

draft-ietf-lpwan-schc-over-sigfox-05 & PySCHC Implementation

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Updates

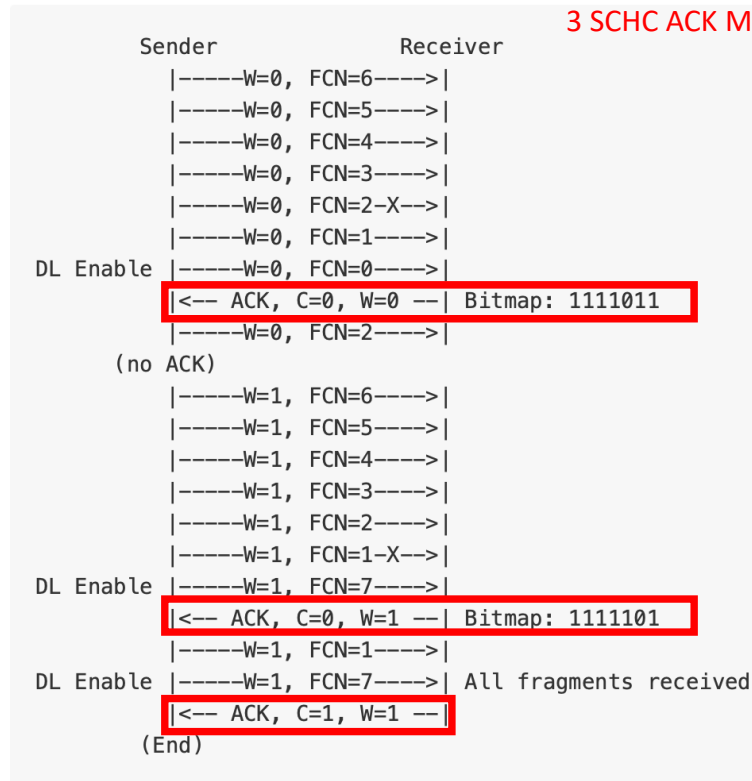
- Hackathon: Off-line coding between UChile and UPC
 - ACK-on-Error and No-ACK SCHC/Sigfox parameter optimizations
 - Error conditions tested
- Last draft updates (rev 05)
 - Added message sequence examples to explain different ACK-on-Error and No-ACK SCHC/Sigfox scenarios
 - Update co-authors' list
- Compound SCHC ACK message proposal (see next slides)

Compound SCHC ACK - Introduction

- ACK-on-Error over Sigfox:
 - Errors in intermediate windows “may” generate at least one ACK
 - Errors in the last window generate at least 2 ACKs
 - Sigfox DL payload is fixed to 64 bits
- When errors occur over multiple windows, the number of ACKs can be reduced by reporting losses from several windows with a single ACK

