ETSI TS 186 011-1 V1.0.0 (2008-04)

Technical Specification

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IMS NNI Interworking Test Specifications; Part 1: Test Purposes for IMS NNI Interworking

ETSI

Reference

DTS/TISPAN-06027-1-NGN

Keywords

IMS, interworking, NNI, testing

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN).

The present document specifies test purposes covering IMS network requirements that can be assessed at the NNI interface between two IMS network implementations, i.e., the Mw reference point. For the purpose of the present document an IMS network is considered consist of P-CSCF, I-CSCF, S-CSCF, and HSS components, i.e., a minimal IMS network configuration. IMS applications servers (AS) and user equipment (UE) are not considered to be part of a IMS network but to be external components that interact with the IMS network via ISC and Gm/ reference points, respectively. DNS servers are also considered to be IMS external entities.

NOTE: The concrete meaning of the Mw interface, e.g. if Mw refers to the interface between P-CSCF in IMS1 and I-CSCF in IMS2 or S-CSCF in IMS1 and I-CSCF in IMS2, is defined by the test configurations specified in annex A of the present document.
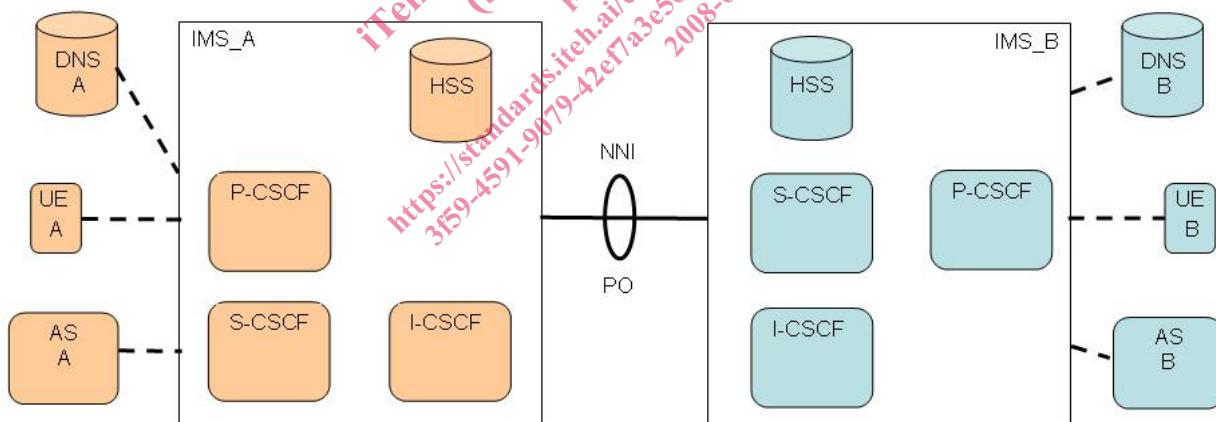
Figure 1: Interoperability test architecture for IMS NNI interworking

The present document is part 1 of a multi-part deliverable covering the IMS NNI Interworking Test Specifications, as identified below:

Part 1: "Test Purposes for IMS NNI Interworking";

Part 2: "Test Descriptions for IMS NNI Interworking".

1 Scope

The present document specifies interoperability Test Purposes (TPs) for IMS NNI interworking based on the IP Multimedia Call Control Protocol based on Stage 3 Session Initiation Protocol (SIP) and Session Description Protocol (SDP) standard, ETSI TS 124 229 Release 6 [1]. TPs are defined using the TPLan notation also described in ES 202 553 [4]. Test purposes have been written based on the test specification framework described in TS 102 351 [2] and the interoperability testing methodology defined in TS 102 237-1 [3]], i.e., interoperability testing with a conformance relation.

The scope of this test purpose specification is not a complete coverage of requirements specified in [1]. It has been reduced to cover only requirements which relate to basic IMS call functionality for a minimal interworking IMS CN configuration, i.e., based on a P-CSCF, S-CSCF, I-CSCF, and HSS. Therefore, assessment of, e.g., IMS roaming, topology hiding, etc., at the NNI are not addressed in this test purpose specification. TPs have been only specified for requirements that are observable at the interface between two separate minimal IMS CN implementations, i.e., IMS NNI.

