# 3GPP TR 22.894 V11.0.0 (2011-06)

*Technical Report*

# 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Feasibility study on IP Multimedia Subsystem (IMS) network-independent public user identities (Release 11)


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# Contents

# Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

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- z the third digit is incremented when editorial only changes have been incorporated in the document.

# 1 Scope

This study aims to examine the use cases and potential requirements that allow different Public User Identities of the form sip:user@domain belonging to the same domain to be:

- assigned by multiple network operators, where an individual Public User Identity is served by only a single network operator for all IMS services;
- provisioned by network operators in the case where other URI schemes have already been, or are going to be, provisioned by different service providers in the internet.

The Public User Identities could be SIP URIs associated with or derived from user identities of services from the Internet domain.

This study also aims to clarify the relationships (e.g., business, interworking) between the Domain Name Owner, the assignee of sip:user@domain where it is not the same as the domain owner, and operators sharing the domain name.

Any potential regulatory aspects will also be considered.

# 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 23.003: "Numbering, addressing and identification".

[3] GSM Association PRD IR.67 (V5.1): "DNS/ENUM Guidelines for Service Providers & GRX/IPX Providers".

[4] IETF RFC 1034: "Domain Names - Concepts and Facilities".

[5] IETF RFC 1035: "Domain Names - Implementation and Specification".

[6] GSM Association PRD AA.80 (V3.2) : "Agreement for IP Packet eXchange (IPX) Services".

[7] GSM Association PRD IR.34 (V4.9): "Inter-Service Provider IP Backbone Guidelines".

[8] IETF RFC 3261: "SIP: Session Initiation Protocol".

[9] 3GPP TS 22.115: "Service aspects; Charging and billing".

[10] 3GPP TS 22.173: "Multimedia Telephony Service and supplementary services".

# 3 Definitions and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in 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 TR 21.905 [1].

**Domain Host**: The entity that hosts and manages the Domain Name on behalf of the Domain Name Owner on the Internet.

**Domain Name**: As defined in [4] and [5].

**Domain Name Owner**: The entity that is noted in the Internet (i.e. ICANN or one of its subsidiaries) as owning the Domain Name.

**IMS Intermediate Network:** An network that provides an interconnect between two operator's networks, an operator's network and another Intermediate Network, or between two other Intermediate Networks.

NOTE 1: The third case above is not a valid scenario on the IP Packet eXchange (IPX).

**IMS Network-Independent Public User Identity (INIPUI)**: A Public User Identity in the form of a SIP URI where the Domain Name part is a Shared Domain Name.

**IMS Network-Independent Public User Identity (INIPUI) User:** An entity that is identified by an IMS Network-Independent Public User Identity.

**IMS Network-Independent Public User Identity (INIPUI) Host**: The entity that hosts and manages the INIPUIs.

**IMS Network-Network Interface (NNI):** The connection between two operators, that can consist of zero or more Intermediate Networks, and which is totally transparent to the End User. An example of a common NNI used by mobile operators is the IP Packet eXchange (IPX).

**IMS Network-Independent Public User Identity (INIPUI) Registry**: An entity that provides mapping of IMS Network-Independent Public User Identities and IMS NNI-Routable Identifiers.

**IMS NNI-Routable Identifier:** An identifier that uniquely identifies the terminating network (and together with the username, identifies a unique subscriber belonging to that network).

NOTE 2: This identifier is never seen by an end user; it is used for routeing purposes only (in the same way as a SIP URI returned from an ENUM look-up is used).

NOTE 3: This identifier is not considered globally routable because the identifier could differ depending on the querying entity (i.e. INIPUI Operator or IMS Intermediate Network). Thus an identifier returned to one querying entity might not be routable by another querying entity.

**INIPUI Operator:** An IMS operator who provides IMS-based Services for a Shared Domain Name.

**IP Packet eXchange (IPX)**: The IPX is an inter-operator IP backbone network that is transparent to subscribers. The commercial details of it are defined in [6] and the technical details are defined in [7].

**Shared Domain Name:** The Domain Name in the IMS Network-Independent Public User Identity, and which is served by multiple INIPUI Operators.

**SIP URI:** As defined in [8].

## 3.2 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].

| | |
|---|---|
| ICANN | Internet Corporation for Assigned Names and Numbers |
| INIPUI | IMS Network-Independent Public User Identity |
| IPX | IP Packet eXchange |
| PUI | Public User Identity |

# 4 Background

IMS network independent PUIs based on Internet domain names are being explored to satisfy customer requirements for PUIs based on their domains rather than PUIs based on E.164 telephone numbers or operator owned domains. Currently, alphanumeric SIP URIs from the same domain, e.g. user.name@operator.com, can only be provided by a single operator. If the operator that provides URIs for domain @operator.com has subsidiaries in different countries, those subsidiaries cannot provide URIs for the same domain @operator.com. Permitting an operator's national/regional subsidiaries in different countries/regions to provide URIs for the same domain will allow operators to keep a single domain name for their international subscriber base.

