lpwan Working Group
Internet-Draft
Intended status: Informational
Expires: May 3, 2018

I. Petrov
Acklio
A. Yegin
Actility

October 30, 2017

Static Context Header Compression (SCHC) over LoRaWAN draft-petrov-lpwan-ipv6-schc-over-lorawan-00

Abstract

The Static Context Header Compression (SCHC) specification describes generic header compression and fragmentation techniques for LPWAN (Low Power Wide Area Networks) technologies. SCHC is a generic mechanism designed for great flexibility, so that it can be adapted for any of the LPWAN technologies.

This document provides the adaptation of SCHC for use in LoRaWAN networks, and provides elements such as efficient parameterization and modes of operation.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at https://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on May 3, 2018.

Table of Contents

1. Introduction

The Static Context Header Compression (SCHC) specification [I-D.ietf-lpwan-ipv6-static-context-hc] describes generic header compression and fragmentation techniques that can be used on all LPWAN (Low Power Wide Area Networks) technologies defined in [I-D.ietf-lpwan-overview]. Even though those technologies share a great number of common features like start-oriented topologies, network architecture, devices with mostly quite predictable communications, etc; they do have some slight differences in respect of payload sizes, reactiveness, etc.

SCHC gives a generic framework that enables those devices to communicate with other Internet networks. However, for efficient

performance, some parameters and modes of operation need to be set appropriately for each of the LPWAN technologies.

This document describes the efficient parameters and modes of operation when SCHC is used over LoRaWAN networks.

2. Terminology

This section defines the terminology and acronyms used in this document. For all other definitions, please look up the SCHC specification [I-D.ietf-lpwan-ipv6-static-context-hc].

o DevEUI: an IEEE EUI-64 identifier used to identify the device during the procedure while joining the network (Join Procedure)

o DevAddr: a 32-bit non-unique identifier assigned to a device statically or dynamically after a Join Procedure (depending on the activation mode)

o TBD: all significant LoRaWAN-related terms.

3. Static Context Header Compression Overview

This section contains a short overview of Static Context Header Compression (SCHC). For a detailed description, refer to the full specification [I-D.ietf-lpwan-ipv6-static-context-hc].

Static Context Header Compression (SCHC) avoids context synchronization, which is the most bandwidth-consuming operation in other header compression mechanisms such as RoHC [RFC5795]. Based on the fact that the nature of data flows is highly predictable in LPWAN networks, some static contexts may be stored on the Device (Dev). The contexts must be stored in both ends, and it can either be learned by a provisioning protocol or by out of band means or it can be pre-provisioned, etc. The way the context is learned on both sides is out of the scope of this document.

