



Monday 11/18 - Tuesday 11/19

# IETF 106 ROLL

## Routing over Low-Power And Lossy Networks

### **Chairs:**

Dominique Barthel

Ines Robles

Peter van der Stok

### **Secretary:**

Michael Richardson



# Note Well

This is a reminder of IETF policies in effect on various topics such as patents or code of conduct. It is only meant to point you in the right direction. Exceptions may apply. The IETF's patent policy and the definition of an IETF "contribution" and "participation" are set forth in BCP 79; please read it carefully.

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BCP 9 (Internet Standards Process)

BCP 25 (Working Group processes)

BCP 25 (Anti-Harassment Procedures)

BCP 54 (Code of Conduct)

BCP 78 (Copyright)

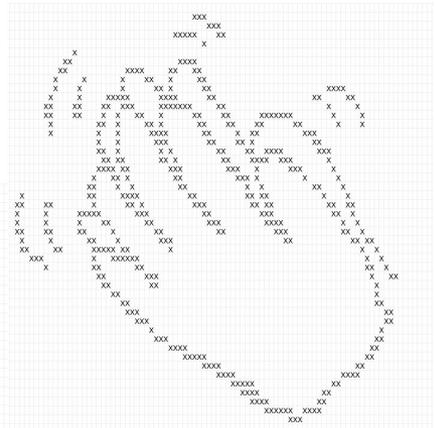
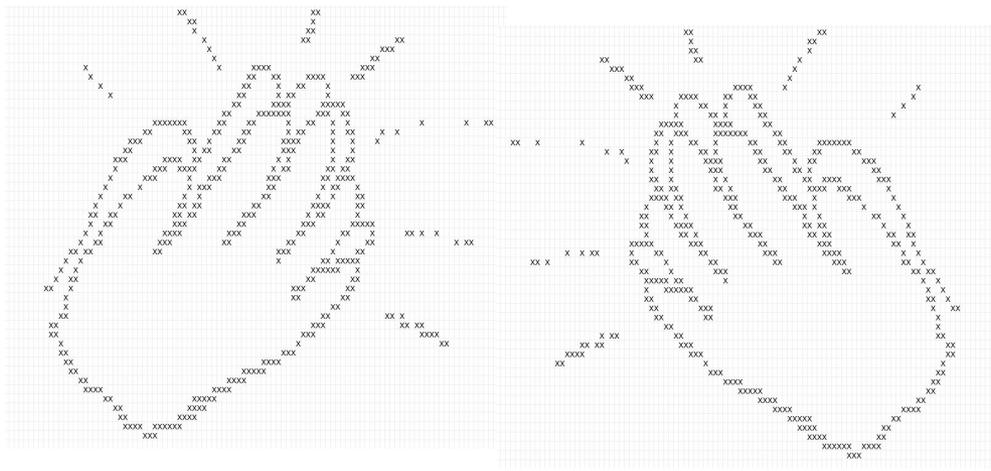
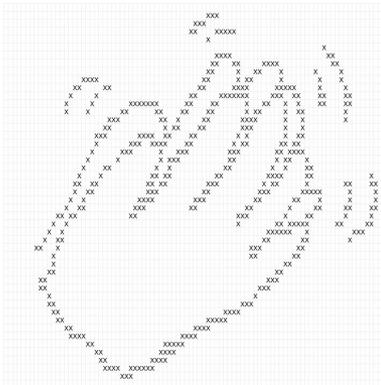
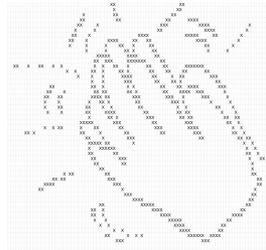
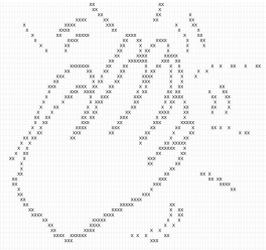
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# MILLION THANKS TO PETER!!!!

## WELCOME DOMINIQUE :-)



# Meeting Materials

- Session: Monday 11/18 and Tuesday 11/19
- Remote Participation
  - Jabber Room: `xmpp:roll@jabber.ietf.org?join`
  - Meetecho: <https://www.meetecho.com/ietf106/roll/>
  - Etherpad: <https://etherpad.ietf.org/p/notes-ietf-106-roll>
  - Slides: <https://datatracker.ietf.org/meeting/106/session/roll>
- Jabber Scribe: **Please volunteer, thank you :)**
- Minutes taker: **Please volunteer, thank you :)**
- **Please sign blue sheets :-)**

# Agenda

Monday Nov 18, 2019 15:50-17:50 Singapore time (UTC+8)

Topic	Time	Presenter - On site/Remote
Introduction - WG Status	16 min	Dominique/Ines
draft-ietf-roll-rpl-observations-02	40 min	Rahul
draft-ietf-roll-dao-projection	25 mn	Pascal
draft-ietf-roll-mopex-cap-01	35 mn	Rahul
Wrap up	4 min	Ines

Tuesday Nov 19, 2019 10:00-12:00 Singapore time (UTC+8)

Topic	Time	Presenter - On site/Remotely
Introduction	5 mn	Dominique/Ines
draft-ietf-roll-unaware-leaves	30 mn	Pascal/Michael
draft-ietf-roll-useofrplinfo	10 mn	Ines/Pascal/Michael
draft-thubert-roll-eliding-dio-information	20 mn	Pascal/Dominique
draft-ietf-roll-efficient-npdao-17	10 mn	Rahul/Pascal
draft-thubert-roll-turnon-rfc8138	15 mn	Pascal
Open Floor	30 mn	Everyone

# Milestones

Date	↕ Milestone
Dec 2020	Initial submission of Mode of Operation extension and Capabilities for RPL to the IESG <a href="#">draft-ietf-roll-mopex-cap</a>
Oct 2020	Recharter WG or close
Jul 2020	Initial submission of a YANG model for MPL to the IESG <a href="#">draft-ietf-roll-mpl-yang</a>
Jun 2020	Initial submission of Enabling secure network enrollment in RPL networks draft to the IESG <a href="#">draft-ietf-roll-enrollment-priority</a>
Jun 2020	Initial submission of a proposal to augment DIS flags and options to the IESG <a href="#">draft-ietf-roll-dis-modifications</a>
Jun 2020	Initial submission of a proposal for Source-Route Multicast for RPL to the IESG <a href="#">draft-ietf-roll-ccast</a>
Mar 2020	Initial submission of Common Ancestor Objective Functions and Parent Set DAG Metric Container Extension to the IESG <a href="#">draft-ietf-roll-nsa-extension</a>
Mar 2020	Initial submission of a reactive P2P route discovery mechanism based on AODV-RPL protocol to the IESG <a href="#">draft-ietf-roll-aodv-rpl</a>
Dec 2019	Initial submission of routing for RPL Leaves draft to the IESG <a href="#">draft-ietf-roll-unaware-leaves</a>
Dec 2019	Initial submission of a root initiated routing state in RPL to the IESG <a href="#">draft-ietf-roll-dao-projection</a>
Dec 2019	Initial Submission of a proposal with uses cases for RPI, RH3 and IPv6-in-IPv6 encapsulation to the IESG <a href="#">draft-ietf-roll-useofrplinfo</a>
Nov 2019	Initial submission of a solution to the problems due to the use of No-Path DAO Messages to the IESG <a href="#">draft-ietf-roll-efficient-npdo</a>

# State of Active Internet-Drafts

Draft	Status
<b>draft-ietf-roll-aodv-rpl-07</b>	Submitted to IESG for Publication
<b>draft-ietf-roll-dao-projection-09</b>	Discussion today
<b>draft-ietf-roll-useofrplinfo-32</b>	RFC Queue - Updates on changes
<b>draft-ietf-roll-efficient-npdao-17</b>	RFC Queue - - Updates on changes
<b>draft-ietf-roll-rpl-observations-02</b>	Used as model to develop further drafts - Updates on changes
<b>draft-ietf-roll-nsa-extension-05</b>	Ready for WG Last call?
<b>draft-ietf-roll-unaware-leaves-07</b>	Discussion today
<b>draft-ietf-roll-enrollment-priority-00</b>	Looking for reviews - ready for last call?
<b>draft-ietf-roll-mopex-cap-01</b>	Discussion today

