
IEEE802.11aa on mesh

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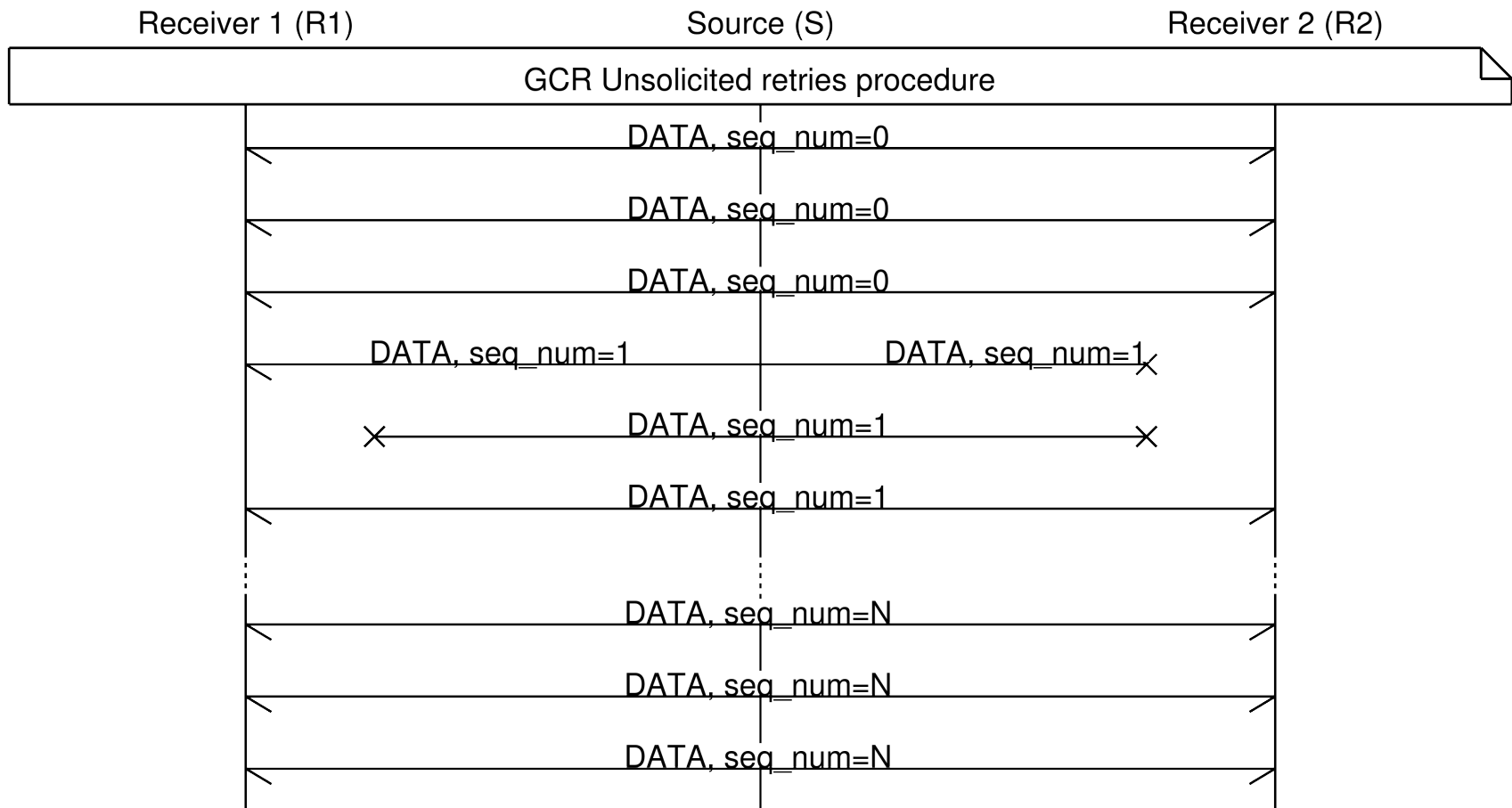
