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Technical Specification

**Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
LTE;
Inter-IMS Network to Network Interface (NNI)
(3GPP TS 29.165 version 8.2.0 Release 8)**



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Contents

| | |
|---|-----------|
| Intellectual Property Rights | 2 |
| Foreword..... | 2 |
| Foreword..... | 4 |
| Introduction | 4 |
| 1 Scope | 5 |
| 2 References | 5 |
| 3 Definitions, symbols and abbreviations | 6 |
| 3.1 Definitions | 6 |
| 3.2 Symbols..... | 7 |
| 3.3 Abbreviations | 7 |
| 4 Overview | 7 |
| 5 Reference model for interconnection between IM CN subsystems | 8 |
| 5.1 General | 8 |
| 5.2 Functionalities performed by entities at the edge of the network..... | 8 |
| 5.2.1 Interconnection Border Control Function (IBCF)..... | 8 |
| 5.2.2 Transition Gateway (TrGW)..... | 9 |
| 6 Control plane interconnection | 9 |
| 6.1 Definition of Inter-IMS Network to Network Interconnection..... | 9 |
| 6.1.1 SIP methods and headers | 9 |
| 6.1.1.1 General | 9 |
| 6.1.1.2 SIP methods | 9 |
| 6.1.1.3 SIP headers..... | 10 |
| 6.1.1.3.1 Trust and not trust domain..... | 10 |
| 6.1.1.3.2 SIP headers | 11 |
| 6.1.1.4 Notations of the codes..... | 12 |
| 6.1.1.5 Modes of signalling..... | 12 |
| 6.1.2 SDP protocol..... | 12 |
| 6.1.2.1 General | 12 |
| 6.2 Control Plane Transport | 12 |
| 6.2.1 General..... | 12 |
| 7 User plane Interconnection..... | 13 |
| 7.1 Media and Codec..... | 13 |
| 7.2 User Plane Transport..... | 13 |
| 8 Numbering, Naming and Addressing | 13 |
| 9 IP Version..... | 14 |
| 10 Security..... | 14 |
| 11 Charging..... | 14 |
| Annex A (informative): Summary of SIP headers..... | 15 |
| Annex B: Change history | 18 |
| History | 19 |

Foreword

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Introduction

This clause is optional. If it exists, it is always the second unnumbered clause.

1 Scope

The objective of this document is to address the Inter-IMS Network to Network Interface (II-NNI) consisting of Ici and Izi reference points between IMS networks in order to support end-to-end service interoperability.

The present document will address the issues related to control plane signalling (3GPP usage of SIP and SDP protocols, required SIP headers) as well as other interconnecting aspects like security, numbering/naming/addressing and user plane issues as transport protocol, media and codecs actually covered in a widespread set of 3GPP specifications. A profiling of the Inter-IMS Network to Network Interface (II-NNI) is also provided.

Charging aspects will be addressed as far as SIP signalling is concerned.

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] IETF RFC 791: "Internet Protocol"
- [3] 3GPP TS 23.002: "Network architecture".
- [4] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".
- [5] 3GPP TS 24.229: "Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".
- [6] 3GPP TR 24.930: "Signalling flows for the session setup in the IP Multimedia core network Subsystem (IMS) based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".
- [7] IETF RFC 2460: "Internet Protocol, Version 6 (IPv6) Specification".
- [8] 3GPP TS 29.162: 'Interworking between the IM CN subsystem and IP networks'.
- [9] 3GPP TS 22.228: "Service requirements for the IP multimedia core network subsystem".
- [10] 3GPP TS 33.210: "3G security; Network Domain Security (NDS); IP network layer security".
- [11] 3GPP TS 26.114: " IP Multimedia Subsystem (IMS); Multimedia Telephony; Media handling and interaction".
- [12] ETSI TS 181 005: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Services and Capabilities Requirements"
- [13] IETF RFC 3261: "SIP: Session Initiation Protocol".
- [14] IETF RFC 3966: "The tel URI for Telephone Numbers".
- [15] IETF RFC 3860: "Common Profile for Instant Messaging (CPIM)".
- [16] IETF RFC 3859: "Common Profile for Presence (CPP)".