# State of Active Internet-Drafts

<b>Draft</b>	<b>Status</b>
<b>Draft-ietf-roll-dis-modifications-00 (Expired)</b>	To be continued
<b>Draft-ietf-roll-mpi-yang-02 (Expired)</b>	To be continued
<b>Draft-ietf-roll-bier-ccast-01 (Expired)</b>	To be continued

# Related Internet-Drafts

<b>Draft</b>	<b>Status</b>
<b>draft-thubert-roll-eliding-dio-information-02</b>	Discussion today :-)
<b>draft-thubert-roll-turnon-rfc8138-03</b>	

# Open tickets

<https://github.com/roll-wg/dao-projection/issues>

5 Open ✓ 1 Closed Author ▾ Labels ▾ Projects ▾ Milestones ▾

- ⓘ **Issues to address in dao projection draft (lifetime, MOP, retransmissions, route cleanup)**  
#7 opened 2 minutes ago by inesrob
- ⓘ **Security considerations for dao projection**  
#6 opened 2 minutes ago by inesrob
- ⓘ **should DAO projection have a new MOP?**  
#5 opened 18 days ago by mcr
- ⓘ **Information Missing in VIO abbreviation**  
#3 opened 20 days ago by rabinsahoo
- ⓘ **cleanup handling of common network segment for two P-DAO**  
#2 opened on Dec 16, 2018 by nyrahul

ⓘ 4 Open ✓ 0 Closed Author ▾ Labels ▾

- ⓘ **difference in Configuration Option, MOP, Capability** needs draft-update  
#4 opened on Aug 30 by nyrahul
- ⓘ **Add scenario for capabilities exchange** needs draft-update  
#3 opened on Aug 25 by nyrahul
- ⓘ **Change MOPex calculation** needs draft-update  
#2 opened on Aug 25 by nyrahul
- ⓘ **Is Caps optional to be supported by nodes?** needs draft-update  
#1 opened on Aug 25 by nyrahul

ⓘ 2 Open ✓ 3 Closed Author ▾

- ⓘ **Path Control bits handling**  
#6 opened 4 days ago by nyrahul
- ⓘ **DIS multicast handling issue** IETF104  
#2 opened on Mar 25 by nyrahul

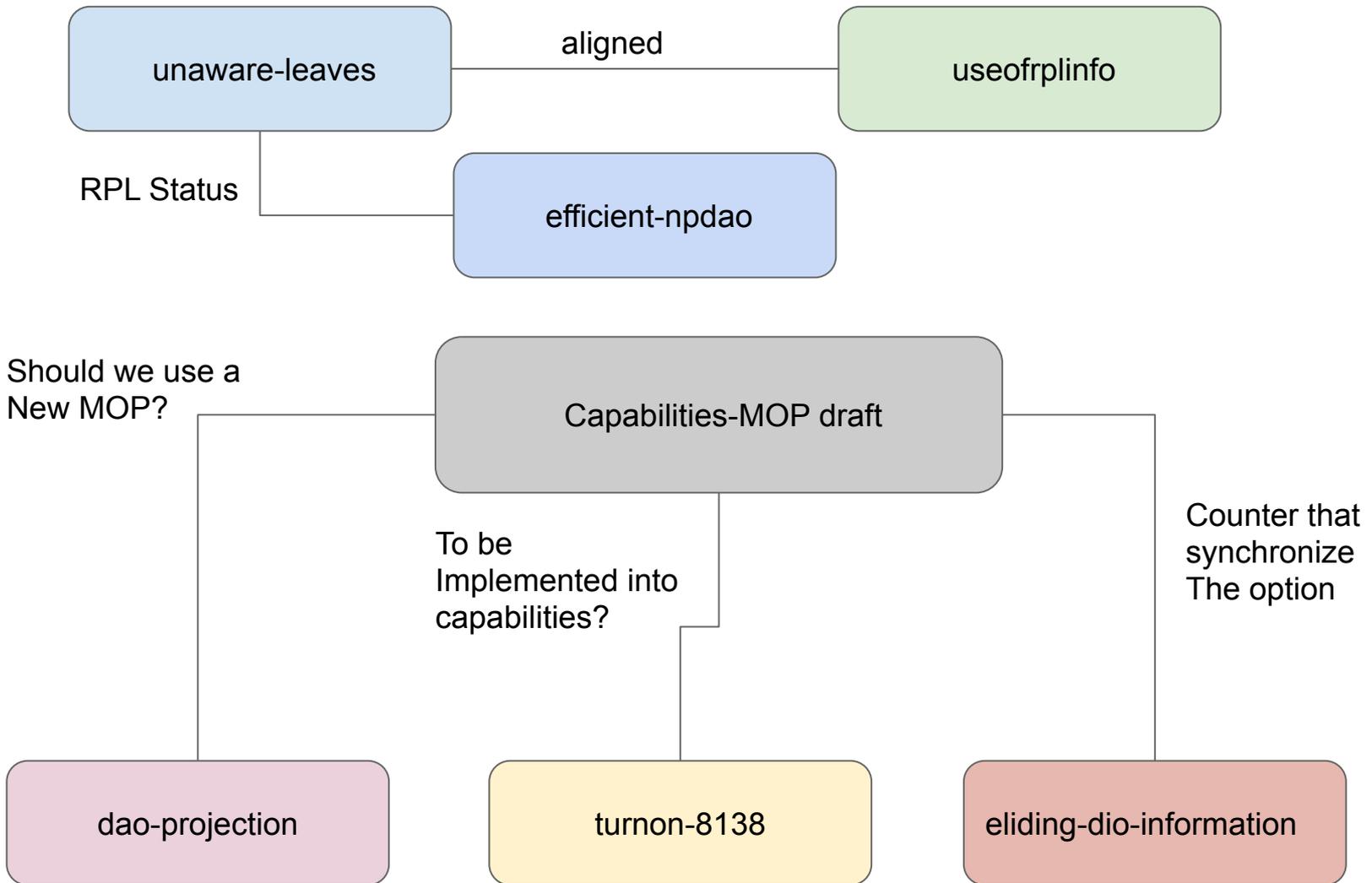
<https://github.com/roll-wg/rpl-observations/issues>

<https://github.com/roll-wg/MOPex-capabilities/issues>

# Open tickets

Ticket	Summary	Component
#179	Security considerations for dao projection	dao-projection
#180	13 issues to address in dao projection draft (lifetime, MOP, retransmissions, route cleanup)	dao-projection
#187	New version of RFC6550 - Topics to include	rpl
#188	Should 6LBR be included into the DODAG root?	rpl
#194	Clarification of AODV-RPL in scope of RPL	aodv-rpl
#195	AODV-RPL should be Experimental?	aodv-rpl
#196	AODV-RPL is Replacing rfc6997?	aodv-rpl
#197	AODV-RPL link checks - definition needed	aodv-rpl
#198	Nits needed to be addressed	aodv-rpl

<https://trac.ietf.org/trac/roll/report/2>



Source: [https://mailarchive.ietf.org/arch/msg/roll/2oVc-fvaO1\\_XhjbSPiQhQqPG30I](https://mailarchive.ietf.org/arch/msg/roll/2oVc-fvaO1_XhjbSPiQhQqPG30I)

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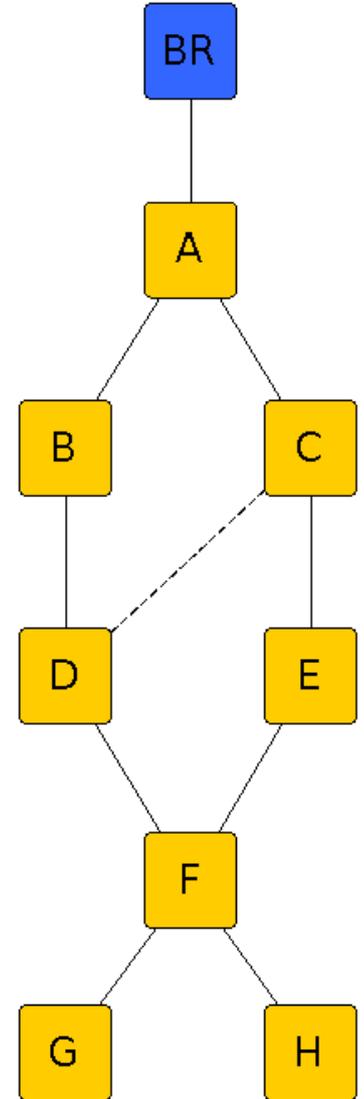
draft-ietf-roll-rpl-observations  
- ROLL Working Group  
IETF 106, Singapore

