

Internet Draft  
IETF IPTEL WG

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Document: [draft-stastny-iptel-tel-enumdi-00.txt](#)

Expires: March 2005

October 2004

**New parameter for the "tel" URI to support ENUM**  
**<[draft-stastny-iptel-tel-enumdi-00.txt](#)>**

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Abstract

This document defines a new parameter "enumdi" in the "tel" Uniform Resource Identifier (URI) to support the handling of ENUM queries in SIP proxies, H.323 gatekeepers and other VoIP network elements. The presence of the "enumdi" parameter indicates to the VoIP network element receiving an URI containing an E.164 number that an ENUM query as defined in [RFC3761](#) has already been performed on the E.164 number indicated by the previous VoIP network element.

Conventions used in this document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC-2119](#) [1].

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### [1. Introduction](#)

VoIP network elements (including UAs) may be set up in different ways to handle E.164 [2] numbers during call setup, depending on the capabilities provided. One common approach is to query ENUM as defined in [RFC3761](#) [3].

If the ENUM query leads to a result, the call is set-up accordingly. If the ENUM query does not lead finally to a result, another database may be queried and/or the call may finally be routed to the PSTN. In doing so, the call may be routed to another VoIP network element. To indicate in signalling to this next VoIP element that an ENUM query has already been made, the "enumdi" parameter is used, to prevent the next VoIP network element from repeating redundant queries.

### [2. Formal Syntax](#)

The following syntax specification uses the augmented Backus-Naur Form (BNF) as described in [RFC2234](#) [4].

```
enumdi           = *1(enum-dip-indicator)
enum-dip-indicator = ";enumdi"
```

The "enum-dip-indicator" can appear in the "tel" URI at most once.

### [3. Normative Rules](#)

This section discusses how a VoIP network element handles a received

"tel" URI that contains the "enumdi" parameter or has accessed ENUM in e164.arpa for a given E.164 number and needs to add the parameter to a "tel" URI.

### **3.1 Handling an URI with the "enumdi" parameter**

If a VoIP network element receives a "tel" URI containing the "enumdi" parameter, the VoIP network element MUST NOT retrieve the related information for this number from ENUM in e164.arpa even if it would normally do so.

If the received "tel" URI is to be passed to the next network element, the VoIP network element MUST pass on the received URI containing the "enumdi" parameter unchanged.

### **3.2 Adding the "enumdi" parameter to URIs**

When a VoIP network element accesses ENUM in e164.arpa for a given E.164 number and the result of the query is NXDOMAIN, and the network element chooses to pass the call to the next network element by using a "tel" URI, the "enumdi" parameter MUST be set.

When a VoIP network element accesses ENUM in e164.arpa for a given E.164 number and

- the result of the query includes a NAPTR RR containing a "tel" URI that has the same E.164 number, or
- the result of the query includes a NAPTR RR containing a "tel" URI with the "enumdi" parameter set,

and that "tel" URI is chosen to be passed to the next network element, the VoIP network element MUST pass on the retrieved URI with the "enumdi" parameter set.

## **4. Examples**

A. A VoIP network element "server.provider.net" receives a "tel" URI <tel:+441632960038>. The VoIP network element accesses the DNS for NAPTR RR in 8.3.0.0.6.9.2.3.6.1.4.4.e164.arpa. and gets the response NXDOMAIN. The VoIP network element decides to route the call to the PSTN via another VoIP network element "gw.provider.net".

It therefore signals to the next VoIP network element with  
<tel:+441632960038;enumdi>  
or (using the procedures of [RFC3261](#)[5] [section 19.1.6](#))  
<sip:+441632960038;enumdi@gw.provider.net;user=phone>.

B. A VoIP network element "server.provider.net" receives a "tel" URI <tel:+441632960038>. The VoIP network element accesses the DNS for NAPTR RR in 8.3.0.0.6.9.2.3.6.1.4.4.e164.arpa. and receives the same

"tel" URI in reply (i.e. <tel:+4416232960038>).

The VoIP network element decides to route the call to the PSTN via another VoIP network element "gw.provider.net".

It therefore signals to the next VoIP network element with

<tel:+441632960038;enumdi>

or (using the procedures of [RFC3261](#)[5] [section 19.1.6](#))

<sip:+441632960038;enumdi@gw.provider.net;user=phone>.

## 5. Security considerations

In addition to those security implications discussed in the revised "tel" URI [6], there are new security implications associated with the defined parameter.

If the "enumdi" is illegally inserted into the "tel" URI when the signaling message carrying the "tel" URI is en route to the destination entity, the call may be routed to the PSTN network, incurring unexpected charges or the causing a downstream VoIP network element to reject the call setup.

It is less a problem if the "enumdi" is illegally removed. An additional ENUM query may be performed to retrieve the routing number information and have the "enumdi" included again.

It is RECOMMENDED that protocols carrying the "tel" URI ensure message integrity during the message transfer between the two communicating network elements so as to detect any unauthorized changes to the content of the "tel" URI and other information.

## 6. IANA Considerations

This document requires no IANA actions.

## 7. Normative References

- 1 Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997
- 2 ITU-T Recommendation E.164, "The international public telecommunication numbering plan", May 1997.
- 3 Faltstrom, P. and Mealling M., "The E.164 to Uniform Resource Identifiers (URI) Dynamic Delegation Discovery System (DDDS) Application (ENUM)", [RFC 3761](#), April 2004.
- 4 D. Crocker and P. Overell, [RFC2234](#), "Augmented BNF for Syntax Specifications: ABNF", November 1997.
- 5 J. Rosenberg, et al., [RFC3261](#), "SIP: Session Initiation Protocol", June 2002.

- 6 H. Schulzrinne, [draft-ietf-iptel-rfc2806bis-07.txt](#), "The tel URI for Telephone Calls", April 9, 2004. (work in progress)

## **8. Informative References**

- 7 Bradner, S., "The Internet Standards Process -- Revision 3", [BCP 9](#), [RFC 2026](#), October 1996.
- 8 Bradner, S., "Intellectual Property Rights in IETF Technology", [BCP 79](#), [RFC3668](#), February 2004
- 9 Bradner, S., "IETF Rights in Contributions", [BCP 78](#), [RFC3667](#), February 2004

## **9. Acknowledgments**

The authors would like to thank James Yu for his comments.

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#### Acknowledgement

Funding for the RFC Editor function is currently provided by the Internet Society.