- [17] IETF RFC 4975: "The Message Session Relay Protocol (MSRP)."
- [18] RFC 3262: "Reliability of provisional responses in Session Initiation Protocol (SIP)".
- [19] RFC 3428: "Session Initiation Protocol (SIP) Extension for Instant Messaging".
- [20] RFC 3265: "Session Initiation Protocol (SIP) Specific Event Notification".
- [21] RFC 3903: "An Event State Publication Extension to the Session Initiation Protocol (SIP)".
- [22] RFC 3515: "The Session Initiation Protocol (SIP) REFER method".
- [23] RFC 3311: "The Session Initiation Protocol (SIP) UPDATE method".
- [24] RFC 3455: "Private Header (P-Header) Extensions to the Session Initiation Protocol (SIP) for the 3rd-Generation Partnership Project (3GPP)".
- [25] RFC 4244: "An Extension to the Session Initiation Protocol (SIP) for Request History Information".
- [26] draft-drage-sipping-service-identification-01 (July 2007): "A Session Initiation Protocol (SIP) Extension for the Identification of Services".

Editor's note: The above document cannot be formally referenced until it is published as an RFC.

- [27] RFC 4168: "The Stream Control Transmission Protocol (SCTP) as a Transport for the Session Initiation Protocol (SIP)".
- [28] RFC 2976: "The SIP INFO Method".
- [29] 3GPP TS 32.260: " Telecommunication management; Charging management; IP Multimedia Subsystem (IMS) charging ".

3 Definitions, symbols and abbreviations

Delete from the above heading those words which are not applicable.

Subclause numbering depends on applicability and should be renumbered accordingly.

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].

Definition format

<defined term>: <definition>.

example: text used to clarify abstract rules by applying them literally.

IM CN subsystem: (IP Multimedia CN subsystem) comprises of all CN elements for the provision of IP multimedia applications over IP multimedia sessions, as specified in 3GPP TS 22.228 [9].

IP multimedia session: as specified in 3GPP TS 22.228 [9] an IP multimedia session is a set of multimedia senders and receivers and the data streams flowing from senders to receivers. IP multimedia sessions are supported by the IP multimedia CN Subsystem and are enabled by IP connectivity bearers (e.g. GPRS as a bearer). A user may invoke concurrent IP multimedia sessions.

3.2 Symbols

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

Symbol format

| <symbol> | <Explanation> |
|----------|---|
| Ici | Reference Point between an IBCF and another IBCF or I-CSCF belonging to a different IM CN subsystem network |
| Izi | Reference Point between a TrGW and another TrGW or media handling node belonging to a different IM CN subsystem network |
| Mi | Reference Point between a BGCF and CSCF |
| Mm | Reference Point between a CSCF/BGCF/IMS ALG and an IP multimedia network. |
| Mw | Reference Point between a CSCF and another CSCF |
| Mx | Reference Point between a CSCF/BGCF and IBCF |

3.3 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].

| | |
|-----------|--|
| IBCF | Interconnection Border Control Function |
| II-NNI | Inter-IMS Network to Network Interface |
| NA(P)T-PT | Network Address (Port-Multiplexing) Translation-Protocol Translation |
| TrGW | Transition Gateway |

4 Overview

Interconnection between two different IM CN subsystems shall be guaranteed in order to support end-to-end service interoperability. For this purpose, Inter-IMS Network to Network Interface (II-NNI) between two IM CN subsystem networks is adopted, according to the assumptions coming from 3GPP TS 23.002 [3] and 3GPP TS 23.228 [4].

Aiming to support the delivery of IMS services between two separated IM CN subsystems, protocol interconnection has to occur:

- at a control plane level, in order that IMS procedures can be supported. In this case the adopted reference point is the Ici;
- at a user plane level, where media streams are exchanged over the Izi reference point.

The management of IP multimedia sessions is acted by using SIP. The transport mechanism for both SIP session signalling and media transport is IPv4 (IETF RFC 791 [2]) or IPv6 (IETF RFC 2460 [7]). The 3GPP profile of SIP defining the usage of SIP within the IM CN subsystem is specified in 3GPP TS 24.229 [5]. Example call flows are provided in 3GPP TR 24.930 [6].

The general interconnection model is shown in Figure 4.1.

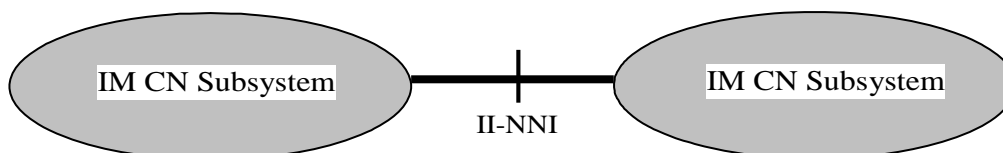


Figure 4.1: Interconnection Model for IM CN Subsystems

The possible functional entities involved in the signalling plane interconnection (IBCF, I-CSCF, BGCF) and in the user plane interconnection (TrGW) are specified in 3GPP TS 24.229 [5] and in 3GPP TS 29.162 [8].