# What is this about?

- Aim is to stabilize-fix-clarify RFC 6550
- RFC 6550 observations over period of time
  - Implementation observations
  - Clarify unclear/complex mechanisms in 6550
  - Extracts from mailing list discussions
- Draft keeps record of all the observations

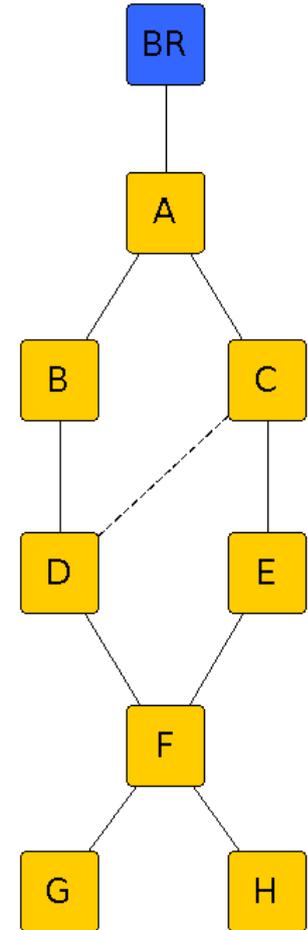
# Parent Switching

- DTSN
  - Destination Advertisement Trigger Sequence Number
  - Sent in DIO by a parent to trigger DAO from child nodes
- Scenario: Node D switches to parent C
- Very easy to handle in non-storing MOP
  - Only root can increment DTSN



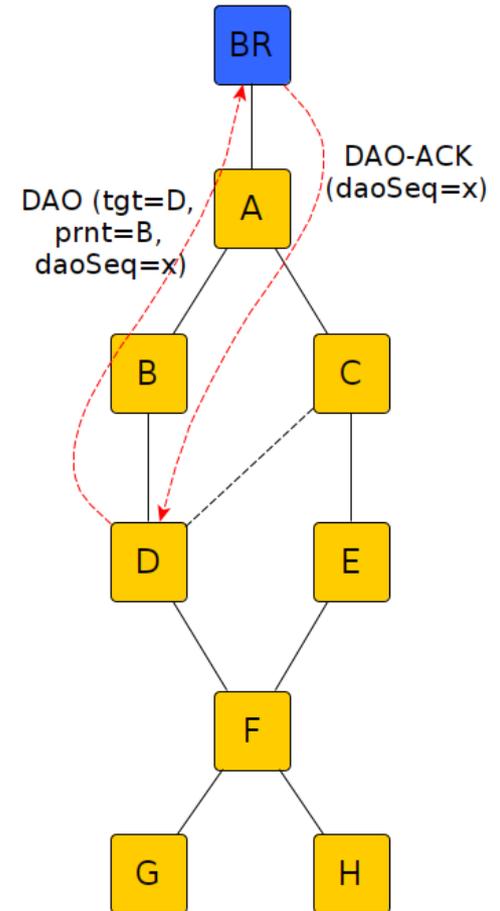
# Parent Switching – Storing MOP

- Storing MOP, not so easy!
- Two strategies possible
  - Increment DTSN
    - Node D increment DTSN and reset DIO trickle
    - Child nodes of D also reset DIO trickle when they see their preferred parent
    - Thus the whole sub-DODAG rooted at D has resetted their trickle timer.
    - Too bad for control overhead
  - Send aggregated DAO on behalf of sub-DODAG
    - Multiple targets with multiple Transit Info options
    - Single DAO may not fit all targets
      - Splitting across DAOs not an easy thing to handle



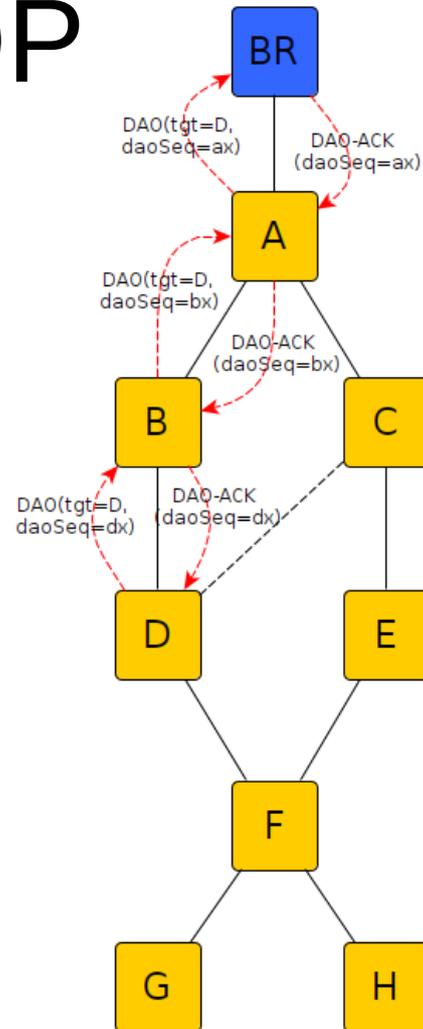
# DAO-ACK handling

- DAO-ACK helps node to ascertain that end to end path is established
  - Indication to start application traffic
- Non-storing MOP
  - DAO sender knows whether root has rcvd the DAO based on DAO-ACK



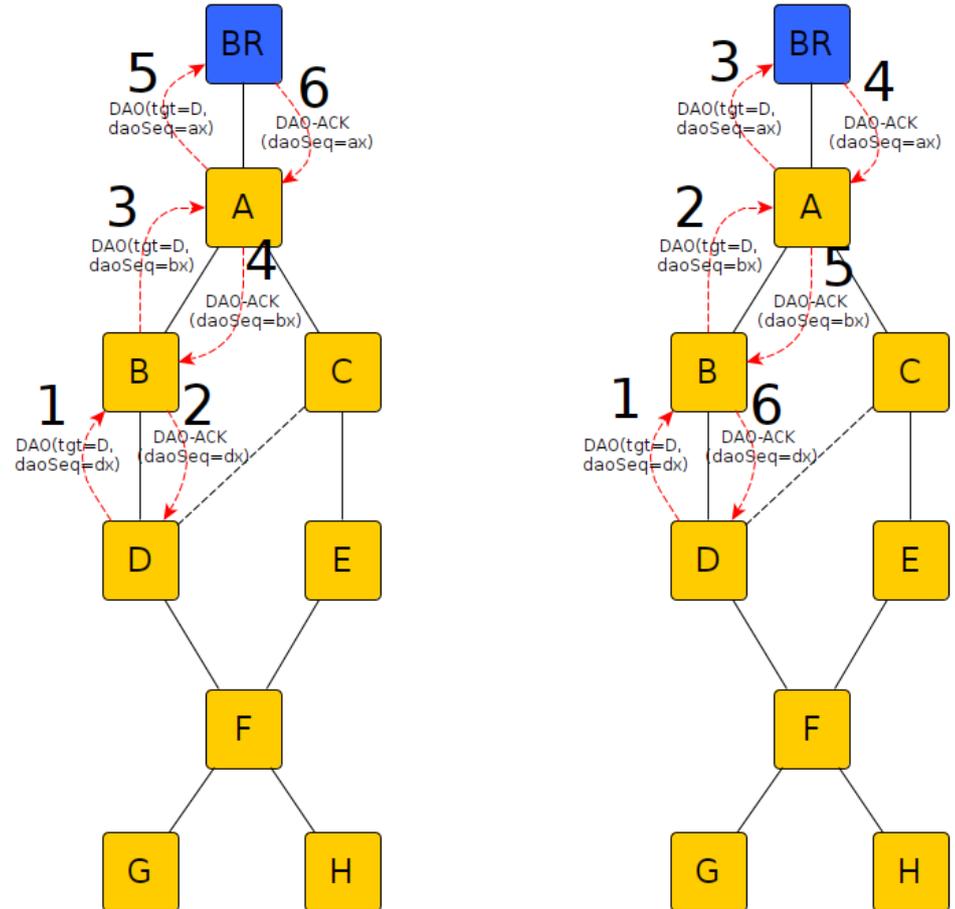
# DAO-ACK, Storing MOP

- DAO-ACK sent hop-by-hop
  - Upstream node sending +ve DAO-ACK accepts responsibility to deliver DAO upstream
- Issue
  - Node B responds with DAO-ACK instantly
    - DAO-ACK cannot be used as an indication to start app-traffic
  - What happens if DAO-ACK with -ve status is responded somewhere up?
    - How to inform downstream peer that DAO-ACK failed somewhere upstream?