NOTE: Requirements which can only be observed at the interface between UE and IMS CN, i.e. home P-CSCF, are explicitly not within the scope of the present document. The latter requirements have been dealt with from a UE and conformance perspective in TS ETSI 134 229 [5].

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.

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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 TS 124 229 (V6.13.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3 (3GPP TS 24.229 version 6.13.0 Release 6)".

[2]   ETSI TS 102 351: "Methods for Testing and Specification (MTS); Internet Protocol Testing (IPT); IPv6 Testing: Methodology and Framework".

[3]   ETSI TS 102 237-1: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 4; Interoperability test methods and approaches; Part 1: Generic approach to interoperability testing".

[4]   ETSI ES 202 553: "Methods for Testing and Specification (MTS); TPLan: A notation for expressing Test Purposes".

[5]   ETSI TS 134 229 (V6.0.0): "Universal Mobile Telecommunications System (UMTS); Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Part 2: Implementation Conformance Statement (ICS) specification (3GPP TS 34.229-2 version 6.0.0 Release 6)".

[6]   ETSI TS 123 228 (V6.15.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); IP Multimedia Subsystem (IMS); Stage 2 (3GPP TS 23.228 version 6.15.0 Release 6)".

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   Abbreviations

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

AS	(IMS) Application Server
CF	(Test) ConFiguration
CN	Core Network
CSCF	Call Session Control Function
DNS	Domain Name System
I-CSCF	Interrogating CSCF
P-CSCF	Proxy CSCF
S-CSCF	Serving CSCF
EUT	Equipment Under Test
HSS	Home Subscriber Server
IMS	IP Multimedia Subsystem
IOI	Inter Operator Identifier
IP	Internet Protocol
NNI	Network-to-Network Interface
RC	Requirements Catalogue
RQ	ReQuirement
SIP	Session Initiation Protocol
TP	Test Purpose
TPLan	Test Purpose Notation
TSS	Test Suite Structure
UE	User Equipment
URI	Uniform Record Identifier

4 Test Suite Structure (TSS)

The Test Suite Structure is based on a Requirements Catalogue which was established prior to test purpose specification. This RC extracts all requirements from [1] which are relevant to the scope of the present document. The TSS is defined by the groups within the following TPLan specification of test purposes. The numbering is not contiguous so that new TPs can be added at a later date without the need to completely renumber the TSS groups.

> NOTE: The requirements catalogue is at this point not accessible as an ETSI document. Requirement identifiers of the catalogue have been replaced in the present document with the location of the requirement in the base specification, i.e. base specification type, identifier, version, clause and paragraph.

> EXAMPLE: TS 124 229 [1] clause5.2.6.3 paragraph 66

The test purposes have been divided into 6 major groups:

Group 1.1: General Capabilities

Group 1.2: IMS-ALG

Group 1.3: Initial dialog or standalone request procedures

Group 1.4: Registration procedures

Group 1.5: Special Cases

Group 1.6: Subsequent or target refresh requests on a dialog procedures

The sub-grouping of these 6 groups follows the structure of the RC. Some of the sub-groups of the RC contained no testable requirement. Headings for those sub-groups are in this test purpose document in the node group to give a full view on the relation between RQ and TSS&TP.

```
Group 1 'IMS_NNI_IOP'
Group 1.1 'General Capabilities'
Group 1.2 'IMS-ALG'
Group 1.3 'Initial dialog or standalone request procedures'
Group 1.3.1 'Initial dialog invite procedures'
Group 1.3.1.1 'Initial originating network'
Group 1.3.1.2 'Initial terminating network'
Group 1.3.2 'Standalone requests procedures'
Group 1.3.2.1 'Standalone originating network'
Group 1.3.2.2 'Standalone terminating network'
Group 1.4 'Registration procedures'
Group 1.5 'Special Cases'
Group 1.5.1 'Emergency'
Group 1.5.2 'Resources not available'
Group 1.6 'Subsequent or target refresh requests on a dialog procedures'
Group 1.6.1 'Subsequent requests on a dialog procedures'
Group 1.6.1.1 'Subsequent originating network'
Group 1.6.1.2 'Subsequent terminating network'
Group 1.6.2 'Target refresh request procedures'
Group 1.6.2.1 'Refresh originating network'
Group 1.6.2.2 'Refresh terminating network'
```

5 Test Purposes (TP)

All test purposes have been written in the formal notation TPLan [5]. Configurations that are referenced by test purposes are shown in annex A. TPLan user definitions are listed in annex B.

