IANA Registration for an Enumservice Trunkgroup
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Abstract

This document registers the Enumservice 'trunk' and subtypes 'sip' and 'tel' using the URI schemes 'sip:' and 'tel:' as per the IANA registration process defined in the ENUM specification RFC 3761 [RFC7761].
RFC 4904 [RFC4904] defines a technique for the conveyance of carrying trunking information in SIP [RFC3261] and or TEL [RFC3966] URI's. This Enumservice provides a mechanism for ENUM databases residing in service provider networks a mechanism to query for that data.

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1. Introduction   [TOC](#)

ENUM (E.164 Number Mapping), RFC 3761 is a system that transforms E.164 numbers (The International Public Telecommunication Number Plan, ITU-T Recommendation E.164) [Recommendation E.164] (ITU-T, "The International Public Telecommunication Number Plan," May 1997.) into domain names and then uses the Domain Name System (DNS), RFC 1034 [RFC1034] (Mockapetris, P., "Domain names - concepts and facilities," November 1987.) and Naming Authority Pointer Records (NAPTR) records in the Dynamic Delegation Discovery System (DDDS) RFC 3403 [RFC3403] (Mealling, M., "Dynamic Delegation Discovery System (DDDS) Part Three: The Domain Name System (DNS) Database," October 2002.) to query the services that are available for a specific domain name.
This document registers an Enumservice 'trunk' according to the guidelines given in RFC 3761, to be used for provisioning a NAPTR [RFC3403] (Mealling, M., "Dynamic Delegation Discovery System (DDDS) Part Three: The Domain Name System (DNS) Database," October 2002.) resource record to indicate a type of connection associated with an end point and/or telephone number. The registration is defined within the DDDS (Dynamic Delegation Discovery System [RFC3401] (Mealling, M., "Dynamic Delegation Discovery System (DDDS) Part One: The Comprehensive DDDS," October 2002.)[RFC3402] (Mealling, M., "Dynamic Delegation Discovery System (DDDS) Part Two: The Algorithm," October 2002.)

[RFC3403] (Mealling, M., "Dynamic Delegation Discovery System (DDDS) Part Three: The Domain Name System (DNS) Database," October 2002.) [RFC3404] (Mealling, M., "Dynamic Delegation Discovery System (DDDS) Part Four: The Uniform Resource Identifiers (URI)," October 2002.) [RFC3405] (Mealling, M., "Dynamic Delegation Discovery System (DDDS) Part Five: URI.ARPA Assignment Procedures," October 2002.) hierarchy, for use with the "E2U" DDDS Application defined in RFC 3761.

The service parameters defined in RFC 3761 dictate that a 'type' and one or more 'subtype' should be specified. Within this set of specifications the convention is assumed that the 'type' (being the more generic term) defines the service and at least one of the 'subtype' may indicate the URI scheme.

In this document, one type is specified, 'trunk' and two subtypes 'sip' and 'tel' corresponding to the URI scheme specified.

RFC 4904 defines the general problem statement as to why sip/tel URI's need to covey trunkgroup parameters.

This Enumservice solves the problem of how SIP proxies or other intermediate session routing elements can query for and utilize trunkgroup data.

The design of this Enumservice was influenced by several factors:

RFC 3761 has become the de facto query-response protocol of for a variety of data types associated with E.164 numbering, addressing and routing. RFC 3761 is already being used by service providers to query for data that has significant privacy or security issues associated with it. RFC 4769 (Livingood, J. and R. Shockey, "IANA Registration for an Enumservice Containing Public Switched Telephone Network (PSTN) Signaling Information," November 2006.) [RFC4769], for instance, describes an Enumservice that associates an E.164 number with a PSTN Local Routing Number. This Enumservice extends that functionality to another form of PSTN routing data.

Communications service providers are concerned with the impact of call setup up times on the overall user experience. There is a strong desire to maintain a single query-response mechanism for data involving E.164 phone numbers and not complicate call processing applications with multiple protocol mechanisms. Were the query for trunkgroup data to require a secondary protocol mechanism such as LDAP or IRIS to retrieve the data, it could significantly impact call setup times.

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2. Terminology

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 (Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels," March 1997.) [RFC2119].

3. Definition of Trunking Data

Trunking data is defined in RFC 4904 as specific circuits in the PSTN that represent a communications paths connecting two switching systems that are used in the establishment of a end to end connection.

4. Distribution of Trunkgroup Data

The distribution of trunkgroup data is generally restricted to internal network operations. The NAPTR records described herein SHOULD not be part of the e164.arpa DNS tree. Distribution of this NAPTR data would be either 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.

5. Enumservice 'trunk' Response Examples

This section documents several examples of how this protocol is used for illustrative purposes only.
From examples given in RFC 4904:

5.1. Trunk group in a global number, with a number prefix trunk-context:

tel:+16305550100;tgrp=TG-1;trunk-context=+1-630
Transforming this tel URI to a sip URI yields:
sip:+16305550100;tgrp=TG-1;trunk-context=+1-630@isp.example.net;user=phone
In an ENUM query-response mechanism this data would be presented as follows.
$ORIGIN 0.0.1.0.5.5.5.0.3.6.1.enum4.network.net
NAPTR 10 100 "u" "E2U+trunk:tel" "!^.*$!tel:
+16305550100;tgrp=TG-1;trunk-context=+1-630!".
NAPTR 10 50 "u" "E2U+trunk:sip" "!^.*$!sip:
+16305550100;tgrp=TG-1;trunk-context=+1-630@isp.example.net;user=phone!".

