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**SCHC for 802.15.4 lpwan applications  
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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.

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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](#)].

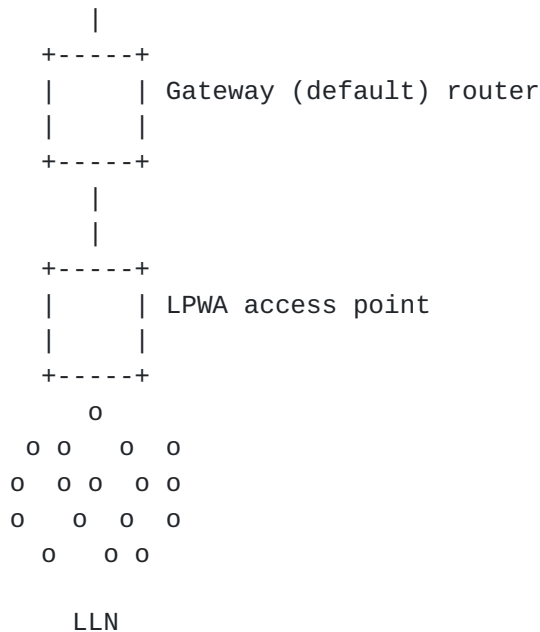


Figure 1: Representative Architecture for 802.15.4w Use Cases

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. L2 CRC**

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

### **3.8. Fragmentation ACK Parameters (not used)**

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

- o The timer duration 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.
- o The inactivity timer.

## **4. Security Considerations**

This document does not introduce any security mechanisms, and does not have affect existing security mechanisms or vulnerabilities already present in the base SCHC document.

## **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**

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