# Another DAO-ACK interpretation

- Respond with DAO-ACK only when the peer upstream has ACKed
- Works well for app-traffic start indication
- Problems
  - Routing table needs additional state, thus costly
  - Implementations using different schemes can't interoperate

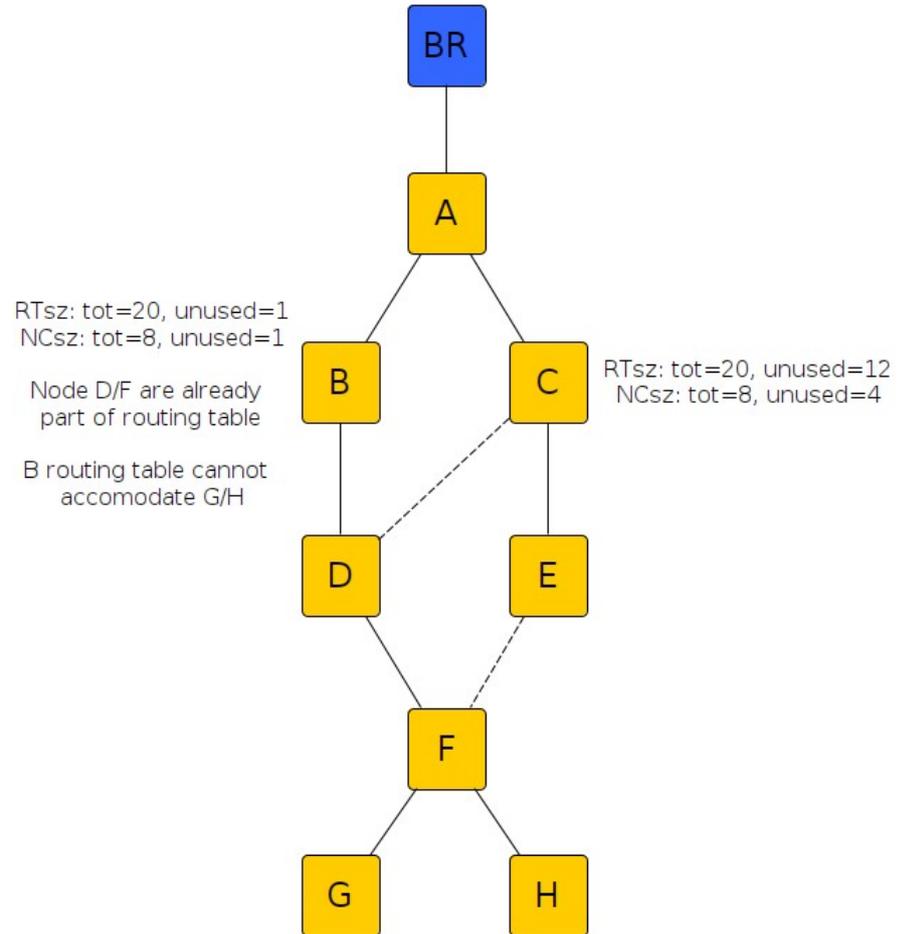


# Design goals for DAO-ACK

- Status=0 as an indication that path is established
- No explicit state should be required on intermediate 6LRs for DAO-ACKing
- DAO-ACK aggregation

# Signaling Resource Constraints

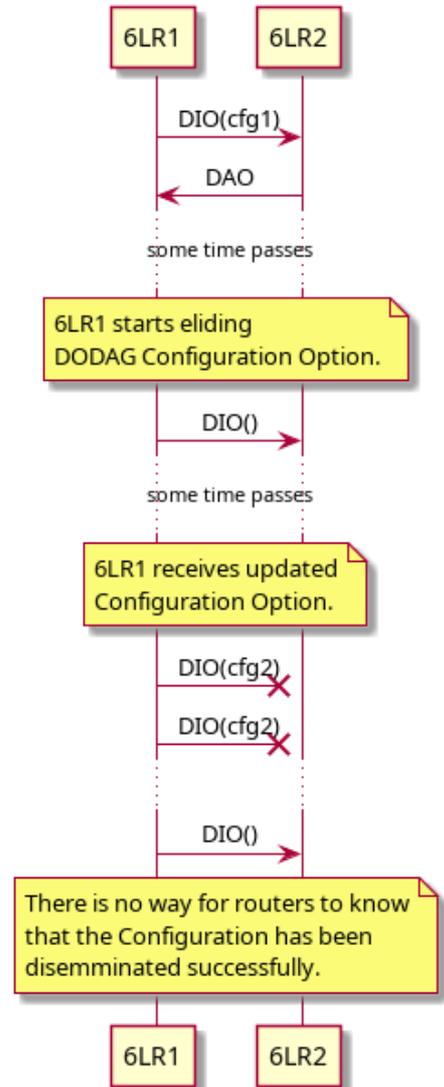
- Handling resource constraints at multihop
- Need new OCPs to take into account
  - Routing table size
  - Neighbor cache size
- Enrollment priority
  - Step in that direction
  - But needs to be usable at multiple hops





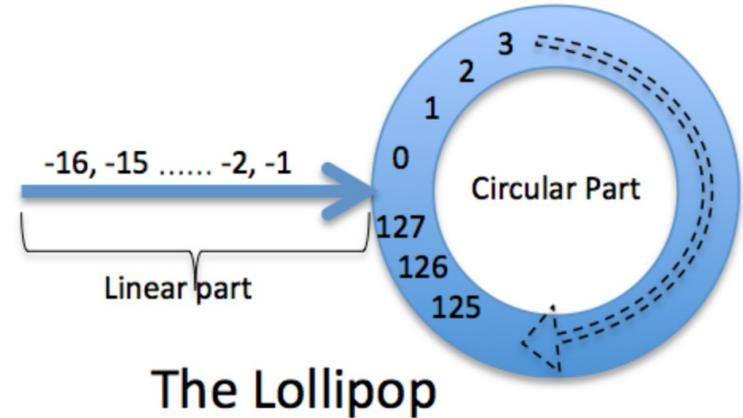
# Eliding Options

- RFC 6550 allows eliding config option
  - But does not give details
  - In its current state, eliding may not work under certain conditions
- We need
  - Eliding to work for Config Option and other static options which rarely change
  - Should be extensible for new options in the future