IP Version interworking is described within 3GPP TS 29.162 [8].

5 Reference model for interconnection between IM CN subsystems

5.1 General

Figure 5.1 illustrates the architecture diagram given in 3GPP TS 23.228 [4] showing the Inter-IMS Network to Network Interface (II-NNI) between two IM CN subsystem networks.

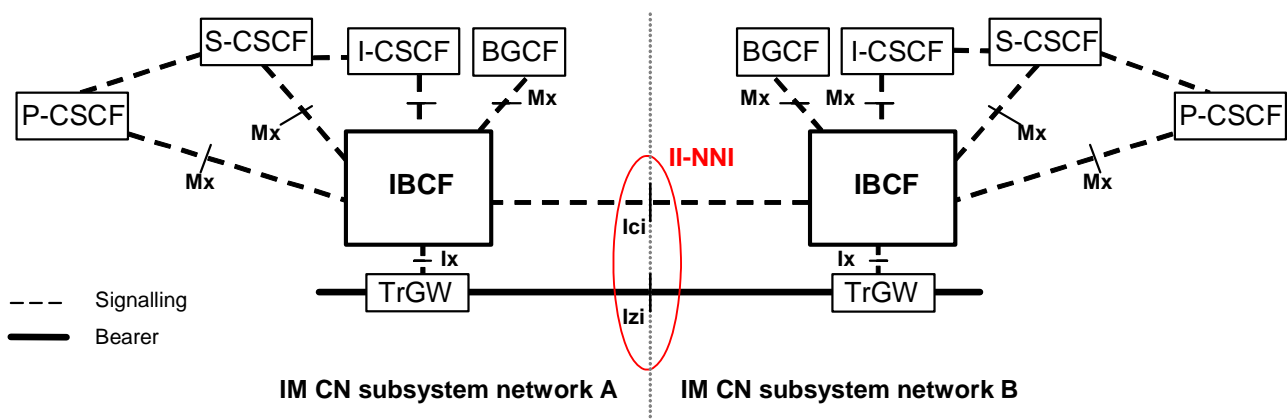


Figure 5.1.1: Inter-IMS Network to Network Interface between two IM CN subsystem networks

The protocols over the two reference points Ici and Izi make up the Inter-IMS Network to Network Interface.

The Ici reference point allows IBCFs to communicate with each other in order to provide the communication and forwarding of SIP signalling messaging between IM CN subsystem networks. The Izi reference point allows TrGWs to forward media streams between IM CN subsystem networks.

IMS roaming performed by using II-NNI is considered, when the IBCFs are inserted at the network borders.

Whenever the Inter-IMS Network to Network Interface is used to interconnect two IM CN subsystem networks belonging to different security domains, security procedures apply as described in 3GPP TS 33.210 [10].

5.2 Functionalities performed by entities at the edge of the network

5.2.1 Interconnection Border Control Function (IBCF)

An IBCF provides application specific functions at the SIP/SDP protocol layer in order to perform interconnection between IM CN subsystem networks by using Ici reference point. According to 3GPP TS 23.228 [4], it may act both as an entry point and as an exit point for a network.

The functionalities of IBCF are indicated in the 3GPP TS 23.228 [4] and specified in 3GPP TS 24.229 [5]: they include:

- network topology hiding;
- application level gateway (enabling communication between IPv6 and IPv4 SIP applications);

- controlling transport plane functions;
- screening of SIP signalling information;
- selecting the appropriate signalling interconnect;
- generation of charging data records;

Based on local configuration, the IBCF may perform transit routing functions [5].

The IBCF acts as a B2BUA when it performs IMS-ALG functionality.

5.2.2 Transition Gateway (TrGW)

According to 3GPP TS 23.002 [3], the TrGW is located at the network borders within the media path and is controlled by an IBCF. Forwarding of media streams between IM CN subsystem networks is applied over Izi reference point.

The TrGW provides functions like network address/port translation and IPv4/IPv6 protocol translation. NAT-PT binds addresses in IPv6 network with addresses in IPv4 network and vice versa to provide transparent routing between the two IP domains without requiring any changes to end points. NA(P)T-PT provides additional translation of transport identifier (TCP and UDP port numbers). The approach is similar to that one described also in 3GPP TS 29.162 [8].

Further details are described in 3GPP TS 23.228 [4].