SCHC Packet: 14 tiles
 Window size: 7 tiles
 3 SCHC ACK Messages

Example

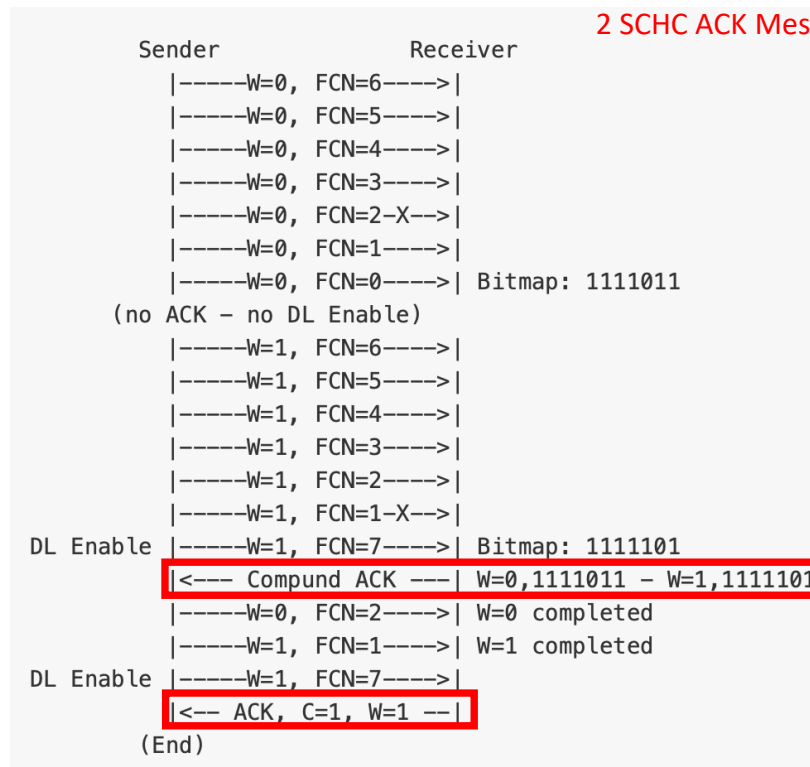


Compound SCHC ACK – Principles and Advantages

- The Compound ACK:
 - Only reports windows with fragment losses
 - Includes W field for each bitmap
 - May not fit all bitmaps of all windows for a SCHC packet
 - Has variable size
 - Compatible with SCHC Receiver Abort message format and ACK Failure message format (RFC8724)
- ACK Reduction when using Compound ACK:
 - Compound ACK messages = Regular SCHC ACKs - (# of windows – 1)

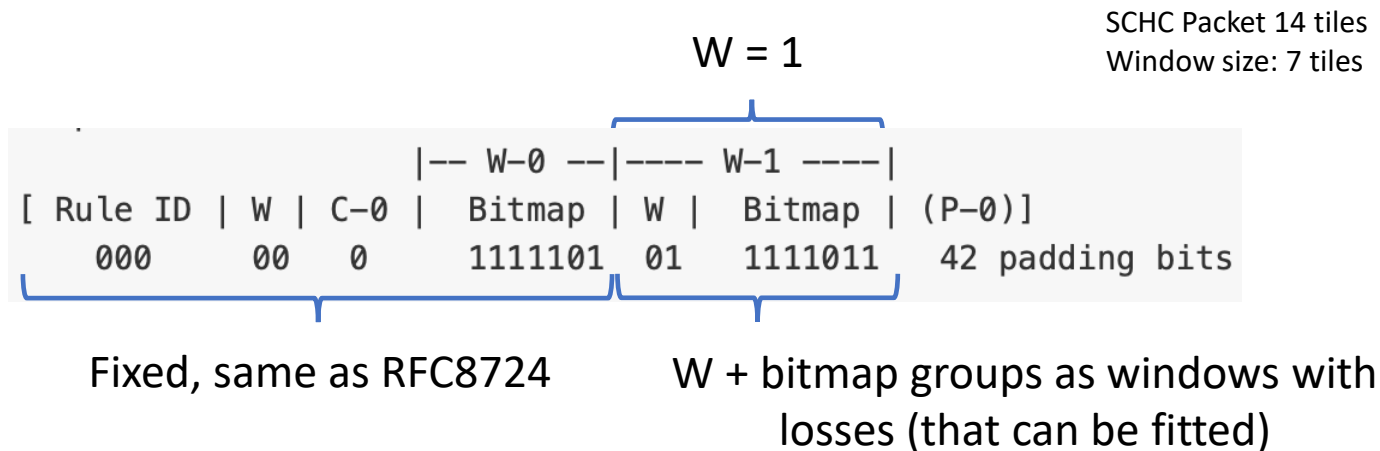
SCHC Packet: 14 tiles
 Window size: 7 tiles
 2 SCHC ACK Messages

