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Upravljanje sistema ENUM v Evropi

ENUM Administration in Europe

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Services and Protocols for Advanced Networks (SPAN).

1 Scope

The present document aims to assist European countries in the development of their national implementations of ENUM. The present document builds upon the concept of ENUM as specified in IETF RFC 2916 [1] limited to E.164. It introduces a set of basic principles that should be adhered to in order to maximize potential benefits from publicly available ENUM implementations within Europe. A functional architecture for ENUM administration is put forward and a number of options for provisioning flows are also proposed.

ENUM-like mechanisms can also be used for other identifiers or purposes such as private dialling plans, routeing, etc. These functions are out of the scope of the present document.

The description of applications that can be offered by using ENUM capabilities and the role to be performed by Application Service Providers are specified in TS 102 055 (see bibliography).

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 and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[1] IETF RFC 2916: "E.164 number and DNS".

[2] IETF RFC 1591: "Domain Name System Structure and Delegation".

[3] ITU-T Recommendation E.105 (08/92): "International telephone service".

[4] ITU-T Recommendation E.164 (05/97): "The international public telecommunication numbering plan".

[5] ITU-T Recommendation E.191 (03/00): "B-ISDN addressing".

[6] IETF RFC 954: "NICNAME/WHOIS".

3 Definitions and abbreviations

3.1 Definitions

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

accreditation: processes by which organizations are approved to act as the entities at the Tier 1 or Tier 2 levels

NOTE: The nature of accreditation, indeed whether it applies at all, is a national matter.

Application Service Provider (ASP): entity that provides specific application(s) which may be linked to an E.164 number using ENUM e.g. email or voice messaging to the end user

assignment entity: entity (e.g. Telephony service provider or National Number Plan Administrator or his agent) responsible for the assignment of E.164 numbers to end users

designated manager or responsible administrative organization: entity, in any level of the ENUM-based architecture, which is responsible for a domain

NOTE: See clause 9.1 of the present document.

domain: set of host names within the DNS consisting of a single domain name and all the domain names below it

domain name: unique designator made up of symbols separated by dots

NOTE: The individual words or characters between the dots are called labels. The label furthest right represents the top level domain. The second most right represents the second level of domain, or "second level domain.

E.164: International Public Telecommunication Numbering Plan

NOTE: See ITU-T Recommendation E.164 [4].

E.164 Number: number taken from ITU-T Recommendation E.164

ENUM root: domain in which ENUM is hosted (according to IETF RFC 2916, this is e164.arpa)

ENUM domain name: domain name for an E.164 number

ENUM database: ENUM database is that part of the DNS below the ENUM root

ENUM end user: assignee of an E.164 number who has agreed to insert its E.164 number in the ENUM DNS-based architecture

ENUM registrar: entity that provides direct services to domain name registrants by processing name registrations

ENUM registrant: entity initiating the ENUM registration process (end user or agent)

ENUM subscriber: assignee of an E.164 number who has agreed to insert its E.164 number in the ENUM DNS-based architecture

ENUM Tier 0: level in the tiered architecture corresponding to the ENUM root, i.e. e164.arpa

NOTE: Records at this level contain pointers to Tier 1 for an E.164 Country Code or portion thereof.

ENUM Tier 1: level in the tiered architecture corresponding to the E.164 Country Code (CC), i.e. <CC>.e164.arpa

NOTE: Records at this level contain pointers to Tier 2 for an E.164 number.

ENUM Tier 2: level in the tiered architecture corresponding to the E.164 number, i.e., <N(S)N>.<CC>.e164.arpa

NOTE: Records at this level contain NAPTR records for an E.164 number.

ENUM Tier 2 Nameserver Provider: entity responsible for the servers within DNS that hold the NAPTR resource records

NOTE: In some other documents this entity is also referred to as the ENUM Tier 2 Registry or the ENUM Tier 2 provider.

National Number Plan Administrator (NNPA): entity responsible for the administration of a national numbering Plan that is part of the international E.164 numbering plan

number portability: ability of an end user to change location within a geographic area, between service providers or services, without changing their number

opt in: concept by which no action is taken unless with the explicit permission of the end user

telephony service provider: entity that provides the telephony service for which an E.164 number is assigned. In most cases the telephony service provider may act as the assignment entity

Uniform Resource Identifier (URI): compact string of characters for identifying an abstract or physical resource that is accessible via the Internet

Uniform Resource Locator (URL): refers to the subset of URI that identify resources via a representation of their primary access mechanism (e.g., their network "location"), rather than identifying the resource by name or by some other attribute(s) of that resource e.g. http://www.etsi.org or sip:user@etsi.org

validation entity: entity (e.g. Telephony service provider or National Number Plan Administrator or his agent) that validates the assignment of E.164 numbers to end users

