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LISP Distinguished Name Encoding

Abstract

This draft defines how to use the AFI=17 Distinguished Names in LISP.

Requirements Language

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 [RFC2119].

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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1. Introduction

The LISP architecture and protocols [RFC9300] introduces two new numbering spaces, Endpoint Identifiers (EIDs) and Routing Locators (RLOCs) which are intended to replace most use of IP addresses on the Internet. To provide flexibility for current and future applications,

these values can be encoded in LISP control messages using a general syntax that includes Address Family Identifier (AFI) [RFC3232].

The length of the value field is implicit in the type of address that follows. For AFI 17, a Distinguished Name can be encoded. A name can be a variable length field so the length cannot be determined solely from the AFI value 17. This draft defines a termination character, an 8-bit value of 0 to be used as a string terminator so the length can be determined.

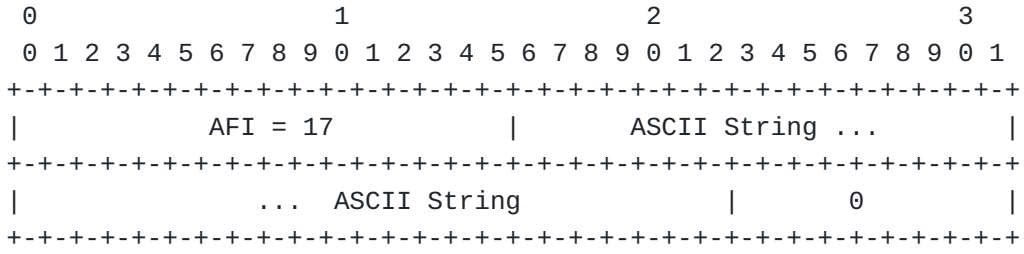
LISP Distinguished Names are useful when encoded either in EID-Records or RLOC-records in LISP control messages. As EIDs, they can be registered in the mapping system to find resources, services, or simply used as a self-documenting feature that accompany other address specific EIDs. As RLOCs, Distinguished Names, along with RLOC specific addresses and parameters, can be used as labels to identify equipment type, location, or any self-documenting string a registering device desires to convey.

2. Definition of Terms

Address Family Identifier (AFI): a term used to describe an address encoding in a packet. An address family currently defined for IPv4 or IPv6 addresses. See [IANA-ADDRESS-FAMILY-REGISTRY] and [RFC3232] for details on other types of information that can be AFI encoded.

3. Distinguished Name Format

An AFI=17 Distinguished Name is encoded as:



The string of characters are encoded in the ASCII character-set definition [RFC0020].

When Distinguished Names are encoded for EIDs, the EID-Prefix length of the EIDs as they appear in EID-Records for all LISP control messages is the length of the string in bits (include the null 0 byte). Where Distinguished Names are encoded anywhere else (i.e. nested in LCAF encodings), then any length field is the length of the ASCII string including the null 0 byte in units of bytes.

4. Mapping System Lookups for Distinguished Name EIDs

Distinguished Name EID lookups MUST carry as an EID-Prefix length equal to the length of the name string. This instructs the mapping system to do either an exact match or longest match lookup.

If the Distinguished Name EID is registered with the same length as the length in a Map-Request, the Map-Server (when configured for proxy Map-Replying) returns an exact match lookup with the same EID-Prefix length. If a less specific name is registered, then the Map-Server returns the registered name with the registered EID-Prefix length.

For example, if the registered EID name is "ietf" with EID-prefix length of 40 bits (the length of string "ietf" plus the null byte is 5 bytes), and a Map-Request is received for EID name "ietf.lisp" with an EID-prefix length of 80 bits, the Map-Server will return EID "ietf" with length of 40 bits.

5. Example Use-Cases

This section identifies three specific use-cases examples for the Distinguished Name format. Two are used for an EID encoding and one for a RLOC-record encoding. When storing public keys in the mapping system, as in [I-D.ietf-lisp-ecdsa-auth], a well known format for a public-key hash can be encoded as a Distinguished Name. When street location to GPS coordinate mappings exist in the mapping system, as in [I-D.ietf-lisp-geo], the street location can be a free form ASCII representation (with whitespace characters) encoded as a Distinguished Name. An RLOC that describes an xTR behind a NAT device can be identified by its router name, as in [I-D.farinacci-lisp-lispers-net-nat], uses a Distinguished Name encoding. As well as identifying the router name (neither an EID or an RLOC) in NAT Info-Request messages uses Distinguished Name encodings.

6. Name Collision Considerations

When a Distinguished Name encoding is used to format an EID, the uniqueness and allocation concerns are no different than registering IPv4 or IPv6 EIDs to the mapping system. See [RFC9301] for more details. Also, the use-case documents specified in Section 5 provide allocation recommendations for their specific uses.

It is RECOMMENDED that each use-case register their Distinguish Names with a unique Instance-ID. For any use-cases which require different uses for Distinguish Names within an Instance-ID MUST define their own Instance-ID and structure syntax for the name registered to the Mapping System. See the encoding procedures in [I-D.ietf-lisp-vpn] for an example.

7. Security Considerations

There are no security considerations.

8. IANA Considerations

The code-point values in this specification are already allocated in [IANA-ADDRESS-FAMILY-REGISTRY].

9. References

9.1. Normative References

[IANA-ADDRESS-FAMILY-REGISTRY] IANA, "IANA Address Family Numbers Registry", https://www.iana.org/assignments/address-family-numbers/, December 2023.

