draft-ietf-6lowpan-nd-02

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Outline

- What is ND for 6LoWPAN (in 1 slide)
- Current status
- New features since Minneapolis
- Open issues on the table
- Next steps

Didn't read the draft yet?

See the end of this slide-set for a quick overview

ND for 6LoWPAN

- Simple bootstrapping on a LoWPAN
- Router and context information dissemination
- DAD and NS without multicast
- Enabling ND over entire LoWPANs
  - Wireless NBMA links, LoWPAN subnet model
- Unique short-address generation
- Compatible with link-layer mesh and IP routing
- Support for infrastructure and ad-hoc LoWPANs
- Fault tolerance and duplicate identifiers detection

Current status

- Draft was accepted as WG doc in Minneapolis
  - Lots of good and constructive feedback received
- -01 and -02 draft revisions since then
  - Closed 12 tickets so far plus lots of editing
- 3 technical issues + editorial issues on the table
- Draft is now stable and complete
- And we've seen good implementation activity

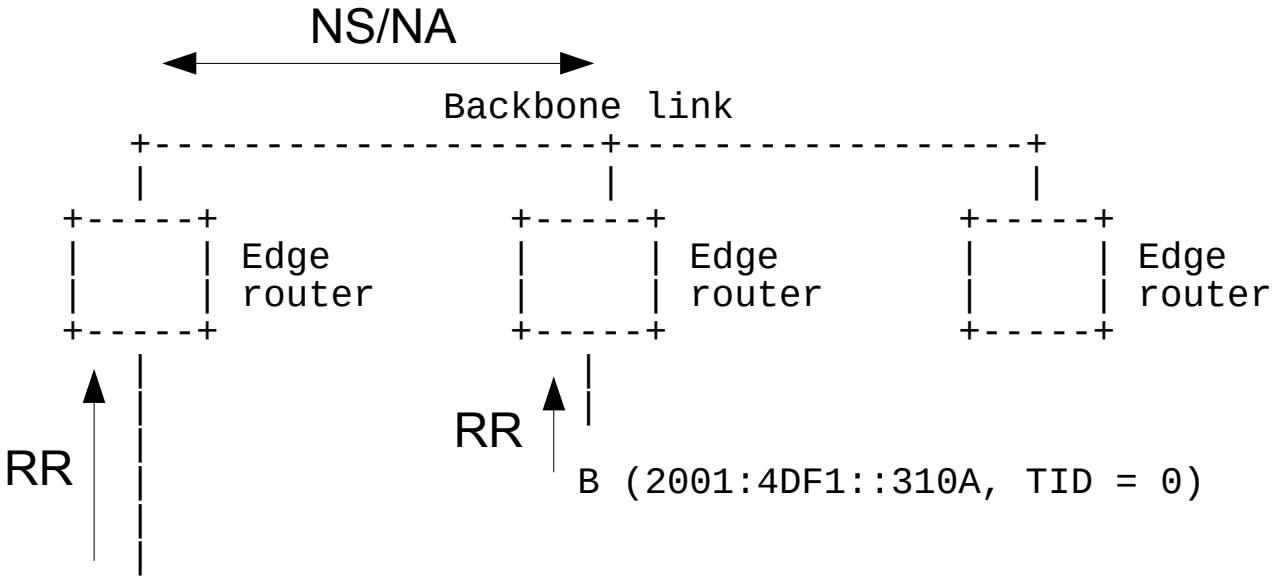
Changes from -00 to -01

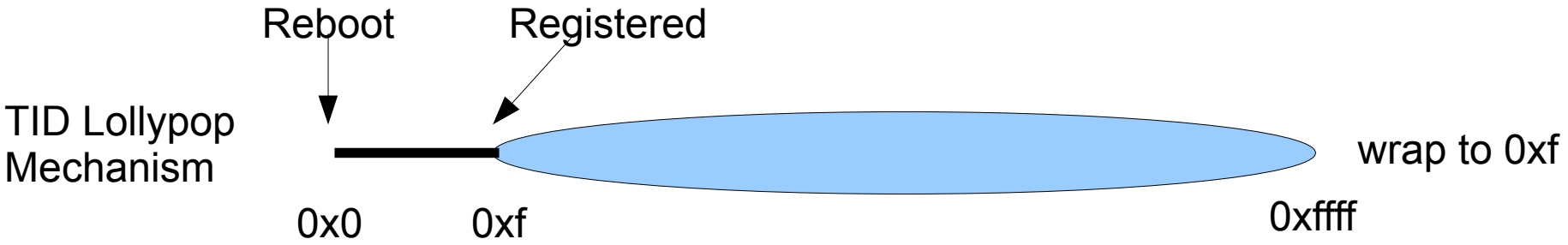
- Wrote sections on fault tolerance (Sections 8.5-8.6)
- Wrote initial ad-hoc LoWPAN section (Section 9)
- Added message examples (Section 10)
- Removed ND Proxy [RFC4389] references
- Removed the E flag from Router Advertisements
- Removed the X flag from RR/RC
- Renamed Host II to Owner II