WHOIS: database function that provides a look up capability of those on the Internet

3.2 Abbreviations

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

ASP	Application Service Provider
DNS	Domain Name System
DNSSEC	DNS SECurity extension
ENF	European Numbering Forum
IAB	Internet Architecture Board
IETF	Internet Engineering Task Force
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ISOC	Internet Society
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector
LS	Location Server
NAPTR	Naming Authority PoinTeR
NNPA	National Number Plan Administrator
NRA	National Regulatory Authority
ONP	Open Network Provision
PSPDN	Packet Switched Public Data Network
PSTN	Public Switched Telephone Network
RFC	Request For Comment (IETF related standard)
RRs	(DNS) Resource Records
SCN	Switched Circuit Network
SIP	Session Initiation Protocol
TLD	Top Level Domain
TSP	Telephony Service Provider
URI	Uniform Resource Identifier
URL	Uniform Resource Locator

4 Background

ENUM is a mechanism (see note 1) that maps E.164 numbers to Internet domain names. Every E.164 number can potentially be used in ENUM. All portions of international or national numbering plans can be considered for inclusion, meaning that every E.164 number can potentially be used in ENUM. Much attention now surrounds ENUM as it facilitates interworking between telephony networks and applications that are reliant on the Internet. ENUM transforms, in real time, end users' E.164 numbers to other communications identities (see note 2) used for setting up connections. For example, this could be used for communications from the circuit switched telephone network (PSTN) to IP-based services and vice-versa. It can also assist end users who wish to be able to be reachable via several means of communication. ENUM capabilities are described in more detail in clause 5 of the present document.

NOTE 1: While ENUM strictly refers to the mechanism, in practical terms it is also used to refer to the wider implementation of ENUM, i.e. the populated database.

NOTE 2: Communications identity is a generic term including a name, a number or an address. For explanation of these three terms refer to ITU-T Recommendation E.191 [5]. This new English term is introduced in the present document in the absence of a suitable well-known generic English term covering both a name, a number and an address for use in electronic communications networks (e.g. PSTN, ISDN, PLMN, Internet and PSPDN).

Following completion of work on IETF RFC 2916 [1] by the IETF which introduced the ENUM mechanism, the focus of attention turned towards the ITU-T who began working with the ISOC/IAB to determine the Administrative requirements (see note 3).

NOTE 3: ITU-T Study Group 2 is developing a Recommendation, E.A-ENUM "Principles and procedures for the administration of E.164 geographic country codes for registration into the domain name system", and a Supplement entitled "Operational and administrative issues associated with national implementations of enum functions" which will offer guidance to national Administrations/NRA. Approval of the Recommendation is targeted for 12/2002.

Work is now under way in some European countries in order to understand the implications of ENUM and how it could be implemented. However this is occurring in a rather fragmented manner. Concerns over ENUM have also been expressed by a number of other parties, including the European Commission (see note 4) in the production of a paper that has been submitted to the ONP Committee. An experts group on Numbering, Naming and Addressing, created by the ONP committee, will also be considering whether any specific action relating to ENUM is required.

NOTE 4: The ONP expert group meet in December 2001 and in January 2002. Their results were provided to the ONP Committee. Then the ONP Committee made a contribution to the ITU-T SG2-meeting in May 2002 that was supported by the 15 MS in EU.

The numbering and addressing environment within Europe exhibits marked differences from that within the US and other parts of the world, so it is considered important that Europe looks closely at the administration issues that occur with ENUM. Efforts at drawing together a co-ordinated approach should not only result in a firm foundation for ENUM activities within the European environment, but should also assist in enhancing the competitive communications environment.

The present document is presented to assist with that task. It has been developed taking due account of the views and comments of other key European bodies, including the European Numbering Forum (ENF).

NOTE 5: In the present document, for consistency, the domain e164.arpa will be mentioned as the ENUM root domain of the ENUM DNS-based architecture. In the case that a different domain results from discussions between ISOC and the ITU the basic principles articulated in this paper will apply.

The single domain that is referred to throughout the present document as for the ENUM Tier 0 domain, is the e164.arpa domain. This domain is used only for convenience and given that domain is specified in IETF RFC 2916 [1], the IETF protocol in which ENUM is described. This should not assume that this domain will be the final choice which the ITU and relevant Internet governance bodies will agree on for the implementation of ENUM. The principles set in the present document are independent of the final choice of the ENUM Tier 0 domain and should not preclude a single authoritative solution at some future point in time, should this become agreed policy.

5 Description of ENUM

ITU-T Recommendation E.164 [4] describes the format and types of use of public telephone numbers (E.164 numbers). ENUM is a term that has been adopted to describe a Domain Name System (DNS) based mechanism which maps E.164 numbers into URIs.

