# IETF 114 ROLL Session

26 July 2022

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# Resources for IETF 114 Philadelphia

- Agenda
  https://datatracker.ietf.org/meeting/agenda
- Meetecho and other information:
  https://www.ietf.org/how/meetings/114/preparation/
- If you need technical assistance, see the Reporting Issues page:
  http://www.ietf.org/how/meetings/issues/

# Resources for ROLL@IETF 114 Phili

- **Remote Participation**
  - Meetecho: https://meetings.conf.meetecho.com/ietf114/?group=roll&short=&item=1
  - Material: https://datatracker.ietf.org/meeting/114/session/roll
  - CodiMD: https://notes.ietf.org/notes-ietf-114-roll
  - Minute takers: **Please volunteer, thank you :)**

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# IETF 114 Meeting Tips

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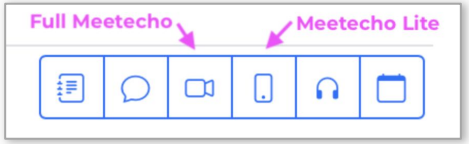


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- Make sure your audio and video are off unless you are chairing or presenting during a session
- Use of a headset is strongly recommended

# Agenda

Tuesday, July 26th, 2022

17:30 - 18:30 ( UTC) - Tuesday Session II

| Time (UTC) | Duration | Draft/Topic | Presenter |
|---|---|---|---|
| 17:30 - 17:45 | 15 min | WG Status | Ines/Dominique |
| 17:45 - 18:00 | 15 min | draft-ietf-roll-dao-projection | Pascal |
| 18:00- 18:20 | 20 min | draft-ietf-6lo-multicast-registration | Pascal |
| 18:20 - 18:30 | 10 min | Open Floor | Everyone |

# Draft status

| | |
|---|---|
| Common Ancestor Objective Function and Parent Set DAG Metric Container Extension<br>draft-ietf-roll-nsa-extension-10 | AD evaluation,<br>revised I-D needed |
| Supporting Asymmetric Links in Low Power Networks: AODV-RPL<br>draft-ietf-roll-aodv-rpl-14 | IESG evaluation, AD follow-up |
| Root initiated routing state in RPL<br>draft-ietf-roll-dao-projection-27 | Discussed today<br>In WGLC |
| Controlling Secure Network Enrollment in RPL Networks<br>draft-ietf-roll-enrollment-priority-06 | Addressing Open Issues |
| Mode of Operation extension<br>draft-ietf-roll-mopex-04 | waiting for attention |
| RPL Capabilities<br>draft-ietf-roll-capabilities-09 | waiting for attention |
| RPL Storing Root-ACK<br>draft-jadhav-roll-storing-rootack-03 | WG adoption to be called |
| RNFD: Fast border router crash detection in RPL<br>draft-ietf-roll-rnfd-00 | New Work adopted by the WG, review needed |

# Milestones: proposed changes

## Milestones

| Date | Milestone | Associated documents |
|---|---|---|
| Nov 2023 | Initial submission of Fast Border Router Crash Detection in RPL to the IESG | |
| Nov 2023 | Recharter WG or close | |
| Nov 2023 | Initial submission of a proposal to augment DIS flags and options to the IESG | draft-ietf-roll-dis-modifications |
| Nov 2023 | Initial submission of a proposal for Source-Route Multicast for RPL to the IESG | draft-ietf-roll-ccast |
| Nov 2023 | Initial submission of a YANG model for MPL to the IESG | draft-ietf-roll-mpl-yang |
| Jun 2023 | Initial submission of Capabilities for RPL to the IESG | draft-ietf-roll-capabilities |
| Nov 2022 | Initial submission of Mode of Operation extension for RPL to the IESG | draft-ietf-roll-mopex |
| Sep 2022 | Initial submission of Controlling Secure Network Enrollment in RPL networks draft to the IESG | draft-ietf-roll-enrollment-priority |
| May 2022 | Initial submission of a root initiated routing state in RPL to the IESG | draft-ietf-roll-dao-projection |