# RPL Persistent state

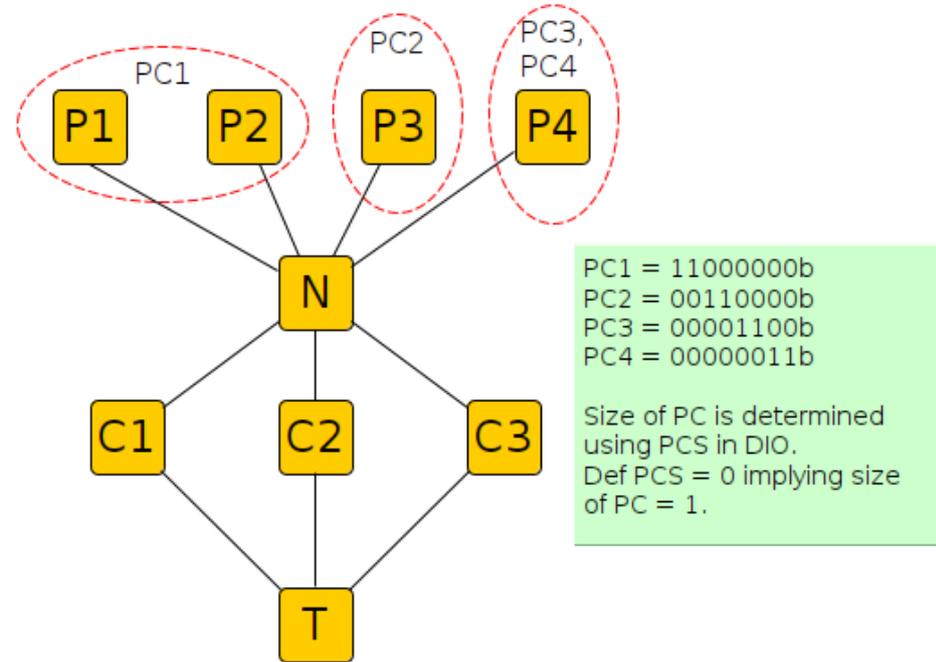
- RPL uses lollipop counters
  - For most of the sequence counters
  - Handling conditions when the node *reboots in linear part* **still requires use of persistent storage**
- Inference
  - Lollipop counters reduce the use of persistent storage in circular part but does not fully eliminate the need for it.



Sequence Win = 16  
(Def RFC6550)

# Path Control bits

- What is it?
  - Enables multiple downwards routes
  - Can advertise pref for paths
- Value of Path Control
  - Provides multi-path routing capability
  - Allows traffic load-balancing within a DODAG



Example from Section 9.9.1

# Path Control Bits

- Not an easy mechanism to implement
  - Impacts Memory and Program size
  - But might be useful in the context of 6tisch/RAW!
- No implementation we know is compliant with the use of Path Control Bits
  - Section 9.9 Point 9 says, “*A node MUST NOT unicast a DAO msg that has no active bits in the Path Control field set*”.
  - By default, even with one parent at-least a single PC bit must be set
    - Default PCS is 0, which means PCS+1 bit in TIO-PC is in use
  - *No implementation handles path-control bits even though 6550 mandates it*

# Miscellaneous

- Mandating support for reception of aggregated targets
- It is possible that DAO-ACK may not be sent even in case the 'K' flag (indicating ACK needed) is set.
  - Why is DAO-ACK sending a SHOULD in 6550 even if K flag is set?
- Multi-DODAG/Multi-Instance
  - Should the routing table be reset when switching from one DODAG to another in the same instance?
  - Best practices when handling multi-instance/multi-DODAG
- Why is Transit Information Option optional?
- Is it better to have an RPL-lite with very specific features?
  - No Path Control
  - Support for handling of aggregated targets

# Overall Status

Point	Status	Remarks
DTSN handling in storing MOP	No update	BCP needed
DAO-ACK	No update	Some work is initiated. Prototype + draft (Rabi?)
Capability & MOPex	draft-ietf-roll-mopex-cap	Draft in-progress
Eliding static info	draft-thubert-roll-eliding-dio-information	Draft in-progress
Miscellaneous	No update	Aggregated Targets handling, TIO vs Target bits
Lollipop Counters	Get WG consensus	Linear part needs to be backed in persistent storage
Resource constraints	No update	

# Other points still uncovered

- Multi-Sink/BR practices
- Multicast Operation
- Partial dependency on ND
  - Prefix Info sent in DIO
  - But Context Table and other global configuration uses ND

# Root initiated routing state in RPL

**draft-ietf-roll-dao-projection**

Pascal Thubert

IETF 106

Singapore

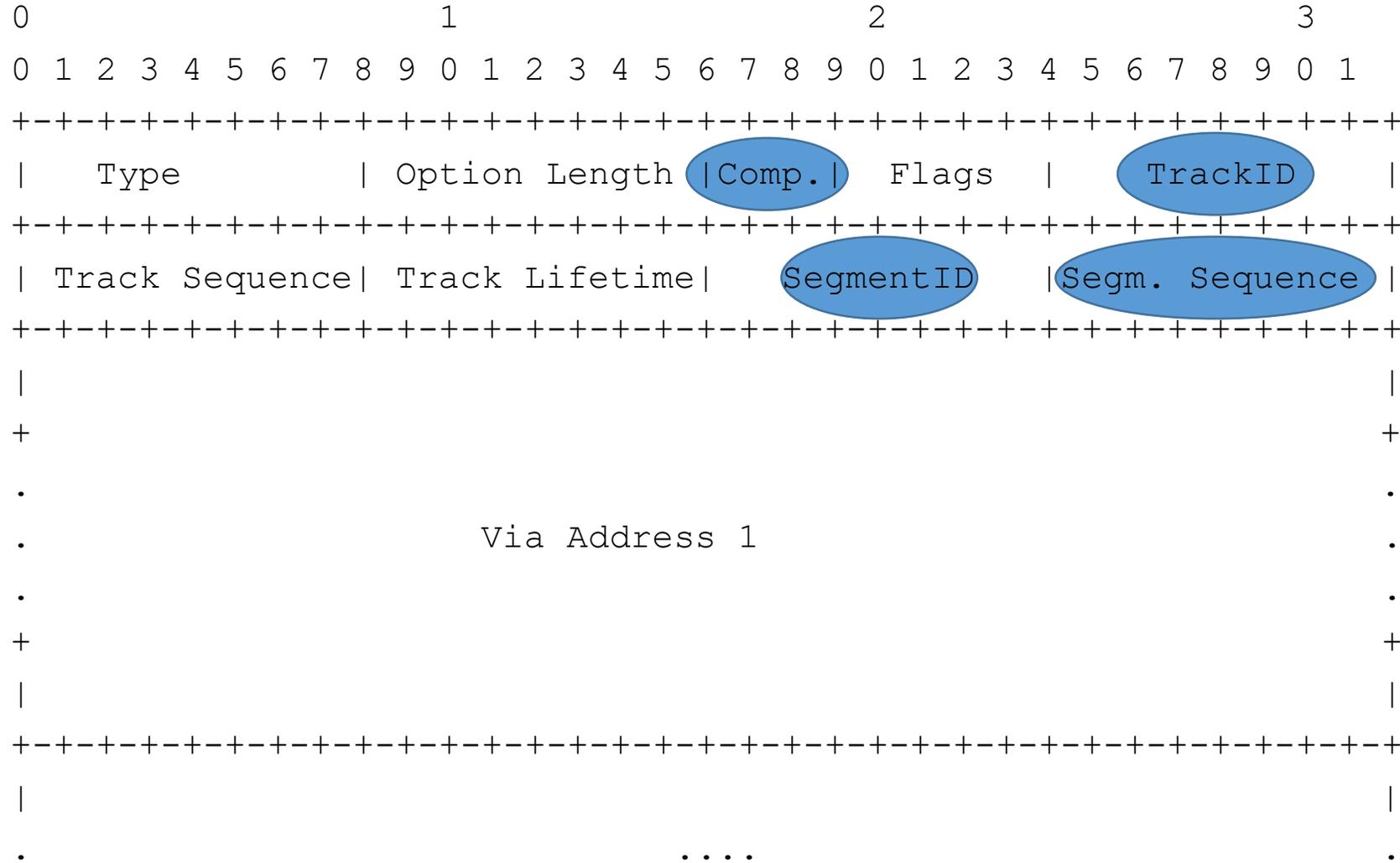
# Changes Highlights (some major!)