Although domains typically refer to an operator, e.g. @operator.com, users may wish to use URIs based on their own domains, rather than SIP URIs based on E.164 numbering or operator-owned domains. This is especially true in the case of large corporations as they would prefer to use their own domain name, e.g. @company.com. For the enterprise case, in general there are two scenarios that need to be considered. In the first scenario, a corporation has IMS-based services provided by different operators within one country. In the second scenario, a multinational corporation has IMS-based services provided on an operator-per-country basis. It follows that allowing different operators within one country and also from different countries to provide URIs for the same domain will provide increased flexibility.

Implementing such PUIs in a secure fashion will present some novel challenges. Current and proposed implementations in [2] and [3] rely on a private DNS infrastructure to resolve PUIs to the serving operator which depends on information about E.164 and E.212 numbering resource assignment to operators and operator ownership of other domains.

# 5 Use Cases

## 5.1 Domain Name Sharing

Although domains typically refer to an operator, e.g. @operator.com, it is also possible to have domains that refer to corporations, e.g. @company.com.

The most straightforward use case involves a single corporation that has IMS subscriptions with various operators within a single country. In this case, the user identities will be provisioned by the different operators that the corporation has a subscription with.

This use case can be expanded to cover the scenario where the corporation obtains IMS-based services from different IMS networks of the same operator (e.g. regional network).

## 5.2 Multinational Corporations

For multinational corporations with locations in several different countries that use a single domain name @company.com, it is likely that they will require IMS-based services to be provided by different operators in different countries. As a result, Public User Identities will need to be provisioned by different operators. This is illustrated in the following diagram.

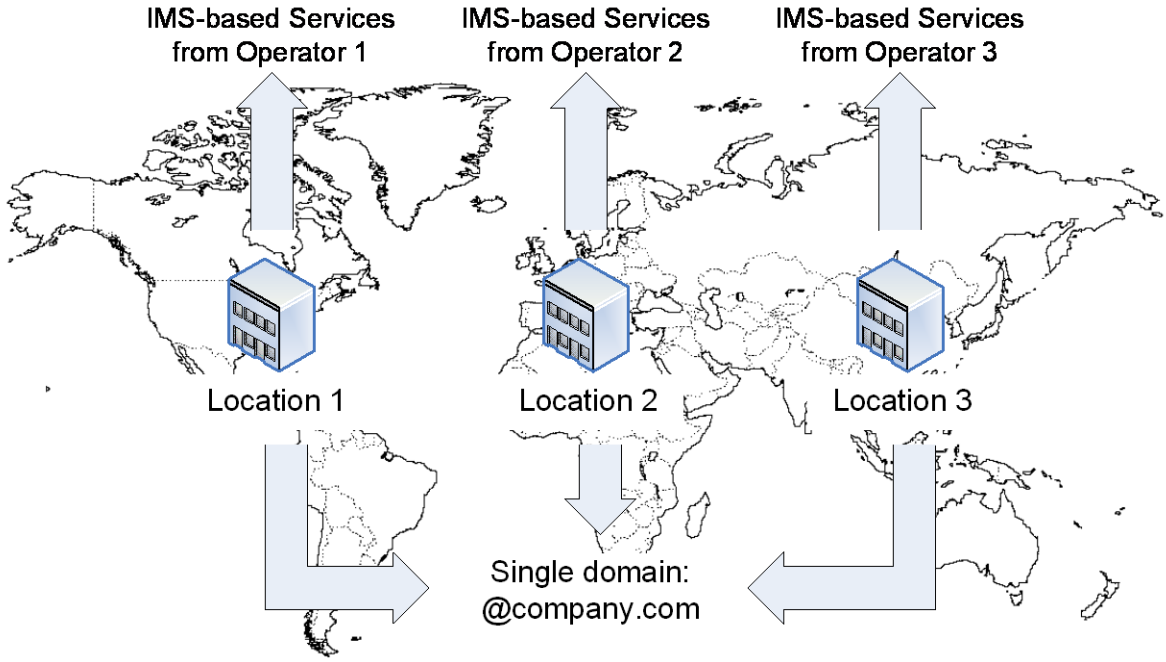


**Figure 1: Multinational Corporation Scenario**

## 5.3 Operator with Multiple Subsidiaries

For the case of an operator with domain @operator.com, if the operator has subsidiaries in different countries or in different regions, the operator subsidiary in Country Y or Region X will need to be allowed to provide Public User Identities for domain @operator.com. This is illustrated in the diagram below.

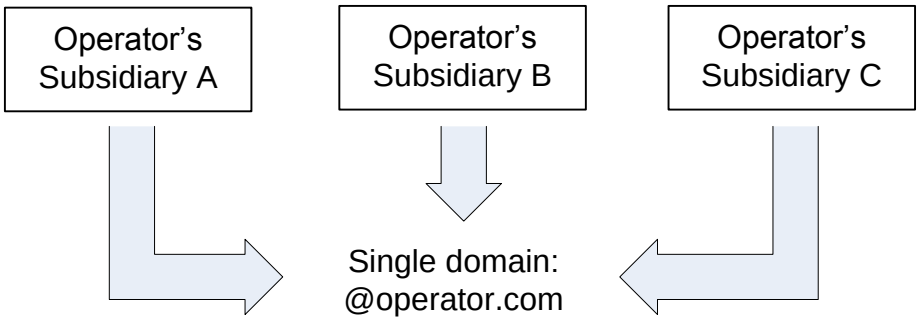


**Figure 2: Operator with Multiple Subsidiaries Scenario**

## 5.4 Different URI Schemes

A corporation that uses different services may have different service providers for each service. For example, email services may be provided by an ISP and IMS-based services may be provided by a telco operator. Therefore, it needs to be possible for URIs of different schemes to be administered by different entities, e.g. sip:myname@company.com by the telco operator and mailto:myname@company.com by an ISP.