Changes from -01 to -02

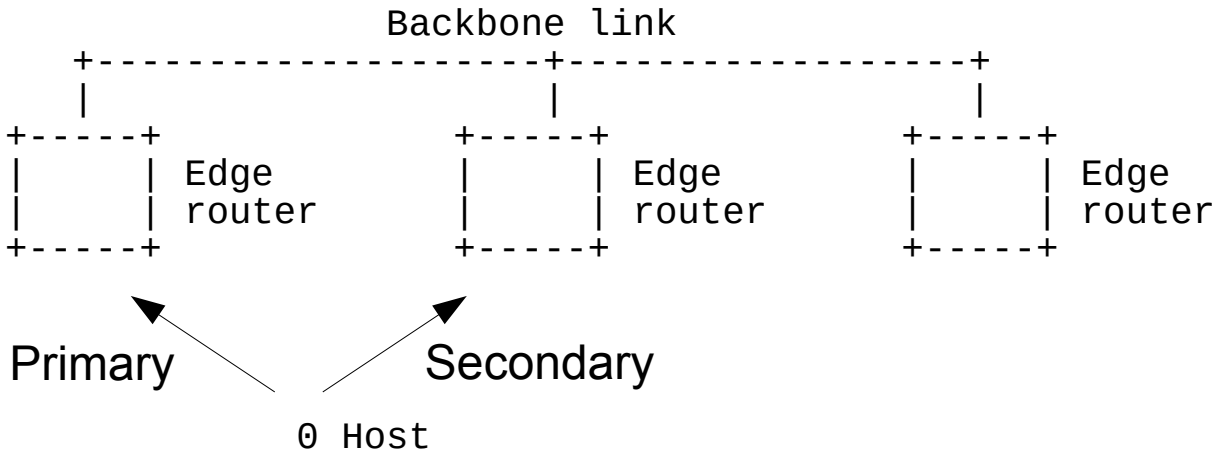
- Fixed a bug in the lollypop text (16 = 0xf)
- Updated Ad-hoc LoWPAN operation (Section 9)
  - Use of ULAs [RFC4193], ER assignment
- Terminology and wording improvements
  - Addressed comments from Alex

Duplicate identifier detection



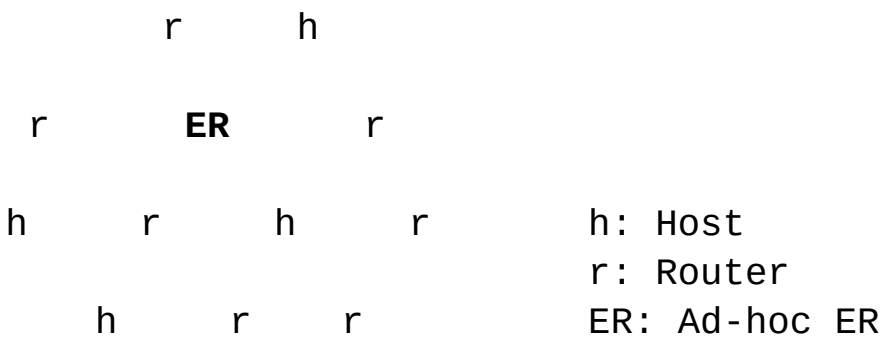


Fault tolerance



- Use of secondary registrations for fault tolerance
  - Prepare network state for movement to new primary
  - Automatic primary->secondary backup operation
  - Bicasting possible

Ad-hoc LoWPANs



- Ad-hoc use of ND for 6lowpan defined
  - Election of simplified ER role for a router
  - Required: ER generates ULA [RFC4193] and disseminates it
  - Optional: ER supports basic whiteboard functionality

Open technical issues

- Checksum recalculation on RR/RC relay (Alex P.)
  - To be fixed in -03
- Trickle algorithm
  - Reference another document or write Tickle Appendix?
- Determining best router for registration (Peter S.)
  - Hosts and new routers have no way to choose a best on-link router to use for registration if multiple hops from ERs
  - Simple 8 bit “ER hop count” indicator would be sufficient
  - Such a field could easily be added to the Multihop Information Option

Open editorial issues

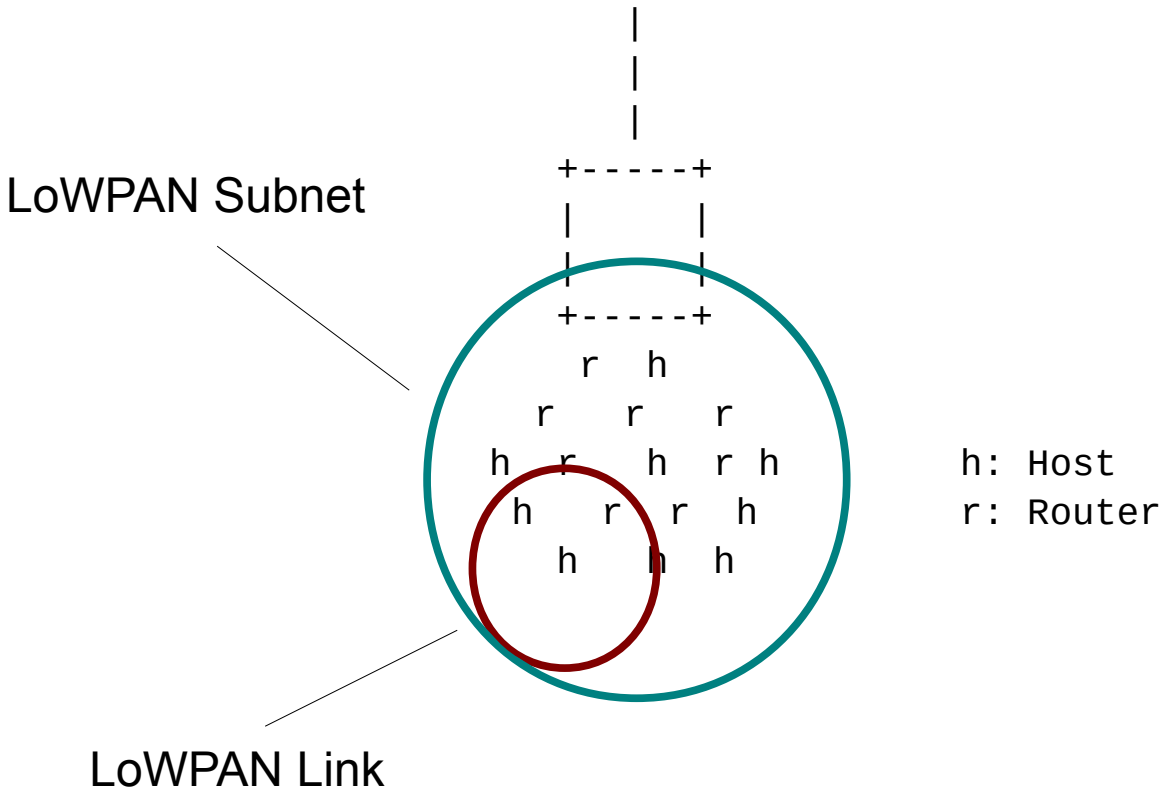
- Router Registration (RR) acronym change (Alex P.)
  - RR acronyms used in other RFCs
  - a) Is it really a problem? b) Alternative names?
- Document too long, hard to grasp (Alex P.)
  - Agreed, for 6lowpan newcomers and outsiders it should be easier to comprehend, ideas how?
  - The document is 47 pages... RFC4861 is 96 pages ;-)
  - Intro is necessary – lack of architecture doc in 6lowpan
  - ER Operations could be compressed somewhat...