Example

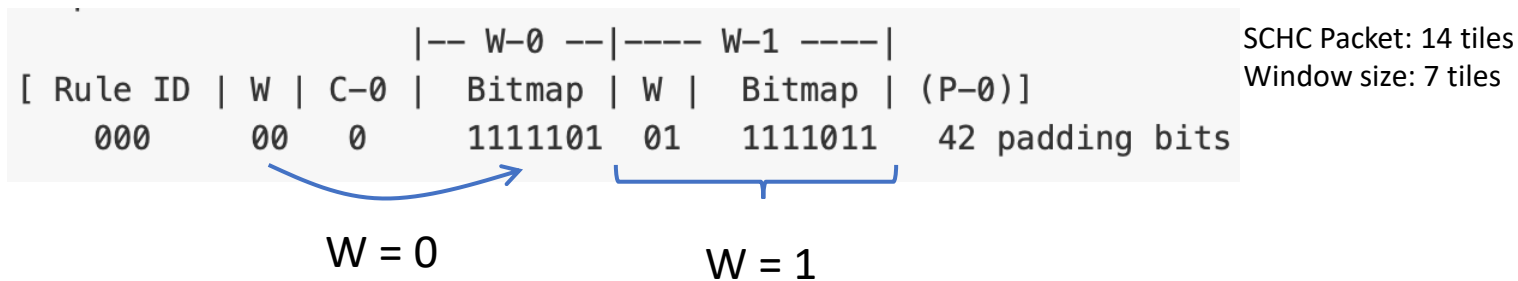


Compound SCHC ACK – Message Format

- Compound ACK message format (only for ACK Failure messages) with SCHC Fragment losses in all windows:



Compound ACK – Message Format



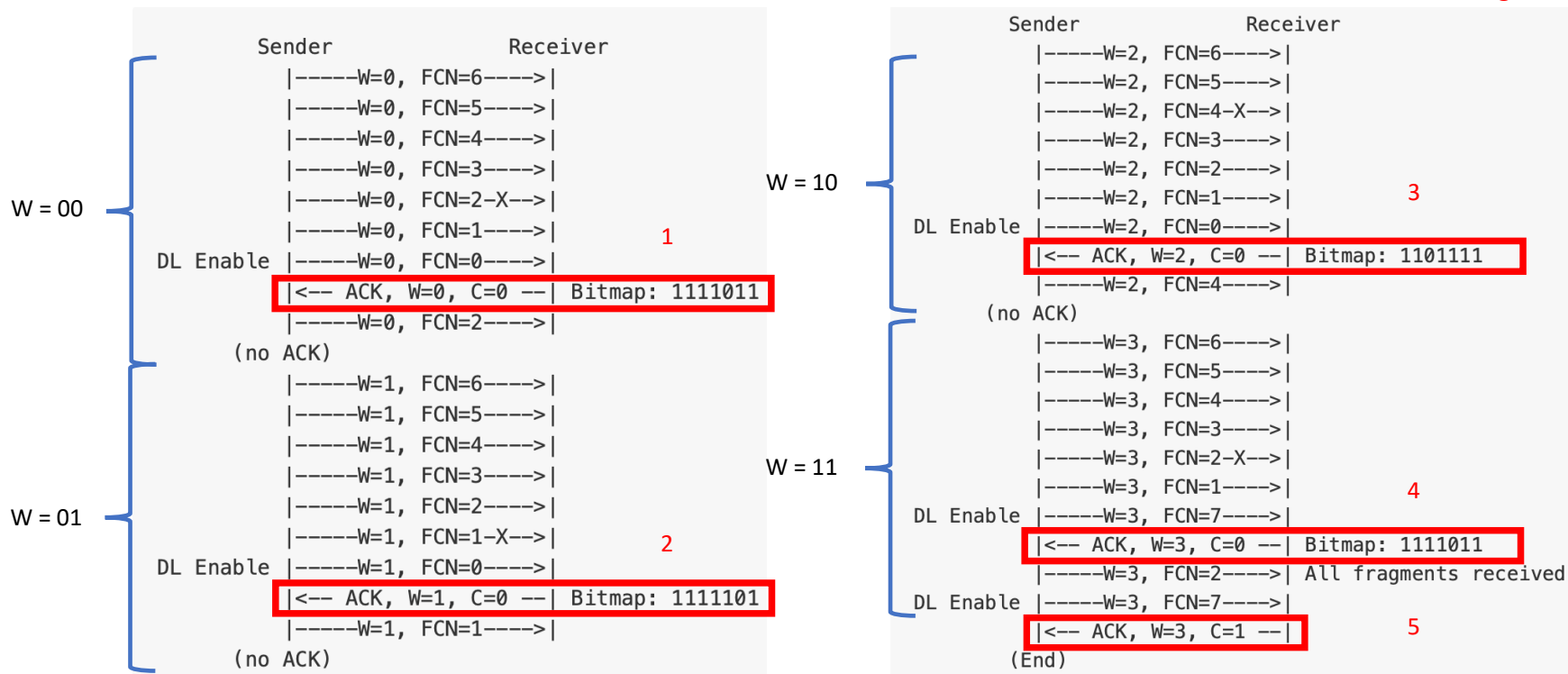
- $W + \text{Bitmap}$ groups are ordered from the smallest window number to the largest
- The window numbered 00 (if present) must always be between the Rule ID and C bit to avoid confusion with padding bits

Thanks!
Questions? Comments?