5.1   Group IMS_NNI_IOP

Group 1 'IMS_NNI_IOP'

TP id   : TP_IMS_5053_01
summary   : 'When P-CSCF receives a request from the UE for an unknown method (not relating to an existing dialog) the P-CSCF shall delete P-Preferred-Identity header and insert P-asserted-Identity header'
TP type   : interoperability
RQ ref   : 3GPP TS 24.229(V6.13.0) §5.2.6.3 ¶66
EUT role : IMS -- P-CSCF
config ref: CF_MO2-SS1-MT2
with { UE_A registered **in** IMS_A **and**
       UE_B registered **in** IMS_B }
ensure that {
  when { UE_A **sends** Unknown_Method **to** UE_B
        }
  then { IMS_B **receives** Unknown_Method
               not containing P-Preferred-Identity_header **and**
               containing P-Asserted-Identity_header
                 containing an address **of** UE_A
        and
        UE_B **receives** Unknown_Method
       }
}

5.1.1   Group General Capabilities

Group 1.1 'General Capabilities'

TP id   : TP_IMS_4002_01
summary   : 'IMS CN components shall support SIP messages > 1300 bytes'
TP type   : interoperability
RQ ref   : 3GPP TS 24.229(V6.13.0) §4.2A ¶1
EUT role : IMS -- General
config ref: CF_MO2-SS1-MT2
with { UE_A registered **in** IMS_A **and**
       UE_B registered **in** IMS_B }
ensure that {
  when { UE_A **sends** MESSAGE **to** UE_B
          containing a Message_Body **bigger than** 1500 bytes }
  then { IMS_B **receives the** MESSAGE
            containing a Message_Body **bigger than** 1500 bytes
        and
        UE_B **receives** MESSAGE
       }
}

End group 1.1

5.1.2   Group IMS-ALG

Group 1.2 'IMS-ALG'
-- TPs for IMS-ALG are out of scope
End group 1.2

5.1.3   Group Initial dialog or standalone request procedures

Group 1.3 'Initial dialog or standalone request procedures'