Next steps

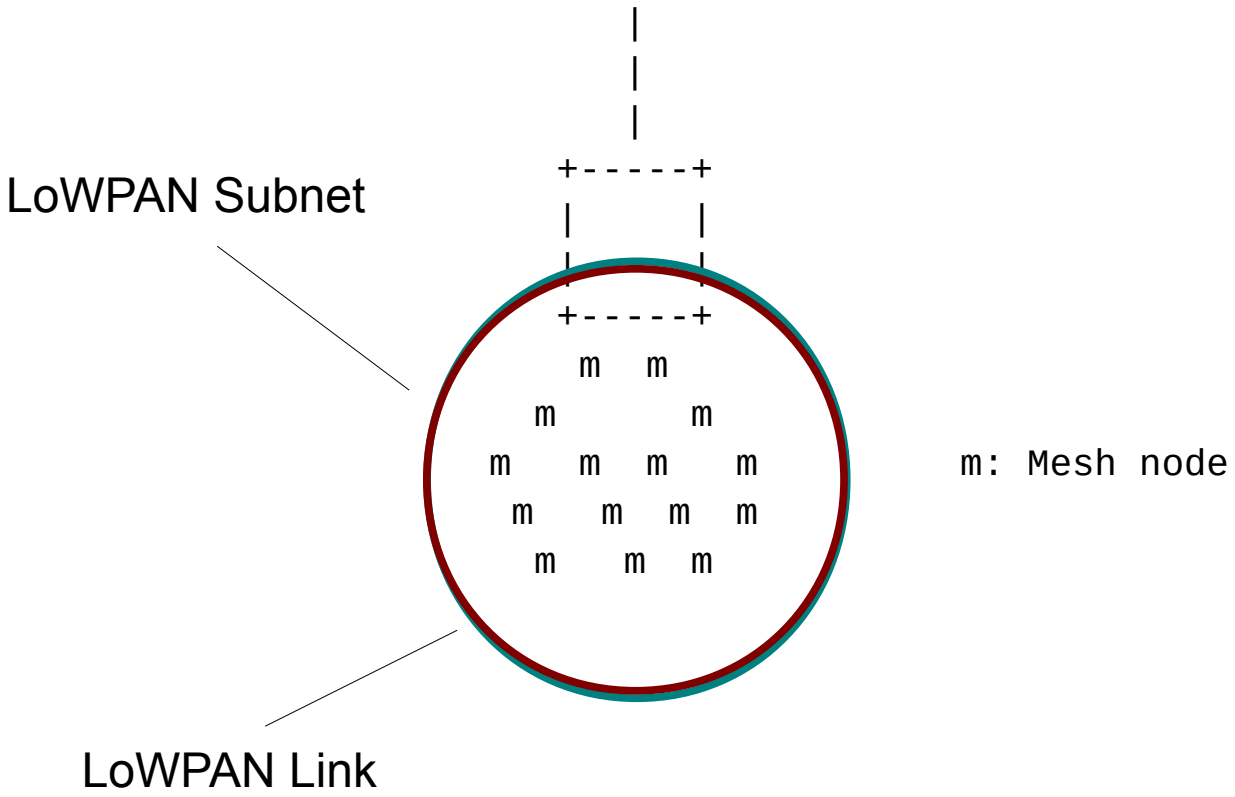
- Solve current technical & editorial issues
- Release of -03 within 2-3 weeks
- Request comments from ADs and IAB people
- Move to last call well before Stockholm?