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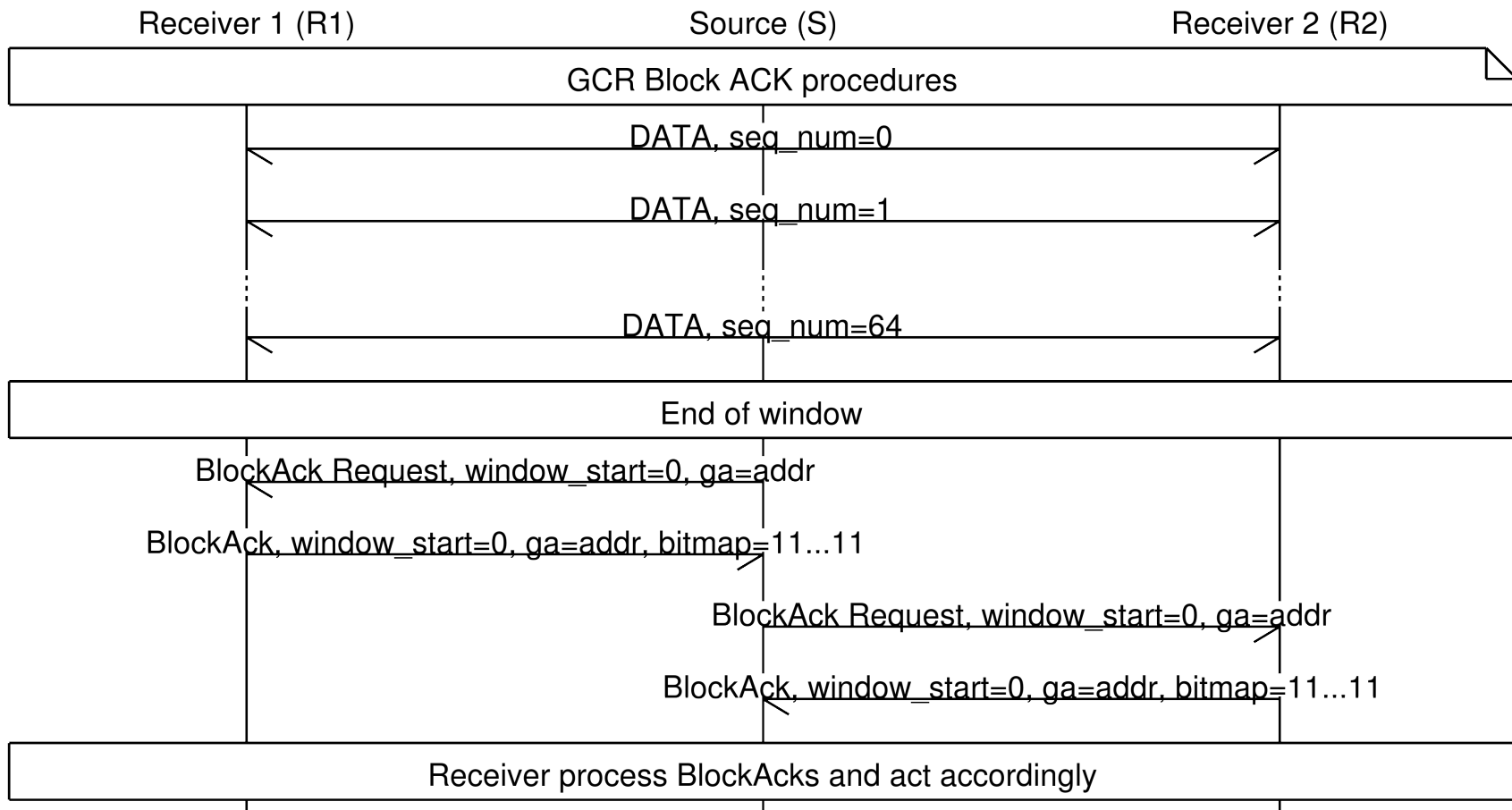
Introduction