Via ENUM, an E.164 number can be used as a single front-end to a variety of communication identities by which an end user can be contacted, including those used for phone, fax and email. This enables users who are the recipient of communications to indicate the means by which they wish to be contacted through a single number. The details of these communications identities can also be easily amended, added to, or updated without changing the number used for access.

The communications identities that can be accessed via a look-up of ENUM data may be associated with a wide range of applications, some of which are shown within figure 1.

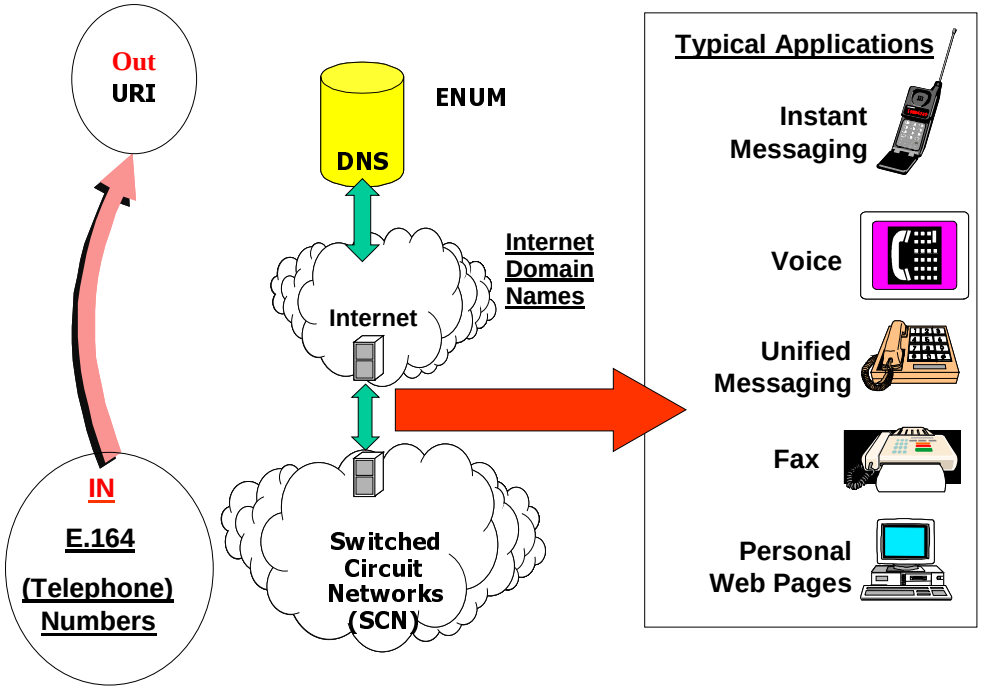

Figure 1: Typical applications enabled through ENUM

Using ENUM capabilities, providers of IP telephony services could legitimately originate IP telephony calls from an E.164 number or terminate IP telephony calls to an E.164 number that was assigned by the access network operator rather than by the IP telephony service provider.

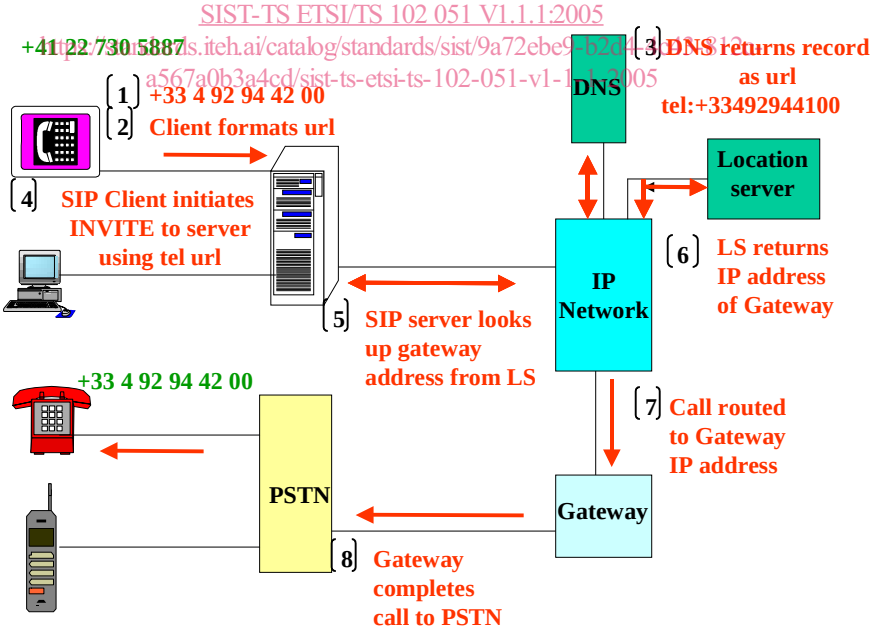

Figure 2: Typical call flows IP-PSTN

Figure 2 shows a typical call flow with a call originating on a SIP based network, in this example in Switzerland (+41 number), contacting a user on a SIP (IP based) network in France (+33 number).