Reference Slides

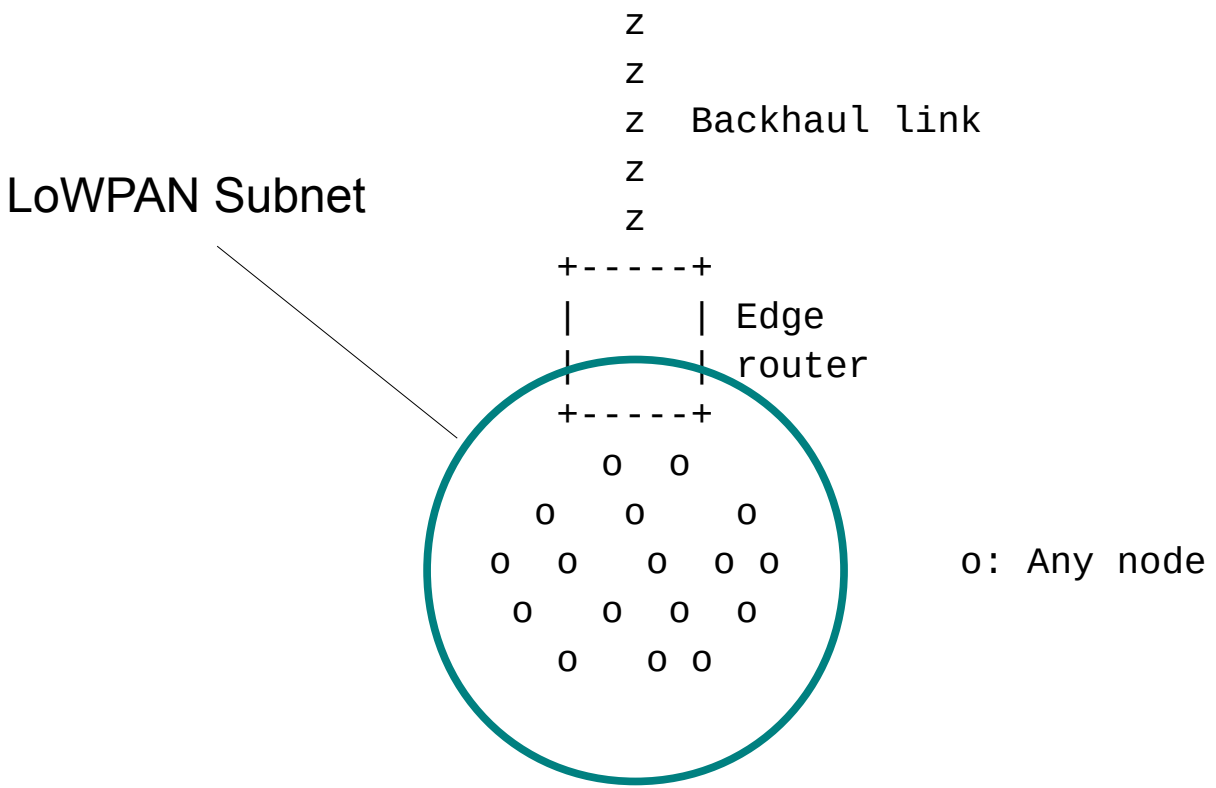
Architecture - Route Over



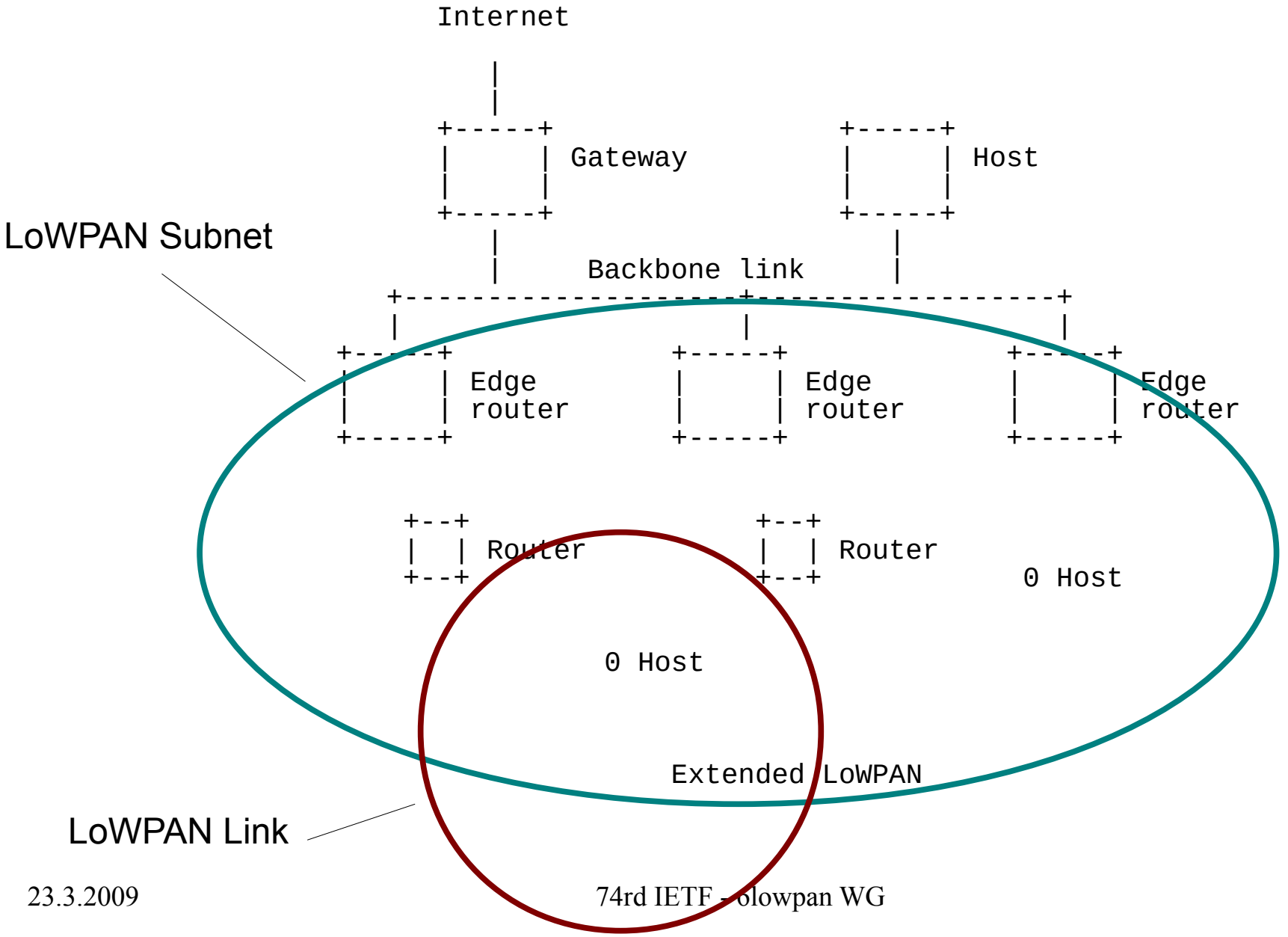
Architecture - Mesh-under



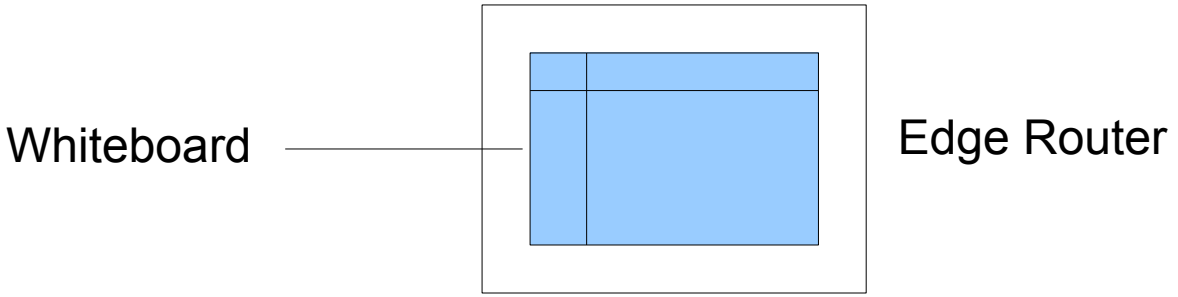