## Done milestones

| Date | Milestone | Associated documents |
|---|---|---|
| Done | Initial submission to the IESG of mechanism to turn on RFC8138 compression feature within a RPL network | draft-ietf-roll-turnon-rfc8138 |
| Done | Initial submission of Common Ancestor Objective Functions and Parent Set DAG Metric Container Extension to the IESG | draft-ietf-roll-nsa-extension |
| Done | Initial submission of routing for RPL Leaves draft to the IESG | draft-ietf-roll-unaware-leaves |
| Done | Initial submission of a reactive P2P route discovery mechanism based on AODV-RPL protocol to the IESG | draft-ietf-roll-aodv-rpl |
| Done | Initial Submission of a proposal with uses cases for RPI, RH3 and IPv6-in-IPv6 encapsulation to the IESG | draft-ietf-roll-useofrplinfo |
| Done | Initial submission of a solution to the problems due to the use of No-Path DAO Messages to the IESG | draft-ietf-roll-efficient-npdao |

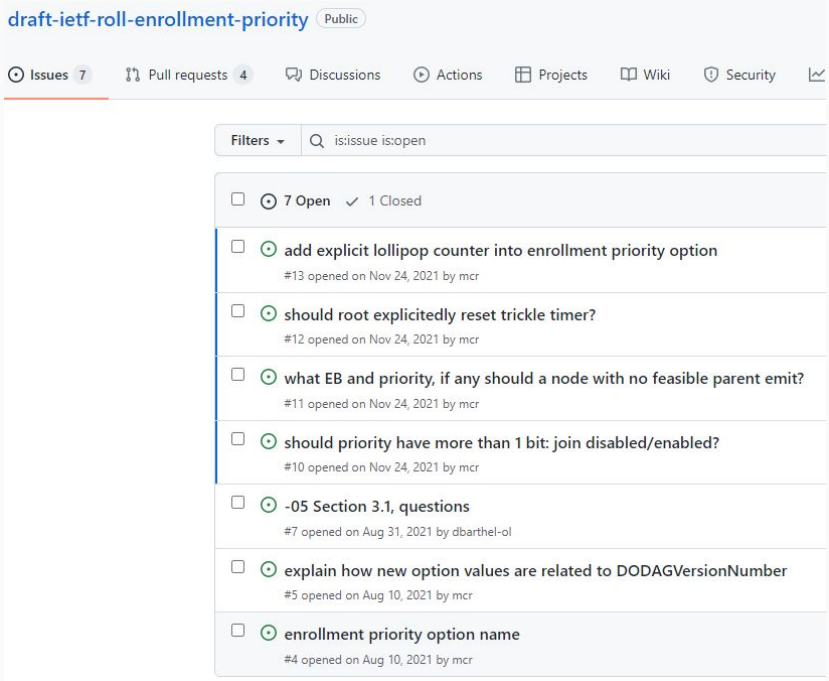
# State of Active Internet-Drafts

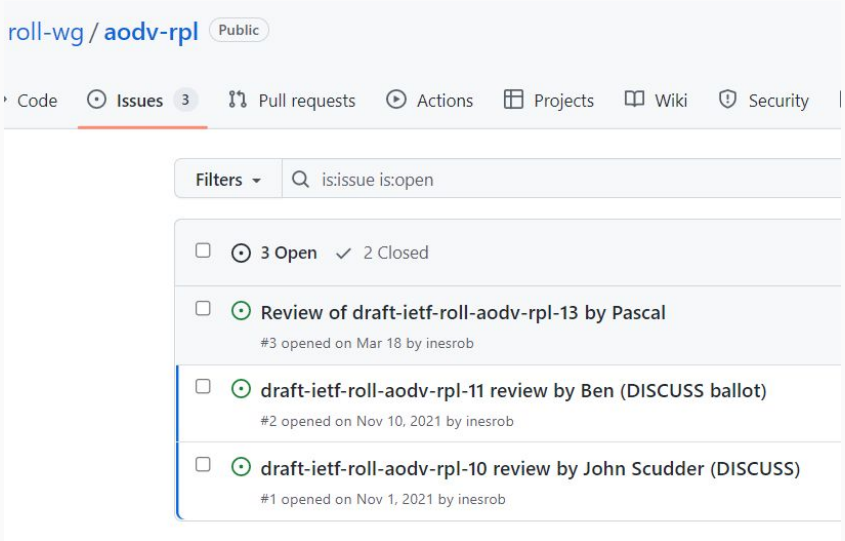
| | |
|---|---|
| Common Ancestor Objective Function and Parent Set DAG Metric Container Extension draft-ietf-roll-nsa-extension-10 | AD evaluation, revised I-D needed |
