Final draft ETSI ES 283 034 V2.2.0 (2008-05)

ETSI Standard

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Network Attachment Sub-System (NASS); e4 interface based on the DIAMETER protocol

ETSI

Reference

RES/TISPAN-03139-NGN-R2

Keywords

interface, network, system

ETSI

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
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

Individual copies of the present document can be downloaded from:
http://www.etsi.org

The present document may be made available in more than one electronic version or in print. In any case of existing or
perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF).
In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive
within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status.
Information on the current status of this and other ETSI documents is available at
http://portal.etsi.org/tb/status/status.asp

If you find errors in the present document, please send your comment to one of the following services:
http://portal.etsi.org/chaircor/ETSI_support.asp

Copyright Notification

Contents

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (http://webapp.etsi.org/IPR/home.asp).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

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 the Resource and Admission Control Subsystem (RACS), based on Diameter.

The present document is applicable to the e4 interface between the Connectivity Session Location and Repository Function (CLF) and the RACS.

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.

- For a specific reference, subsequent revisions do not apply.

- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:

    - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;

    - for informative references.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

For online referenced documents, information sufficient to identify and locate the source shall be provided. Preferably, the primary source of the referenced document should be cited, in order to ensure traceability. Furthermore, the reference should, as far as possible, remain valid for the expected life of the document. The reference shall include the method of access to the referenced document and the full network address, with the same punctuation and use of upper case and lower case letters.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

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

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

[3]   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)".

[4]   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)".

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

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

[7] IETF RFC 3588: "Diameter base protocol".

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

[9] IETF RFC 4005: "Diameter Network Access Server application".

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

[11] IETF RFC 3046: "DHCP Relay Agent Information Option".

[12] ETSI TS 183 017: "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".

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:

Application Function (AF): element of the service layer architecture offering 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 [7].

NASS User: See definition in [1].

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
ATM   Asynchronous Transfer Mode
AVP   Attribute-Value Pair
CLF   Connectivity session Location and repository Function
DHCP   Dynamic Host Configuration Protocol
FQDN   Fully Qualified Domain Name
IANA   Internet Assigned Numbers Authority
ID   IDentifier
IETF   Internet Engineering Task Force
IPSec   IP Security
NAS   Network Access Server

NASS	Network Attachment Sub-System
PDBF	Profile Data Base Function
PNA	Push-Notification-Answer
PNR	Push-Notification-Request
QoS	Quality of Service
RACF	Resource and Admission Control Function
RACS	Resource and Admission Control Subsystem
RCEF	Resource Control Enforcement Function
RFC	Request For Comments
SCTP	Stream Control Transport Protocol
SPDF	Service-based Policy Decision Function
UAAF	User Authentication and Authorization Function
UDA	User-Data-Answer
UDR	User-Data-Request
VC	Virtual Channel
VP	Virtual Path

4 Overview

The Network Attachment Sub-System (NASS), defined in ES 282 004 [1], maintains information about IP-connectivity associated with uNASS Users connected to TISPAN networks. This information is stored in the Connectivity session Location and repository Function (CLF) 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 [2].

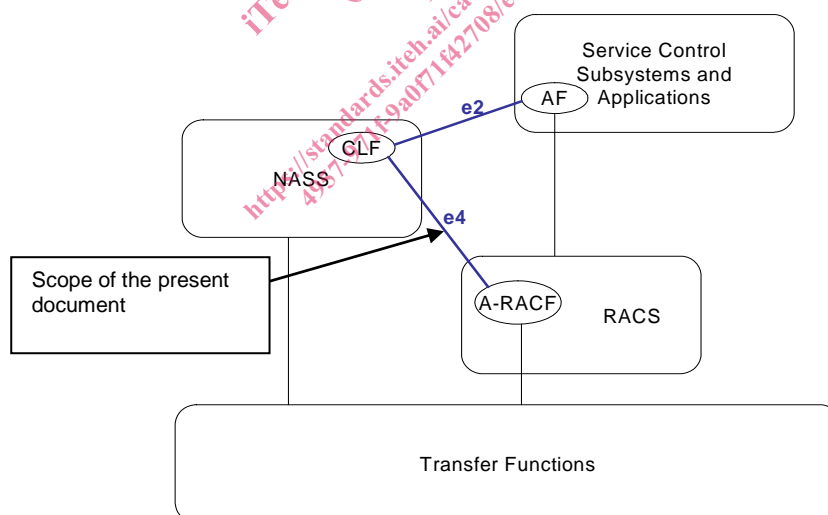The present document specifies the protocol for the e4 interface.