Architecture – Single LoWPAN



Architecture – Extended LoWPAN

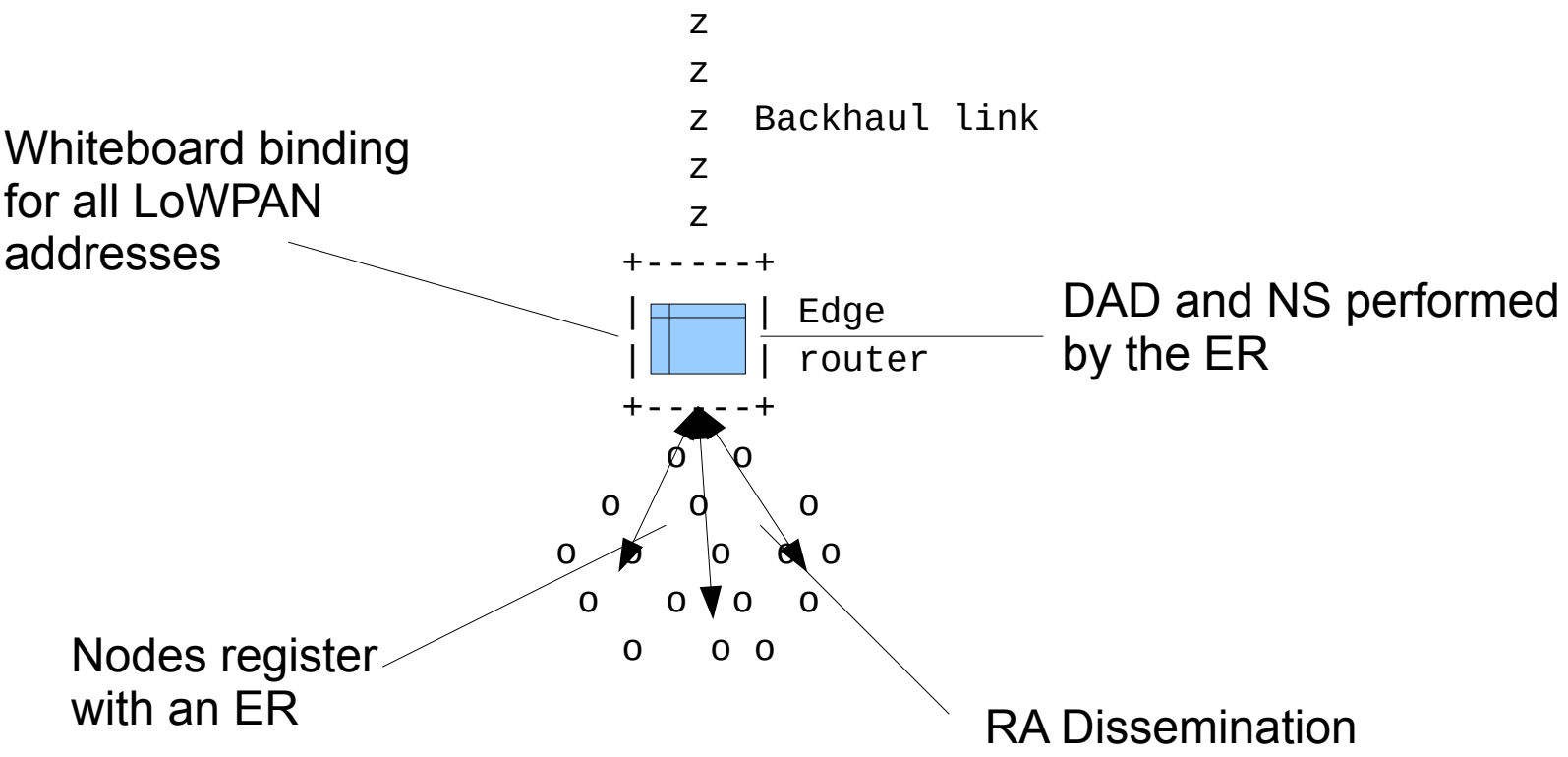


Whiteboard model

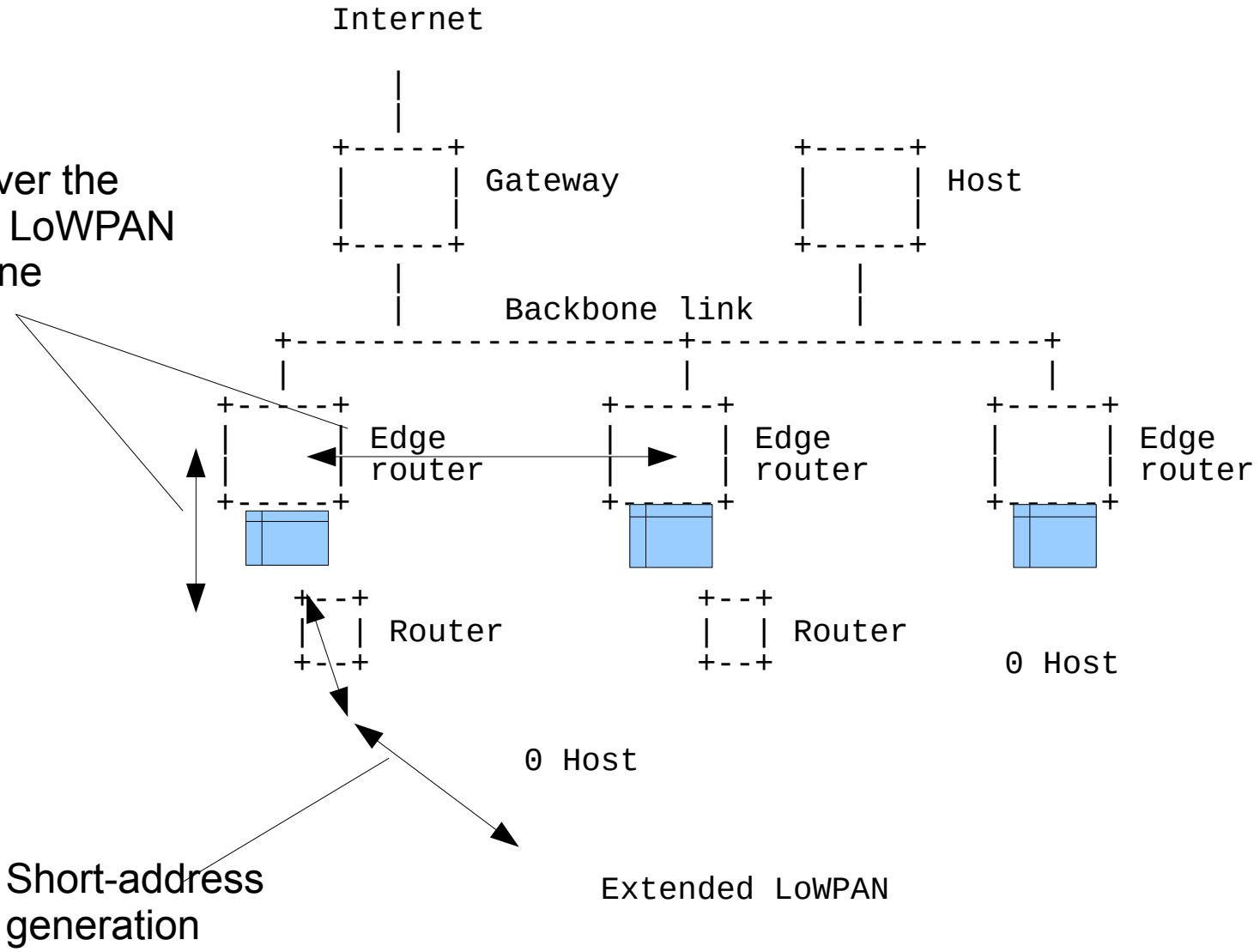


- A whiteboard binding entry has the following fields:
  - `Owner Interface Identifier`
  - `IPv6 Address`
  - `Lifetime`
- Bindings are soft
  - Must be refreshed
  - Can be moved between ERs

