The length of the IPv6 link-local prefix
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Abstract

The length of the IPv6 link-local prefix is 64 decimal.

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1. **Statement**

The length of the IPv6 link-local prefix is 64 decimal.

The IPv6 link-local prefix is represented textually "fe80::/64".

The illustration of the IPv6 link-local prefix is:

```
+----------+-------------------------+----------------------------+
|111111101000000000000...0000000000|       interface ID         |
+----------+-------------------------+----------------------------+
```

Figure 1: The IPv6 link-local prefix

2. **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 [RFC2119].

Prefix: a contiguous string of bits valid for forwarding operations and for subnet formation.

textual representation of a prefix: e.g. fe80::/64.

n leading bits: the first n bits in a string of bits read from left to right in a writing system that is read left-to-right. E.g. the 10 leading bits of the fe80::/64 textual representation of the IPv6 link-local prefix are 1111111010.
3. Context

The RFC "IPv6 Address Archi" illustrates the format of the link-local addresses. From the illustration it MAY be understood that the length of the link-local prefix is 10 bits of value 1111111010 and 54 0 bits.

IANA lists the "IPv6 prefix", and "Address Block", to be "fe80::/10" on its website. It is possible that in the future the IETF could decide to use the bits 11-53.

The RFC 2464 "IPv6-over-Ethernet" states that the prefix for link-local addresses is "fe80::/64".

RFC 6874, "Representing IPv6 Zone Identifiers in Address Literals and Uniform Resource Identifiers" specifies the link-local addresses to be under prefix "fe80::/10".

Several knowledgeable interpretations state that, generally speaking, the prefix length of link-local addresses is 10, but it is 64 in the particular case of Stateless Address-Autoconfiguration (SLAAC). In this latter case, the prefix is named a "subnet prefix", or "prefix on a link", and it is "fe80::/64".

Implementations of an IPv6 stack in a particular operating system allow for the manual configuration of both prefix lengths 64 and 10 for link-local addresses. In another operating system the prefix length for link-local addresses can not be explicitly specified by the end user, but may be indirectly derived from two distinct textual formats by using an unspecified rule.

Misconfigurations and lack of interoperability MAY arise between computers that use mixed prefix lengths for link-local addresses.

A memo describes the use of IPv6 link-local addresses in applications. The filename of the Internet Draft is draft-smith-ipv6-link-locals-apps-00.

Historical note: earlier, the link-local prefix fe80::/10 and site-local prefix fec0::/10 were grouped into a common fe80::/9. If bits 10-64 were 0 then the prefix was a link-local, otherwise a site-local. The site-local addresses were later deprecated by RFC 3879.

4. Security Considerations

The clarification of the definition of the prefix length of the IPv6 link-local prefix at IANA is: call it ‘leading bits’ and not ‘prefix’, or state that the IPv6 prefix length of link-local...
addresses is 10 decimal. This clarification has beneficial impact in
the algorithm implementation for calculation of the opaque and stable
Interface Identifiers for IPv6 link-local addresses. It also
positively impacts some implementations of IPv6 forwarding.

5. IANA Considerations

IANA is requested to change the name of the column head in the table
that depicts the "Internet Protocol Version 6 Address Space". The
name should be "The n leading bits of an address" instead of "IPv6
Prefix".

The desired effect of this change is that the IPv6 link-local prefix
be "fe80::/64" and that the 10 leading bits of this prefix be
1111111010. A second effect is that the textual representation
"fe80::/10" as an IPv6 link-local prefix should disappear from that
IANA page, because it is wrong.

6. Contributors

Listed from 6man WG discussion.

7. Acknowledgements

The following persons are acknowledged for the discussion that is
reflected in this draft. Not all points are reflected. Some points
are copied almost entirely.

Ole Troan, Scott Timothy Morizot, Brian Carpenter, Fred Baker, Mark
Smith, Peter Occil, Philip Homburg, Albert Manfredi, &amp;#144;&amp;#150;3/4
&amp;#146;B&amp;#141;AE (TATUYA Jinmei), Fernando Gont, Christian Huitema.

8. Normative References

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

Appendix A. ChangeLog

The changes are listed in reverse chronological order, most recent
changes appearing at the top of the list.

-02: corrected a typo in "fe80::/1" and added a 7-bit encoding for
one persons name (in addition to the japanese-shift-jis encoding
which is not understood by xml2rfc.)
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