| Supporting Asymmetric Links in Low Power Networks: AODV-RPL draft-ietf-roll-aodv-rpl-13 | Back to the WG |
| Root initiated routing state in RPL draft-ietf-roll-dao-projection-26 | Discussed today, In WGLC |
| Controlling Secure Network Enrollment in RPL Networks draft-ietf-roll-enrollment-priority-06 | Addressing open issues |
| Mode of Operation extension draft-ietf-roll-mopex-04 | waiting for attention (expired Nov 2021) |
| RPL Capabilities draft-ietf-roll-capabilities-09 | waiting for attention (expired Nov 2021) |
| RPL Storing Root-ACK draft-jadhav-roll-storing-rootack-03 | WG adoption to be called |
| RNFD: Fast border router crash detection in RPL draft-ietf-roll-rnfd-00 | New Work adopted by the WG, review needed |

# Inactive **WG Internet-Drafts**

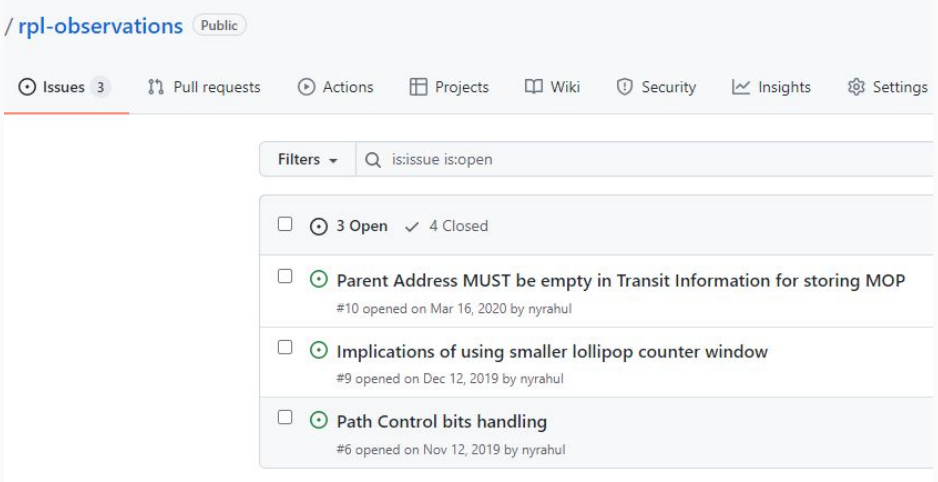
| Draft | Status |
|---|---|
| **RPL DIS modifications**<br>**draft-ietf-roll-dis-modifications** | Expired, waiting for attention |
| **Draft-ietf-roll-mpl-yang-02** | Long expired, dormant |
| **Draft-ietf-roll-bier-ccast-01** | Long expired, dormant |

