

# *Status updates on the Latest (March 2006) Developments*

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# Agenda

- Number Portability Parameters for the "tel" URI
- IANA Registration for an Enumservice Containing PSTN Signaling Information
- Combined User and Carrier ENUM in the e164.arpa tree
- Carrier/Infrastructure ENUM Requirements
- IANA Registration for Enumservice VOID
- IANA Registration for an Enumservice and tel Parameter for Calling Name Delivery (CNAM)
- A Telephone Number Mapping (ENUM) Service Registration for Instant Messaging (IM) Services

# Number Portability Parameters for the "tel" URI

- IETF draft-ietf-iptel-tel-np-09.txt (Yu, Neustar)
- *This document defines five parameters in the "tel" Uniform Resource Identifier (URI) to carry the number portability (NP)-related information. Those parameters can be passed to the next-hop network node after an NP database dip has been performed.*
- *NP impacts call signaling and routing. One impact is the need to carry the NP-related information in the "tel" URI for protocols such as the Session Initiation Protocol (SIP) and H.323 after the NP database dip has been performed.*
- *Another impact is for a Voice over IP (VoIP) server to use the NP-related information in a received "tel" URI to determine routing.*

# Parameters

- *rn* = \*1("rn=" global-rn / local-rn)
- *npdi* = \*1("npdi")
- *cic* = \*1("cic=" global-cic / local-cic)
- *global-rn* = "+" 1\*3(DIGIT) \*phonedigit-hex
- *local-rn* = 1\*phonedigit-hex rn-context
- For a "global-rn", the routing number information after "+" MUST begin with a valid E.164 country code.  
*Hexadecimal digit is allowed after the country code in the "global-rn".*
- A "Carrier Identification Code (CIC)" identifies the current freephone service provider for a freephone number.  
*This parameter can also be used to carry the pre-subscribed or dialed long distance carrier information;*

Number Portability Parameters for  
the "tel" URI  
draft-ietf-iptel-tel-np-09.txt

# Retrieving NP-related information for a geographical telephone number

When a network node accesses an NP database for a geographical telephone number:

- If the network node retrieves a routing number, it MUST add the "rn" parameter to the "tel" URI to carry the routing number for the "tel" URI information in the "global-rn" or "local-rn" format. It MUST also add the "npdi" parameter.
- If the network node does not retrieve a routing number (e.g., for a non-ported geographical telephone num

Number Portability Parameters for  
the "tel" URI  
draft-ietf-iptel-tel-np-09.txt

# IANA Registration for an Enumservice Containing PSTN Signaling Information

- IETF draft-ietf-enum-pstn-03 (Shockey, Livingood)
- *This document registers the Enumservice type "pstn" and subtype "tel" using the URI scheme 'tel', as well as the subtype "sip" using the URI scheme 'sip' as per the IANA registration process defined in the ENUM specification, RFC 3761. This Enumservice is used to facilitate the routing of telephone calls in those countries where Number Portability exists.*
- *This document registers Enumservices according to the guidelines given in RFC 3761 to be used for provisioning in the services field of a NAPTR resource record to indicate the types of functionality associated with an end point and/or telephone number.*

# Consolidate all telephone number lookups

- *The Enumservices could enable service providers to place ported, pooled, and blocks of numbers and their associated PSTN contact information, into externally available or highly locally cached ENUM databases.*
- *This, in turn, could enable such parties to consolidate all telephone number lookups in their networks into a single ENUM lookup, thereby simplifying call routing and network operations, which would then result in either an on-net, or IP-based response, or off-net, PSTN-based response.*

# Reduce traditional query gateways

- *It is conceivable that being able to query for this information in ENUM databases could significantly reduce or eliminate the need for these parties to maintain traditional query gateways, applications, and protocols in their networks, such as those Signaling System 7 (SS7), Transaction Capabilities Application Part (TCAP), and Signaling Transport (SIGTRAN).*

# Distribution of data

- *The distribution of number portability data is often highly restricted either by contract or regulation of a National Regulatory Authority (NRA), therefore NAPTR records specified herein may or may not be part of the e164.arpa DNS tree.*
- *The authors believe that it is more likely that these records will be distributed on a purely private basis. Distribution of this NAPTR data could be either (a) on a private basis (within a service provider's internal network, or on a private basis between one or more parties using a variety of security mechanisms to prohibit general public access), (b) openly available or, (c) distributed by the relevant number portability organization or other industry organization, [...]*