## 5.5 Independent Name Space Provider

A corporation may have a business providing services, e.g. email, to retail customers under its own domain name, for example, example.com. The corporation might partner with an operator or operators to allow its users to employ their email IDs as PUIs in IMS, e.g. jennyjones@example.com.

## 5.6 User Identities from Internet-based Services

Operators, together with a provider of services in the Internet domain, could provide their subscribers a facility to import user identities from the provider of services in the Internet domain (e.g. email address, social network ID, instant messaging user ID) into the IMS domain. The imported user identity may need to be converted into a SIP URI and could then be used as the subscriber's IMS Public User Identity, alongside the existing subscriber's IMS Public User Identity.

In this scenario, different user identities for one particular provider of services in the Internet domain could be associated with different network operators.

# 6 INIPUI Ecosystem Business Relationships

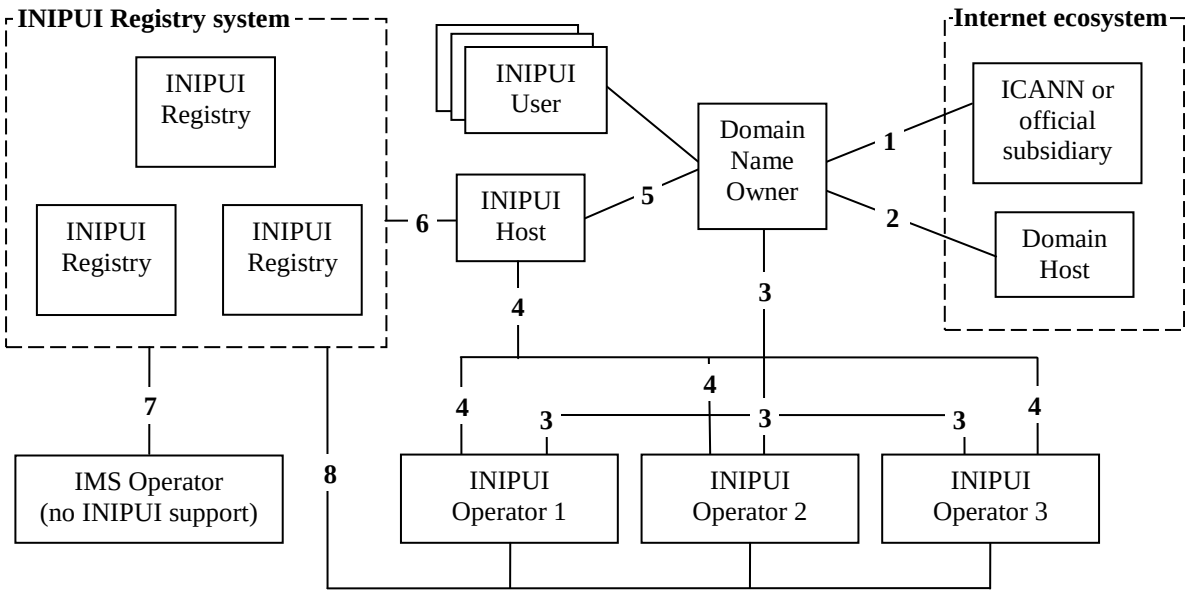


**Figure 3: Diagram of the business relationships between the entities within the INIPUI ecosystem**

NOTE 1: The INIPUI Registry ecosystem is out of the scope of 3GPP.

NOTE 2: The above nodes in the diagram represent roles. A single entity can take on more than one of these roles.

NOTE 3: The Domain Name Owner could allow another entity to use the Shared Domain Name.

The INIPUI and the Internet ecosystems are completely independent. The only common point is the Domain Name Owner has control over the use of the Shared Domain Name in both ecosystems.

Details of the relationships between entities within the INIPUI ecosystem are as follow, where the numbering refers to the numbering in Figure 1:

1) The Domain Name Owner has an agreement with ICANN or an official ICANN subsidiary for a Domain Name. This Domain name will be used as a Shared Domain Name.

2) The Domain Name Owner has an agreement with an Internet-based Domain Host in order to provide Internet-based services.

NOTE 4: The Domain Name Owner and the Internet-based Domain Host could be the same entity.

3) The Domain Name Owner has an agreement with one or more INIPUI Operators to provide IMS-based services for their INIPUI Users. Each INIPUI User is assigned a Username within the Shared Domain Name. A Username is unique within the Shared Domain Name and is associated with a single INIPUI Operator.

4) The INIPUI Host has an agreement with the INIPUI Operators to provide operator-specific information of the INIPUIs to the INIPUI Registry ecosystem.

5) The INIPUI Host has an agreement with the Domain Name Owner to provide domain-specific information of the INIPUIs to the INIPUI Registry ecosystem.

6) The INIPUI Host has an agreement with one or more INIPUI Registries to provide details of INIPUI and associated IMS NNI-Routable Identifier mappings.