Backup slides

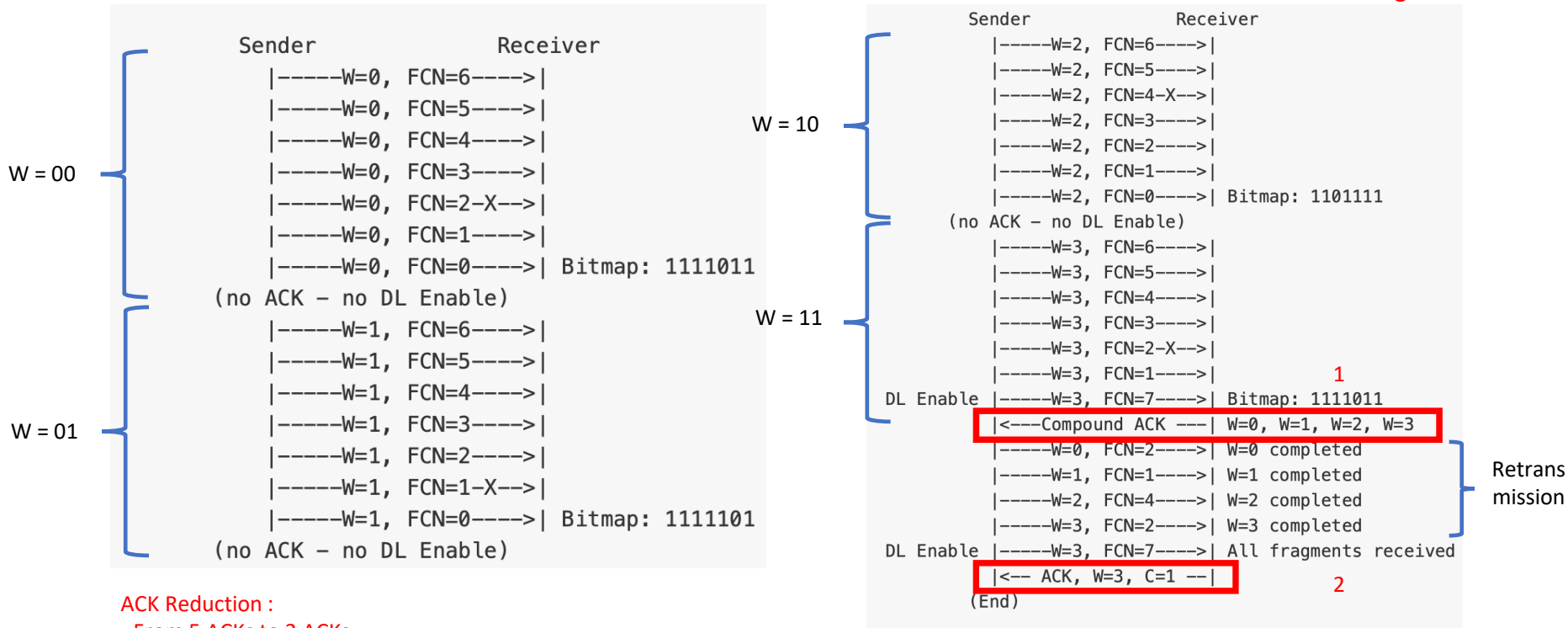
Example – SCHC Packet 28 tiles

Window size: 7 tiles
5 SCHC ACK Messages



Example – SCHC Packet 28 tiles

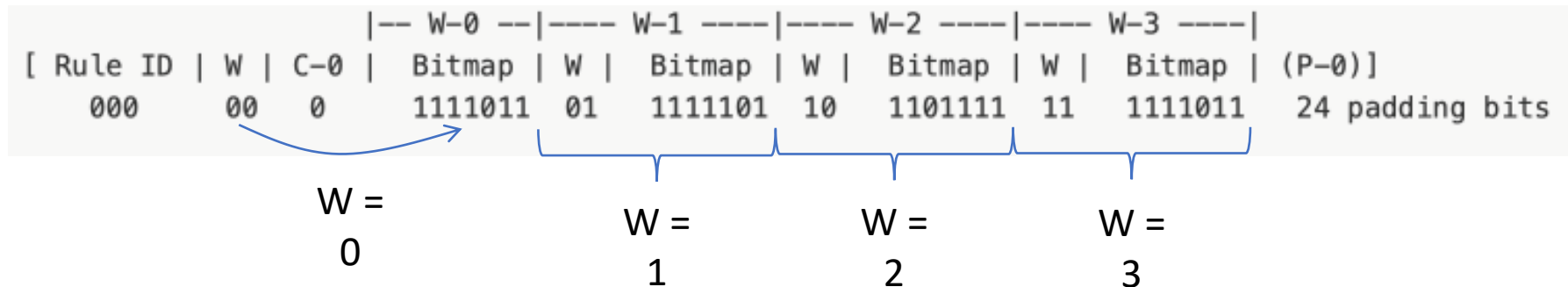
SCHC Packet 28 tiles
 Window size: 7 tiles
 2 SCHC ACK Messages



ACK Reduction :
