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Carrier/Infrastrucure ENUM Requirements
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Abstract

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.

Conventions used in this document

RFC2119 [1] provides the interpretations for the key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" found in this document.

1. Infrastructure ENUM

1.1. Definition

Infrastructure ENUM is defined as the use of the technology in RFC3761 [2] by the carrier-of-record for a specific E.164 number [3] to map a telephone number into a URI that identifies a specific point of interconnection to that service provider's network that could enable the originating party to establish communication with the associated terminating party. It is separate from any URIs that the end-user, who registers their E.164 number, may wish to associate with that E.164 number.

For purposes of this document, "Carrier of Record" refers to the entity that provides PSTN service for an E.164 number with the understanding that this definition is ultimately a matter for national authorities to determine.

1.2. Background

Carriers use E.164 numbers currently as their main naming and routing vehicle. Carrier ENUM in e164.arpa or another publicly available tree allows Carriers to link Internet based resources such as URIs to E.164 numbers (Note: this is the other way round then User ENUM). This allows Carrier in addition to interconnecting via the PSTN (or exclusively) to peer via IP-based protocols. Carriers may announce all E.164 numbers or number ranges they host, regardless if the final end-user device is on the Internet, on IP-based closed NGNs or on the PSTN, provided an access (e.g. SBC or gateway) to the destination carriers network is available on the Internet. There is also no guarantee that the originating carrier querying Carrier ENUM is able to access the ingress network element of the destination carriers network. Additional peering and accounting agreements requiring authentication may be necessary. The access provided may also be to a shared network of a group of carriers, resolving the final destination network within the shared network.

2. Requirements for Infrastructure ENUM

2.1.

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.

2.2.

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.

2.3.

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.

2.4.

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.

2.5.

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.

2.6.

Infrastructure ENUM SHALL be implemented under a TLD that can support reliability and performance suitable for PSTN applications.

2.7.

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.

2.8.

Proposed implementations of Infrastructure ENUM SHOULD

a. Minimize changes required to existing requirements that are part of RFC 3761

b. Work with open numbering plans

c. Restrict additional functionality to carrier resolvers.

d. Minimize the number of lookups required to obtain as many NAPTR records (end-user and carrier) as possible.

e. Minimize the client knowledge of the numbering plan required.

f. Maximize synergies with end-user ENUM

g. Support interworking with private ENUM trees.

3. Security Considerations

Existing security considerations for ENUM detailed in [2] still apply. Note that some registration validation issues concerning end user ENUM may not apply to carrier ENUM. Where the Tier 1 registry is able to identify the carrier serving a number e.g., based on industry data for number block assignments and number portability, registration might be more easily automated and a separate registrar not required.

Some parties have expressed concern that a carrier ENUM could compromise end user privacy by making it possible for others to identify unlisted or unpublished numbers based on their registration in ENUM. This can be avoided if carriers register all of the their allocated (as opposed to assigned) numbers. Unassigned numbers should be provisioned to route to the carrier's network in the same fashion as assigned numbers and only then provide an indication that they are unassigned. In that way, carrier registration of a number in ENUM provides no more information about status of a number than could be obtained by dialing it.

4. IANA Considerations

IANA considerations will depend on the architecture ultimately chosen
to meet the requirements.

5. Normative References

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

[2] Faltstrom, P. and M. Mealling, "The E.164 to Uniform Resource Identifiers (URI) Dynamic Delegation Discovery System (DDDS)

Application (ENUM)", RFC 3761, April 2004.

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

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