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The Longest Acceptable Prefix for IPv6 Links
draft-carpenter-6man-lap-01

Abstract

This document introduces the concepts of a Longest Acceptable Prefix (LAP) and a Shortest Acceptable Identifier Length (SAIL) for an IPv6 link.

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1. Introduction

The IPv6 addressing architecture [RFC4291] clearly separates an address into a routing prefix of length n bits and an interface identifier of length 128-n bits. IPv6 routers are required by BCP 198 [RFC7608] to support any length of routing prefix. For operational reasons, routing prefixes up to 127 bits have been recommended [RFC6164].

Stateless Address Autoconfiguration (SLAAC) [RFC4862] requires a fixed prefix length for each Layer 2 medium, and for largely historical reasons [RFC7136] this has been fixed for all media as 64 bits by the addressing architecture.

Efforts to update the addressing architecture [I-D.ietf-6man-rfc4291bis] have shown that there are contradictory opinions about retaining this fixed length for all purposes, not just for SLAAC. See for example [I-D.bourbaki-6man-classless-ipv6].

This document does not aim to rehash those opinions and the arguments behind them. Its only purpose is to propose simple terminology to make the discussion easier. Both the terms introduced include the word "Acceptable" to make it clear that they are human operational choices.

2. Definition of Longest Acceptable Prefix

As noted above, any prefix length up to /128 is treated identically by routing protocols. However, for a given network, end site, or link, there always exists a Longest Acceptable Prefix (LAP), whose length is locally determined. Currently, a site or link that uses SLAAC has a LAP of /64, and will not work with a longer one. A point-to-point link may have a LAP of /127, according to [RFC6164]. Situations in which other LAPs might be used should be defined in other documents.

3. Definition of Shortest Acceptable Identifier Length

The interface identifier is used to identify a given interface on a given link, and is therefore only of local significance, even though it is globally visible as part of an address. For a given link, there always exists a Shortest Acceptable Identifier Length (SAIL). By definition,

LAP + SAIL <= 128

Currently, a site or link that uses SLAAC has a SAIL of 64. Situations in which other SAILs might be used should be defined in other documents, with particular attention to security and privacy issues.

4. Security Considerations

As noted in the Security Considerations of [I-D.ietf-6man-rfc4291bis], the length of a SAIL, and therefore the length of a LAP, have important implications for privacy. Proposals for adopting LAPs longer than /64 must take this into account.

Additionally, the length of a SAIL has important implications for the feasability of network reconnaissance by scanning attacks [RFC7707].

5. IANA Considerations

This document makes no request of the IANA.

6. Acknowledgements

The term SAIL is directly based on a suggestion by Mark Smith.

7. Informative References

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[RFC4862] Thomson, S., Narten, T., and T. Jinmei, "IPv6 Stateless Address Autoconfiguration", RFC 4862, DOI 10.17487/RFC4862, September 2007, <https://www.rfc-editor.org/info/rfc4862>.

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[RFC7608] Boucadair, M., Petrescu, A., and F. Baker, "IPv6 Prefix Length Recommendation for Forwarding", BCP 198, RFC 7608, DOI 10.17487/RFC7608, July 2015, <https://www.rfc-editor.org/info/rfc7608>.

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Appendix A. Change log [RFC Editor: Please remove]

draft-carpenter-6man-lap-00, 2018-06-13:

Initial version

draft-carpenter-6man-lap-01, 2018-06-20:

Added SAIL, minor clarifications

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