 - From 5 ACKs to 2 ACKs

Compound ACK – SCHC Packet 28 tiles

SCHC Packet 28 tiles
Window size: 7 tiles



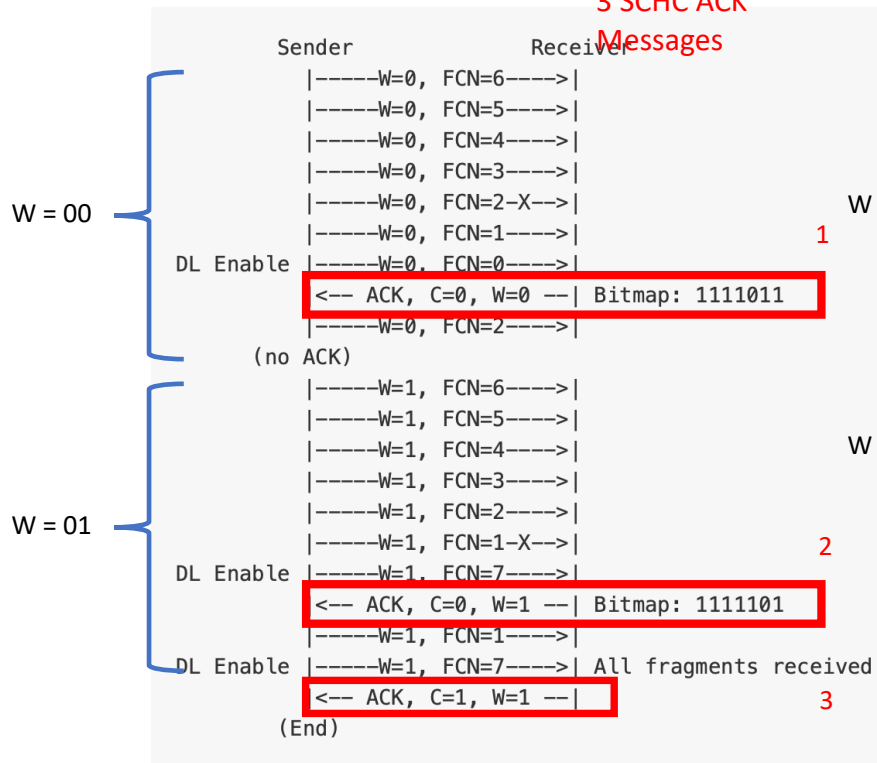
- W + Bitmap groups for all windows with losses
- ACK Reduction
 - Number of windows of the SCHC packet: 4
 - ACK reduction: 3 ACKs

