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LISP EID Block Management Guidelines
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Abstract

This document proposes an allocation framework for the management of the LISP EID address prefix (requested in [I-D.ietf-lisp-eid-block]). The framework described relies on hierarchical distribution of the address space with sub-prefixes allocated on a temporary basis to requesting organizations.

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1. Requirements Notation

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].

2. Introduction

The Locator/ID Separation Protocol (LISP - [RFC6830]) and related mechanisms ([RFC6831], [RFC6832], [RFC6833], [RFC6834], [RFC6835], [RFC6836], [RFC6837]) separates the IP addressing space into two logical spaces, the End-point Identifier (EID) space and the Routing Locator (RLOC) space. The first space is used to identify communication end-points, while the second is used to locate EIDs in the Internet routing infrastructure topology.

The document [I-D.ietf-lisp-eid-block] requested an IPv6 address block to be reserved for exclusive use for EID prefix allocation and assignment. The rationale, intent, size, and usage of the EID address block are described in [I-D.ietf-lisp-eid-block].

This document proposes an allocation framework for the EID address block based on temporary allocation of portions of the block to different requesting organizations.

3. Definition of Terms

The present document does not introduce any new term with respect to the set of LISP Specifications ([RFC6830], [RFC6831], [RFC6832], [RFC6833], [RFC6834], [RFC6835], [RFC6836], [RFC6837]). To help the reading of the present document the terminology introduced by LISP is summarized in Appendix A.

4. EID Prefix Allocation Policy

The allocation of EID prefixes MUST respect the following policies:

1. EID addressing prefixes are made available in the reserved space on a temporary basis and for experimental uses. The requester of an experimental prefix MUST provide a short description of the intended use or experiment that will be carried out (see Section 6). If the prefix will be used for activities not documented in the original description, the renewal of the allocation may be denied or withdrawn (see Section 5).

2. EID prefixes are allocated on a lease/license basis for a limited period of time (which can be renewed). The lease/license period SHOULD NOT be longer than one year.
3. Exception to the previous rule may be granted in cases in which the prefix has been delegated to an organization that will act as a registry for further sub-allocations. Sub-allocations MUST respect this present list of policies as well as the allocation requirements outlined in Section 5. Requests for a prefix delegation that will be used for further sub-allocations MUST clearly state such intent in the short description of the intended use document.
4. All of the allocations (renewed or not, including delegations and sub-allocations) MUST end by 31 December 2017, in accordance to the 3+3 years experimental allocation plan outlined in [I-D.ietf-lisp-eid-block].
5. Upon IETF review before 31 December 2017, the EID prefix space may become a permanent allocation. In this case existing allocations CAN be renewed and new allocations granted (still on a yearly temporary basis). All allocations (renewed or not, including delegations and sub-allocations) MUST end by 31 December 2020, in accordance to the 3+3 years plan outlined in [I-D.ietf-lisp-eid-block]. During the second 3 years phase of the experiment, the IETF will decide the final EID prefix block size and elaborate the allocation and management policies that will be applied starting 1 January 2021.
6. When an allocation is freed because of non-renewal or the termination of an experiment, the address space is returned to the global pool of free EID prefixes. This freed allocation MUST NOT be announced through registration on Map Servers in the LISP mapping system for at least 72 hours to ensure expiration of all cached map entries in the global LISP infrastructure.
7. The EID prefix of an allocation that is not renewed (or whose renewal has been denied) can be re-used after no less than one week from the date when the EID prefix is freed. This delay will provide sufficient time for all cached map entries in the global LISP infrastructure to expire and will allow any management process for re-allocation to be dealt with.
8. EID prefix allocations can be revoked as a result of abuse, unjustified usage (e.g., not conforming the intended use provided at request time), failure to pay maintenance fees, legal court orders, etc. Withdrawal can be enforced by filtering on Map Servers so to prevent map registration.

If/When the EID block experiment changes status (e.g., to not being "experimental"), and following the policies outlined in [RFC5226], the EID block will change status as well and will be converted to a permanent allocation. The IETF will define the transition process from the policies and requirements outlined in this document to a new set of policies and requirements. This transition process will include mechanisms that will allow for requests to convert existing temporary allocations (without renumbering) to permanent allocations.