- Compressing P-DAO natively
  - Using RFC 8138
- Specified TrackID as a RPL instanceID
  - Enables to signal the flow in the packet  
=> (destination IP + local Instance)
  - Missing segment ID
- Added Sibling information
  - Optional metrics container
  - Sibling Selection out of Scope (need OF-type plug-in)

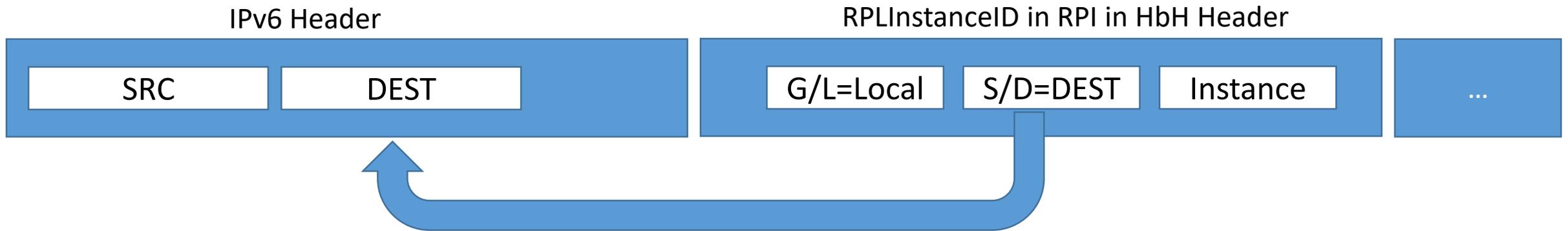
# Changes Highlights (Cont.)

- New Message to query a P-DAO
  - P-DAO request and PDR-ACK
- **Stitching P-DAO segments**
  - Correlated by TrackID
  - Missing stitching operation (e.g. Replication)
- Filled IANA Section
- Need improvements on security section

# Updated Route Projection Options

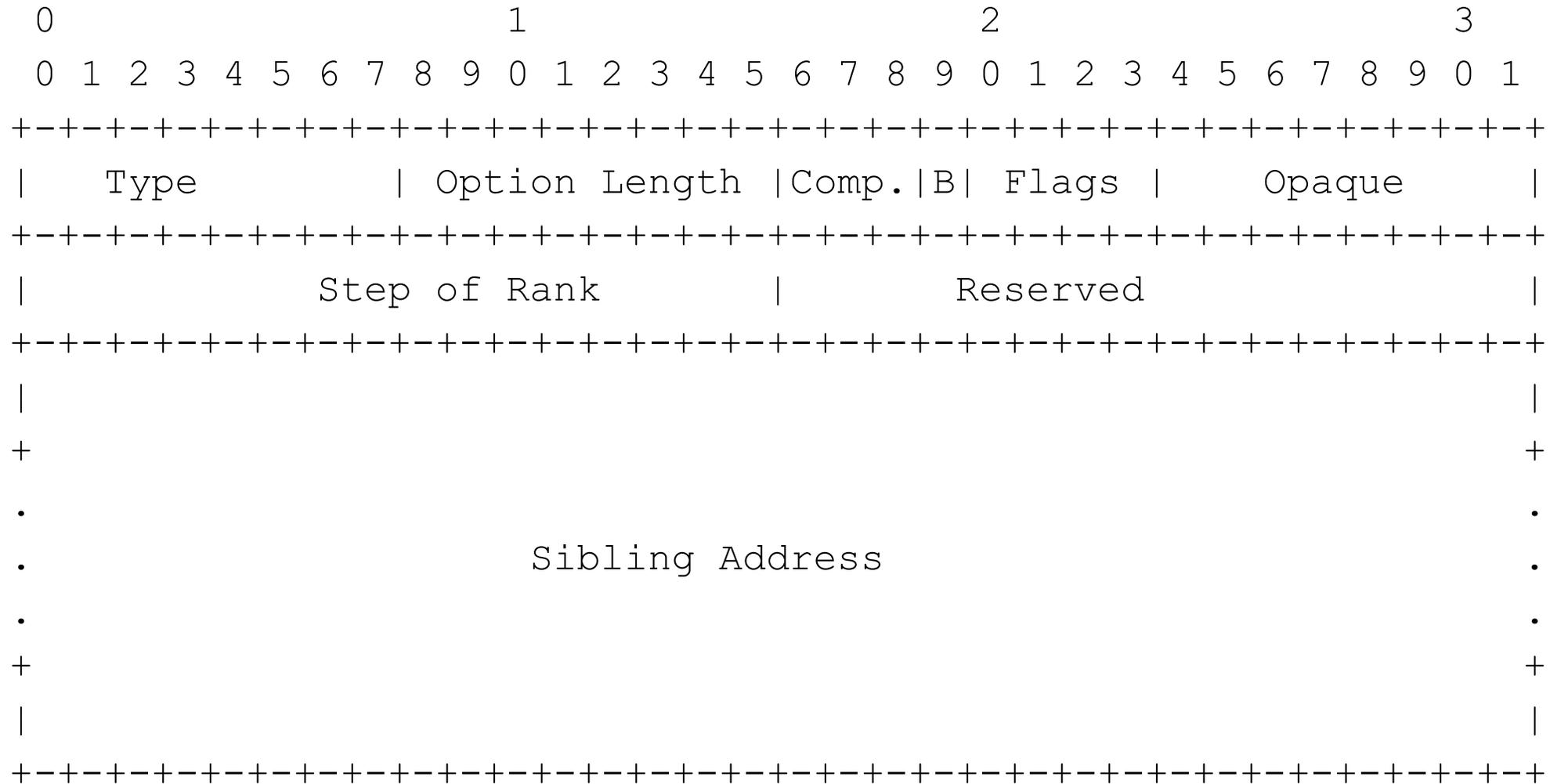


# Signaling the Track in Packet



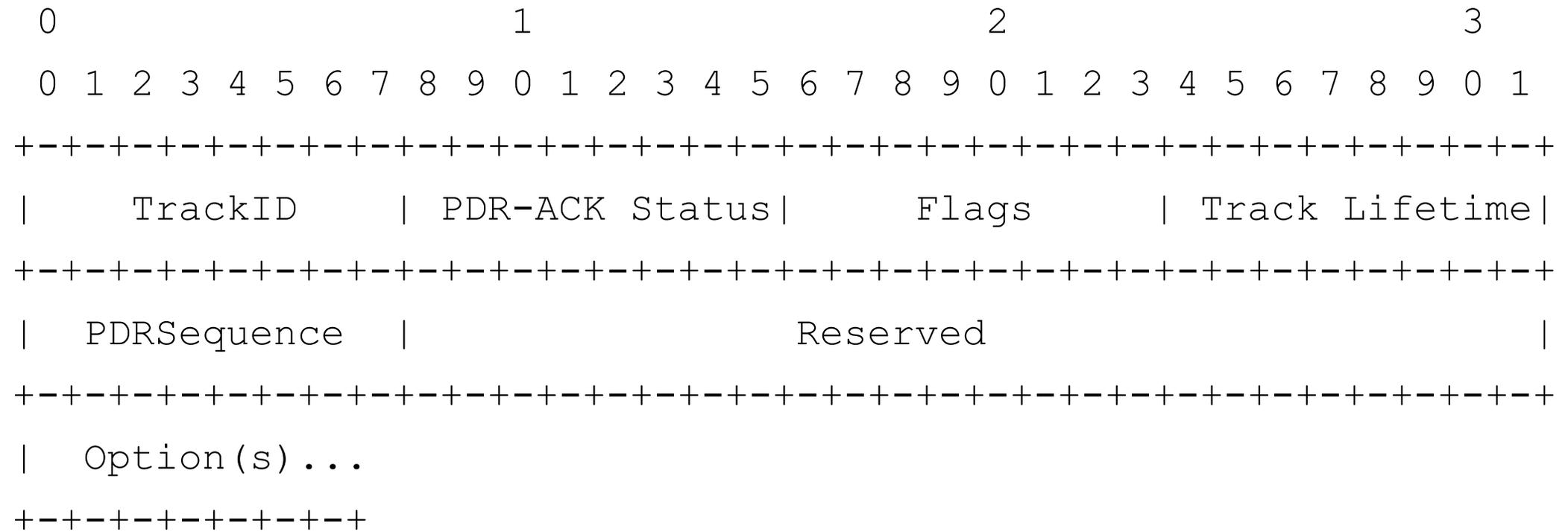
- A Track is a Local Instance of the destination
- Signaled in the packet in the classical RPL fashion

# New Sibling Information option





# New PDR-ACK



# Pending Issues / Missing features

- Security Considerations (Ticket [#179](#))
- How P-DAO messages could be abused by
  - a) rogue nodes
  - b) via replay of messages
  - c) if P-DAO messages may deal with any threats?
- Lifetime, MOP, Retransmissions, Cleanup (Ticket [#180](#))
- Configuration parameters for Local Instance in P-DAO
  - Also P-DAO parameter option in PDAO request

# Next Steps

- Gather feedback on the proposals
- Add missing segment information
- Revamp the formats to optimize
- WGLC around next IETF ?