[RFC0020] Cerf, V., "ASCII format for network interchange", STD 80, RFC 20, DOI 10.17487/RFC0020, October 1969, <https://www.rfc-editor.org/info/rfc20>.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

[RFC3232] Reynolds, J., Ed., "Assigned Numbers: RFC 1700 is Replaced by an On-line Database", RFC 3232, DOI 10.17487/RFC3232, January 2002, <https://www.rfc-editor.org/info/rfc3232>.

[RFC9300] Farinacci, D., Fuller, V., Meyer, D., Lewis, D., and A. Cabellos, Ed., "The Locator/ID Separation Protocol (LISP)", RFC 9300, DOI 10.17487/RFC9300, October 2022, <https://www.rfc-editor.org/info/rfc9300>.

[RFC9301] Farinacci, D., Maino, F., Fuller, V., and A. Cabellos, Ed., "Locator/ID Separation Protocol (LISP) Control Plane", RFC 9301, DOI 10.17487/RFC9301, October 2022, <https://www.rfc-editor.org/info/rfc9301>.

9.2. Informative References

[I-D.farinacci-lisp-lispers-net-nat] Farinacci, D., "lispers.net LISP NAT-Traversal Implementation Report", Work in Progress, Internet-Draft, draft-farinacci-lisp-lispers-net-nat-07, 22 December 2023,

https://datatracker.ietf.org/doc/html/draft-farinacci-lisp-lispers-net-nat-07>.

[I-D.ietf-lisp-ecdsa-auth] Farinacci, D. and E. Nordmark, "LISP Control-Plane ECDSA Authentication and Authorization", Work in Progress, Internet-Draft, draft-ietf-lisp-ecdsa-auth-11, 28 August 2023, <https://datatracker.ietf.org/doc/html/draft-ietf-lisp-ecdsa-auth-11>.

[I-D.ietf-lisp-geo] Farinacci, D., "LISP Geo-Coordinate Use-Cases", Work in Progress, Internet-Draft, draft-ietf-lisp-geo-03, 26 November 2023, <https://datatracker.ietf.org/doc/html/draft-ietf-lisp-geo-03>.

[I-D.ietf-lisp-vpn] Moreno, V. and D. Farinacci, "LISP Virtual Private Networks (VPNs)", Work in Progress, Internet-Draft, draft-ietf-lisp-vpn-12, 19 September 2023, <https://datatracker.ietf.org/doc/html/draft-ietf-lisp-vpn-12>.

Appendix A. Acknowledgments

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Appendix B. Document Change Log

B.1. Changes to draft-ietf-lisp-name-encoding-05

*Submitted December 2023.

*Update IANA AFI reference.

B.2. Changes to draft-ietf-lisp-name-encoding-04

*Submitted December 2023.

*More comments from Alberto. Change to standard spellings throughout.

*Add RFC 2119 boilerplate.

*Update reference RFC1700 to RFC3232.

B.3. Changes to draft-ietf-lisp-name-encoding-03

*Submitted December 2023.

*Address comments from Alberto, document shepherd.

*Update references.

B.4. Changes to draft-ietf-lisp-name-encoding-02

*Submitted August 2023.

*Update references and document expiry timer.

B.5. Changes to draft-ietf-lisp-name-encoding-01

*Submitted February 2023.

*Update references and document expiry timer.

*Change 68**.bis references to proposed RFC references.

B.6. Changes to draft-ietf-lisp-name-encoding-00

*Submitted August 2022.

*Move individual submission to LISP WG document.

B.7. Changes to draft-farinacci-lisp-name-encoding-15

*Submitted July 2022.

*Added more clarity text about how using VPNs (instance-ID encoding) addresses name collisions from multiple use-cases.

*Update references and document expiry timer.

B.8. Changes to draft-farinacci-lisp-name-encoding-14

*Submitted May 2022.

*Update references and document expiry timer.

B.9. Changes to draft-farinacci-lisp-name-encoding-13

*Submitted November 2021.

*Update references and document expiry timer.

B.10. Changes to draft-farinacci-lisp-name-encoding-12

*Submitted May 2021.

*Update references and document expiry timer.

B.11. Changes to draft-farinacci-lisp-name-encoding-11

*Submitted November 2020.

*Made changes to reflect working group comments.

*Update references and document expiry timer.

B.12. Changes to draft-farinacci-lisp-name-encoding-10

*Submitted August 2020.

*Update references and document expiry timer.

B.13. Changes to draft-farinacci-lisp-name-encoding-09

*Submitted March 2020.

*Update references and document expiry timer.

B.14. Changes to draft-farinacci-lisp-name-encoding-08

*Submitted September 2019.

*Update references and document expiry timer.

B.15. Changes to draft-farinacci-lisp-name-encoding-07

*Submitted March 2019.

*Update referenes and document expiry timer.

B.16. Changes to draft-farinacci-lisp-name-encoding-06

*Submitted September 2018.

*Update document expiry timer.

B.17. Changes to draft-farinacci-lisp-name-encoding-05

*Submitted March 2018.

*Update document expiry timer.

B.18. Changes to draft-farinacci-lisp-name-encoding-04

*Submitted September 2017.

*Update document expiry timer.

B.19. Changes to draft-farinacci-lisp-name-encoding-03

*Submitted March 2017.

*Update document expiry timer.

B.20. Changes to draft-farinacci-lisp-name-encoding-02

*Submitted October 2016.

*Add a comment that the distinguished-name encoding is restricted to ASCII character encodings only.

B.21. Changes to draft-farinacci-lisp-name-encoding-01

*Submitted October 2016.

*Update document timer.

B.22. Changes to draft-farinacci-lisp-name-encoding-00

*Initial draft submitted April 2016.

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