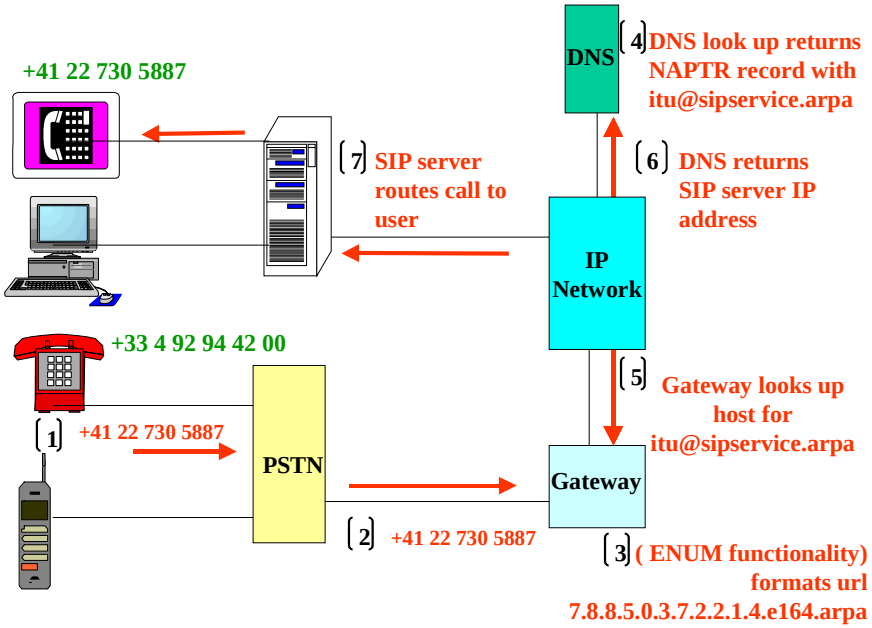

Figure 3: Typical call flows PSTN-IP

Figure 3 shows a typical call flow where a call originating on a on a circuit switched network in this case in France (+33 number), contacts a user on a SIP (IP based) network in Switzerland (+41 number).

It should be noted that ENUM can facilitate a wide range of different applications by providing access using an E.164 number, however ENUM itself does not provide these applications, merely a method that can facilitate access.

ENUM utilizes a mechanism developed by the Internet Engineering Task Force (IETF), specified in IETF RFC 2916 [1]. As stated previously ENUM resolution utilizes the DNS for resolution. The part of the DNS tree applicable to ENUM is shown in figure 4.

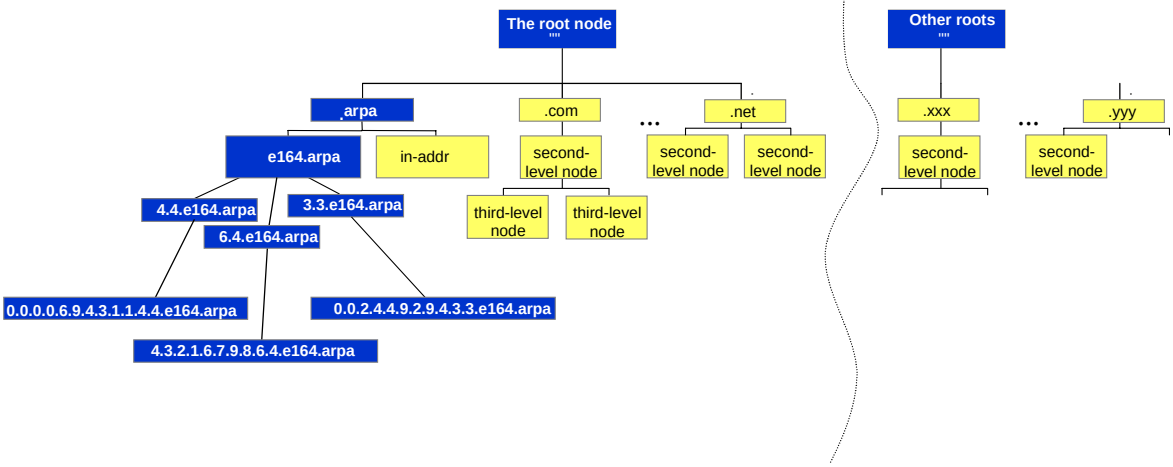

Figure 4: shows how ENUM fits into the DNS structure

The DNS forms a distributed database which holds information about Internet hosts. Each domain path spreads down from one 'root' domain at the highest level through its sub domains. In written form each sub domain is indicated by the insertion of a dot (.) within the written string. “Other roots” can be found in clause 6.3.3.