IPTEL
Internet-Draft
Expires: September 2, 2005

R. Stastny
Oefeg
R. Shockey
Neustar Inc.
L. Conroy
Siemens Roke Manor Research
March 1, 2005

The ENUM Dip Indicator parameter for the "tel" URI
<draft-ietf-iptel-tel-enumdi-01.txt>

Status of this Memo

Copyright Notice

Abstract

This document defines a new parameter "enumdi" in the "tel" Uniform Resource Identifier (URI) as defined in RFC3966 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.

Table of Contents

1. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT","SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in thisdocument are to be interpreted as described in BCP 14, RFC2119 [1].

2. Introduction

VoIP network elements (including UAS and UAC) 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 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 be made for the "tel" URI (specified in RFC3966 [4]), the "enumdi" parameter is used, to prevent the next VoIP network element from repeating redundant queries.

3. Formal Syntax

The following syntax specification uses the augmented Backus-Naur Form (BNF) as described in RFC2234 [6].

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

enum-dip-indicator      = ";enumdi"
```

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

4. 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.

4.1 Handling an URI with the "enumdi" parameter

If a VoIP network element receives a "tel" URI containing the "enumdi" parameter, the VoIP network element SHOULD 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.

4.2 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 either:

- 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,

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

5. Examples

a. A VoIP network element "server.example.com" receives a "tel" URI <tel: 竟潺弁>. 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 called "gw.example.com".

   It therefore signals to the next VoIP network element with:
   <tel: 竟潺弁;enumdi>
   or (using the procedures of RFC3261 [5] section 19.1.6):
   <sip: 竟潺弁;enumdi@gw.example.com;user=phone>.

b. A VoIP network element "server.example.com" receives a "tel" URI <tel: 竟潺弁>. 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: 玲綽 >).

   The VoIP network element decides to route the call to the PSTN via another VoIP network element "gw.example.com".

   It therefore signals to the next VoIP network element with:
   <tel: 竟潺弁;enumdi>
   or (using the procedures of RFC3261 [5] section 19.1.6):
   <sip: 竟潺弁;enumdi@gw.example.com;user=phone>.

6. Security Considerations

In addition to those security implications discussed in the "tel" URI [4] specification, 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.

7. IANA Considerations

This document requires no IANA actions.

8. References

8.1 Normative References

[1] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", RFC 2119, BCP 14, March 1997.

[2] ITU-T, "The International Public Telecommunication Number Plan", Recommendation E.164, May 1997.

[3] Faltstrom, P. and M. Mealling, "The E.164 to Uniform Resource Identifiers (URI) Dynamic Delegation Discovery System (DDDS) Application (ENUM)", RFC 3761, April 2004.

[4] Schulzrinne, H., "The tel URI for Telephone Numbers", RFC 3966, December 2004.

[5] Rosenberg, J., Schulzrinne, H., Camarillo, G., Johnston, A., Peterson, J., Sparks, R., Handley, M. and E. Schooler, "SIP: Session Initiation Protocol", RFC 3261, June 2002.

8.2 Informative References

[6] Crocker, D. and P. Overell, "Augmented BNF for Syntax Specifications: ABNF", RFC 2234, November 1997.

[7] Bradner, S., "The Internet Standards Process -- Revision 3", RFC 2026, BCP 9, October 1996.

[8] Bradner, S., "IETF Rights in Contributions", BCP 78, RFC 3667, February 2004.

[9] Bradner, S., "Intellectual Property Rights in IETF Technology", BCP 79, RFC 3668, February 2004.

Authors' Addresses

Richard Stastny
Oefeg
Postbox 147
1103 Vienna
Austria

Phone: 664-420-4100
Email: Richard.stastny@oefeg.at

Richard Shockey
Neustar Inc.
46000 Center Oak Plaza
Sterling, VA 20166
United States

Phone: 571-434-5651
Email: richard.shockey@neustar.biz

Lawrence Conroy
Siemens Roke Manor Research
Roke Manor
Romsey
United Kingdom

Phone: 1794-833666
Email: lwc@roke.co.uk

Intellectual Property Statement

Disclaimer of Validity

Copyright Statement

Acknowledgment

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