6 Control plane interconnection

6.1 Definition of Inter-IMS Network to Network Interconnection

6.1.1 SIP methods and headers

6.1.1.1 General

The functional entity closest to the border of an IMS network towards an Inter-IMS Network to Network Interconnection (see reference model in Clause 5) shall provide the capabilities specified for that network element in Annex A.2 of TS 24.229 [5] with modifications as described in the following sub-clauses.

6.1.1.2 SIP methods

3GPP TS 24.229 [5] defines the methods allowing an IBCF to interconnect to an IBCF placed in another IM CN subsystem.

The following SIP Methods are supported on the II-NNI as defined in table 6.1.

The following table is based on Table A.5 and Table A.163 of TS 24.229 [5] and endorsed for this document:

Table 6.1: Supported methods

| Item | Method | Ref. | II-NNI | |
|-------|---|------|---------|-----------|
| | | | Sending | Receiving |
| 1 | ACK request | [13] | m | m |
| 2 | BYE request | [13] | m | m |
| 3 | BYE response | [13] | m | m |
| 4 | CANCEL request | [13] | m | m |
| 5 | CANCEL response | [13] | m | m |
| 5A | INFO request | [28] | o | o |
| 5B | INFO response | [28] | o | o |
| 8 | INVITE request | [13] | m | m |
| 9 | INVITE response | [13] | m | m |
| 9A | MESSAGE request | [19] | o | o |
| 9B | MESSAGE response | [19] | o | o |
| 10 | NOTIFY request | [20] | c1 | c1 |
| 11 | NOTIFY response | [20] | c1 | c1 |
| 12 | OPTIONS request | [13] | m | m |
| 13 | OPTIONS response | [13] | m | m |
| 14 | PRACK request | [18] | m | m |
| 15 | PRACK response | [18] | m | m |
| 15A | PUBLISH request | [21] | c1 | c1 |
| 15B | PUBLISH response | [21] | c1 | c1 |
| 16 | REFER request | [22] | o | o |
| 17 | REFER response | [22] | o | o |
| 18 | REGISTER request | [13] | c2 | c2 |
| 19 | REGISTER response | [13] | c2 | c2 |
| 20 | SUBSCRIBE request | [20] | c1 | c1 |
| 21 | SUBSCRIBE response | [20] | c1 | c1 |
| 22 | UPDATE request | [23] | m | m |
| 23 | UPDATE response | [23] | m | m |
| c1: | In case of roaming scenario, the support of the method is m, else o. | | | |
| c2: | In case of roaming scenario, the support of the method is m, else n/a. | | | |
| NOTE: | In the above table, m, o and c and n/a have the meanings indicated in Table 6.3 | | | |

The methods described in Table 6.1 shall be passed transparently on the II-NNI.

6.1.1.3 SIP headers

The IBCF shall provide the capabilities to manage and modify SIP headers according to section 5.10 and Annex A of TS 24.229 [5] with modifications as described in the following sub-clauses.

NOTE: The applicability of the SIP profile described in the following, in case of II-NNI between P-CSCF and S-CSCF, is FFS.

6.1.1.3.1 Trust and not trust domain

In case there is a trust relationship between the two IM CN subsystems connected by II-NNI, the IBCF acting as contact point shall apply the procedures described in the section 4.4 of TS 24.229 [5], before forwarding the SIP signalling to the next IBCF.

In case there is not a trust relationship between the two IM CN subsystems connected by II-NNI, the IBCF acting as exit point shall apply the procedures described in the section 5.10.2 of TS 24.229 [5] before forwarding the SIP signalling to the IBCF acting as entry point; this one shall apply the procedures described in the section 5.10.3 of TS 24.229 [5].

TS 24.229 [5] provide procedures for handling SIP headers based on trust domain. These procedures may be utilized on a per header basis to realize overall trust as well as per service level screening of headers.

The management of the SIP headers (if present) over II-NNI in case of a presence or not of a trust relationship between the two interconnected IM subsystems is wrapped up in the following table.