Basic features



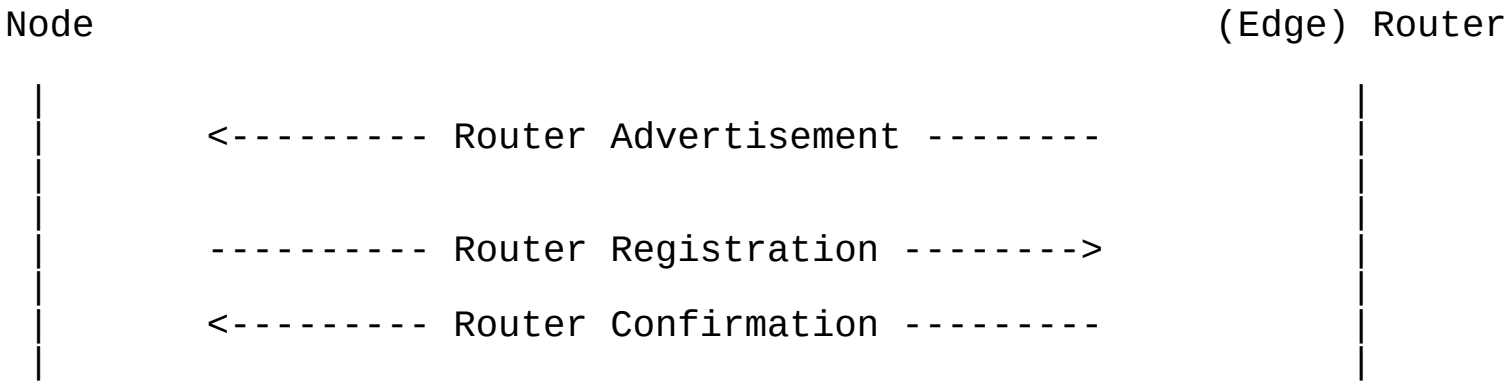
Optional features

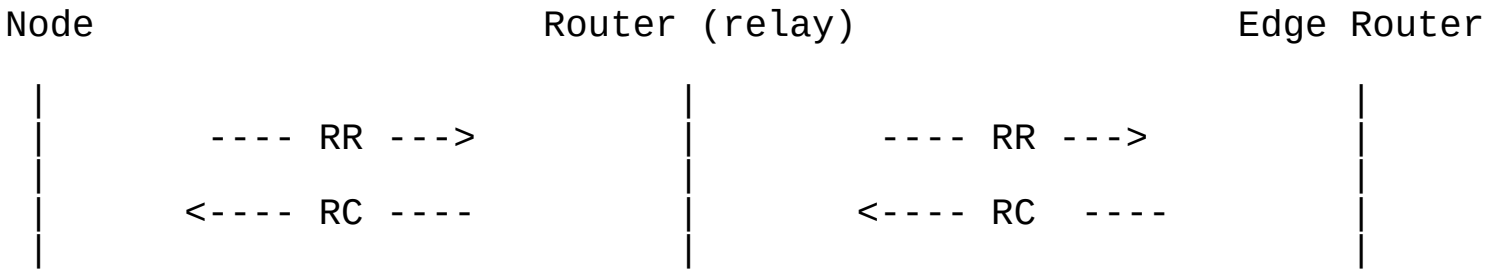


Subnet over the extended LoWPAN + backbone

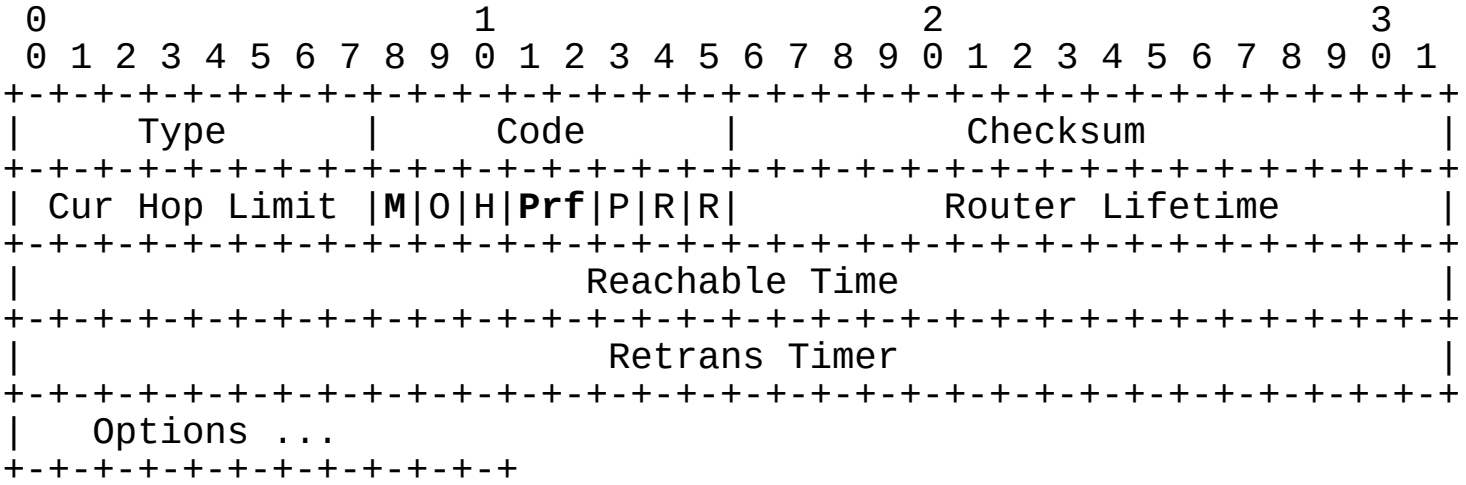
Short-address generation

Message exchanges





RA message

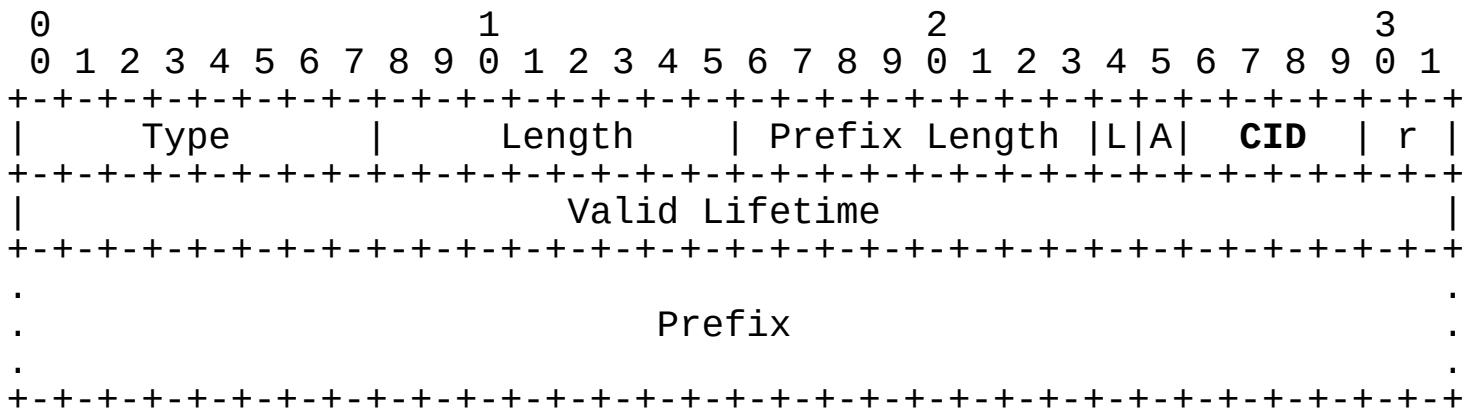


M – Used to indicate that address generation is supported.