5. EID Prefixes Allocation Requirements

All EID prefix allocations (and delegations) MUST respect the following requirements:

1. Allocations MUST be globally unique.
2. Requirements for allocation MUST be the same globally. No regional/national/local variations are permitted.
3. The minimum allocated prefix size MUST be a /48. An allocation may be larger (i.e., shorter prefix) provided that the requester is able to justify the intended size in their request description.
4. Registration information MUST be maintained and made publicly available through a searchable interface, preferably RDAP ([I-D.ietf-weirds-rdap-sec]) and optionally whois, http, or similar.
5. If fees are charged for EID allocation and registration services, those fees MUST be no more than the cost of providing those services.
6. Requesters obtaining an allocation SHOULD provide Reverse DNS service.
7. Requesters obtaining a delegation, hence acting as registries, MUST provide Reverse DNS service.
8. The service SHOULD be available 99% of the time.
9. Anyone, private persons, companies, or other entities can request EID space and those requests MUST be granted, provided that they can show a clear intent in carrying out LISP experimentation.

6. EID Prefix Request Template

Future versions of this document will include a detailed allocation (and delegation) request template to ensure a uniform process. An example of a similar template/process is the IANA Private Enterprise Number online request form (<http://pen.iana.org/pen/PenApplication.page>). The EID Prefix Request template MUST at minimum contain:

- o Requester Information (e.g., company name)
- o Requester Referral Person (and Contact Information)
- o Requested EID prefix size
- o Request Rationale

7. General Considerations

This document is a starting point for discussion aiming to address the concerns raised during the IETF Review of [I-D.ietf-lisp-eid-block], more specifically the lack of guidelines concerning the EID Block allocation and management.

Discussion with IANA, the RIR communities, and the IETF community should be carried out in order to verify compatibility of the proposed policy and agree upon the process for EID prefix allocation and management.

8. Security Considerations

This document does not introduce new security threats in the LISP architecture nor in the Legacy Internet architecture.

For accountability reasons, and in line with the security considerations in [RFC7020], each allocation request MUST contain accurate information on the requesting entity (company, institution, individual, etc.) and valid and accurate contact information of a referral person (see Section 6).

9. Acknowledgments

Thanks to J. Curran, A. Severin, B. Haberman, T. Manderson, D. Lewis, D. Farinacci, for their helpful comments.

10. IANA Considerations

This document provides only management guidelines for the reserved LISP EID prefix requested and allocated in [I-D.ietf-lisp-eid-block].

There is an operational requirement for an EID allocation service that ensures uniqueness of EIDs allocated according to the requirements described in Section 5. Furthermore, there is an operational requirement for EID registration service that allows a lookup of the contact information of the entity to which the EID was allocated.

IANA must ensure both of these services are provided, for the space directly allocated by IANA, in a globally uniform fashion for the duration of the experiment.

11. References

11.1. Normative References

- [I-D.ietf-lisp-eid-block]
Iannone, L., Lewis, D., Meyer, D., and V. Fuller, "LISP EID Block", draft-ietf-lisp-eid-block-05 (work in progress), August 2013.
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- [RFC5226] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 5226, May 2008.

11.2. Informative References

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- [RFC6837] Lear, E., "NERD: A Not-so-novel Endpoint ID (EID) to Routing Locator (RLOC) Database", RFC 6837, January 2013.
- [RFC7020] Housley, R., Curran, J., Huston, G., and D. Conrad, "The Internet Numbers Registry System", RFC 7020, August 2013.

Appendix A. LISP Terms

LISP operates on two name spaces and introduces several new network elements. This section provides high-level definitions of the LISP name spaces and network elements and as such, it must not be considered as an authoritative source. The reference to the authoritative document for each term is included in every term description.

Legacy Internet: The portion of the Internet that does not run LISP and does not participate in LISP+ALT or any other mapping system.

LISP site: A LISP site is a set of routers in an edge network that are under a single technical administration. LISP routers that reside in the edge network are the demarcation points to separate the edge network from the core network. See [RFC6830] for more details.

Endpoint ID (EID): An EID is a 32-bit (for IPv4) or 128-bit (for IPv6) value used in the source and destination address fields of the first (most inner) LISP header of a packet. A packet that is emitted by a system contains EIDs in its headers and LISP headers are prepended only when the packet reaches an Ingress Tunnel Router (ITR) on the data path to the destination EID. The source EID is obtained via existing mechanisms used to set a host's "local" IP address. An EID is allocated to a host from an EID-prefix block associated with the site where the host is located. See [RFC6830] for more details.