Table 6.2: Management of SIP headers over II-NNI in presence or not of a trust relationship

| Item | Header | Trust domain | Not trust domain |
|------|---|---|--|
| 1 | P-Asserted-Identity | As specified in 3GPP TS 24.229 [5], clause 4.4 | As specified in 3GPP TS 24.229 [5], clause 5.10 |
| 2 | P-Access-Network-Info | As specified in 3GPP TS 24.229 [5], clause 4.4 | As specified in 3GPP TS 24.229 [5], clause 5.10 |
| 3 | Resource-Priority | As specified in 3GPP TS 24.229 [5], clause 4.4 | As specified in 3GPP TS 24.229 [5], clause 4.4 |
| 4 | History-Info | As specified in 3GPP TS 24.229 [5], clause 4.4 | As specified in Clause 4.3.3 of RFC 4244 [25] |
| 5 | P-Asserted-Service | As specified in 3GPP TS 24.229 [5], clause 4.4 | As specified in Clause 5.1.2 of draft-dra-ge-sipping-service-identification [26]. In addition, value-dependent operator policies may be applied. |
| 6 | P-Charging-Vector (see RFC 3455 [24]) | As specified in 3GPP TS 24.229 [5], clause 5.10 | As specified in 3GPP TS 24.229 [5], clause 5.10 |
| 7 | P-Charging-Function-Addresses (see RFC 3455 [24]) | As specified in 3GPP TS 24.229 [5], clause 5.10 | As specified in 3GPP TS 24.229 [5], clause 5.10 |
| 8 | P-Profile-Key | As specified in 3GPP TS 24.229 [5], clause 4.4 | As specified in 3GPP TS 24.229 [5], clause 4.4 |
| 9 | P-Private-Network-Indication | As specified in 3GPP TS 24.229 [5], clause 4.4 | As specified in 3GPP TS 24.229 [5], clause 4.4 |
| 10 | P-Served-User | As specified in 3GPP TS 24.229 [5], clause 4.4 | As specified in 3GPP TS 24.229 [5], clause 4.4 |

6.1.1.3.2 SIP headers

For any method in Table 6.1, the SIP headers applicable on the II-NNI are detailed in the corresponding method tables for the UA role and proxy role sending behaviour in Annex A of 3GPP TS 24.229 [5]. Unless other information is specified in the normative part of the present specification, the applicability of headers at the II-NNI can be derived for each method from the the corresponding tables in Annex A of 3GPP TS 24.229 [5] as follows:

- All headers not present in the corresponding tables in Annex A of 3GPP TS 24.229 or marked as 'n/a' in both the 'RFC status' and 'profile status' columns for the UA role and proxy role sending behavior of that tables are not applicable at the II-NNI.

Note: Operators could choose to apply headers for new SIP extensions on an II-NNI based on bilateral agreements, but this is outside the scope of the present specification.

- All headers which are marked as 'o' in at least one of the 'RFC status' or the 'profile status' profile columns for the sending behaviour in the corresponding UA role and proxy role tables in Annex A of 3GPP TS 24.229 and as 'n/a' or 'o' in the other such columns are applicable at II-NNI based on bilateral agreement between operators.
- All headers which are marked as 'm' in at least one of the 'RFC status' or the 'profile status' columns for the sending behaviour in the corresponding UA role or proxy role table in Annex A of 3GPP TS 24.229 and as 'n/a', 'o', or 'm' in the other such columns are applicable at the II-NNI.
- If conditions are specified, they are also applicable at the II-NNI and the above rules are applicable to the 'n/a', 'o' and 'm' values within the conditions.

Note: In the above rules, the RFC profile columns are taken into account in order to enable interworking with non-3GPP networks,

An informative summary of SIP headers to be used over the II-NNI is proposed in Annex A.

6.1.1.4 Notations of the codes

In the table 6.1 the status codes m, o, c, i and n/a have the following meanings:

Table 6.3: Key to notation codes for SIP messages

| Notation code | Notation name | Sending side | Receiving side |
|----------------|----------------|--|--|
| m | mandatory | The message shall be supported at II-NNI. Supporting sending a SIP message at the II-NNI means that this message shall be sent over the II-NNI if received from the serving network. It does not imply that network elements inside the serving network or user equipment connected to this network shall support this message. | Supporting receiving a SIP message at the II-NNI means that this message shall be forwarded to the serving network. It does not imply that network elements inside the served network or user equipment connected to this network are supporting this message. |
| o | optional | The message may or may not be supported at II-NNI. The support of the method is provided based on bilateral agreement between the operators. | Same as for sending side. |
| n/a | not applicable | It is impossible to use/support the message. | It is impossible to use/support the message. This element will be discarded by the IBCF. |
| c <integer> | conditional | The requirement on the message ("m", "o" or "n/a") depends on the support of other optional or conditional items. <integer> is the identifier of the conditional expression. | Same as for sending side. |

Editor's Note: better rewording of the values" meaning could be requested.