Example – SCHC Packet: 14 tiles

Window size: 7 tiles

3 SCHC ACK

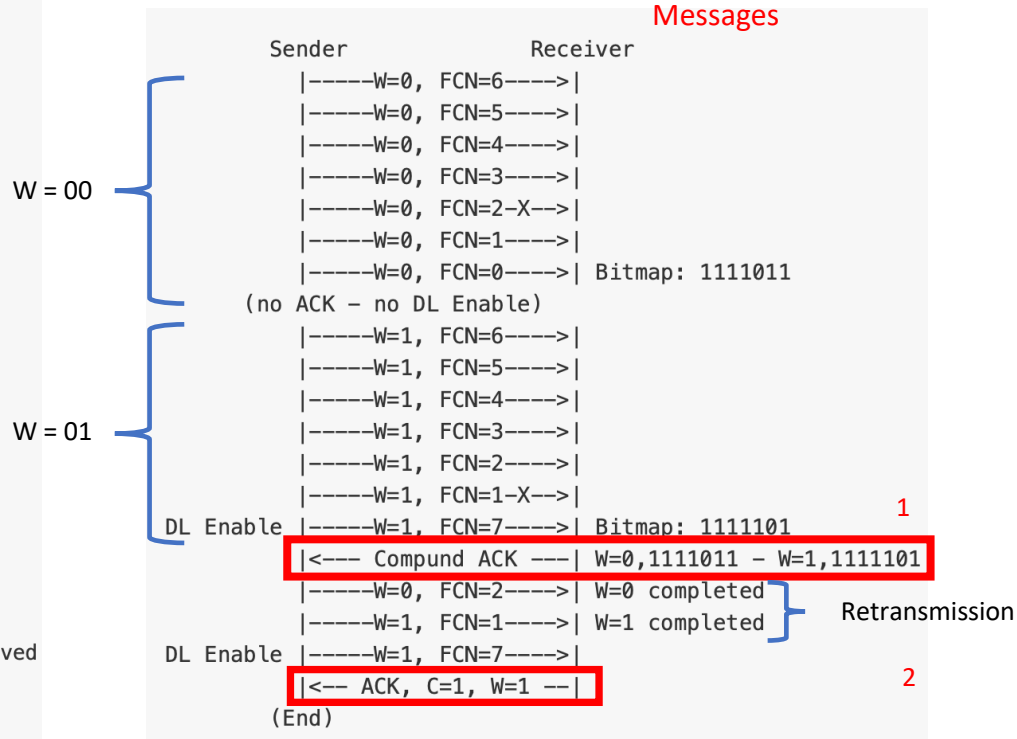
Messages



Window size: 7 tiles

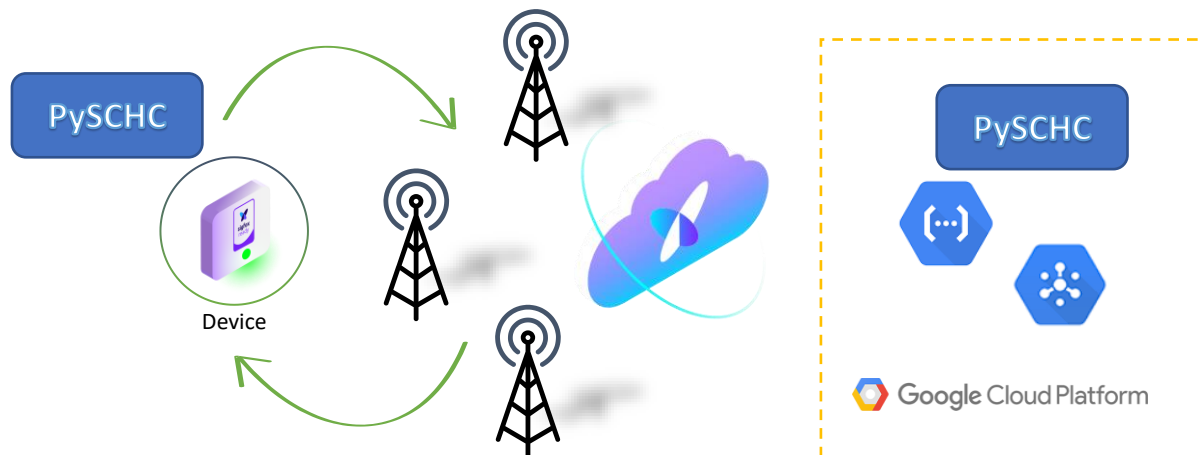
2 SCHC ACK

Messages



Testing Network Architecture

- PySCHC SW
- Pycom (LoPy4)
- Sigfox Network
- Google Cloud *



* <https://cloud.google.com/community/tutorials/sigfox-gw>