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Technical Specification

Services and Protocols for Advanced Networks (SPAN); Minimum requirements for interoperability of European ENUM trials

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ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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Contents

Intellectual Property Rights	4
Foreword.....	4
1 Scope	5
2 References	5
3 Definitions and abbreviations.....	6
3.1 Definitions	6
3.2 Abbreviations	7
4 Introduction	8
5 General objectives of ENUM trials within Europe	9
6 ENUM trial interoperability	10
6.1 Constraints in national trials	10
6.2 Interoperability in ENUM trials	12
6.3 Application recommendations to facilitate trial interoperability	13
7 Administrative requirements for interoperability of trials.....	13
8 DNS requirements for interoperability of trials.....	14
9 Harmonization of the "ENUMservice" field in the NAPTR Records	14
9.1 Background to minimum requirements for NAPTR use	14
9.2 General conditions.....	15
9.3 Format and processing of NAPTR records.....	16
9.4 "ENUMservices" and associated URI Schemes	17
9.4.1 Minimum set of "ENUMservices"	17
9.4.1.1 "ENUMservices" for Interactive Media-stream Exchange	17
9.4.1.2 "ENUMservices" for Discrete (non-session related) Messages	17
9.4.1.3 "ENUMservices" for Information Source	18
9.4.1.4 "ENUMservices" for Service Resolution Services	18
9.4.1.5 "ENUMservices" for Session-oriented Message Exchanges.....	18
9.4.1.6 "ENUMservices" for Instant Information Display - Announcement.....	19
9.4.1.7 "ENUMservice" for Redirection	19
9.4.2 Additional "ENUMservices"	20
9.4.2.1 "ENUMservices" for Location Information	20
9.4.2.2 "ENUMservices" for Public Key Information	20
10 Processing of retrieved information by ENUM Clients	20
10.1 Generic ENUM Clients	20
10.2 ENUM enabled Application Clients.....	21
10.3 Examples of specific ENUM enabled Application Clients	21
10.3.1 ENUM enabled SIP Client.....	21
10.3.2 ENUM enabled H323 Client.....	21
10.3.3 ENUM enabled Email Client	22
10.3.4 ENUM enabled Web Browser	22
10.3.5 ENUM enabled FTP Client.....	22
10.3.6 ENUM enabled FAX Client.....	22
10.3.7 ENUM enabled SMS Client	22
10.3.8 ENUM enabled Location Client	22
Annex A (informative): Background to NAPTR Resource Records.....	23
Annex B (informative): Bibliography.....	26
History	27

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Foreword

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

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1 Scope

The present document contains general guidance on European ENUM trials and the specification for:

- The format, contents and meaning of the information in the NAPTR records that are held by the ENUM Tier 2 Nameserver providers and accessible by DNS.
- The ways in which ENUM client software should interpret and act upon information obtained from NAPTR records.

The present document is intended to enable interoperability between ENUM trials that are organized in different countries. This interoperability enables:

- The same ENUM client software to work with NAPTR records generated by different national trials and this in turn will enable applications that use ENUM to access details of ENUM subscribers in more than one country without additional modifications.
- Organizations to function as ENUM Registrars and ENUM Tier 2 Nameserver Provider in more than one national trial.

The present document will therefore add economies of scope to the ENUM trials that will benefit ENUM subscribers, trial participants, application service providers and ENUM users.

The present document is published as a Technical Specification (TS) at this stage as the contents are unproven. The intention is to update and upgrade the present document in the light of the results obtained from the trials.

These requirements are therefore specified for the trial phase only, and as such impose no constraints on ENUM when implemented on a commercial basis following completion of the trial.

Although the present document is focused towards European ENUM trials its use could facilitate interoperability with ENUM trials in other parts of the world.

[SIST-TS ETSI/TS 102 172 V1.1.1:2005
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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.

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

NOTE 1: The present document is based additionally on "Work in Progress" at the IETF, documented in Internet Drafts. This is especially valid for the syntax of the "ENUMservice" field in the NAPTR RR, which is based on the definitions in Internet Draft <draft-ietf-ENUM-rfc2916bis-05.txt>, which will supersede RFC 2916. Within the present document this Internet Draft is referenced as RFC 2916bis.

- [1] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".
- [2] ETSI TS 102 051: "ENUM Administration in Europe".
- [3] IETF RFC 1034: "Domain Names - Concepts and Facilities".
- [4] IETF RFC 1035: "Domain Names - Implementation and Specification".
- [5] IETF RFC 1123: "Requirements for Internet Hosts -- Application and Support".