6.1.1.5 Modes of signalling

Overlap signalling may be used if agreement exists between operators to use overlap and which method to be used , otherwise enbloc shall be used at the NNI.

6.1.2 SDP protocol

6.1.2.1 General

The functional entity closest to the border of an IMS network towards an Inter-IMS Network to Network Interconnection (see reference model in Clause 5) shall provide the capabilities specified for that network element in Annex A.3 of TS 24.229 [5] with modifications as described in the following sub-clauses.

6.2 Control Plane Transport

6.2.1 General

The control plane transport of the IMS Inter-Operator Service Interconnection Interface shall comply with Clause 4.2A of TS 24.229 [5] with modifications as described in the following sub-clauses.

Support of SCTP as specified in RFC 4168 [27] is optional for IBCF connected by II-NNI. Nevertheless this option is favorable if the operators would like to improve reliability over the Ici.

7 User plane Interconnection

7.1 Media and Codec

For 'end-to-end' media session involving the II-NNI, the SIP/SDP codec negotiation procedure can be applied between IM CN subsystems using different media codecs. It is possible that the end-to-end codec negotiation could fail because no common codec could be supported by the UEs, in particular for voice services.

To enhance interoperability, the IBCF may interfere with the end-to-end codec negotiation to offer additional codec(s) the TrGW is able to transcode, based on the interworking agreements.

NOTE: Possible codecs which could be used at the II-NNI are described in 3GPP TS 26.114 [11] and ETSI TS 181 005 [12].

In case the codec negotiation procedure determines that the two IMS endpoints share a common codec, the user plane may be transported through the IM CN subsystem without being transcoded by any IM CN subsystem entity.

If a common codec is not supported by the UEs, the core IMS entities (e.g. TrGW controlled by IBCF) may provide functionalities to provide transcoding of the user plane.

The IBCF and the TrGW shall perform media transcoding control procedures as indicated in 3GPP TS 24.229 [5].

7.2 User Plane Transport

The user plane transport of the IMS Inter-Operator Service Interconnection Interface may use the protocols listed in Table 7.2.1. The used protocols to transport media are negotiated by means of SDP offer/answer.

Table 7.2.1: Supported transport-level RFCs to be described in SIP/SDP messages

| Item | RFC | Title | Support |
|------|----------|--|-------------------|
| 1 | RFC 3550 | RTP: A Transport Protocol for Real-Time Applications | Mandatory |
| 2 | RFC 768 | User Datagram Protocol | Mandatory |
| 3 | RFC 3551 | RTP Profile for Audio and Video Conferences with Minimal Control | Mandatory |
| 4 | RFC 3556 | Session Description Protocol (SDP) Bandwidth Modifiers for RTP Control Protocol (RTCP) Bandwidth | Mandatory |
| 5 | RFC 4585 | Extended RTP Profile for Real-time Transport Control Protocol (RTCP) - Based Feedback (RTP/AVPF) | Optional (NOTE 1) |
| 6 | RFC 793 | Transmission Control Protocol | Optional (NOTE 2) |

NOTE 1: used by MTSI, as indicated in 3GPP TS 26.114 [11]
 NOTE 2: used for MSRP service

8 Numbering, Naming and Addressing

The following URI formats in SIP messages may be applied at the Ici as standardized in 3GPP TS 24.229 [5]:

- SIP URI defined in IETF RFC 3261 [13];
- tel URI defined in IETF RFC 3966 [14];
- IM URI defined in IETF RFC 3860 [15];
- PRES URI defined in IETF RFC 3859 [16].

Moreover, in case of MSRP sessions passing through the II-NNI, the MSRP URI may be also used at the Ici in the SDP exchange, following the formats defined in IETF RFC 4975 [17].

The IBCF shall support these URI formats. Other URI formats may be supported over the II-NNI depending on the operators' policies.

A global number as defined in RFC 3966 [14] shall be used in a Tel-URI or in the user portion of a SIP URI with the user=phone parameter when conveyed via a non-roaming interface in the Request URI and in the P-Asserted-Identity header.

NOTE 1: In a SIP URI the user portion of the request URI represents a telephone number only if the SIP URI includes user equal phone parameter.

NOTE 2: If bilateral agreements exist between operators non-global number (e.g. national service numbers.) can be transported in local format.

NOTE 3: The following entities can be involved for the normalization of the telephone number: AS BGCF and MGCF for the Request-URI and the P-CSCF, MGCF and S-CSCF for the P-Asserted-Identity.

9 IP Version

The network elements interconnected by means of the II-NNI may support IPv4 only, IPv6 only or both.