- The 802.11aa amendment to IEEE Std. 802.11 was ratified on May '12, introducing MAC enhancements for robust audio and video streaming.
- The standard defines Groupcast with retries (GCR) service as a service to provide greater reliability by using group addressed retransmissions.
- GCR provides two new retransmission policies for group addressed frames:
 - GCR-Unsolicited-Retry
 - GCR-Block-Ack

GCR – Unsolicited retries



GCR – BlockAck



Objectives

- Execute a feasibility study for a 11.aa implementation.
- Implement a basic subset of 802.11aa for single hop mesh networks.
- Simplifications were accepted.
- Study results obtained and determine future improvements.

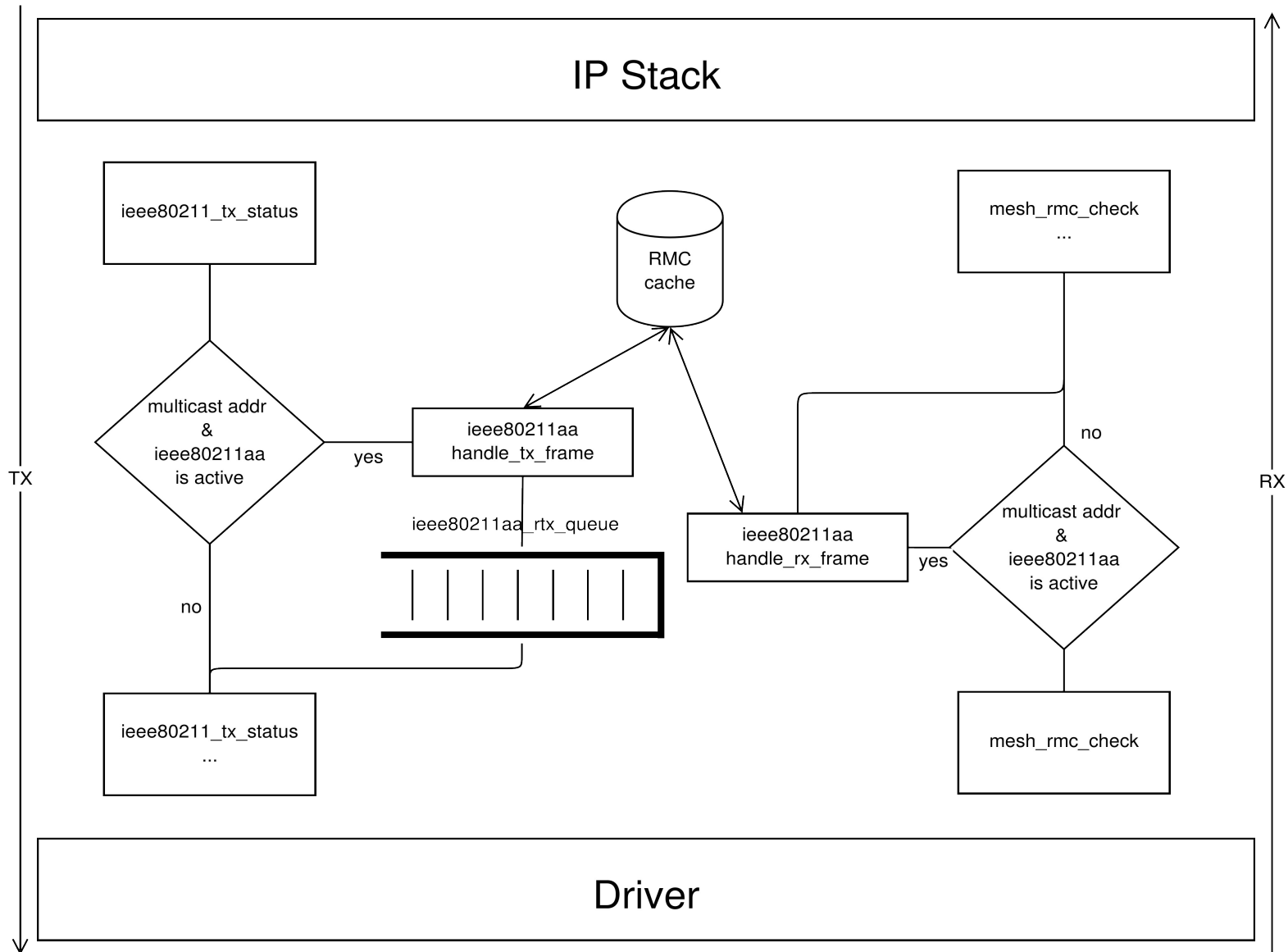
Implementation overview

- Most suitable mechanism, GCR BlockAck.
- The minimal set of functionalities for GCR on mesh:
 - 802.11aa Group Membership mechanism.
 - 802.11aa GCR BlockAck mechanism.
 - Carl9170 driver and firmware modifications to not filter required frames.

Simplifications

- In order to overcome the lack of a session management functionalities some departures where necessary:
 - Use of a special multicast mesh sequence number instead of using the sequence number on 802.11 frames.
 - Use of SA instead of DA for frame tracking.
- These simplifications affect the GCR granularity, current implementation only allows to enable GCR support globally on each peer.

Changes on mac80211



Known Problems and Limitations

- No granularity to select which flows are GCR protected and which not.
- Current implementation is focused on solving single hop issues, protocol may degrade on multiple hop networks.

Future work

- Implement frame reordering on reception path.
- Implement Session Management.
- Converge to standard by using DA + 802.11 sequence numbers
- If possible, use of frame aggregation support on hardware.

Demo

GCR BlockAck support enabled.

Source code available at:

<https://github.com/cozybit/open80211s/tree/ft-11aa>

Should we submit this?

Any questions?