7) An IMS Operator that does not support INIPUIs does not need to have any agreement with the INIPUI Host or INIPUI Registry.

8) An INIPUI Operator could have an agreement with a number of INIPUI Registries in order to map INIPUIs to associated IMS NNI-Routable Identifiers.

# 7 Service Scenarios

## 7.1 Call between users provisioned by same INIPUI Operator

In this scenario, user Red@example.com calls user Blue@example.com. Both Red and Blue have been provisioned by the same INIPUI Operator, Operator A. This is shown in the following diagram.

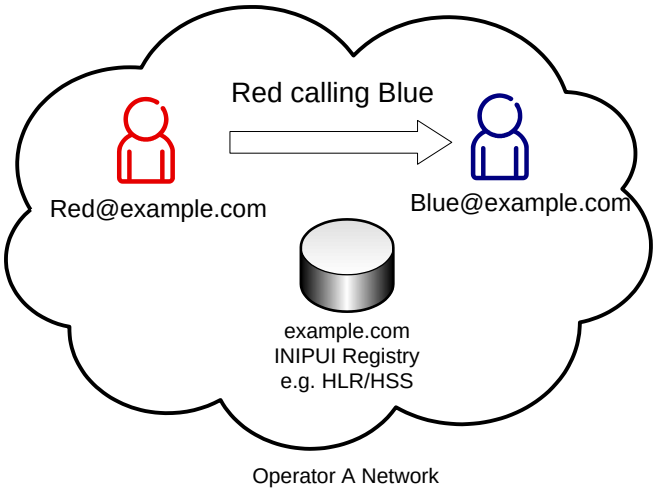


**Figure 4: Call between two users provisioned by the same INIPUI Operator**

The procedure within Operator A's network upon receiving the request from Red@example.com to contact Blue@example.com is as follows:

1) Is Blue@example.com a subscriber of Operator A? Yes

2) Call is routed within Operator A

In this scenario, Operator A does not have to query an INIPUI Registry outside the network, but Operator A is not prohibited from doing so.

## 7.2 Call between users provisioned by different INIPUI Operators

### 7.2.1 Scenarios

In this scenario, again Red@example.com calls Blue@example.com. However, this time Red@example.com is provisioned by Operator A while Blue@example.com is provisioned by Operator B.

In general, there are 3 basic scenarios:

- Operator A is capable of routing the call directly to Operator B
- Operator A routes the call to an IMS Intermediate Network where:
  - the IMS Intermediate Network is capable of routing the call to Operator B
  - the IMS Intermediate Network routes the call to another IMS Intermediate Network that is capable of routing the call to Operator B

### 7.2.2 Direct Interconnect

In this particular scenario, Operator A is capable of performing the routing.

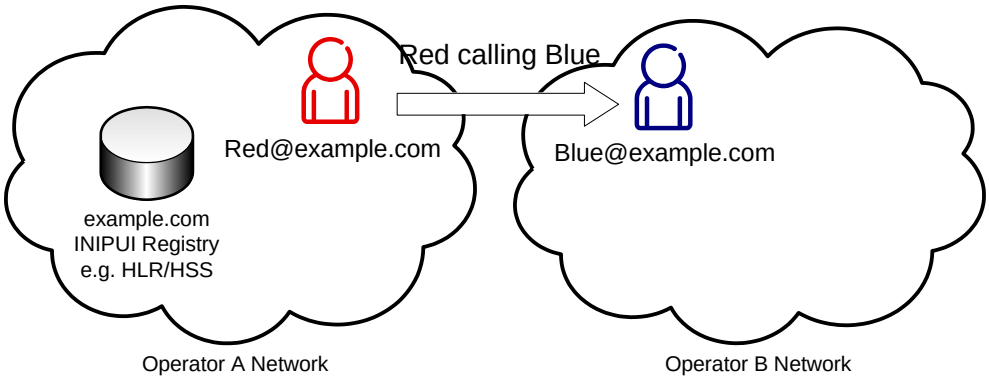


**Figure 5: Direct interconnect**

The procedure within Operator A's network upon receiving the request from Red@example.com to contact Blue@example.com is as follows:

1) Is Blue@example.com a subscriber of Operator A? No

2) Locate INIPUI Registry for example.com

3) Query INIPUI Registry for Blue@example.com

4) INIPUI Registry returns the IMS NNI-Routable Identifier, Blue@operatorB.com

5) Resolve destination for Blue@operatorB.com

6) Route call on to Operator B

NOTE 1: Yellow highlighting indicates a proposed modification to existing procedures

### 7.2.3 Indirect Interconnect

In this case, Operator A and Operator B are interconnected by one or more intermediate networks. Again the case where user Red@example.com calls user Blue@example.com is considered.