- [6] IETF RFC 1591: "Domain Name System Structure and Delegation".
- [7] IETF RFC 1738: "Uniform Resource Locators (URL)".
- [8] IETF RFC 2181: "Clarifications to the DNS Specification", Updates: 1034, 1035, 1123.
- [9] IETF RFC 2182: "Selection and Operation of Secondary DNS Servers".
- [10] IETF RFC 2255: "The LDAP URL Format".
- [11] IETF RFC 2368: "The mailto URL scheme".
- [12] IETF RFC 2396: "Uniform Resource Identifiers (URI): Generic Syntax".
- [13] IETF RFC 2616: "Hypertext Transfer Protocol -- HTTP/1.1".
- [14] IETF RFC 2806: "URLs for Telephone Calls".
- [15] IETF RFC 2818: "HTTP Over TLS".
- [16] IETF RFC 2916: "E.164 number and DNS".
- [17] IETF RFC 3261: "SIP: Session Initiation Protocol".
- [18] IETF RFC 3401: "Dynamic Delegation Discovery System (DDDS) Part One: The Comprehensive DDDS".
- [19] IETF RFC 3402: "Dynamic Delegation Discovery System (DDDS) Part Two: The Algorithm".
- [20] IETF RFC 3403: "Dynamic Delegation Discovery System (DDDS) Part Three: The Domain Name System (DNS) Database".
- [21] IETF RFC 3405: "Dynamic Delegation Discovery System (DDDS) Part Five: URI.ARPA Assignment Procedures".

NOTE 2: Also some of the above referenced URI Schemes are currently updated.

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3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TS 102 051 [2], with the exception of ENUM End User and ENUM Subscriber and the following apply:

NOTE: The term ENUM End user is not used within the present document, ENUM User and ENUM Subscriber are defined as follows:

ENUM Subscriber: assignee of an E.164 number who has agreed to insert its E.164 number in the ENUM DNS-based architecture and who requests population of an ENUM domain

NOTE: The ENUM subscriber has full control over the provision and content of the NAPTR Resource Records in the ENUM Tier 2 Nameserver provider. The ENUM Subscriber is called ENUM End User in TS 102 051 [2].

ENUM User: person or entity who is querying the ENUM DNS-based architecture using an ENUM-enabled Application Client or an ENUM Client

NOTE: The ENUM User may be aware only of the application and not of the use of ENUM by the application.

In addition, the following terms and definitions apply:

Application Client: function that provides a user access to the Application Server, e.g. a VoIP client or e-mail client

Application Server: function provided by an Application Service Provider to communicate with the Application Client

ENUM Client: function that provides access to the DNS which will then return information in the form of NAPTR records

NOTE: This could take several forms e.g. it may reside as client software on an intelligent terminal used directly by the ENUM User or be network based, provided upstream as part of the facilities offered by an Application Service Provider.

ENUM Client Supplier: entity supplying the ENUM Client

ENUM enabled Application Client: Application Client querying ENUM directly for NAPTR Resource Records

ENUM enabled Application Server: Application Server that is using ENUM Clients as part of their application, e.g. an email server that translates phone numbers in the To:/RCPT fields into their ENUM stored mailto: values

"ENUMservice": parameter held in the Service Field of a NAPTR Resource Record associated with the ENUM DDDS Application that indicates the class of functionality a given URI Scheme offers

NOTE: According to RFC 2916bis an "ENUMservice" must be registered with the IANA via a description in an RFC.

Naming Authority Pointer Resource Record (NAPTR): The Naming Authority Pointer Resource Record is specified in RFC 3403 [20] and a way to encode rule-sets in DNS.

Resource Record: element within the Domain Names System (DNS) containing a data item associated with a domain name

Uniform Resource Identifier (URI): compact string of characters for identifying an abstract or physical resource (e.g. an application)

NOTE: An URI is used within a NAPTR Resource Record to point to a specific application.

Uniform Resource Identifier (URI) Schemes: In the Uniform Resource Identifier (URI) definition (RFC 2396, RFC 1738) there is a field, called "scheme", to identify the type of resource.

NOTE: URI Schemes are defined in RFCs and officially registered with the IANA (see <http://www.iana.org/assignments/uri-schemes>).

The following registered URI Schemes are used within the present document:

ftp	File Transfer Protocol	RFC 1738 [7]
http	Hypertext Transfer Protocol	RFC 2616 [13]
mailto	Electronic mail address	RFC 2368 [11]
sip	Session Initiation Protocol	RFC 3261 [17]
tel	Telephone	RFC 2806 [14]
ldap	Lightweight Directory Access Protocol	RFC 2255 [10]
https	Hypertext Transfer Protocol Secure	RFC 2818 [15]

In addition, the not yet registered URI Schemes "h323" and "ENUM" are used. The "tel" URI Schemes is also currently undergoing modifications. For more information see the related Internet Drafts (work in progress).