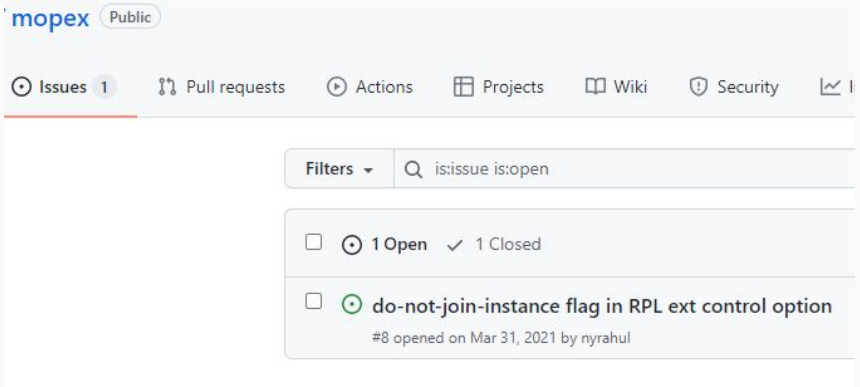
# Open Tickets



# Open Tickets



# Joint meeting with MANET and BABEL to discuss about multicast

| | | | | |
|---|---|---|---|---|
| **Friday, July 29, 2022** | | | | |
| 12:30-14:00 | Liberty Ballroom Foyer & Independence Foyer | | | Continental Breakfast |
| 12:30-17:00 | Liberty Ballroom Foyer | | | B IETF Registration |
| **14:00-16:00** | **Friday Session I** | | | |
| | M Freedom E/F | art | httpapi | Building Blocks for HTTP APIs |
| | B Liberty C | ops | mops | Media OPerationS |
| | M Independence A/B | ops | opsawg | Operations and Management Area Working Group<br>Combined OpsAWG/OpsAREA |
| | B Liberty B | rtg | lsr | Link State Routing |
| | M Freedom G | rtg | manet | Mobile Ad-hoc Networks<br>Joint MANET/BABEL/ROLL |
| | M Independence C | sec | openpgp | Open Specification for Pretty Good Privacy |
| | M Philadelphia North | tsv | tcpm | TCP Maintenance and Minor Extensions |
| 16:00-16:30 | Liberty Ballroom Foyer | | | B Beverage and Snack Break |

# Root initiated routing state in RPL

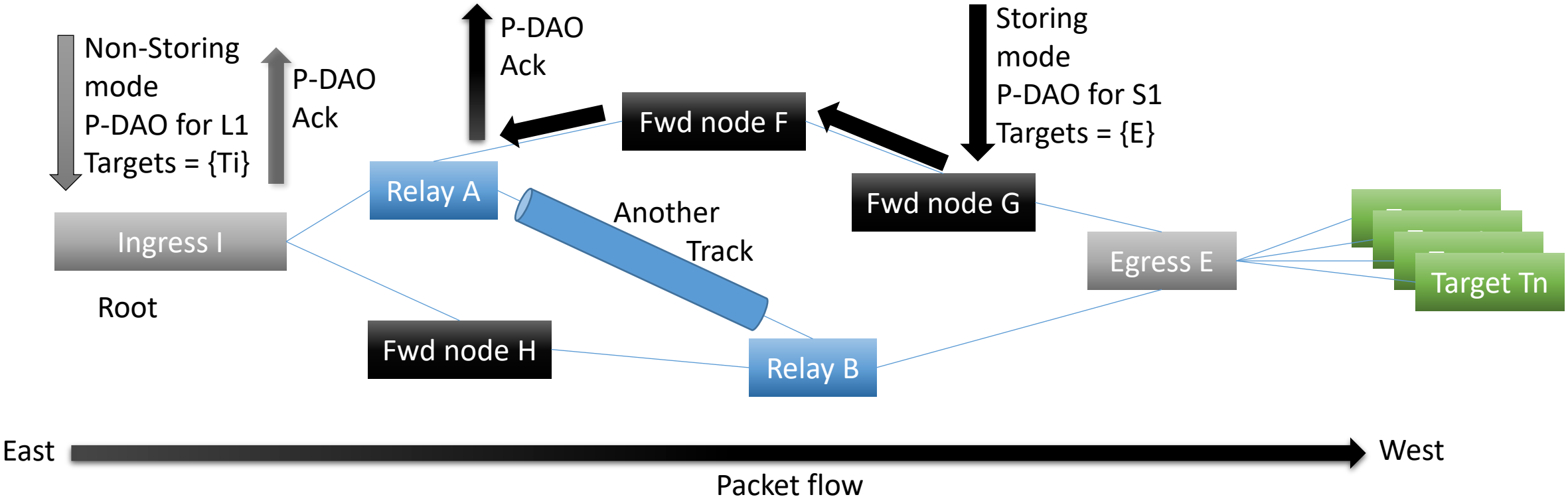
draft-ietf-roll-dao-projection

Pascal Thubert, Rahul Arvind Jadhav, Michael Richardson

IETF 114

Presenter: Pascal Thubert, remote.