**draft-ietf-roll-mopex-cap**

- Rahul, Pascal, Michael

**IETF106, Singapore**

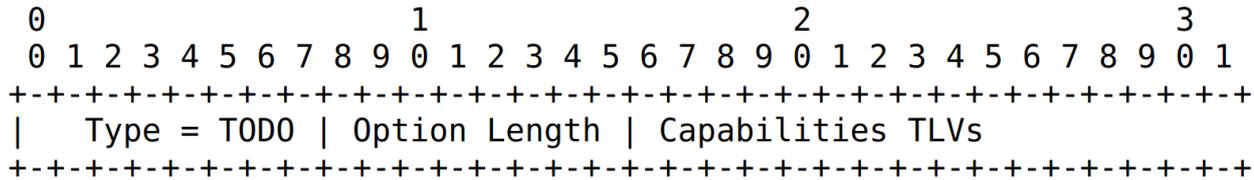
# Capabilities(CAP)

- What is it?
  - RPL nodes could signal their capabilities
- How is it different from MOP & DIO Config Option?
  - MOP & Config Option is strictly root-controlled
  - CAP could be sent by 6LN/6LR/root
  - CAP can emit more rich information
  - CAPs may be more dynamic than MOP/Config

# Design Goals

- Any node could generate it
- An option that could be sent in any message
- Capabilities could change at runtime
- Could be explicitly queried
- CAPs could flow upstream or downstream
- Work with existing Modes of operation

# How it looks?



CAPs are not just bits.  
They can carry associated data optionally.

Figure 2: Capabilities Option

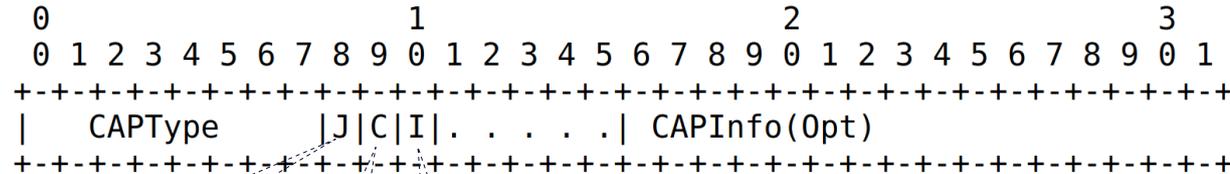


Figure 3: Capabilities TLV

Join as leaf  
if CAP  
not understood

Copy CAP  
Downstream  
if not understood?

CAP Info  
present

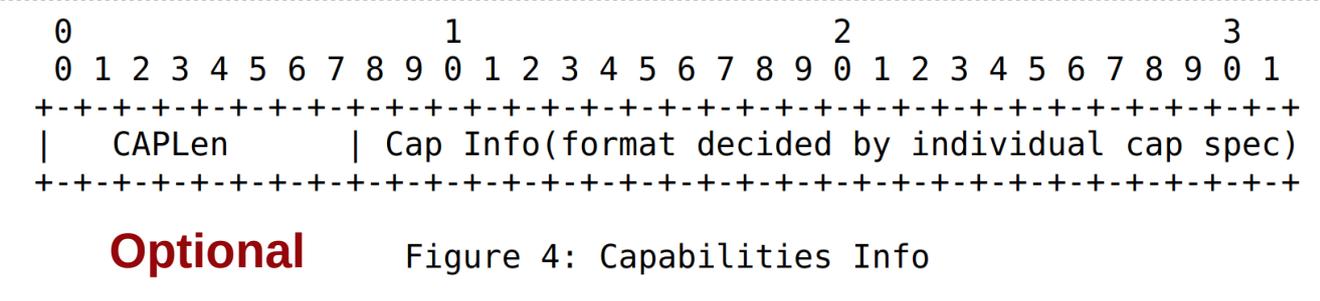


Figure 4: Capabilities Info

# Handling CAP unaware nodes

- MOPex to rescue
- CAPs to be used only with MOPex
- MOP=0-6 has equivalent MOPex=0-6
  - If CAPs are needed use MOPex even for existing modes

# CAPs signalling

- CAPs need to be carried in DIO
  - Since, they could influence parent selection
- It should be possible to query node's capability in the future
  - New <TODO> message to query capability
- CAPs itself are carried as options
  - Thus could be carried in DIO/DAO or the new message

# What can we use it for now?

- Projected routes
  - Root needs to know whether nodes along the projected segments are capable to install projected routes.
- 6LoRH (RFC 8138)
  - Nodes need to signal whether they are 8138 capable
    - Root could use 6LoRH only when all nodes in the network support 8138

# MOPex where we are?

- MOPex value calculation changed
  - Final MOPex is directly carried in the new option
- New logic is,
  - If MOP=7, use MOPex option
  - Discard DIO if MOPex not present
  - MOPex could still carry 0-6 values
    - This could be used to indicate existing MOPs with CAPs

# Two Questions

- MOPex has 24-bits currently
  - Limit 16-bits for MOPex?
    - Anyways CAPs should reduce use of new MOPs
  - Reserve 8 bits for future use
- Split the two topics? MOPex and CAP

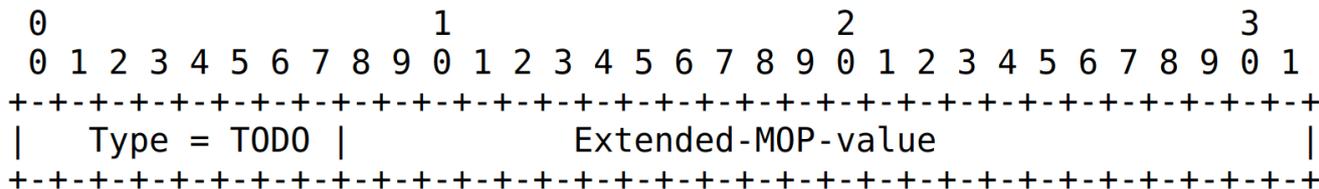


Figure 1: Extended MOP Option

# ACK

- Interims really helped!
- What next?
  - Set of considerations for defining CAPs
  - One more major update is due
  - Shall we update P-DAO to use this?

# Wrap up -- Open Floor



Tuesday 11/19

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  - Meetecho: <https://www.meetecho.com/ietf106/roll/>
  - Etherpad: <https://etherpad.ietf.org/p/notes-ietf-106-roll>
  - Slides: <https://datatracker.ietf.org/meeting/106/session/roll>
- Jabber Scribe: **Please volunteer, thank you :)**
- Minutes taker: **Please volunteer, thank you :)**
- **Please sign blue sheets :-)**

# Tuesday Agenda

Tuesday Nov 19, 2019 10:00-12:00 Singapore time (UTC+8)

Topic	Time	Presenter - On site/Remotely
Introduction	5 mn	Dominique/Ines
draft-ietf-roll-unaware-leaves	30 mn	Pascal/Michael
draft-ietf-roll-useofrplinfo	10 mn	Ines/Pascal/Michael
draft-thubert-roll-eliding-dio-information	20 mn	Pascal/Dominique
draft-ietf-roll-efficient-npdao-17	10 mn	Rahul/Pascal
draft-thubert-roll-turnon-rfc8138	15 mn	Pascal
Open Floor	30 mn	Everyone

# RPL Unaware Leaves

**draft-ietf-roll-unaware-leaves**

Pascal Thubert

IETF 106

Singapore

# Changes to the draft

- Moved from 02 to 06 since last IETF
  - Extensive reorganization and work to move it forward
- Added DCO to carry an asynchronous EARO status down
- Added ROVR to target option
  - To build a full EDAR at the Root
- Adapted to useofrplinfo updates and Alvaro's review
  - RUL definition
  - External routes using non storing mode
  - Updated RPL Status, new bit indicating transports an EARO Status

# Next steps

- Blocks a number of drafts in MISS REF
- (Getting) Ready for WGLC
- Ask for early reviews?