The support of one or both of the IP versions is an operator option and should be based on bilateral agreement.

In case IPv4 and IPv6 networks are interconnected, the involved IBCFs and TrGWs shall apply the IP version interworking procedures as indicated in 3GPP TS 29.162 [8].

10 Security

The supported security mechanisms for IP signalling transport over II-NNI interfaces are described in 3GPP TS 33.210 [10].

11 Charging

The accounting information to be supported over the Ici is described in 3GPP TS 32.260 [29]. It shall be configurable by the operator to use or not the accounting mechanisms provided by the IBCF.

Annex A (informative): Summary of SIP headers

A summary of the SIP headers to be used in case of interconnection by using II-NNI is proposed in Table A.1.

The starting point is the sending behaviour described for proxy and UA roles in Annex A of TS 24.229 [5]. In case of misalignment between Table A.1 and the behaviour described in [5], the [5] has the precedence. In case a header is not described in Table A.1 and it is described in [5], description in [5] is applicable over II-NNI.

The notation of the codes used for the SIP headers listed in table A.1 has a different meaning to the one proposed for the SIP messages. The definition of these terms is provided in table A.2.

Table A.1: Supported headers

| Item | Header | Ref. | II-NNI |
|------|-------------------------------|-------------------------|---|
| 1 | Accept | [5] | m |
| 2 | Accept-Contact | [5] | m |
| 3 | Accept-Encoding | [5] | m |
| 4 | Accept-Language | [5] | m |
| 5 | Alert-Info | [5] | o |
| 6 | Allow | [5] | m |
| 7 | Allow-Events | [5] | m |
| 8 | Authentication-Info | [5] | m |
| 9 | Authorization | [5] | m |
| 10 | Call-ID | [5] | m |
| 11 | Call-Info | [5] | m |
| 12 | Contact | [5] | m |
| 13 | Content-Disposition | [5] | m |
| 14 | Content-Encoding | [5] | m |
| 15 | Content-Language | [5] | m |
| 16 | Content-Length | [5] | m |
| 17 | Content-Type | [5] | m |
| 18 | Cseq | [5] | m |
| 19 | Date | [5] | m |
| 20 | Error-Info | [5] | o |
| 21 | Expires | [5] | m |
| 22 | Event | [5] | m |
| 23 | From | [5] | m |
| 24 | Geolocation | [5] | m |
| 25 | History-Info | sub-clause 6.1.1.3.1 | m in case of a trust relationship between the interconnected networks, else n/a |
| 26 | In-Reply-To | [5] | o |
| 27 | Join | [5] | o |
| 27a | Max-Breadth | [5] | n/a |
| 28 | Max-Forwards | [5] | m |
| 29 | Min-Expires | [5] | m |
| 30 | MIME-Version | [5] | m |
| 31 | Min-SE | [5] | m |
| 32 | Organization | [5] | m |
| 33 | P-Access-Network-Info | sub-clause 6.1.1.3.1 | m in case of a trust relationship between the interconnected networks, else n/a |
| 34 | P-Asserted-Identity | sub-clause 6.1.1.3.1 | m in case of a trust relationship between the interconnected networks, else n/a |
| 35 | P-Asserted-Service | sub-clause 6.1.1.3.1 | m in case of a trust relationship between the interconnected networks, else n/a |
| 36 | P-Called-Party-ID | [5] | m on roaming NNI between home and visited IMS, else n/a |
| 37 | P-Charging-Function-Addresses | [5] | n/a |
| 38 | P-Charging-Vector | sub-clause 6.1.1.3.1 | m |
| 38a | P-Debug-Id | [5] | o |
| 39 | P-Early-Media | [5] | m |
| 40 | P-Media-Authorization | [5] | n/a |
| 41 | P-Preferred-Identity | [5] | n/a |
| 42 | P-Preferred-Service | [5] | m on roaming NNI between home and visited IMS, else n/a |
| 43 | P-Private-Network-Indication | sub-clause 6.1.1.3.1 | m on roaming NNI between home and visited IMS, else o |
| 44 | P-Profile-Key | sub-clause 6.1.1.3.1 | m on roaming NNI between home and visited IMS, else n/a |
| 45 | P-Served-User | sub-clause 6.1.1.3.1 | m on roaming NNI between home and visited IMS, else n/a |
| 46 | P-User-Database | [5] | n/a |
| 47 | P-Visited-Network-ID | [5] | m on roaming NNI between home and visited IMS, else n/a |
| 48 | Priority | [5] | o |
| 49 | Privacy | [5] | m |
| 50 | Proxy-Authentication | [5] | m on NNI between home IMS A and home IMS B, else n/a |
| 51 | Proxy-Authorization | [5] | m on NNI between home IMS A and home IMS B, else n/a |

