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IPv6 over Low-Power Wireless Personal Area Network (6LoWPAN) Dispatch Type for SCHC
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Abstract

A new framework called Static Context Header Compression (SCHC) has been designed with the primary goal of supporting IPv6 over Low Power Wide Area Network (LPWAN) technologies [RFC8724]. One of the SCHC components is a header compression mechanism. If used properly, SCHC header compression allows a greater compression ratio than that achievable with traditional 6LoWPAN header compression [RFC6282]. For this reason, it may make sense to use SCHC header compression in some 6LoWPAN environments. This document defines a 6LoWPAN Dispatch Type to signal when a packet header has been compressed by using SCHC header compression.

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1. Introduction

RFC 6282 is the main specification for IPv6 over Low power Wireless Personal Area Network (6LoWPAN) IPv6 header compression [RFC6282]. This RFC was designed assuming IEEE 802.15.4 as the layer below the 6LoWPAN adaptation layer, and it has also been reused (with proper adaptations) for IPv6 header compression over many other technologies relatively similar to IEEE 802.15.4 in terms of characteristics such as physical layer bit rate, layer 2 maximum payload size, etc. Examples of such technologies comprise BLE, DECT-ULE, ITU G.9959, MS/TP, NFC, and PLC. RFC 6282 provides additional functionality, such as a mechanism for UDP header compression.

In the best cases, RFC 6282 allows to compress a 40-byte IPv6 header down to a 2-byte compressed header (for link-local interactions) or a 3-byte compressed header (when global IPv6 addresses are used). On the other hand, an RFC 6282 compressed UDP header has a typical size of 4 bytes. Therefore, in advantageous conditions, a 48-byte uncompressed IPv6/UDP header may be compressed down to a 6-byte format (when using link-local addresses) or a 7-byte format (for global interactions) by using RFC 6282.

Recently, a new framework called Static Context Header Compression (SCHC) has been designed with the primary goal of supporting IPv6 over Low Power Wide Area Network (LPWAN) technologies [RFC8724]. SCHC comprises header compression and fragmentation functionality tailored to the extraordinary constraints of LPWAN technologies,

which are more severe than those exhibited by IEEE 802.15.4 or other relatively similar technologies.

SCHC header compression allows a greater compression ratio than that of RFC 6282. If used properly, SCHC allows to compress an IPv6/UDP header down to e.g. a single byte. Therefore, it may make sense to use SCHC header compression in some 6LoWPAN environments [I-D.toutain-6lo-6lo-and-schc], considering its greater efficiency.

If SCHC header compression is added to the panoply of header compression mechanisms used in 6LoWPAN environments, then there is a need to signal when a packet header has been compressed by using SCHC. To this end, in its current form, the present document specifies a 6LoWPAN Dispatch Type for SCHC header compression, based on exploiting RFC 8025 Dispatch type space [RFC8025].

2. Conventions used in this document

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].

3. Frame Format

Figure 1 illustrates the content of an encapsulated, SCHC compressed, IPv6 datagram:

Figure 1: Encapsulated, SCHC compressed IPv6 datagram

The SCHC Dispatch is a 6LoWPAN Dispatch Type that indicates that the next field is a SCHC Header. The latter corresponds to a packet header that has been compressed by using SCHC. As defined in [RFC8724], the SCHC Header comprises a Rule ID, and a compression residue. (Note: more details, including a discussion on padding, to be added.)

4. SCHC Dispatch Type

This section defines the 6LoWPAN Dispatch Type called "SCHC Dispatch", by using the RFC 8025 concept of "pages". With the aim to minimize overhead, the present document allocates a whole page (Page 2) for the SCHC Dispatch Type:

SCHC Dispatch Type bit pattern: 11110010 (Page 2 (Note: to be confirmed by IANA))

For example, two bytes may be used for the SCHC Dispatch plus the Rule ID, which offers a Rule ID space of 256 possible Rule IDs.

5. IANA Considerations

This document requests the allocation of the Dispatch Type Field bit pattern 11110010 (Page 2) as SCHC Dispatch Type.

6. Security Considerations

TBD

7. Acknowledgments

Ana Minaburo and Laurent Toutain suggested for the first time the use of SCHC in environments where 6LoWPAN has traditionally been used. Laurent Toutain made comments that helped shape this document.

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8.2. Informative References

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