# Example of a Ported Number, Using a 'tel' URI Scheme

- `$ORIGIN 3.1.8.7.1.8.9.5.1.2.1.e164.arpa.  
NAPTR 10 100 "u" "E2U+pstn:tel"  
"!^.*$!tel:+1-215-981-7813;npdi;rn="+1-215-555-  
1212!"`
- *In this example, a Routing Number (rn) and a Number Portability Dip Indicator (npdi) are used as shown in draft-ietf-iptel-tel-np-08. The 'npdi' field is included in order to prevent subsequent lookups in legacy-style PSTN databases.*

# Example of a Ported Number, Using a 'sip' URI Scheme

- *\$ORIGIN 3.1.8.7.1.8.9.5.1.2.1.e164.arpa.  
NAPTR 10 100 "u" "E2U+pstn:sip"  
"!^.\*\$!sip:+1-215-981-7813;npdi;rn=+1-215-5551212  
@gw.example.com;user=phone!"*.

# Example of a Non-Ported Number, Using a 'tel' URI Scheme

- *\$ORIGIN 3.1.8.7.1.8.9.5.1.2.1.e164.arpa.  
NAPTR 10 100 "u" "E2U+pstn:tel"  
"!^.\*\$!tel:+1-215-981-7813;npdi!"*.

# Example: Dialed Number Available On-Net and on the PSTN

- *a) A user, which is connected to a calling application, dials an E.164 telephone number: 1-215-981-7813.*
- *b) The calling application uses the dialed number to form a NAPTR record: 3.1.8.7.1.8.9.5.1.2.1.e164.arpa.*
- *c) The DNS finds both an E2U+pstn record, as well as an E2U+sip record, since this number happens to be on the IP network of a connected network.*
- *d) The calling application prioritizes the on-net record first: sip:+1-215-981-7813;npdi@gw.example.com;user=phone.*
- *e) The calling application sets up the SIP call to gw.example.com.*
- *f) Should the IP call route fail for whatever reason, the calling application may be able to utilize the E2U+pstn record to invoke a fallback route to a media gateway that is connected to the PSTN.*

# Combined User and Carrier ENUM in the e164.arpa tree

- IETF draft-haberler-carrier-enum-02 (Haberler)
- *branch off the e164.arpa tree into a subdomain at a given point below e164.arpa, and deploy a Carrier ENUM subtree underneath without touching User ENUM semantics at all. For readability, we will use the label 'carrier' for this subdomain from now on, while in practice any label will suffice, e.g. a single character label like 'c' or 'i'.*

# Carrier/Infrastructure ENUM Requirements

- IETF draft-lind-infrastructure-enum-reqs-01  
(Lind, Pfautz)
- *This document provides requirements for 'infrastructure' or 'carrier' ENUM, defined as the use of RFC 3761 technology to facilitate interconnection of networks for E.164 number addressed services, in particular but not restricted to VoIP*

# Carrier/Infrastructure ENUM Requirements

- *Infrastructure ENUM SHALL provide a means for a carrier to populate DNS RRs in a common publicly accessible namespace for the E.164 numbering resources for which it is the carrier-of-record.*
- *Queries of infrastructure ENUM FQDNs MUST return a result, even if the result is NXDOMAIN. Queries must not be rejected, e.g. based on ACLs.*
- *Infrastructure ENUM SHALL support RRs providing a URI that can identify a point of interconnection for delivery of communications addressed to the E.164 number.*

Carrier/Infrastructure ENUM  
Requirements draft-lind-  
infrastructure-enum-reqs-01

# Carrier/Infrastructure ENUM Requirements

- *Infrastructure ENUM SHALL support an IRIS capability that allows qualified parties to obtain information regarding the E.164 numbering resources and the corresponding carrier-of-record.*
- *Implementation of Infrastructure ENUM MUST NOT restrict the ability of an end-user, in a competitive environment, to choose a Registrar and/or Tier 2 name server provider for end-user ENUM registrations.*
- *Infrastructure ENUM SHALL be implemented under a TLD that can support reliability and performance suitable for PSTN applications.*

Carrier/Infrastructure ENUM  
Requirements draft-lind-  
infrastructure-enum-reqs-01

# Carrier/Infrastructure ENUM Requirements

- *Infrastructure ENUM MUST meet all reasonable privacy concerns about visibility of information an end user has no control over, for example discovery of unlisted numbers, or inadvertent disclosure of user identity.*