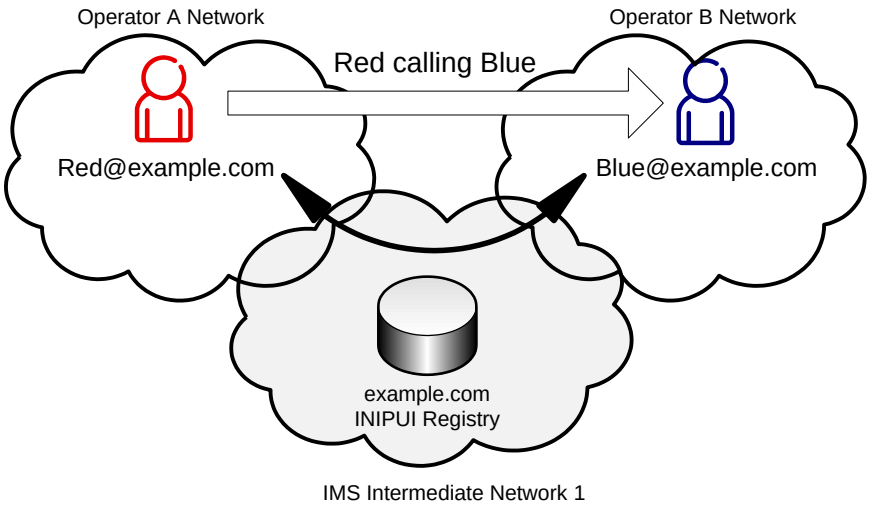


**Figure 6: Indirect interconnect with a single IMS Intermediate Network providing the INIPUI Registry**

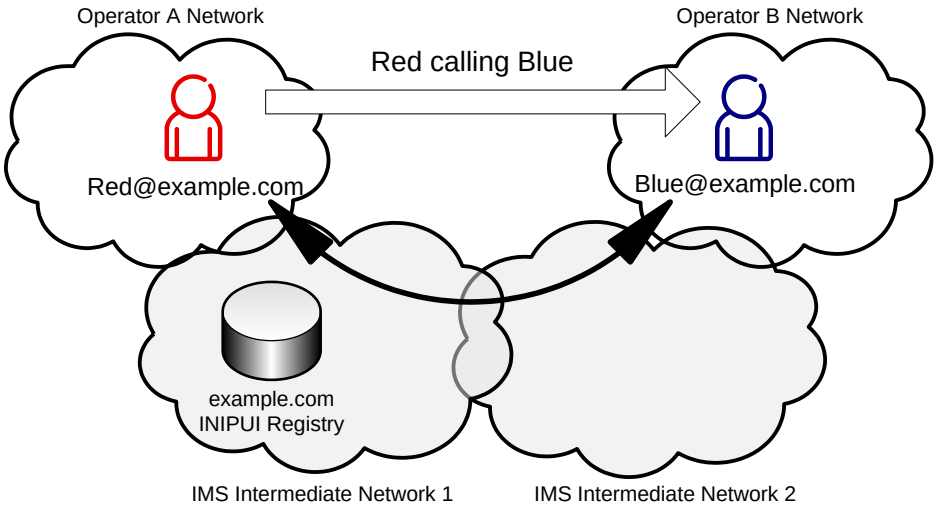


**Figure 7: Indirect interconnect with two IMS Intermediate Networks and INIPUI Registry provided by IMS Intermediate Network 1**

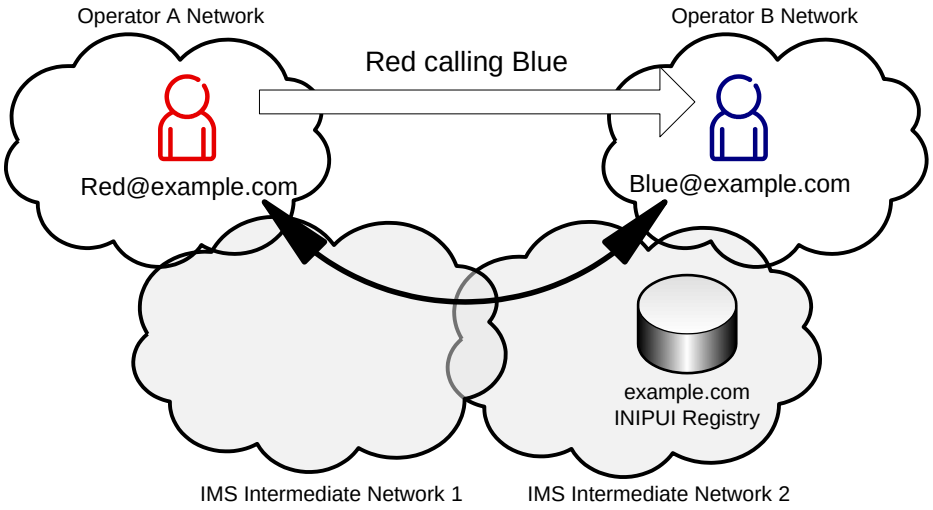


**Figure 8: Indirect interconnect with two IMS Intermediate Networks and INIPUI Registry provided by IMS Intermediate Network 2**

The procedure within Operator A's network upon receiving the request from Red@example.com to contact Blue@example.com is as follows:

1) Is Blue@example.com a subscriber of Operator A? No

2) Route call on to IMS Intermediate Network 1 (possibly after an INIPUI Registry query, which may have succeeded or failed)

IMS Intermediate Network 1 will then either do steps (1a-4a):

1a) Locate INIPUI Registry for example.com

2a) Query INIPUI Registry for Blue@example.com

3a) INIPUI Registry returns the IMS NNI-Routable Identifier, Blue@operatorB.com

4a) Resolve destination for Blue@operatorB.com

5a) Route call on to Operator B (e.g. via one or more IP-layer and/or SIP-layer intermediate networks)

OR:

1b) Route call on to IMS Intermediate Network 2 (who will perform steps 1a-5a above)

NOTE 2: Yellow highlighting indicates a proposed modification to existing procedures.