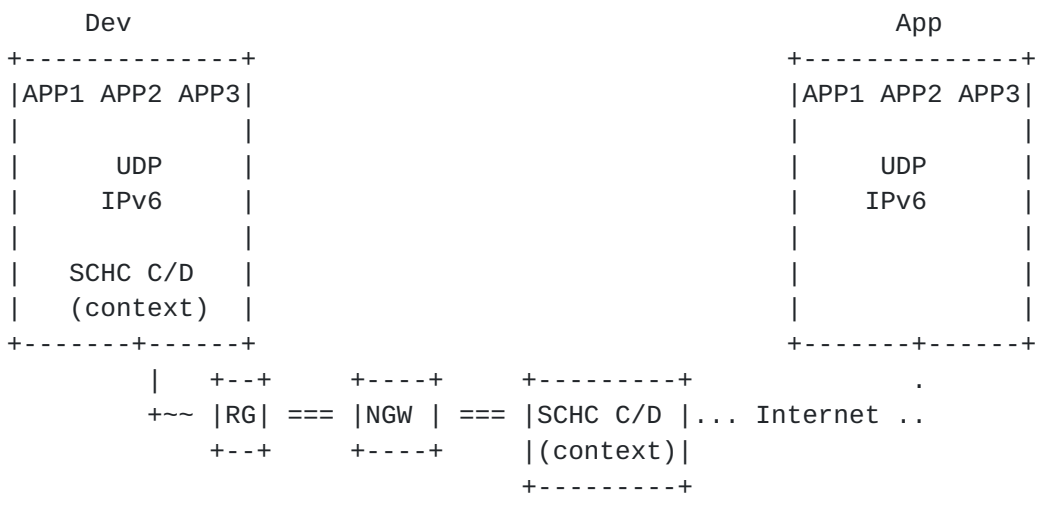

Figure 1: Architecture

Figure 1 represents the architecture for compression/decompression, it is based on [I-D.ietf-lpwan-overview] terminology. The Device is sending applications flows using IPv6 or IPv6/UDP protocols. These flows are compressed by an Static Context Header Compression Compressor/Decompressor (SCHC C/D) to reduce headers size. Resulting information is sent on a layer two (L2) frame to a LPWAN Radio Network (RG) which forwards the frame to a Network Gateway (NGW). The NGW sends the data to a SCHC C/D for decompression which shares the same rules with the Dev. The SCHC C/D can be located on the Network Gateway (NGW) or in another place as long as a tunnel is established between the NGW and the SCHC C/D. The SCHC C/D in both sides must share the same set of Rules. After decompression, the packet can be sent on the Internet to one or several LPWAN Application Servers (App).

The SCHC C/D process is bidirectional, so the same principles can be applied in the other direction.

In a LoRaWAN network, the RG is called a Gateway, the NGW is Network Server, and the SCHC C/D can be embedded in different places, for example in the Network Server and/or the Application Server.

Next steps for this section: detailed overview of the LoRaWAN architecture and its mapping to the SCHC architecture.

4. LoRaWAN Overview

4.1. Device classes (A, B, C) and interactions

TBD

4.2. Device addressing

TBD

4.3. General Message Types

TBD

4.4. LoRaWAN MAC Frames

TBD

5. SCHC over LoRaWAN

5.1. Rule ID management

Rule ID can be stored and transported in the FPort field of the LoRaWAN MAC frame. TBD

5.2. IID computation

TBD

5.3. Fragmentation

TBD

5.3.1. Reliability options

TBD

5.3.2. Supporting multiple window sizes

TBD

5.3.3. Downlink fragment transmission

TBD

5.3.4. SCHC behavior for devices in class A, B and C

TBD

6. Security considerations

TBD

7. Acknowledgements

TBD

8. References

8.1. Normative References

[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, <https://www.rfc-editor.org/info/rfc4944>.

[RFC5795] Sandlund, K., Pelletier, G., and L-E. Jonsson, "The RObust Header Compression (ROHC) Framework", RFC 5795, DOI 10.17487/RFC5795, March 2010, <https://www.rfc-editor.org/info/rfc5795>.

[RFC7136] Carpenter, B. and S. Jiang, "Significance of IPv6 Interface Identifiers", RFC 7136, DOI 10.17487/RFC7136, February 2014, <https://www.rfc-editor.org/info/rfc7136>.

8.2. Informative References

[I-D.ietf-lpwan-ipv6-static-context-hc] Minaburo, A., Toutain, L., and C. Gomez, "LPWAN Static Context Header Compression (SCHC) and fragmentation for IPv6 and UDP", draft-ietf-lpwan-ipv6-static-context-hc-07 (work in progress), October 2017.

[I-D.ietf-lpwan-overview] Farrell, S., "LPWAN Overview", draft-ietf-lpwan-overview-07 (work in progress), October 2017.

Appendix A. Examples

Appendix B. Note

Authors' Addresses

Ivaylo Petrov
Acklio
2bis rue de la Chataigneraie
35510 Cesson-Sevigne Cedex
France

Email: ivaylo@ackl.io

Alper Yegin
Actility
.
Paris, Paris
France

Email: alper.yegin@actility.com