporting Over Np Reference Point".

- [18] IETF RFC 5777: "Traffic Classification and Quality of Service (QoS) Attributes for Diameter".
- [19] 3GPP TS 23.007: "Restoration procedures".
- [20] IETF RFC 7944: "Diameter Routing Message Priority".
- [21] IETF RFC 5778: "Diameter Mobile IPv6: Support for Home Agent to Diameter Server Interaction".
- [22] IETF RFC 8583: "Diameter Load Information Conveyance".
- Editor's note:** The above document cannot be formally referenced until it is published as an RFC.
- [23] IETF RFC 6733: "Diameter Base Protocol".
- [24] 3GPP TS 29.128: "Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) interfaces for interworking with packet data networks and applications".
- [25] 3GPP TS 29.154: "Service capability exposure functionality over Nt Reference point".

3 Definitions, symbols and abbreviations

3.1 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].

AAA	Authentication, Authorization and Accounting
ABNF	Augmented Backus-Naur Form
AVP	Attribute-Value Pair
DRMP	Diameter Routing Message Priority
DSCP	Differentiated Services Code Point
IANA	Internet Assigned Numbers Authority
MTC	Machine-Type Communications
MTC-IWF	MTC Interworking Function
NIDD	Non-IP Data Delivery
SCS	Services Capability Server
SCEF	Service Capability Exposure Function

4 General Description

4.1 Introduction

The S6m reference point between the MTC-IWF and the HSS, the S6n reference point between the MTC-AAA and the HSS, and the S6t reference point between the SCEF and the HSS, are defined in the 3GPP TS 23.682 [2].

This document describes the Diameter-based S6m, S6n and S6t related procedures, message parameters and protocol specification.

An excerpt of the architecture for Machine-Type Communication, as defined in 3GPP TS 23.682 [2] is shown in Figure 4.1-1, where the relevant interfaces towards the HSS are highlighted.

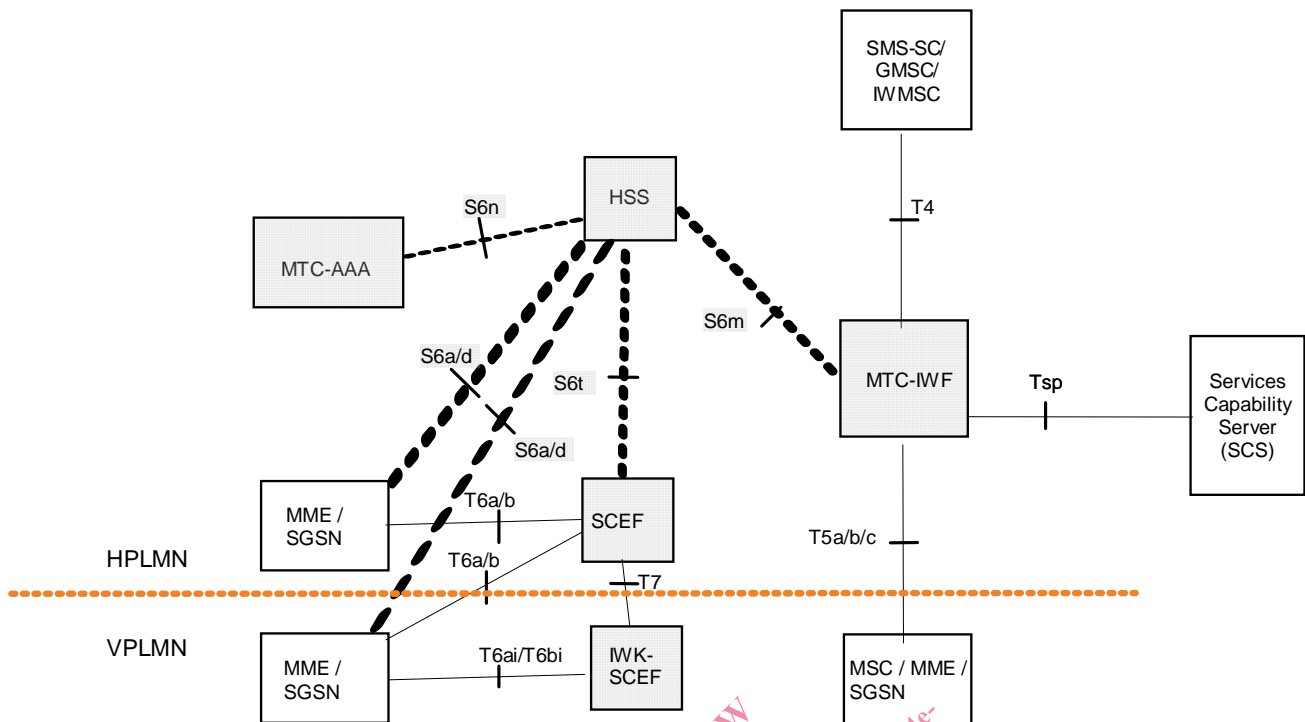


Figure 4.1-1: 3GPP Architecture for Machine-Type Communication

In this architecture, the S6m reference point connects the MTC-IWF with the HSS, where the subscription information of the UE (e.g., an MTC device) is stored. This reference point allows the MTC-IWF to retrieve subscription data and to do any necessary mapping between different identities associated to the UE.