Theoretically there may be more than two IMS Intermediate Networks, in which case IMS Intermediate Network N will forward on to IMS Intermediate Network N+1 who will perform either the steps 1a-4a above or forward on to IMS Intermediate Network N+2 (and so on), However, some implementations (such as the IPX) may mandate a maximum of IMS Intermediate Networks (for the IPX, this maximum is two).

# 8 Security Aspects

The following scenarios have been identified for possible security requirements:

- Because data on the INIPUI Registry may be considered as private user data, access to the INIPUI Registry needs to be limited to entities that require access in order to provision and/or query INIPUIs.
- To avoid the scenario where the Shared Domain Name is hijacked in the INIPUI ecosystem, during the INIPUI Registry provisioning there is a need for the INIPUI Host to ensure that the Domain Name Owner controls the Shared Domain Name in the Internet ecosystem.
- To protect against malicious attacks, the INIPUI Registry itself needs to be secure.

The last two bullets are outside the scope of 3GPP.

The first bullet is a valid concern and results in the following potential requirement:

- An INIPUI Operator accessing an INIPUI Registry, for either provisioning or query, shall provide the INIPUI Registry with credentials that indicate that the INIPUI Operator is allowed access.

# 9 Charging Aspects

## 9.1 End User and Domain Name Owner

The following scenarios have been identified for possible End User and Domain Name Owner charging:

- The INIPUI User or Domain Name Owner could be charged, e.g. a fixed monthly charge, for the availability of INIPUI, irrespective of INIPUI usage.

NOTE 1: This scenario does not generate charging requirements in addition to those already specified in [9].

- The INIPUI User or Domain Name Owner could be charged on a per terminating call basis, when receiving a call made to an INIPUI.
- The calling party could be charged on a per originating call basis, when:
  - making a call towards any INIPUI;
  - making a call towards an INIPUI with a generic top-level domain, e.g. @example.com;
  - making a call towards an INIPUI with a country-specific top-level domain, e.g. @example.co.uk.

Subject to regulatory requirements, the user could be informed about the charges (e.g. in terms of rates, destination country, destination network or other information requested by the regulators).

## 9.2 Network Operator

The following scenarios have been identified for possible network operator-based charging:

- When acting as an IMS Intermediate Network, a network operator could charge another network operator for routing a call to an INIPUI based on the terminating top-level domain name, e.g. handling for @example.com could be charged more than @example.co.uk because of the additional handling that may be needed for a generic top-level domain rather than a country-specific top-level domain.
- A network operator could charge the Domain Name Owner for providing hosting services in the case the network operator assumes the INIPUI Host role.
- A network operator could charge the originating INIPUI Operator and/or IMS Intermediate Network for providing access to the INIPUI Registry in the case the network operator assumes the INIPUI Registry and/or INIPUI Host role.

The scenarios described above do not generate charging requirements in addition to those already specified in [9].

A network operator terminating a call from an INIPUI User may require information about the location of the calling UE to assess settlement charges.

# 10 Potential Requirements

Subject to regulatory requirements, multiple INIPUI Operators shall be able to associate SIP URIs of type "sip:user@domain" (also known as "alphanumeric SIP URIs") that share a single domain name.

Subject to regulatory requirements, an INIPUI operator shall be able to associate a SIP URI scheme with a domain name that has other URI schemes from different service providers.

NOTE 1: This allows customers who use an INIPUI Operator in one geographic region to use another INIPUI Operator in another region without affecting the domain name used (which may be part of a corporate branding), as well as choose a different service provider for different service offerings e.g. different INIPUI operator compared to their email provider.

NOTE 2: Provisioning of the INIPUI Registry for a particular Shared Domain Name is done by a single entity, the INIPUI Host. This ensures the uniqueness of the username, when assigned by different INIPUI operators, within a Shared Domain Name. The INIPUI Host also needs to ensure each INIPUI provisioned in the INIPUI Registry is authorised by the Domain Name Owner.

The IMS shall support a mechanism for an INIPUI User to be globally reachable by any subscriber, regardless of whether the originating operator supports INIPUI. In addition, an IMS operator that is serving inbound roaming INIPUI Users shall not be required to support any additional configuration on top of what already exists.

The IMS shall support the use of INIPUI as an IMS identity between the calling User and their INIPUI operator.

The use of INIPUI shall be transparent to the UE and therefore INIPUIs shall be usable by legacy UEs, subject to the UE support of alphanumeric SIP URI.

When the user enters the INIPUI of the called party, the UE shall display the INIPUI that was entered, subject to the UE display capability. For Terminating Identification Presentation (TIP), the INIPUI of the terminating party shall be displayed according to the requirements in TS 22.173 [10].

The IMS shall support passing of an INIPUI of the originating user and the INIPUI shall be displayed as CLI to the called party, subject to the UE display capability.

