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Assignment of an Ethertype for IPv6 with Low-Power Wireless Personal Area Network (LoWPAN) Encapsulation

Abstract

When carried over Layer 2 technologies such as Ethernet, IPv6 datagrams using Low-Power Wireless Personal Area Network (LoWPAN) encapsulation as defined in RFC 4944 must be identified so the receiver can correctly interpret the encoded IPv6 datagram. The IETF officially requested the assignment of an Ethertype for that purpose and this document reports that assignment.

Status of This Memo

This document is not an Internet Standards Track specification; it is published for informational purposes.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Not all documents approved by the IESG are a candidate for any level of Internet Standard; see Section 2 of RFC 7841.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at http://www.rfc-editor.org/info/rfc7973.

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1. Introduction

The IETF defined "LoWPAN encapsulation", a format for IPv6 [RFC2460] datagram encapsulation [RFC4944]. This document regards any IPv6 datagram using the Dispatch octet as defined in Section 5.1 of RFC 4944 as using LoWPAN encapsulation. LoWPAN encapsulation as defined in RFC 4944 has been updated by [RFC6282], and may be extended and modified by future IETF Standards. The intended Layer 2 technology for IPv6 datagrams using LoWPAN encapsulation as originally defined is [IEEE.802.15.4_2011], which does not provide for a protocol switch in its Layer 2 headers.

The following list gives some example use cases for the Ethertype-based protocol dispatch for the LoWPAN-encapsulated IPv6 datagram:

- Usage of LoWPAN encapsulation in conjunction with IEEE 802.15.9 Multiplexed Data Service [IEEE802159], which provides the ability to perform upper layer protocol dispatch for IEEE 802.15.4 networks. Wi-SUN Alliance intends to use the 15.9 Multiplexed Data Information Element for upper layer protocol dispatch. As specified in IEEE 802.15.9, dispatch of LoWPAN encapsulation frames will require that an Ethertype be assigned for LoWPAN encapsulation.

- LoWPAN encapsulation will likely be needed for Wi-Fi Alliance's HaLoW [HALOW] standard (low-power operation in the 900 MHz band).

- Other Layer 2 technologies such as Ethernet and debugging tools such as Wireshark require a unique Protocol Type field for LoWPAN encapsulation to properly interpret IPv6 datagrams that use LoWPAN encapsulation.

- Any existing or future Layer 2 technology, incorporating Ethertype-based upper layer dispatch, can use the Ethertype proposed in this document to dispatch LoWPAN-encapsulated IPv6 datagrams.

2. Assignment of an Ethertype by IEEE

The IETF formally submitted a request to IEEE for assignment of an Ethertype for IPv6 datagrams using LoWPAN encapsulation. IEEE has responded with the assignment of Ethertype 0xA0ED for this purpose. The assignment has been recorded by IEEE [IEEE-ETHERTYPES].

3. IANA Considerations

The following entry has been added to the "ETHER TYPES" subregistry of the "IEEE 802 Numbers" registry [IANA-IEEE802]:

```
Ethertype (decimal): 41197
Ethertype (hex): A0ED
Exp. Ethernet (decimal): -
Exp. Ethernet (octal): -
Description: LoWPAN encapsulation
References: RFC 7973 (this document)
```

4. Security Considerations

This document only requests assignment of an Ethertype for IPv6 datagrams using LoWPAN encapsulation. It has no incremental implications for security beyond those in the relevant protocols.

5. Normative References

[HALOW] Wi-Fi Alliance, "Wi-Fi HaLow", <http://www.wi-fi.org/discover-wi-fi/wi-fi-halow>.

[IANA-IEEE802] IANA, "IEEE 802 Numbers", <http://www.iana.org/assignments/ieee-802-numbers>.

[IEEE-ETHERTYPES] IEEE, "Ethertype", <http://standards-oui.ieee.org/ethertype/eth.txt>.

[IEEE.802.15.4_2011] IEEE, "IEEE Standard for Local and metropolitan area networks--Part 15.4: Low-Rate Wireless Personal Area Networks (LR-WPANs)", IEEE 802.15.4-2011, DOI 10.1109/ieeestd.2011.6012487, September 2011, <http://ieeexplore.ieee.org/servlet/opac?punumber=6012485>.

[IEEE802159] IEEE, "IEEE Draft Recommended Practice for Transport of Key Management Protocol (KMP) Datagrams", IEEE P802.15.9/D04, May 2015, <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7272753>.

[RFC2460] Deering, S. and R. Hinden, "Internet Protocol, Version 6 (IPv6) Specification", RFC 2460, DOI 10.17487/RFC2460, December 1998, <http://www.rfc-editor.org/info/rfc2460>.

[RFC4944] Montenegro, G., Kushalnagar, N., Hui, J., and D. Culler, "Transmission of IPv6 Packets over IEEE 802.15.4 Networks", RFC 4944, DOI 10.17487/RFC4944, September 2007, <http://www.rfc-editor.org/info/rfc4944>.

[RFC6282] Hui, J., Ed. and P. Thubert, "Compression Format for IPv6 Datagrams over IEEE 802.15.4-Based Networks", RFC 6282, DOI 10.17487/RFC6282, September 2011, <http://www.rfc-editor.org/info/rfc6282>.

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