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**The E.164 to Uniform Resource Identifiers (URI)
Dynamic Delegation Discovery System (DDDS) Application for
Infrastructure ENUM**
[draft-ietf-enum-infrastructure-01](#)

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Abstract

This document defines a parallel namespace `ie164.arpa` to `e164.arpa` as defined in [RFC3761](#) to be used for Infrastructure ENUM purposes.

Table of Contents

1. Terminology.....	2
2. Introduction.....	2
3. IANA Considerations.....	3
4. DNS Root Selected for Infrastructure ENUM.....	3
5. Security and Privacy Considerations.....	3
6. Acknowledgements.....	4
7. References.....	4
7.1 Normative References.....	4
7.2 Informative References.....	5
Authors' Addresses.....	5
Intellectual Property and Copyright Statements.....	5

[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, ie164.arpa.

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

[RFC 2916](#) [11] (which was replaced by [RFC 3761](#)) requested IANA to delegate the e164.arpa domain following instructions to be provided by the IAB. This document requests IANA delegate ie164.arpa for Infrastructure ENUM. Names within this zone are to be delegated to parties according to the International Telecommunications Union's (ITU) Telecommunication Standardization Sector (ITU-T) Recommendation E.164. The names allocated should be hierarchic in accordance with ITU-T Recommendation E.164, and the codes should be assigned in accordance with that Recommendation.

The IAB is to coordinate with ITU-T Telecommunication Standardization Bureau (TSB) if the technical contact for the domain ie164.arpa is to change, as ITU-T TSB has an operational working relationship with this technical contact which needs to be reestablished. Delegations in the zone ie164.arpa (not delegations in delegated domains of ie164.arpa) should be done after Expert Review, and the IESG will appoint a designated expert.

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 Selected for Infrastructure ENUM

The DNS root is ie164.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

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