# 11 Conclusion

This technical report analysed the following:

- the relationship between entities and roles within the INIPUI ecosystem
- the use cases that support the use of INIPUI
- the service and interworking scenarios for INIPUI
- the regulatory, security and charging aspects

As a result, potential requirements have been identified in section 10. Therefore it is proposed that these potential requirements are introduced into TS 22.228 section 7.5.1.

# Annex A:
# INIPUI Registry architecture/organisation

## A.1 General

Although the architecture/organisation of INIPUI Registries is outside the scope of 3GPP, it is helpful to explain some aspects that aid in the understanding of the INIPUI principle as a whole.

## A.2 Relation of INIPUI Registry to IMS

The function of the INIPUI Registry is to map one SIP URI, an INIPUI, to another SIP URI. This means that the interface between the INIPUI Registry and querying entities (i.e. Originating INIPUI Operators and IMS Intermediate Networks) could be considered to be part of the IMS (i.e. in order to allow the SIP URIs to be exchanged).

In order to provision the INIPUI Registry with INIPUI mappings, similarly, SIP URIs will need to be input to the INIPUI Registry. It follows that the interface between the INIPUI Registry and provisioning entity could also be considered to be part of the IMS but only if the INIPUI Host is an INIPUI operator.

The INIPUI Registry itself is not considered to be part of the IMS.

## A.3 Connectivity between INIPUI Registries and Querying Entities

The organisation of INIPUI Registries is out of the scope of 3GPP and is up to the operator community to decide. However, the organisation of INIPUI Registries in terms of data sharing amongst individual INIPUI Registries impact the connectivity requirements for querying entities.

In general, there are three possible scenarios:

- when all of the INIPUI Registries share their data, only one INIPUI Registry needs to be queried;
- when none of the INIPUI Registries share their data, all INIPUI Registries need to be queried;
- when a set of INIPUI Registries share their data only between themselves, all possible sets of INIPUI Registries need to be queried.

From the network operator point of view, the first bullet above would be preferred.

## A.4 Provisioning entries into the INIPUI Registry

The relationship between INIPUI Registries and the provisioning entities is illustrated in the following diagram.

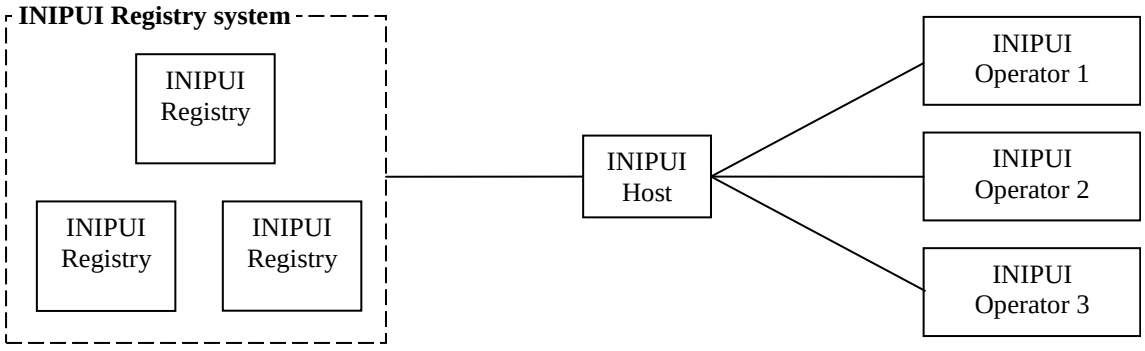


**Figure 9: Relationship between the INIPUI Registry and the provisioning entities**

Provisioning of the INIPUI Registry for a particular Shared Domain Name is done by a single entity, the INIPUI Host. This ensures the uniqueness of the username, when assigned by different INIPUI operators, within a Shared Domain Name.

Depending on the deployment scenario, one of the INIPUI Operators for the Shared Domain Name could take on the role of the INIPUI Host, as mentioned in Annex B.

# Annex B: Example Relationship Scenarios

## B.1 Operator Domain Name

In the case where the Shared Domain Name is an operator domain, e.g. @operator.com, the following roles would typically be taken on by a network operator:

- Domain Name Owner
- INIPUI Host
- INIPUI Operator

The INIPUI User in this case is typically the subscriber of the network operator.

## B.2 Enterprise Domain Name

In the case where the Shared Domain Name is a domain of a corporation, e.g. @company.com, the following roles would typically be taken on by a network operator:

- Domain Name Owner

NOTE: This role could be taken on by a network operator, for example, in the case of a small-medium enterprise that would prefer to outsource the role of Domain Name Owner.

- INIPUI Host
- INIPUI Operator

The INIPUI User in this case is typically the employee of the corporation.

## B.3 Independent Name Space Provider

In the case where the Shared Domain Name is a domain of an independent name space provider, e.g., @example.com, the following roles would typically be taken on by a network operator:

- INIPUI Operator

The independent name space provider might take on the roles of:

- Domain Name Owner
- Domain Host
- INIPUI Host

The INIPUI User in this case is typically a customer of the independent name space provider.