TP id   : TP_IMS_5097_01
summary   : 'S-CSCF must retain the icid parameter received in the P-Charging-Vector header for initial INVITE'
TP type   : interoperability
RQ ref   : 3GPP TS 24.229(V6.13.0) §5.4.3.2 ¶1
EUT role : IMS -- S-CSCF
config ref: CF_MT2-SS1-MT2
with { UE_A registered **in** IMS_A **and**
       UE_B registered **in** IMS_B }
ensure that {
  when { UE_A **sends an initial** INVITE **to** UE_B }
  then { IMS_B **receives the initial** INVITE
               containing a P-Charging-Vector_header
                 containing a icid_parameter
        and

```
                    UE_B receives the INVITE }
}

TP id     : TP_IMS_5097_02
summary   : 'S-CSCF must inserts orig-ioi parameter, remove access-network-charging-info parameter
and P-Access-Network-Info header before sending initial INVITE over NNI'
TP type   : interoperability
RQ ref    : 3GPP TS 24.229(V6.13.0) §5.4.3.2 ¶1
EUT role  : IMS -- S-CSCF
config ref: CF_MO2-SS1-MT2
with { UE_A registered in IMS_A and
       UE_B registered in IMS_B }
ensure that {
  when { UE_A sends initial INVITE to UE_B }
  then { IMS_B receives the initial INVITE
                        containing a topmost Record-Route_header
                          indicating the originating S-CSCF_SIP_URI  and
                        containing a P-Charging-Vector_header
                          (containing a orig-ioi_parameter
                              indicating ioi of IMS_A and
                           not containing an
                                 access-network-charging-info_parameter) and
                        not containing a P-Access-Network-Info_header
         and
         UE_B receives the INVITE }
}

TP id     : TP_IMS_5097_03
summary   : 'S-CSCF inserts a second P-Asserted-Identity header indicating a registered tel URI if
not present for initial INVITE'
TP type   : interoperability
RQ ref    : 3GPP TS 24.229(V6.13.0) §5.4.3.2 ¶1
EUT role  : IMS -- S-CSCF
config ref: CF_MO2-SS1-MT2
with { UE_A registered in IMS_A and
       UE_B registered in IMS_B and
       UE_A registered_public_identities containing a Tel_URI and
       UE_A default_registered_public_identity is a SIP_URI }

ensure that {
  when { UE_A sends initial INVITE to UE_B
                        not containing a P-Preferred-Identity_header or
                        containing a P-Preferred-Identity_header
                          not indicating a Tel_URI}
  then { IMS_B receives the initial INVITE
                        containing a P-Asserted-Identity_header
                          indicating the default_registered_public_identity and
                        containing a P-Asserted-Identity_header
                          indicating a Tel_URI
         and
         UE_B receives the INVITE }
}

TP id     : TP_IMS_5097_04
summary   : 'S-CSCF inserts a second P-Asserted-Identity header indicating a registered SIP URI if
not present for initial INVITE'
TP type   : interoperability
RQ ref    : 3GPP TS 24.229(V6.13.0) §5.4.3.2 ¶1
EUT role  : IMS -- S-CSCF
config ref: CF_MO2-SS1-MT2
with { UE_A registered in IMS_A and
       UE_B registered in IMS_B and
       UE_A default_registered_public_identity is a Tel_URI }

ensure that {
  when { UE_A sends initial INVITE to UE_B
                        not containing a P-Preferred-Identity_header or
                        containing a P-Preferred-Identity_header
                          indicating a Tel_URI }
  then { IMS_B receives the initial INVITE
                        containing a P-Asserted-Identity_header
                          indicating the default_registered_public_identity and
                        containing a P-Asserted-Identity_header
                          indicating a Tel_derived_SIP_URI
         and
         UE_B receives the INVITE }
}
```

```
TP id     : TP_IMS_5097_05
summary   : 'S-CSCF uses ENUM/DNS to translate Tel URIs to SIP URIs in initial INVITE requests'
TP type   : interoperability
RQ ref    : 3GPP TS 24.229(V6.13.0) §5.4.3.2 ¶1
EUT role  : IMS -- S-CSCF
config ref: CF_MO2-SS1-MT2
with { UE_A registered in IMS_A and
       UE_B registered in IMS_B and
       DNS_B configured with an ENUM_entry for Tel_URI_E.164_Number of UE_B }
ensure that {
  when { UE_A sends initial INVITE to UE_B
                      containing a Request_URI
                         indicating a Tel_URI}
  then { IMS_A sends a DNS_Query to DNS_B
                      containing the Tel_URI_E.164_Number }
  when { IMS_A receives DNS_Response
                      containing a NAPTR_Resource_Record
                         indicating the SIP_URI of UE_B }
  then { IMS_A sends the initial INVITE to IMS_B
                      containing a Request_URI
                         indicating a SIP_URI
          and
          UE_B receives the INVITE }
}


TP id     : TP_IMS_5097_06
summary   : 'S-CSCF must retain the icid parameter received in the P-Charging-Vector header for
MESSAGE'
TP type   : interoperability
RQ ref    : 3GPP TS 24.229(V6.13.0) §5.4.3.2 ¶1
