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The E.164 to Uniform Resource Identifiers (URI)
Dynamic Delegation Discovery System (DDDS) Application for
Infrastructure ENUM
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Abstract

This document defines a use case as well as a proposal for a parallel namespace to `e164.arpa` as defined in [RFC3761](#), to be used for Infrastructure ENUM purposes.

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[1.](#) 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 [BCP 14](#), [RFC-2119](#).

[2.](#) Introduction

ENUM (E.164 Number Mapping, [RFC 3761](#) [1]) is a system that transforms E.164 numbers [2] into domain names and then uses the DNS (Domain Name Service) [3] to discover NAPTR records that specify what services are available for a specific domain name.

ENUM as originally defined was based on the end-user opt-in principle. While this has great potential to foster new services and end-user choice in the long-term, the current requirements for IP-based interconnection of Voice over IP (VoIP) domains require the provisioning of all allocated or served (hosted) numbers of a participating service provider, without the need for individual users to opt-in or not. This is particularly important if Infrastructure ENUM is used for number portability applications, for example.

In addition, while it is possible that service providers could mandate that their users opt-in into e164.arpa through end-user contract terms and conditions, there are substantial downsides to such an approach. Thus, for all these reasons and many others, ENUM

for end-user provisioning is ill-suited for use by service providers for the interconnection of VoIP domains.

As VoIP evolves and becomes pervasive, E.164-addressed telephone calls need not necessarily traverse the Public Switched Telephone Network (PSTN). Therefore, VoIP service providers have an interest

in using ENUM, on a so-called "Infrastructure" basis, to keep VoIP traffic on IP networks on an end-to-end basis, both within and between service provider domains.

The requirements for Infrastructure ENUM are provided in an ENUM Working Group document, Infrastructure ENUM Requirements [4]. This document defines that Infrastructure ENUM be implemented by means of a parallel namespace to e164.arpa dedicated to Infrastructure ENUM, in a domain which is to be determined.

Infrastructure ENUM Tier 2 resource records in the Infrastructure ENUM tree would be controlled by the service provider that is providing services to a given E.164 number, generally referred to in various nations as the "carrier of record". The definition of who controls a given E.164 number is a national matter or is defined by the entity controlling the numbering space.

3. IANA Considerations

IANA has created a registry for Enumservices as originally specified in [RFC 2916](#) and revised in [RFC 3761](#). Enumservices registered with IANA are valid for Infrastructure ENUM as well as end-user ENUM.

4. DNS Root for Infrastructure ENUM

The top level DNS zone for infrastructure ENUM must support a level of performance similar to that required for root servers ([RFC 2870](#)) and must be independent of e164.arpa.

5. Security and Privacy Considerations

Since Infrastructure ENUM is also implemented on the public Internet, the same security considerations apply as noted in [RFC 3761](#).

In addition, since there is no opt-in for end-users, personally-identifiable information (PII) must not be disclosed for any end-user.

Thus, the information provided in the NAPTR records must not disclose any PII about the end-user such as a name in user-info. This can be achieved, for example, by entering the information in the format sip:<e164_phone_number>@provider.example, mailto:<e164_phone_number>@provider.example or sip:<opaque string>@provider.example.

6. Acknowledgements

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7. References

7.1 Normative References

- [1] Faltstrom, P. and M. Mealling, "The E.164 to Uniform Resource Identifiers (URI) Dynamic Delegation Discovery System (DDDS) Application (ENUM)", [RFC 3761](#), April 2004.
- [2] ITU-T, "The International Public Telecommunication Number Plan", Recommendation E.164, May 1997.
- [3] Mockapetris, P., "DOMAIN NAMES - CONCEPTS AND FACILITIES", [RFC 1034](#), November 1987.
- [4] Lind, S., Pfautz, P., "Infrastructure ENUM Requirements", [draft-enum-infrastructure-requirements-01](#), March 2006. (work-in-progress)
- [5] Mealling, M., "Dynamic Delegation Discovery System (DDDS) Part Three: The Domain Name System (DNS) Database", [RFC 3403](#), October 2002.
- [6] Mealling, M., "Dynamic Delegation Discovery System (DDDS) Part One: The Comprehensive DDDS", [RFC 3401](#), October 2002.

[7] Mealling, M., "Dynamic Delegation Discovery System (DDDS) Part Two: The Algorithm", [RFC 3402](#), October 2002.

[8] Mealling, M., "Dynamic Delegation Discovery System (DDDS) Part Four: The Uniform Resource Identifiers (URI)", [RFC 3404](#), October 2002.

[9] Mealling, M., "Dynamic Delegation Discovery System (DDDS) Part Five: URI.ARPA Assignment Procedures", [RFC 3405](#), October 2002.

[10] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [RFC 2119](#), March 1997.

[11] Faltstrom, P., "E.164 number and DNS", [RFC 2916](#), September 2000.

[7.2](#) Informative References

Authors' Addresses

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