# The RPL Track: A DODAG rooted at Ingress




Targets {Tx }

Legs L1 = I->A->E to {Ti} , L2 = I->B->E to {Ti} , L3 = I->A->B->E to {Ti}

Segments S1 = A=>F=>G to E , S2 = I=>H to B

SubTracks Any Set ⊂ {L1, L2, L3} but { }

# Status of the draft

-> 23: Li's review, first round with questions left opened

Clarifications

Introducing P-DAO ACK

Introducing the bidirectional flag in Sibling Info Option (SIO)

-> 24: More of Li's review, treated as GitHub issues

Allows more than one target options, will reach 1st + undefined subset.

Use of the bidirectional flag in Sibling Info Option (SIO) / what if dup

Michael's edits on Amends and Extends. Michael becomes co-author

-> 25: Rephrasing terminology on Legs and SubTracks

Legs are loose hop sequences from Track Ingress to Egress

SubTracks (of a Track) are collections of Legs of the Track

# Status of the draft (cont.)

-> 26 Remous-Aris' review, intense but mostly cleanup

-> 27 Dominique's review

- Lacking text about SIO in RPL multicast DAO
- Used to discover relaying neighbor for 2-hops P2P
- Also this AMENDS RFC 6550 section 9.10
- 2-hops via a common Sibling is loop less
- A Cisco related IPR to be declared

# Status of the draft (cont.)

-> 27 Dominique's review: discussion on Loop avoidance

- Need a strict precedence (A uses B => B cannot use A)
- Missing clear order of both precedence and preference
- Proposed when forwarding along a Track :

  direct 1 hop > Via common neighbor > Segment > Track > drop
- Note: fwd along Segment is only direct 1 hop

  Allows Via common neighbor? would respect the precedence

# Next

- Publication request?

# IPv6 Neighbor Discovery Multicast Address Listener Registration

draft-ietf-6lo-multicast-registration

Pascal Thubert

IETF 114

Remote

# 6LoWPAN ND (IPv6 Stateful Address Autoconfiguration)

- RFC 6775 (original 6LoWPAN ND)
  - Defines ARO for registration and DAD operations for stateful AAC
- RFC 8505 (extended 6LoWPAN ND)
  - Extends ARO, updates the registration procedure
  - Allows registering to network services inc. proxy
- RFC 8928 (Address Protection for ND)
  - Secures ownership and enables SAVI
- RFC 8929 (Backbone Router – proxy ND)
  - Defines a proxy ND operation. Updates EDAR to transport ND options such as SLLAO.
- draft-thubert-6lo-unicast-lookup (Unicast Address lookup on backbone)
  - Allows the 6LBR to respond to lookups and saves broadcasts
- draft-ietf-6lo-multicast-registration (Anycast and Multicast Address Registration)
  - Registers anycast and multicast addresses (in addition to unicast per RFC 8505)