EUT role  : IMS -- S-CSCF
config ref: CF_MT2-SS1-MT2
with { UE_A registered in IMS_A and
       UE_B registered in IMS_B }
ensure that {
  when { UE_A sends a MESSAGE to UE_B }
  then { IMS_B receives the MESSAGE
                      containing a P-Charging-Vector_header
                         containing a icid_parameter
          and
          UE_B receives the MESSAGE }
}

TP id     : TP_IMS_5097_07
summary   : 'S-CSCF must inserts orig-ioi parameter, remove access-network-charging-info parameter
and P-Access-Network-Info header before sending MESSAGE over NNI'
TP type   : interoperability
RQ ref    : 3GPP TS 24.229(V6.13.0) §5.4.3.2 ¶1
EUT role  : IMS -- S-CSCF
config ref: CF_MO2-SS1-MT2
with { UE_A registered in IMS_A and
       UE_B registered in IMS_B }
ensure that {
  when { UE_A sends MESSAGE to UE_B }
  then { IMS_B receives the MESSAGE
                      containing a topmost Record-Route_header
                         indicating the originating S-CSCF_SIP_URI  and
                      containing a P-Charging-Vector_header
                        (containing a orig-ioi_parameter
                            indicating ioi of IMS_A and
                         not containing a
                           access-network-charging-info_parameter) and
                      not containing a P-Access-Network-Info_header
          and
          UE_B receives the MESSAGE }
}

TP id     : TP_IMS_5097_08
summary   : 'S-CSCF inserts a second P-Asserted-Identity header indicating a registered tel URI if
not present for MESSAGE'
TP type   : interoperability
RQ ref    : 3GPP TS 24.229(V6.13.0) §5.4.3.2 ¶1
EUT role  : IMS -- S-CSCF
config ref: CF_MO2-SS1-MT2
with { UE_A registered in IMS_A and
       UE_B registered in IMS_B and
```

```
        UE_A registered_public_identities containing a Tel_URI and
        UE_A default_registered_public_identity is a SIP_URI }

ensure that {
  when { UE_A sends MESSAGE to UE_B
                        not containing a P-Preferred-Identity_header or
                        containing a P-Preferred-Identity_header
                            not indicating a Tel_URI}
  then { IMS_B receives the MESSAGE
                        containing a P-Asserted-Identity_header
                            indicating the default_registered_public_identity and
                        containing a P-Asserted-Identity_header
                            indicating a Tel_URI
          and
          UE_B receives the MESSAGE }
}


TP id     : TP_IMS_5097_09
summary   : 'S-CSCF inserts a second P-Asserted-Identity header indicating a registered SIP URI if
not present for MESSAGE'
TP type   : interoperability
RQ ref    : 3GPP TS 24.229(V6.13.0) §5.4.3.2 ¶1
EUT role  : IMS -- S-CSCF
config ref: CF_MO2-SS1-MT2
with { UE_A registered in IMS_A and
       UE_B registered in IMS_B and
       UE_A default_registered_public_identity is a Tel_URI }

ensure that {
  when { UE_A sends MESSAGE to UE_B
                        not containing a P-Preferred-Identity_header or
                        containing a P-Preferred-Identity_header
                            indicating a Tel_URI }
  then { IMS_B receives the MESSAGE
                        containing a P-Asserted-Identity_header
                            indicating the default_registered_public_identity and
                        containing a P-Asserted-Identity_header
                            indicating a Tel_derived SIP_URI
          and
          UE_B receives the MESSAGE }
}


TP id     : TP_IMS_5097_10
summary   : 'S-CSCF uses ENUM/DNS to translate Tel URIs to SIP URIs in MESSAGE requests'
TP type   : interoperability
RQ ref    : 3GPP TS 24.229(V6.13.0) §5.4.3.2 ¶1
EUT role  : IMS -- S-CSCF
config ref: CF_MO2-SS1-MT2
with { UE_A registered in IMS_A and
       UE_B registered in IMS_B and
       DNS_B configured with an ENUM_entry for Tel_URI_E.164_Number of UE_B }
ensure that {
  when { UE_A sends MESSAGE to UE_B
                        containing a Request_URI
                            indicating a Tel_URI}
  then { IMS_A sends a DNS_Query to DNS_B
                        containing the Tel_URI_E.164_Number }
  when { IMS_A receives DNS_Response
                        containing a NAPTR_Resource_Record
                            indicating the SIP_URI of UE_B }
  then { IMS_A sends the MESSAGE to IMS_B
                        containing a Request_URI
                            indicating a SIP_URI
          and
          UE_B receives the MESSAGE }
}


TP id     : TP_IMS_5109_01
summary   : 'S-CSCF returns 408 or 5xx response to initial terminating INVITE when there is no
response from AS and filter criterion indicates the value SESSION_TERMINATED'
TP type   : interoperability
RQ ref    : 3GPP TS 24.229(V6.13.0) §5.4.3.3 ¶32
EUT role  : IMS -- S-CSCF
config ref: CF_MO2-SS1-MT2-AST4b
with { UE_A registered in IMS_A and
       UE_B not registered and
       IMS_B configured_with_a_terminating_unregistered_filter_criterion for UE_B indicating
SESSION_TERMINATED_on_INVITE }
```