# IANA Registration for Enumservice VOID

- IETF draft-ietf-enum-void-02.txt (Stastny, Conroy, Reid)
- *If a NAPTR with this Enumservice is received, it indicates that the queried E.164 number is currently unassigned to an end user for communications service.*
- *The recipient SHOULD treat this response as if they had received a "number not in service" indication from a terminating network.*
- *Note that, whatever subtype exists for this Enumservice, the generated URI is not a potential target for any current call. This contact (mailto:, http:, or https:) MUST NOT be used in normal call processing but only if there is a non-call related reason to contact the number holder or authority.*

# Problem (1)

- *At present, from the ENUM client's perspective, two possibilities exist: there is an ENUM domain that potentially holds alternative contacts, or there is no ENUM domain, in which case a query on ENUM will return a DNS response showing 'no such domain' (NXDOMAIN).*
- *This latter response is ambiguous. There are two potential reasons for the lack of an ENUM domain holding alternative contacts; either the assignee has chosen not to register the domain, or the E.164 number is not assigned for communications service at present.*

IANA Registration for Enumservice  
VOID <draft-ietf-enum-void-02.txt>

# Problem (2)

- *the issue is distinguishing between E.164 numbers that do not have corresponding ENUM entries but are supported via the PSTN and those E.164 numbers that are not terminated on the PSTN. In this latter case lack of a NAPTR holding a destination URI really implies that there is no service at all for this telephone number. For example, some number ranges have been allocated for service that is provided only via reference to an ENUM domain, and terminate on the Internet*
- *The fundamental problem is that there may be inconsistencies between the E.164 name space as it is understood by the NRA and how that name space is represented in ENUM as service moves towards being provided in some cases only via non-PSTN access. In effect, the PSTN may not have complete information and ENUM may be required to deliver a call, but the data stored in ENUM at present may be ambiguous.*

# Solution

- *an explicit indication of this "number unassigned" state. This uses a NAPTR in the zone associated with an unassigned telephone number, or at least in the "enclosing" zone, with an Enumservice called VOID that should be taken as an assertion that the associated E.164 number is not assigned to an end user for communications service; it's an unused number.*
- *This NAPTR can also be used by a National Regulatory Authority (NRA) to indicate number blocks that it has reserved or has not allocated, or has not assigned to a service provider.*

IANA Registration for Enumservice  
VOID <draft-ietf-enum-void-02.txt>

# ENUM Service Registration - VOID

- Enumservice Name: "VOID"
- Enumservice Type: "void"
- Enumservice Subtypes:
  - "mailto",
  - "http",
  - "https"
- URI Schemes: "mailto:", "http:", "https:"

# IANA Registration for an Enumservice and tel Parameter for Calling Name Delivery(CNAM)

- IETF draft-shockey-enum-cnam-00 (Shockey, Livingood)
- *This document registers the Enumservice cnam and subtype tel using the URI scheme tel:, as per the IANA registration process defined in the ENUM specification, RFC 3761.*

# Caller Display Name

- *Caller Display Name is a data string of up to 15 ASCII characters of information associated with a specific calling party number [13] [14] [15] [16] [17]. In the Public Switched Telephone Network (PSTN) this data is sent by the originating network only at the specific request of the terminating network via a SS7 Transaction Capabilities Application Part (TCAP) response message.*

IANA Registration for an Enumservice and  
tel Parameter for Calling Name  
Delivery(CNAM) Information  
draft-shockey-enum-cnam-00

# Distribution of CNAM

- *The distribution of CNAM data is often highly restricted. The NAPTR records described herein probably would not be part of the e164.arpa DNS tree. Distribution of this NAPTR data would be either (a) on a private basis (within a service provider's internal network, or on a private basis between one or more parties using a variety of security mechanisms to prohibit general public access) or (b) openly available on a national basis according to national regulatory policy.*
- *The authors believe it is most likely that these records will be distributed on a purely private basis.*

IANA Registration for an Enumservice and  
tel Parameter for Calling Name  
Delivery(CNAM) Information  
draft-shockey-enum-cnam-00

# A Telephone Number Mapping (ENUM) Service Registration for Instant Messaging (IM) Services

- draft-mahy-enum-im-service-00.txt (Mahy)
- *Instant Messaging (IM) is a service defined in RFC 2778 that allows users to send and receive typically short, often textual messages in near real-time.*
- *The IETF has defined a generic URI used to identify an IM service for a particular resource: the 'im' URI scheme (defined in RFC 3861).*