# draft-ietf-6lo-multicast-registration

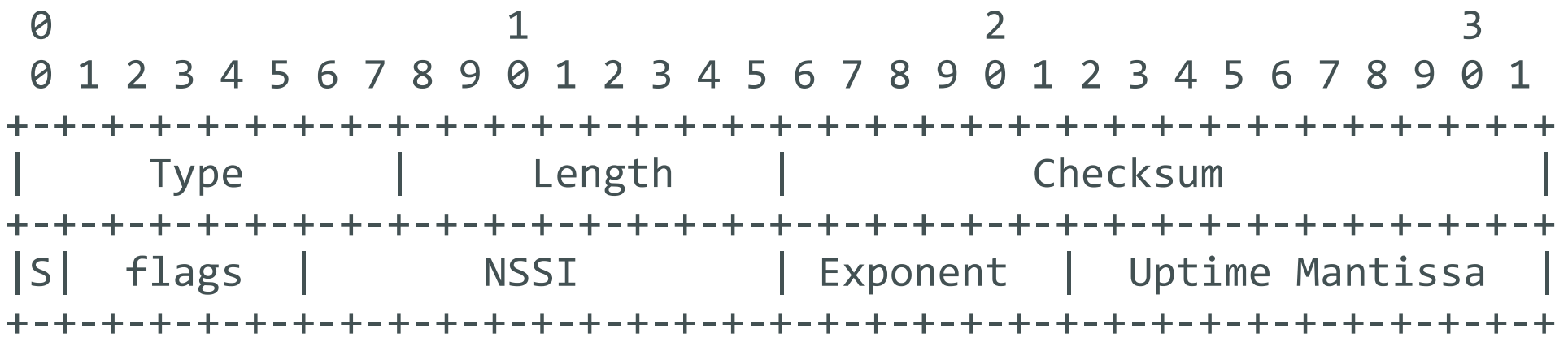
- Generated as a response to a request from Wi-Sun alliance
  - Remove the need for MLD, and its reactive broadcast REPORT polling
- Extends RFC 8505
  - New flags in the EARO to signal anycast and multicast
  - 6LN operation virtually unmodified, just setting the flags
  - New 6LR behavior that accepts multiple registration with different ROVR
- Extends RFC 9010 (RPL Unaware Leaves)
  - To inject the anycast and multicast addresses in RPL, with new flags
- Extends RFC 6550
  - New MOP for Non-Storing Multicast (MOP 5?), new DAO / RTO flags
  - New anycast support also in Storing Mode Multicast (MOP 3)

# Changes in draft-ietf-6lo-multicast-registration since IETF 113

- From 04 to 07
- Clarification as a push alternate to MLD
- Clarification that TID-based freshness assertion is not done
- New ARO Status to indicate a "Registration Refresh Request" (see Table 7)
  - In NA messages
  - sent to a unicast or a multicast link-scope address (e.g., all nodes)
  - 6LNs requested to reregister all previously registered addresses to sender
- New Node Uptime Option to discover a reboot (next slide)
- IANA revisited

# New Node Uptime Option

This specification introduces a new option that characterizes the uptime of the sender. The option may be used by routers in RA messages and by any node in NA, NA, and RS messages. It is used by the receiver to infer whether some state synchronization might be lost, e.g., due to reboot.



# New Non-Storing Multicast Mode of Operation

- MOP (?5) => manage collision with AODV-RPL
- 6LRs with listeners register the multicast  and anycast address to the Root
  - New flags in DAO messages echo those in EARO
- Packets reach up to the Root as if unicast within the DODAG
- The Root performs Ingress Replication for multicast
  - to all the 6LRs that registered
  - Same encapsulation as external routes (RUL), SRH to the 6LR
  - 6LR decapsulates and distributes to all 6LNs that subscribed (new term)
- The Root performs Destination Selection for Anycast
  - Passes the anycast packet to only one 6LR

# New RPL Anycast Operation

- For MOP 3 and the new MOP (?5), also MOP 1 for backward compatibility
- Indistinguishable from anycast, applies to both addresses and prefixes
- TID is irrelevant since multiple nodes can originate an advertisement
  - Multihomed mobile target should be advertised as unicast
- RPL advertises multiple paths as for multicast
  - A tree in Storing Mode, multiple paths at the Root in NS-mode
- But a packet follows only one of those paths
- No instruction for flow stickiness and load balancing given
- In case of collision (flag set / not set) consider all DAOs as anycast

# Backward compatibility and deployment considerations

- Discusses interaction with other multicast protocols
  - e.g., Root performing MPL flooding instead of RPL Ingress Replication
- Allows single DODAG with MOP 1 for brown field
  - Support of multicast / anycast must be signaled otherwise (config, mgt)
  - 6LRs that support this spec signal so with 6CIO
- Incremental operation in DODAG with MOP 3
  - MOP 3 (Storing Mode with Multicast) extended to accepted anycast
  - Recognize legacy DAO multicast from address FF::/8 assume M flag set
  - Anycast / unicast collision is processed as anycast for all

# Next steps

- Missing items?
- Important new features for ROLL in this spec
- Got Reviews from ROLL participants => Common WGLC?

# Open Floor

**AOB?**

# Thank you very much for your attention