3.2 Abbreviations

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

+NNN	Any E.164 number e.g. in the format +12345678900
CNAME	Canonical Name DNS Resource Record
DDDS	Dynamic Delegation Discovery System
DNAME	DNS RR for non-terminal DNS Name Redirection
DNS	Domain Name System
DNSSEC	DNS SECURITY extension
EDNS	Enhanced Domain Name System
EMS	Enhanced Message Service
FAX	Facsimile Service
FTP	File Transfer Protocol

H323	Protocol defined in ITU-Recommendation H.323
IANA	Internet Assigned Numbers Authority
IETF	Internet Engineering Task Force
IP	Internet Protocol
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector
LDAP	Lightweight Directory Access Protocol
MMS	Multimedia Messaging Service
NAPTR	Naming Authority PoinTeR
NICNAME	Unique Identifier ("handle") pointing to personal information in WHOIS
NRA	National Regulatory Authority
PC-Phones	Phone Clients running on Personal Computers
POSIX	Portable Operating System Interface
PSTN	Public Switched Telephone Network
RegExp	Regular Expression
RFC	Request For Comment
RIPE NCC	Reseaux IP Europeens Network Control Center
RR	(DNS) Resource Record
SIP	Session Initiation Protocol
SMS	Short Message Service
SW	Software
URI	Uniform Resource Identifier
VoIP	Voice over IP
WHOIS	A tool (program) to look up domain names and related information in a database

4 Introduction

ITh STANDARD PREVIEW

Following initial work on the national ENUM trials that are either being planned or taking place in several European countries, it has been recognized that additional benefits can be gained by facilitating interoperability of the various trials. The present document aims to assist those countries who wish to expand their trials on a pan-European basis. It proposes a minimum set of requirements for interoperability.

ENUM Trial interoperability would enable benefits to be gained by sharing experience of different administrative, technical, operational and user aspects relating to the provision of ENUM capabilities between countries. Each country will have its own particular architectural, administrative, security and authentication requirements along with its particular implementation rules. Therefore linking the trials together will enable the various approaches to be evaluated on a broad basis. This approach would also widen the range of applications and services available to end users as it will enable them to access those provided by other trialists.

Without commonality of some aspects especially as the format of the NAPTRs designed to support applications, attempts to link trials together are likely to result in difficulties when trying to access user information in more than one country.

The results collected from pan-European trials should enable participants to gain valuable information and experience that will assist when commercial deployment is considered at a later stage.

Involved parties are interested in carrying out trials for ENUM implementation in order to further the resolution of technical, administrative and operation issues that may define the rules for the commercial deployment in that country.

In order not to presume any implementation solution, it is necessary that the minimum sets of requirements will not limit the freedom of individual trials and the possibility to take different approaches.

The range of functional entities participating in a national trial depends on the choice of the administrative model in the country involved. The preferred model in a given country, in turn, depends on, among other things, the national arrangements for the management of domain names and E.164 numbers. TS 102 051 [2] outlines a number of options for the administrative model and explains the functions of these roles. Nonetheless, most of the roles (functional entities) listed are expected to be present in all European trials irrespective of the chosen administrative model:

- ENUM Tier 0 Registry
- ENUM Tier 1 Registry
- ENUM Tier 2 Nameserver Provider

- ENUM Registrar
- Application Service Provider
- Authentication Agency
- ENUM Subscriber
- ENUM User

For more general information on ENUM see TS 102 051 [2].

5 General objectives of ENUM trials within Europe

Although the objectives for ENUM trials undertaken within any European country must remain totally a national matter, it should be recognized that additional benefits may be gained from shared experience if some of the general objectives are shared. Such experience can be further enhanced if different implementations are linked together.

The following list of objectives identifies those that fall into this category and is recommended for trials that are linked together within Europe in order to share their ENUM experience:

- Understanding the ENUM technology and its potential in providing new applications and services to customers.
- Evaluating basic DNS infrastructure in relation to ENUM architecture models (for example ENUM Tier 1 Registry, ENUM Registrar, ENUM Tier 2 Nameserver Provider, Authentication and Validation procedures).
- Evaluate and refine the economic benefits and costs of introducing the ENUM capability.
- Exchange of information related to processes e.g. provide process, change process, cessation process, dispute process.
- Increase the overall size and thereby the benefits of European trials.
- Provide feedback to the relevant standard bodies.
- Provide feedback to NRA/Governments.

Additionally the following list identifies aspects where additional benefits are likely to be gained, although their inclusion should be dependent upon each specific case and should remain a national issue:

- Experience of registering the ENUM domain name related to the E.164 number and the entry of the necessary data into DNS zone files.
- Validation initiated by the ENUM Registrar (that the correct delegation is made to the ENUM Subscriber).
- Gaining experience in provisioning ENUM delegation processes between ENUM Registrars and ENUM Tier 1 Registries.
- Exploring options for harmonized provisioning protocols across different countries as well as for unified validation processes.
- Experience of sharing a common set of applications (e.g. VoIP) from a wider set of users.