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                   SCHC for 802.15.4 lpwan applications
                     draft-perkins-lpwan-schc-802154-00

Abstract

   This document provides guidelines for creating Rules for Static
   Context Header Compression for IEEE 802.15.4. Since 802.15.4
   provides layer-2 acknowledgements, some complexities that were
   designed for more general systems can be avoided.

Status of This Memo

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1. Introduction

   Static Context Header Compression (SCHC)
   [I-D.ietf-lpwan-ipv6-static-context-hc] is a solution for header
   compression, highly specialized for very predictable IPv6 packets to
   and from an lpwan node with significant resource constraints
   (especially power). This document provides guidelines for creating
   Rules for Static Context Header Compression (SCHC) for IEEE 802.15.4
   [dot4]. Since 802.15.4 provides layer-2 acknowledgements, some
   complexities that were designed for more general systems can be
   avoided.

   The Low-Power, Wide-Area IEEE 802.15.4w task group (LPWA) has been
   chartered to specify modifications to 802.15.4 MAC and PHY parameters
   that would be needed to make the technology more suitable for lpwan
   applications [lpwa_par], [lpwa_csd]. Although 801.15.4g [dot4g] and
   802.15.4k [dot4k] were previously designed for such systems, recent
   experiments and further experience with new use cases have indicated
   the need for additional specification and wider applicability.

   LPWA has listed different use-cases that may be relevant for LPWAN in
   a study group document [lpwa_use_cases]. The LPWAN use-cases
   discussed in that document are characterized as follows:

   o Focusing on uplink data
   o Typical Payload data length less than 16 bytes

o   No strict latency requirements

The LPWA also determined that it would be useful to produce a
document for the IETF lp-wan Working Group to suggest parameters for
the use cases. The discussion so far in LPWA has resulted in the
document [lpwa_schc].

```
                      |
               +-----+
               |     | Gateway (default) router
               |     |
               +-----+
                  |
                  |
               +-----+
               |     | LPWA access point
               |     |
               +-----+
                  o
              o  o    o   o
              o   o  o  o o
              o    o  o   o
               o    o  o

              LLN
```
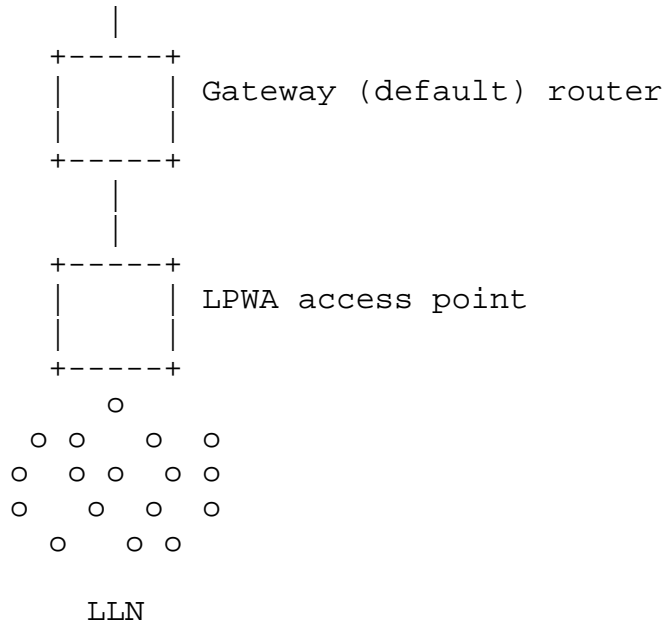
     Figure 1: Representative Architecture for 802.15.4w Use Cases

A typical 802.15.4w use case is illustrated in Figure 1. The header
compression context is statically configured for the transmission and
reception of packets between the LPWA access point and the individual
low-power devices (indicated as 'o'). Most of the rules follow the
recommended practice in [I-D.ietf-lpwan-ipv6-static-context-hc] for
compressing the IPv6 addresses and UDP ports; the same rulesets can
be used for the possibly thousands of low-power devices, only
changing the IPv6 address for the particular device relevant to the
context.

2. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
"SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and
"OPTIONAL" in this document are to be interpreted as described in
[RFC2119].

This document uses the following definitions:

LPWA

       Low-Power Wide Area
   PAN
       Personal Area Network
   802.15.4w
       Low-Power Wide Area (LPWA) task group within IEEE 802.15

3. SCHC parameters

   In this section we provide details about parameter selection for a
   static compression context to be used over 802.15.4, according to the
   guidelines in [minaburo_email]. The method by which the context is
   agreed upon by sender and receiver is left unspecified. For the
   purposes of this document, the rule-ID, rule parameters, and other
   uncompressed information is to be considered as a normal L2 payload
   that will be decompressed before delivery to L3.

3.1. Size of the Rule ID

   Size of the Rule ID should be 3, to allow for up to 8 rules.

3.2. Use of Padding

   Pad to a multiple of 8 bits in the L2 payload.

3.3. Fragmentation Delivery Reliability Option

   802.15.4 link acknowledgement should be used, since the static
   context as defined should be decompressed after delivery over a
   single link.

3.4. MAX_ACK_REQUEST

   MAX_ACK_REQUEST SHOULD be set to 3, following usual practice in
   802.15.4.

3.5. FCN

   FCN SHOULD be set to 0, since unfragmented traffic is expected for
   most use cases under consideration in 802.15.4w.

3.6. DTag

   Similarly, DTag SHOULD be set to 0, since unfragmented traffic is
   expected for most use cases under consideration in 802.15.4w.

3.7. MAX_ACK_REQUEST

MAX_ACK_REQUEST SHOULD be set to 3, following usual practice in 802.15.4.

3.8. L2 CRC

Either CRC-16 or CRC-32 as defined in 802.15.4 could be used.

3.9. Fragmentation ACK Parameters (not used)

Since acknowledgments SHOULD be handled at Layer 2, no specification is made here for the following:

o   The timer size for Fragmentation ACK Always
o   When to abort in ACK Always
o   MAX_ATTEMPTS counter size
o   The timer size between windows in ACK On Error.

4. Security Considerations

This document does not introduce any security mechanisms, and does not have affect existing security mechanisms.

5. IANA Considerations

This document does not specify any IANA actions.

6. Acknowledgements

This document has benefitted from discussions with the following people, in alphabetical order: Pat Kinney

7. References

7.1. Normative References

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