6. Implementation Considerations

There may be one or more trunkgroups associated with a particular E.164 number since there may be multiple terminations strategies associated with an end-to-end connection. Since an ENUM query for trunkgroup data may return multiple responses, it is important that there be unambiguous information on which group to use or the order to which sessions should be attempted.
Implementations of this Enumservice MUST be able to distinguish between the order and preference fields in the NAPTR records. It is recommended that implementers should fix the Order field to a single value (such as 100) and use the preference field to rank order the selections.

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7. Privacy Considerations

It is assumed that carriers, service providers, or other organizations that originate trunkgroup data will not publish such information in a globally visible DNS tree, such as e164.arpa.
This data is strictly for internal service provider use only in highly internally cached ENUM databases, which is only able to be queried by trusted elements of their network, such as soft switches and SIP proxy servers.

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8. Security Considerations

The trunkgroup Enumservice defined in this document is assumed to be used in an environment where elements are trusted and where attackers are not supposed to have access to the protocol messages between those elements. Traffic protection between network elements is sometimes achieved by using IPSec and sometimes by physically protecting the underlying network. In any case, it is presumed the environment where the enum trunkgroup request-response mechanism will be used can ensure the integrity and accuracy of the data.

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9. IANA Considerations

This document registers the 'trunk' Enumservice using the type 'trunk' and the subtypes 'sip' and 'tel' in the Enumservice registry described in the IANA considerations in RFC 3761.

9.1. IANA Enumservice Registration for "trunk"

Enumservice Name: "trunk"
Enumservice Type: "trunk"
Enumservice Subtype: "tel"
URI Scheme: 'tel:'
Functional Specification:
This Enumservices indicate trunkgroup data, as defined in RFC 4904
necessary for a SIP proxy to make routing decisions.
Security Considerations: See Section 8.
Intended Usage: COMMON
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9.2. ENUM Service Registration for PSTN with Subtype "sip"

Enumservice Name: "pstn"
Enumservice Type: "pstn"
Enumservice Subtype: "sip"
URI Scheme: 'sip:'
Functional Specification:
These Enumservices indicate that the remote resource identified can be
addressed by the associated URI scheme in order to initiate a
telecommunication session, which may include two-way voice or other
communications, to the PSTN.
Security Considerations: See Section 7.
Intended Usage: COMMON
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Interoperability considerations.
The URI is designed to be used specifically in conjunction with systems
that utilize private the RFC 3761 [ENUM] databases.

10. Acknowledgements

11. References

11.1. Normative References

[RFC1034]	Mockapetris, P., "Domain names - concepts and facilities," STD 13, RFC 1034, November 1987 (TXT).
[RFC2119]	Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels," BCP 14, RFC 2119, March 1997 (TXT, HTML, XML).
[RFC2396]	Berners-Lee, T., Fielding, R., and L. Masinter, "Uniform Resource Identifiers (URI): Generic Syntax," RFC 2396, August 1998 (TXT, HTML, XML).
[RFC3261]	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 (TXT).
[RFC3401]	Mealling, M., "Dynamic Delegation Discovery System (DDDS) Part One: The Comprehensive DDDS," RFC 3401, October 2002 (TXT).
[RFC3402]	Mealling, M., "Dynamic Delegation Discovery System (DDDS) Part Two: The Algorithm," RFC 3402, October 2002 (TXT).
[RFC3403]	Mealling, M., "Dynamic Delegation Discovery System (DDDS) Part Three: The Domain Name System (DNS) Database," RFC 3403, October 2002 (TXT).
[RFC3404]	Mealling, M., "Dynamic Delegation Discovery System (DDDS) Part Four: The Uniform Resource Identifiers (URI)," RFC 3404, October 2002 (TXT).
[RFC3405]	Mealling, M., "Dynamic Delegation Discovery System (DDDS) Part Five: URI.ARPA Assignment Procedures," BCP 65, RFC 3405, October 2002 (TXT).
[RFC3761]	Faltstrom, P. and M. Mealling, "The E.164 to Uniform Resource Identifiers (URI) Dynamic Delegation Discovery System (DDDS) Application (ENUM)," RFC 3761, April 2004 (TXT).
[RFC3966]	Schulzrinne, H., "The tel URI for Telephone Numbers," RFC 3966, December 2004 (TXT).
[RFC4769]	Livingood, J. and R. Shockey, "IANA Registration for an Enumservice Containing Public Switched Telephone Network (PSTN) Signaling Information," RFC 4769, November 2006 (TXT).
[RFC4904]	Gurbani, V. and C. Jennings, "Representing Trunk Groups in tel/sip Uniform Resource Identifiers (URIs)," RFC 4904, June 2007 (TXT).

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

11.2. Informative References

[RFC3833]	Atkins, D. and R. Austein, "Threat Analysis of the Domain Name System (DNS)," RFC 3833, August 2004 (TXT).
[RFC4035]	Arends, R., Austein, R., Larson, M., Massey, D., and S. Rose, "Protocol Modifications for the DNS Security Extensions," RFC 4035, March 2005 (TXT).

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