Figure 1: NASS external interfaces

5 Procedure descriptions

5.1 General

5.1.1 Information elements

The following clauses describe the realization of the functional procedures defined in the NASS (ES 282 004) [1] and RACS specifications (ES 282 003 [2]) using Diameter commands described in clause 7. This involves describing a mapping between the information elements defined in the NASS specification (ES 282 004 [1]) 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 tables 1 to 8) 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 to 8) 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 to 8) 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.

5.1.2 NASS User profile

NASS User profile information sent over the e4 interface comprises QoS profile information and initial gate setting information. Each of these pieces of information may be sent in the form of an identifier using the QoS-Profile-ID and Initial-Gate-Setting-ID AVPs or in the form of an explicit description using the QoS-Profile-Description and Initial-Gate-Setting-Description AVPs.

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

Table 1: Initial gate setting description

Information element name	Mapping to Diameter AVP	Cat.	Description
List of allowed destinations as well as multicast flows	NAS-Filter-Rule	O	In case of unicast data, the list of default destination IP addresses ports, prefixes and port ranges to which traffic can be sent. In case of multicast, the list of IP-Multicast group addresses and/or the list of (Source IP address, IP-Multicast group address) pairs which traffic can be received from by the attached NASS User.
List of denied destinations as well as multicast flows	NAS-Filter-Rule	O	In case of unicast, the list of default destination IP addresses ports, prefixes and port ranges to which traffic is denied. In case of multicast, the list of IP-Multicast group addresses and/or the list of (Source IP address, IP-Multicast group address) pairs for which traffic towards the attached NASS User must be denied.
UL Subscribed Bandwidth	Maximum-Allowed-Bandwidth-UL	O	The maximum amount of bandwidth that can be used without explicit authorization in the uplink direction.
DL Subscribed Bandwidth	Maximum-Allowed-Bandwidth-DL	O	The maximum amount of bandwidth that can be used without explicit authorization in the downlink direction.

Table 2: QoS profile description

Information element name	Mapping to Diameter AVP	Cat.	Description
Transport service class	Transport-Class	O	The transport class applicable to the QoS Profile Information.
Media-Type	Media-Type	O	The media type applicable to the QoS Profile information.
UL Subscribed Bandwidth	Maximum-Allowed-Bandwidth-UL	O	The maximum amount of bandwidth subscribed by the attached NASS User in the uplink direction.
DL Subscribed Bandwidth	Maximum-Allowed-Bandwidth-DL	O	The maximum amount of bandwidth subscribed by the attached NASS User in the downlink direction.
Maximum Priority	Reservation-Priority	O	The maximum priority allowed for any reservation request.
Requestor Name	Application Class ID	O	Identifies the application class(es) that are allowed to request resources for the QoS profile.

5.2   Procedures on the CLF - A-RACF interface

5.2.1   Access profile push

5.2.1.1   Overview

This procedure is used to push session-related information from the CLF to the A-RACF. This information flow occurs when an IP address has been allocated to a NASS User or in case a modification occurs on a profile that has already been pushed to the RACS.

The CLF should push session-related-information to the A-RACF as soon as it is available to the CLF. This may require the CLF to pull part of the information from other components of the NASS.

For the same NASS User, the CLF may push several independent session records with different IP addresses, with or without the same logical access identifier.

This procedure is mapped to the commands Push-Notification-Request/Answer in the Diameter application specified in clause 7. Tables 3 and 4 detail the involved information elements as defined in the NASS specification ES 282 004 [1] and their mapping to Diameter AVPs.