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ETSI Standard

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Network Attachment Sub-System (NASS); e2 interface based on the DIAMETER protocol

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Foreword

This ETSI Standard (ES) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN), and is now submitted for the ETSI standards Membership Approval Procedure.

1 Scope

The present document defines a protocol for use between the TISPAN NGN Network Attachment Sub-System (NASS) and service control subsystems or applications of the TISPAN NGN architecture, based on Diameter.

The present document is applicable to the e2 interface between the Connectivity session Location and repository Function (CLF) and an Application Function (AF).

Whenever it is possible the present document specifies the requirements for this 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

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

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2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

[1] ETSI ES 282 001: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Functional Architecture Release 2".

[2] ETSI ES 282 004: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Functional Architecture; Network Attachment Sub-System (NASS)".

[3] ETSI ES 282 003: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Resource and Admission Control Sub-System (RACS); Functional Architecture".

[4] ETSI ES 282 007: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IP Multimedia Subsystem (IMS); Functional architecture".

[5] ETSI ES 283 034: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Network Attachment Sub-System (NASS); e4 interface based on the DIAMETER protocol".

[6] ETSI TS 129 229: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Cx and Dx interfaces based on the Diameter protocol; Protocol details (3GPP TS 29.229)".

[7] ETSI TS 129 329: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Sh interface based on the Diameter protocol; Protocol details (3GPP TS 29.329)".

[8] ETSI TS 129 209: "Universal Mobile Telecommunications System (UMTS); Policy control over Gq interface (3GPP TS 29.209)".

[9] IETF RFC 2960: "Stream Control Transmission Protocol".

[10] IETF RFC 3588: "Diameter Base Protocol".

[11] IETF RFC 3309: "Stream Control Transmission Protocol (SCTP) Checksum Change".

[12] IETF RFC 3554: "On the use of Stream Control Transmission Protocol (SCTP) with IPSec".

[13] ETSI TS 182 008: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Presence Service; Architecture and functional description (Endorsement of 3GPP TS 23.141 and OMA-AD-Presence-SIMPLE-V1-0)".

[14] void.

[15] IETF RFC 4776: "Dynamic Host Configuration Protocol (DHCPv4 and DHCPv6) Option for Civic Addresses Configuration Information".

[16] IETF RFC 3825: "Dynamic Host Configuration Protocol Option for Coordinate-based Location Configuration Information".

[17] IETF RFC 4234: "Augmented BNF for Syntax Specifications: ABNF".

[18] ITU-T Recommendation M.1400: "Designations for interconnections among operators' networks".

[19] ISO 3166-1: "Codes for the representation of names of countries and their subdivisions - Part 1: Country codes".

2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area**.** For non-specific references, the latest version of the referenced document (including any amendments) applies.

Not applicable.

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

access record: the set of information stored in the CLF in relation to an IP address

Application Function (AF): element of the network architecture offering - or providing access to - applications that require information about the characteristics of the IP-connectivity session used to access such applications

Attribute-Value Pair (AVP): corresponds to an Information Element in a Diameter message

NOTE: See RFC 3588 [10].

NASS User: See definition in [2].

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ABNF	Augmented Backus-Naur Form
AF	Application Function
A-RACF	Access-Resource and Admission Control Function
ASF	Application Server Function
AVP	Attribute-Value Pair
CLF	Connectivity session Location and repository Function
CSCF	Call Session Control Function
DHCP	Dynamic Host Configuration Protocol
IANA	Internet Assigned Numbers Authority
IBCF	Interconnection Border Control Function
ICC	ITU Carrier Code
IETF	Internet Engineering Task Force
IMS	IP Multimedia Subsystem
IP	Internet Protocol
LAC	Location-Area-Code
LCI	Location Configuration Information
NASS	Network Attachment Sub-System
NOC	Network-Operator-Code
P-CSCF	Proxy Call Session Control Function
PDBF	Profile Data Base Function
PNA	Presence Network Agent
PNR	Push-Notification-Request
RACF	Resource and Admission Control Function
RACS	Resource and Admission Control Subsystem
RFC	Request For Comments
SCTP	Stream Control Transport Protocol
SNA	Subscribe-Notifications-Answer
SNR	Subscribe-Notifications-Request
SPDF	Service-based Policy Decision Function
UAAF	User Authentication and Authorization Function
UDA	User-Data-Answer
UDR	User-Data-Request

4 Overview

The Network Attachment Sub-System (NASS) defined in ES 282 004 [2] maintains information about IP-connectivity access sessions associated with NASS Users connected to the TISPAN network. This information is stored in the Connectivity session Location and repository Function (CLF) in the form of access records and made accessible to other subsystems and applications through the following two interfaces (see figure 1):

- The e2 interface enables Application Functions (AF) to retrieve IP-connectivity related session data.
- The e4 interface enables the IP-connectivity related session data to be exchanged between the NASS and the Resource and Admission Control Subsystem (RACS) defined in ES 282 003 [3].

The present document specifies the protocol for the e2 interface.

In the context of the present document, an Application Function (AF) is a generic term representing any element of the network architecture offering - or providing access to - applications that require information about the characteristics of the IP-connectivity session used to access such applications. Examples of such Application Functions are the P-CSCF and the IBCF in the IMS (ES 282 007 [4]), certain categories of Application Server Functions (ASF) (ES 282 001 [1]) or a Presence Network Agent (PNA) as defined in TS 182 008 [13]. In the later case, the Pn reference point of the presence architecture is mapped to the e2 interface.