| Item | Header | Ref. | II-NNI |
|------|---------------------|-------------------------|---|
| 52 | Proxy-Require | [5] | m |
| 53 | Reason | [5] | o |
| 54 | Record-Route | [5] | m |
| 55 | Referred-By | [5] | m |
| 56 | Reject-Contact | [5] | m |
| 57 | Replaces | [5] | o |
| 58 | Reply-To | [5] | o |
| 59 | Request-Disposition | [5] | m |
| 60 | Require | [5] | m |
| 61 | Resource-Priority | sub-clause 6.1.1.3.1 | o |
| 62 | Route | [5] | m |
| 63 | Security-Client | [5] | n/a |
| 64 | Security-Verify | [5] | n/a |
| 65 | Server | [5] | o |
| 66 | Session-Expires | [5] | m |
| 67 | Subject | [5] | o |
| 68 | Supported | [5] | m |
| 69 | Timestamp | [5] | m |
| 70 | To | [5] | m |
| 71 | Trigger-Consent | [5] | m |
| 72 | User-Agent | [5] | m |
| 73 | User-to-User | [5] | o |
| 74 | Via | [5] | m |
| 75 | Warning | [5] | o |
| 76 | WWW-Authenticate | [5] | m on roaming NNI between home and visited IMS, else n/a |

Table A.2: Key to notation codes for SIP headers

| Notation code | Meaning |
|---------------|---|
| m | The SIP header is applicable at II-NNI. Supporting sending a SIP header at the II-NNI means that this header is passed through the IBCF. It does not imply that network elements inside the networks support this header, where 3GPP TS 24.229 [5] is applied. If specified in 3GPP TS 24.229, an IBCF modifies the SIP header. |
| o | The applicability of SIP header at II-NNI depends on bilateral agreement between the operators. |
| n/a | It is impossible to use the SIP header at the II-NNI. This header could be discarded by the IBCF. |

Annex B: Change history

It is usual to include an annex (usually the final annex of the document) for reports under TSG change control which details the change history of the report using a table as follows:

| Change history | | | | | | | |
|----------------|--------|-----------|-----|-----|--|-------|-------|
| Date | TSG # | TSG Doc. | CR | Rev | Subject/Comment | Old | New |
| 4/05/2008 | | | | | TS Skeleton (C3-080779) | - | 0.0.0 |
| 07/07/2008 | | | | | Added agreed text of C3-080991, C3-081158 and C3-081208 | 0.0.0 | 0.1.0 |
| 28/08/2008 | | | | | Added agreed text of C3-081282 and C3-081672 | 0.1.0 | 0.2.0 |
| 01/09/2008 | | | | | Version 1.0.0 created for presentation to TSG by MCC | 0.2.0 | 1.0.0 |
| 17/10/2008 | | | | | Added agreed text of C3-081721 and C3-082105 | 1.0.0 | 1.1.0 |
| 20/11/2008 | | | | | Added agreed text of C3-082303, C3-082446, C3-082447 and C3-082611 | 1.0.0 | 1.2.0 |
| 26/11/2008 | | | | | v 2.0.0 was produced by MCC for Approval in CT#42 | 1.2.0 | 2.0.0 |
| 13/12/2008 | TSG#42 | | | | V 8.0.0 was produced by MCC | 2.0.0 | 8.0.0 |
| 03/2008 | TSG#43 | CP-090087 | 002 | 3 | Charging requirements on II-NNI | 8.0.0 | 8.1.0 |
| 03/2008 | TSG#43 | CP-090087 | 004 | 1 | Modification of the REFER method status | 8.0.0 | 8.1.0 |
| 03/2008 | TSG#43 | CP-090087 | 007 | 2 | NNI header tables | 8.0.0 | 8.1.0 |
| 05/2009 | TSG#44 | CP-090341 | 008 | 4 | Use of E.164 number at the II-NNI | 8.1.0 | 8.2.0 |
| 05/2009 | TSG#44 | CP-090341 | 009 | 4 | Correction to SIP headers table | 8.1.0 | 8.2.0 |

History

| Document history | | |
|-------------------------|---------------|-------------|
| V8.0.0 | February 2009 | Publication |
| V8.1.0 | April 2009 | Publication |
| V8.2.0 | June 2009 | Publication |
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