# Using RPL Option Type, Routing Header for Source Routes and IPv6-in-IPv6 encapsulation in the RPL Data Plane

[draft-ietf-roll-useofrplinfo-32](#)

Michael Richardson  
Ines Robles  
Pascal Thubert

# Terminology Modified

**RPL Leaf:** An IPv6 host that is attached to a RPL router and obtains connectivity through a RPL Destination Oriented Directed Acyclic Graph (DODAG). As an IPv6 node, a RPL Leaf is expected to ignore a consumed Routing Header and as an IPv6 host, it is expected to ignore a Hop-by-Hop header. It results that a RPL Leaf can correctly receive a packet with RPL artifacts. On the other hand, a RPL Leaf is not expected to generate RPL artifacts or to support IP-in-IP encapsulation. For simplification, this document uses the standalone term leaf to mean a RPL leaf.

**RPL-aware-node (RAN):** A device which implements RPL. Please note that the device can be found inside the LLN or outside LLN.

**RPL-Aware-Leaf(RAL):** A RPL-aware-node that is also a RPL Leaf.

**RPL-unaware-node:** A device which does not implement RPL, thus the device is not-RPL-aware. Please note that the device can be found inside the LLN.

**RPL-Unaware-Leaf(RUL):** A RPL-unaware-node that is also a RPL Leaf.

## Other modifications

- Updates to [RFC6550](#): Advertise External Routes with Non-Storing Mode Signaling.
- Updates the cases with Storing Mode when the RUL is the destination
- Updates with RFC Editor Comments.

<https://tools.ietf.org/rfcdiff?url2=draft-ietf-roll-useofrplinfo-32.txt>

# Eliding and Querying RPL Information

**draft-thubert-roll-eliding-dio-information**

Pascal Thubert

IETF 106

Singapore

# What is this draft?

- The draft presents a method to safely elide a group of RPL options in a DIO message by synchronizing the state associated with each of these options between parent and child
- This is achieved using a new sequence counter in DIO messages called RPL Configuration State Sequence (RCSS)
- A child that missed a DIO message with an update of any of those protected options detects it by the change of RCSS and queries the update with a DIS Message.
- The draft also provides a method to fully elide the options in a DAO message.

# Changes Highlights

- New draft since last IETF
  - Based on a discussion at last ROLL interim
- New RPL Configuration State Sequence (RCSS)
- Updates base objects
  - DIO to add RCSS
  - DAO to indicate it is abbreviated
  - DIS base objects to query missing options
- New “Abbreviated Option” Option (AOO)
  - Replacement for a full option, indicates last RCSS

# Protected Options

The protected options are:

1. The Route Information Option (RIO) defined in section 6.7.5 of [RPL]
2. The DODAG Configuration Option (DCO) defined in section 6.7.6 of [RPL]
3. The Prefix Information Option (PIO) defined in section 6.7.10 of [RPL]
4. The Extended MOP Option (MOPex) defined in [MOPEX-CAP]
5. The Global Capabilities Option (GCO) defined in [MOPEX-CAP]





# RCSS operation

- The RCSS applies to a DIO Message and a same value of the RCSS can be used in DIO messages that are sent consecutively with no change in the protected options.
- The RCSS is incremented by the Root using a lollipop technique
- A reboot of the Root is detected when the RCSS moves from the circular to the straight part of the lollipop.
- During the straight part of the lollipop, a second reboot of the Root might not be recognized. For that reason the protected options **MUST** be provided in full with each increment on the RCSS during the straight part of the lollipop.
- When a field is modified in one of the protected options, the Root **MUST** send a DIO with an incremented RCSS and the modified protected option(s) in full.

# Resync operation

A child can resynchronize any of the protected options to the latest RCSS by sending a DIS Message to a candidate parent that advertises that RCSS in DIO messages.

The child **MUST** set the desired combination of 'R', 'D', 'P', 'M' and 'O' flags to indicate the option(s) that it needs updated.

The child **MUST** signal in the Last Synchronized RCSS field of the DIS the freshest value of RCSS for which it was fully synchronized

The DIO message that is sent in response **MUST** contain in full all the options that are requested and that were updated since the Last Synchronized RCSS in the DIS Message. The other options **MUST** be added in the abbreviated form.

The options **MAY** be spread over more than one DIO message sent in a quick sequence.

draft-ietf-roll-efficient-npdao  
- Updates



# Unaware-leaves impact

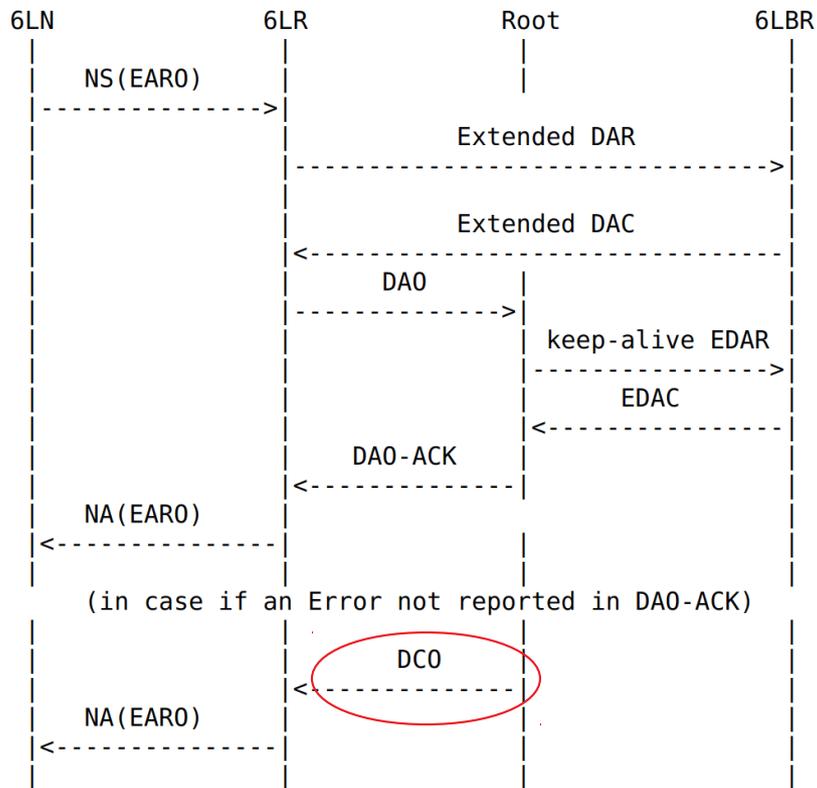


Figure 3: First Registration Flow in Non-Storing Mode

Range	Meaning
0	Success/Unqualified acceptance
1-127	Not an outright rejection
128-255	Rejection

Table 1: RPL Status per [RFC 6550](#)

The resulting RPL status is as follows:

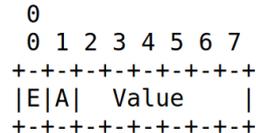


Figure 2: RPL status Format

RPL Status subfields:

E: 1-bit flag. Set to indicate a rejection. When not set, a value of 0 indicates Success/Unqualified acceptance and other values indicate "not an outright rejection" as per [RFC 6550](#).

A: 1-bit flag. Indicates the type of the status value.

Status Value: 6-bit unsigned integer. If the 'A' flag is set this field transports a status value defined for IPv6 ND EARO. When the 'A' flag is not set, the status value is defined in a RPL extension.

# Next?

- An Update to fix the value of Status

# Configuration option for RFC 8138

**draft-thubert-roll-turnon-rfc8138**

Pascal Thubert

IETF 106

Singapore

# Next steps

- No change since last IETF - Stable
- Discussion on whether the flag belongs to RPL conf
  - Using 6CIO from RFC 7400 does not fly in this case
  - RFC 8138 is a RPL operation and the bit configures its use
  - The bit implies a RPL behavior to act as leaf
  - No alternative protocol – would we implement an additional one?
- Ready for WGLC
- Ask for early reviews?

# Wrap up -- Open Floor