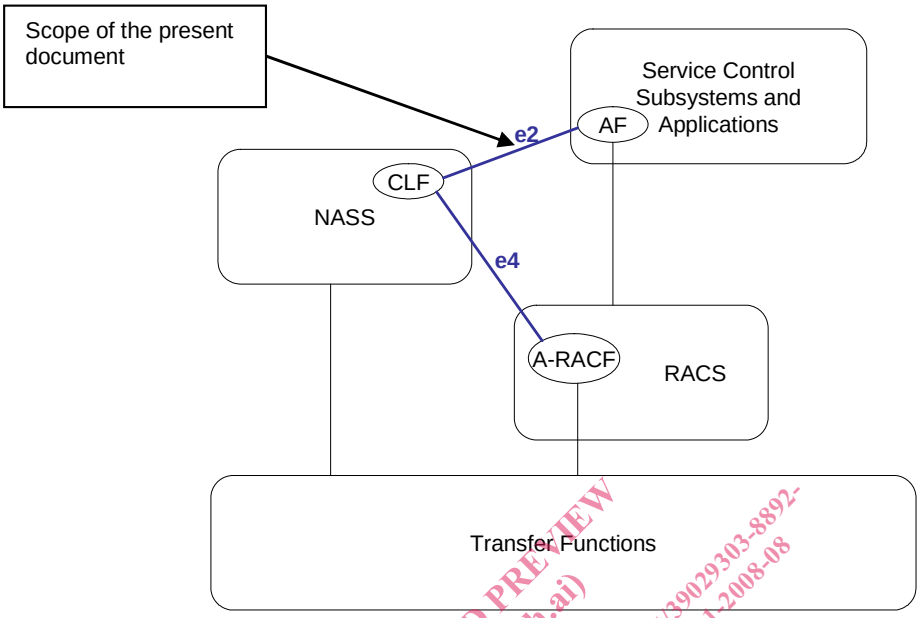

Figure 1: NASS external interfaces

5 Procedure descriptions

5.1 General

The following clauses describe the realization of the functional procedures defined in the NASS (ES 282 004 [2]) and RACS specifications (ES 282 003 [3]) using Diameter commands described in clause 7. This involves describing a mapping between the Information Elements defined in the NASS specification (ES 282 004 [2]) and Diameter AVPs.

In the tables that describe this mapping, each Information Element is marked as (M) Mandatory, (C) Conditional or (O) Optional.

- A mandatory Information Element (marked as (M) in the table) shall always be present in the command. If this Information Element is absent, an application error occurs at the receiver and an answer message shall be sent back to the originator of the request with the Result-Code set to DIAMETER_MISSING_AVP. This message shall also include a Failed-AVP AVP containing the missing Information Element i.e. the corresponding Diameter AVP defined by the AVP Code and the other fields set as expected for this Information Element.

- A conditional Information Element (marked as (C) in tables 1 and 2) shall be present in the command if certain conditions are fulfilled:

  - If the receiver detects that those conditions are fulfilled and the Information Element is absent, an application error occurs and an answer message shall be sent back to the originator of the request with the Result-Code set to DIAMETER_MISSING_AVP. This message shall also include a Failed-AVP AVP containing the missing Information Element i.e. the corresponding Diameter AVP defined by the AVP Code and the other fields set as expected for this Information Element. If multiple Information Elements are missing, all corresponding AVP codes shall be included in the Failed-AVP AVP.

- If those conditions are not fulfilled, the Information Element shall be absent. If however this Information Element appears in the message, it shall not cause an application error and it may be ignored by the receiver if this is not explicitly defined as an error case. Otherwise, an application error occurs at the receiver and an answer message with the Result-Code set to DIAMETER_AVP_NOT_ALLOWED shall be sent back to the originator of the request. A Failed-AVP AVP containing a copy of the corresponding Diameter AVP shall be included in this message.

- An optional Information Element (marked as (O) in tables 1 and 2) may be present or absent in the command, at the discretion of the application at the sending entity. Absence or presence of this Information Element shall not cause an application error and may be ignored by the receiver.

5.2 Procedures on the CLF - AF interface

5.2.1 Information query

5.2.1.1 Overview

This procedure is used by an AF to retrieve from the CLF location information and other data related to an access session.

This procedure is mapped to the commands User-Data-Request/Answer in the Diameter application specified in TS 129 329 [7].

Tables 1 and 2 detail the involved information elements as defined in the NASS specification ES 282 004 [2] and their mapping to Diameter AVPs.

Table 1: Information query request

Information element name	Mapping to diameter AVP	Cat.	Description
Globally unique IP Address	Globally-Unique-Address	C	This information element contains: -The IP address of the NASS User for which profile information is being pushed. -The addressing domain in which the IP address is significant.
NASS User ID	User-Name	C	The identity of the NASS User that is attached to the network.
AF Identity	AF-Application-Identifier	M	Identifies the AF originating the request.
Requested-Items	Requested-Information	O	The list of items requested by the AF.
NOTE: Either the Globally-Unique-IP-Address or the NASS User ID shall be included.			