The S6m interface shall allow the MTC-IWF to:

- retrieve subscription information of the UE from the HSS,
- request routing information from the HSS, i.e. the address of the UE's serving nodes supporting SMS for the UE ; in this context serving nodes of the UE are the MSC or MME but not both, the SGSN, and the IP-SM-GW,
- retrieve the IMSI of the UE,
- retrieve the External Identifier of the UE associated to an Application Port Identifier,
- perform authorization of the Service Capability Server that is requesting to send a device trigger to the UE.

Additionally, the S6n reference point connects the MTC-AAA with the HSS, and it allows the MTC-AAA to do the mapping of the UE IMSI to the external identifier(s) of the UE.

The S6t reference point connects the SCEF with the HSS to perform configuration and reporting of Monitoring events, and configuration of AESE Communication Pattern.

The S6t interface shall allow the SCEF to:

- configure UE related Monitoring events
- receive reporting of the configured Monitoring events from the HSS
- configure UE related AESE Communication Pattern
- Authorize the UE for NIDD.

5 Diameter-based S6m/S6n Interface

5.1 Introduction

This clause describes the Diameter-based S6m and S6n interface related procedures and Information elements exchanged between functional entities.

In the tables that describe the Information Elements transported by each Diameter command, each Information Element is marked as (M) Mandatory, (C) Conditional or (O) Optional in the "Cat." column. For the correct handling of the Information Element according to the category type, see the description detailed in clause 6 of the 3GPP TS 29.228 [6].

5.2 Procedure Descriptions

5.2.1 Subscriber Information Retrieval

5.2.1.1 General

This procedure is used between the MTC-IWF and the HSS and between the MTC-AAA and the HSS.

When the procedure is invoked by the MTC-IWF, it is used:

- To translate an external identifier, or MSISDN, to the IMSI of the user,
- To retrieve information about the serving entities currently serving a certain user,
- To authorize a certain SCS to request a specific service (e.g. device triggering),
- To retrieve subscription data of the user, associated to the specific service requested by the SCS,
- To retrieve an External Identifier based on IMSI and application port identifier.

When the procedure is invoked by the MTC-AAA, it is used:

- To translate an IMSI to one or more external identifiers of the user.

This procedure is mapped to the commands Subscriber-Information-Request/Answer in the Diameter application specified in chapter 6. Tables 5.2.1.1/1 and 5.2.1.1/2 detail the involved information elements.

Table 5.2.1.1/1: Subscriber Information Retrieval (Request)

Information Element Name	Mapping to Diameter AVP	Cat.	Description
User Identity (see 6.4.2)	User-Identifier	M	This Information Element shall contain the identity of the UE. This is a grouped AVP containing either an External Identifier, an MSISDN or an IMSI (exactly one, and only one, of those identifiers shall be included in the request).
Requested Service (see 6.4.3)	Service-ID	O	This Information Element shall contain the service requested by the SCS. In this release, only the Device Triggering and SMS_MO services are supported. For S6n (i.e., when the procedure is invoked by the MTC-AAA), this IE is not applicable, and shall be absent.
SCS Identity (see 6.4.4)	SCS-Identity	O	This Information Element shall contain the identity of the Service Capability Server that is requesting a service to be applied to a certain UE. When the Service-ID indicates DEVICE_TRIGGER (0) or SMS_MO (1), the SCS-Identity shall be formatted as an E.164 address as described in clause 6.4.4. For S6n (i.e., when the procedure is invoked by the MTC-AAA), this IE is not applicable, and shall be absent.
Service Parameters (see 6.4.5)	Service-Parameters	O	This Information Element shall contain the parameters associated to the requested service by the SCS (identified by the Service-ID AVP). In this release, only parameters associated to Device Triggering via SMS-MT (T4) and parameters associated to SMS_MO are supported. For Device Triggering via SMS-MT, this AVP may contain: Priority-Indication, SM-RP-SMEA... For SMS_MO, this parameter may contain: Application-Port Identifier. For S6n (i.e., when the procedure is invoked by the MTC-AAA), this IE is not applicable, and shall be absent.
SIR Flags (see 6.4.10)	SIR-Flags	M	This Information Element shall contain a bit mask. See clause 6.4.10 for the meaning of the bits.
Supported Features (See 3GPP TS 29.229 [7])	Supported-Features	O	If present, this Information Element shall contain the list of features supported by the origin host.