Prf – Used to indicate if the sender is an Edge Router (Prf=01) or a Router (Prf=00).

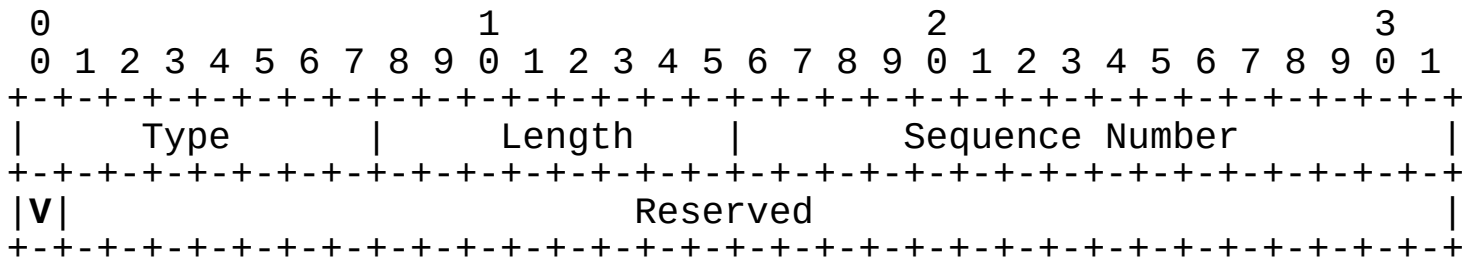
RA options

6LoWPAN Prefix Information Option (A new option!)

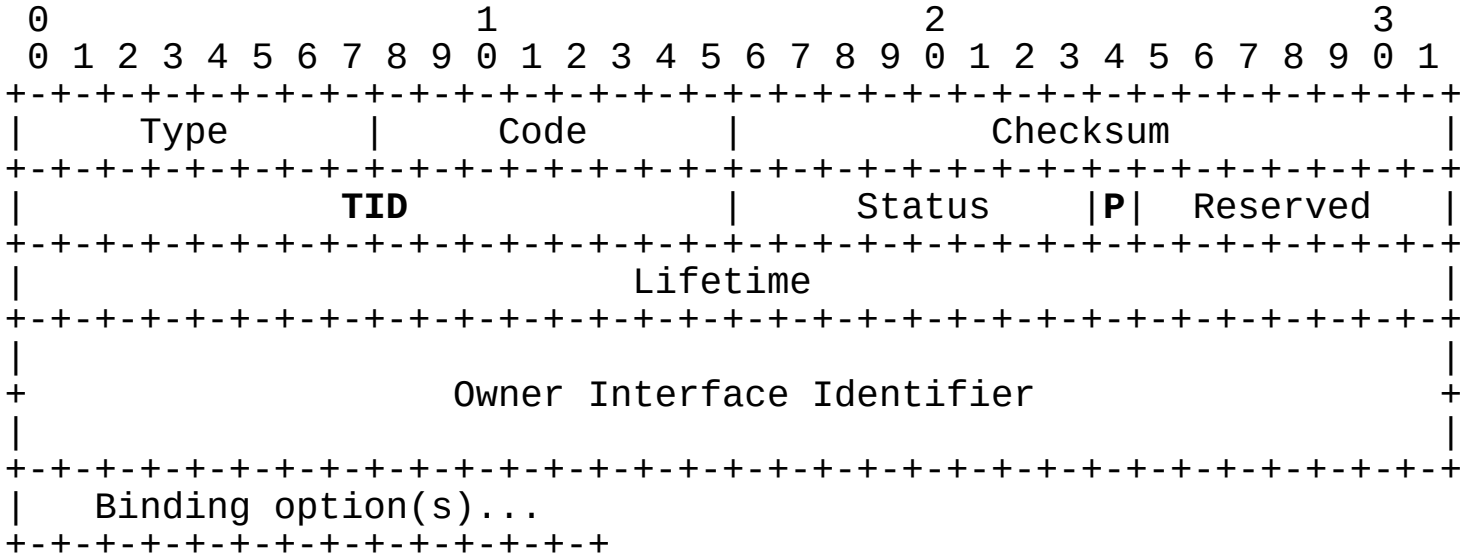


CID – Context Identifier for use in 6LoWPAN HC compression.

Multihop Information Option



RR/RC message

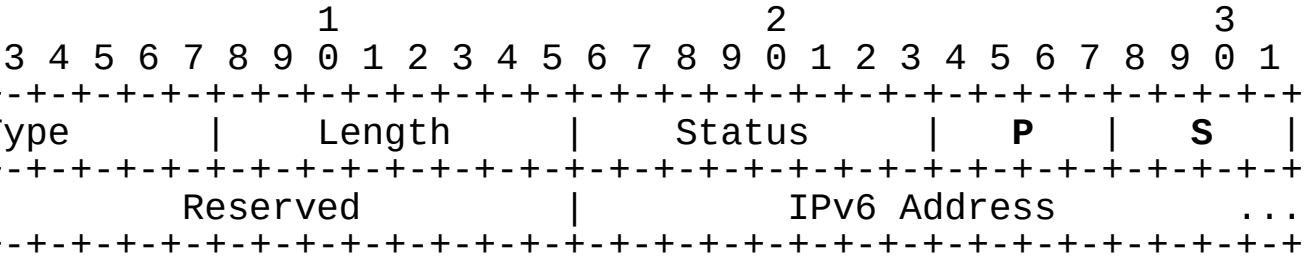


TID – Transaction ID for matching confirmations.

P – Primary flag for using an ER as primary. For use with secondary registrations.

RR/RC options

Address Option



P/S – Prefix and suffix compression fields.

D – Allow duplicates flag.

A – Address request flag.

R – Remove address flag.

Source link-layer address option [RFC4861, RFC4944]

Target link-layer address option [RFC4861, RFC4944]