EID-prefix: A power-of-two block of EIDs that are allocated to a site by an address allocation authority. See [RFC6830] for more details.

EID-Prefix Aggregate: A set of EID-prefixes said to be aggregatable in the [RFC4632] sense. That is, an EID-Prefix aggregate is defined to be a single contiguous power-of-two EID-prefix block. A prefix and a length characterize such a block. See [RFC6830] for more details.

Routing LOCator (RLOC): A RLOC is an IPv4 or IPv6 address of an egress tunnel router (ETR). A RLOC is the output of an EID-to-RLOC mapping lookup. An EID maps to one or more RLOCs. Typically, RLOCs are numbered from topologically aggregatable blocks that are assigned to a site at each point to which it attaches to the global Internet; where the topology is defined by the connectivity of provider networks, RLOCs can be thought of as Provider Aggregatable (PA) addresses. See [RFC6830] for more details.

EID-to-RLOC Mapping: A binding between an EID-Prefix and the RLOC-set that can be used to reach the EID-Prefix. The general term "mapping" always refers to an EID-to-RLOC mapping. See [RFC6830] for more details.

Ingress Tunnel Router (ITR): An Ingress Tunnel Router (ITR) is a router that accepts receives IP packets from site end-systems on one side and sends LISP-encapsulated IP packets toward the Internet on the other side. The router treats the "inner" IP destination address as an EID and performs an EID-to-RLOC mapping lookup. The router then prepends an "outer" IP header with one of its globally routable RLOCs in the source address field and the result of the mapping lookup in the destination address field. See [RFC6830] for more details.

Egress Tunnel Router (ETR): An Egress Tunnel Router (ETR) receives LISP-encapsulated IP packets from the Internet on one side and sends decapsulated IP packets to site end-systems on the other side. An ETR router accepts an IP packet where the destination address in the "outer" IP header is one of its own RLOCs. The router strips the "outer" header and forwards the packet based on the next IP header found. See [RFC6830] for more details.

Proxy ITR (PITR): A Proxy-ITR (PITR) acts like an ITR but does so on behalf of non-LISP sites which send packets to destinations at LISP sites. See [RFC6832] for more details.

Proxy ETR (PETR): A Proxy-ETR (PETR) acts like an ETR but does so on behalf of LISP sites which send packets to destinations at non-LISP sites. See [RFC6832] for more details.

Map Server (MS): A network infrastructure component that learns EID-to-RLOC mapping entries from an authoritative source (typically an ETR). A Map Server publishes these mappings in the distributed mapping system. See [RFC6833] for more details.

Map Resolver (MR): A network infrastructure component that accepts LISP Encapsulated Map-Requests, typically from an ITR, quickly determines whether or not the destination IP address is part of the EID namespace; if it is not, a Negative Map-Reply is immediately returned. Otherwise, the Map Resolver finds the appropriate EID-to-RLOC mapping by consulting the distributed mapping database system. See [RFC6833] for more details.

The LISP Alternative Logical Topology (ALT): The virtual overlay network made up of tunnels between LISP+ALT Routers. The Border Gateway Protocol (BGP) runs between ALT Routers and is used to carry reachability information for EID-prefixes. The ALT provides a way to forward Map-Requests toward the ETR that "owns" an EID-prefix. See [RFC6836] for more details.

ALT Router: The device on which runs the ALT. The ALT is a static network built using tunnels between ALT Routers. These routers are deployed in a roughly-hierarchical mesh in which routers at each level in the topology are responsible for aggregating EID-Prefixes learned from those logically "below" them and advertising summary prefixes to those logically "above" them. Prefix learning and propagation between ALT Routers is done using BGP. When an ALT Router receives an ALT Datagram, it looks up the destination EID in its forwarding table (composed of EID-Prefix routes it learned from neighboring ALT Routers) and forwards it to the logical next-hop on the overlay network. The primary function of LISP+ALT routers is to provide a lightweight forwarding

infrastructure for LISP control-plane messages (Map-Request and Map-Reply), and to transport data packets when the packet has the same destination address in both the inner (encapsulating) destination and outer destination addresses ((i.e., a Data Probe packet). See [RFC6830] for more details.

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