# Annex C:
# Change history

| Change history | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Date** | **TSG #** | **TSG Doc.** | **CR** | **Rev** | **Subject/Comment** | **Old** | **New** |
| 2010-11 | SA1#52 | | | | Version 0.0.0 Editor's Initial Draft | - | 0.0.0 |
| 2010-11 | SA1#52 | | | | Version 0.1.0 Inclusion of text agreed in the following contributions:<br>- S1-103250: FS_INIPUI Proposed Scope for TR22.894<br>- S1-103253: FS_INIPUI Proposed Background for TR22.894<br>- S1-103014: FS_INIPUI Proposed Use Cases for TR22.894<br>- S1-103256: FS_INIPUI Proposed Requirements for TR22.894 (last sentence superseded by text in S1-103259)<br>- S1-103251: Use Case for IMS Network-Independent Public User Identities<br>- S1-103259: Requirements for IMS Network-Independent Public User Identities<br>- S1-103260: FS_INIPUI Service Scenarios<br>In addition, introduced new sections for:<br>- Business Models<br>- Security Aspects<br>- Charging Aspects<br>- Potential Regulatory Requirements | 0.0.0 | 0.1.0 |
| 2011-01 | SA1#53 | | | | Version 0.2.0<br>Editorial updates identified at SA1#52:<br>- Change history: Version number V0.0.1 incorrect, updated to V0.1.0<br>- Section 2: Reference [3] updated with version number and correct title<br>Other editorial updates:<br>- Sections 3.1 and 3.2: Updated references to 21.905 from [x] to [1]<br>- Section 3.2: Introduced abbreviations already used in the TR for IP, IPX | 0.1.0 | 0.2.0 |
| 2011-02 | SA1#53 | | | | Version 0.3.0<br>Inclusion of text agreed in the following contributions:<br>- S1-110331: FS_INIPUI: Updates to the Scope<br>- S1-110327: FS_INIPUI: Proposed Definitions<br>- S1-110328: FS_INIPUI: Business Relationship between Entities<br>- S1-110011: FS_INIPUI: Proposed Updates for Service Scenarios<br>- S1-110332: FS_INIPUI: Proposed Text on Security<br>- S1-110333: FS_INIPUI: Charging Aspects<br>- S1-110330: FS_INIPUI: End to End Service Requirements (last paragraph in section 2 to be included in section 10.1 of the TR)<br>- S1-110329: FS_INIPUI: Updates to Potential Requirements<br>- S1-110014: FS_INIPUI: Potential Regulatory Requirements (implementation of proposal in section 3)<br>- S1-110334: FS_INIPUI: INIPUI Registry architecture/organization<br>- S1-110335: FS_INIPUI: Proposed Conclusions<br><br>Editorial updates:<br>- Updated Table of Contents<br>- Updated term "Domain Owner" to "Domain Name Owner" throughout<br>- Section 3.1: Introduced references used in the TR<br>- Section 5, 7: Updated figure numbering<br>- Section 3.2: Introduced abbreviations already used in the TR, removal of items duplicated in 21.905 [1]<br>- Section 6.2, 6.3: Introduced figure caption<br>- Section 8: Removal of Editor's Note<br>- Section 10.1: Removal of Editor's Note 1 and 2 after agreement of S1-110334, S1-110328<br>- Change history: Version number updated | 0.2.0 | 0.3.0 |
| 2011-03 | SA#51 | | | | Raised by MCC to v.1.0.0 for presentation for information to SA#51. Same technical content as v.0.3.0 but some clean-up made. | 0.3.0 | 1.0.0 |
| 2011-05 | SA1#54 | | | | Version 1.1.0<br>Editorial updates:<br>- Removed empty Introduction section<br>- Moved Use Cases section before INIPUI Ecosystem Business | 1.0.0 | 1.1.0 |

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| | | | | | Relationships section<br>- Removed header for section 6.1 General and 10.1 General Requirements since these are redundant<br>- Re-instated missing header for section 7.1 (deleted by mistake in v1.0.0) | | |
| 2011-05 | SA1#54 | | | | Version 1.2.0<br>Inclusion of text agreed in the following contributions:<br>- S1-111011: FS_INIPUI: Updates to Definitions (except changes to Note re-numbering which is incorrect)<br>- S1-111038: Input contribution to INIPUI TR22.894 (changed "IM" to "instant messaging")<br>- S1-111341: FS_INIPUI: Further Clarification of the Business Relationships<br>- S1-111342: FS_INIPUI: Updates to Potential Requirements<br>- S1-111014: FS_INIPUI: Authoritative Provisioning Aspects<br>- S1-111016: FS_INIPUI: Proposed Conclusions<br><br>Editorial and formatting updates throughout the document.<br>- addition of new reference<br>- removal of Editor's Note in section 9.2<br>- update terminology to match agreed terms in S1-111011 | 1.1.0 | 1.2.0 |
| 2011-05 | SA1#54 | | | | Version 1.2.0<br>Editorial updates to remove hanging paragraph in section 7.2:<br>- introduction of new header 7.2.1<br>- re-numbering of remaining sections in 7.2 | 1.2.0 | 1.2.1 |
| 2011-05 | SA#52 | | | | Updated from version 1.2.1 to version 2.0.0 by MCC for submission for approval at SA#52. No technical change. | 1.2.1 | 2.0.0 |
| 2011-06 | SA#52 | | | | Raised to v.11.0.0 by MCC following SA#52 approval (no technical change) | 2.0.0 | 11.0.0 |