# Router Solicitation Refresh

draft-nordmark-6man-rs-refresh
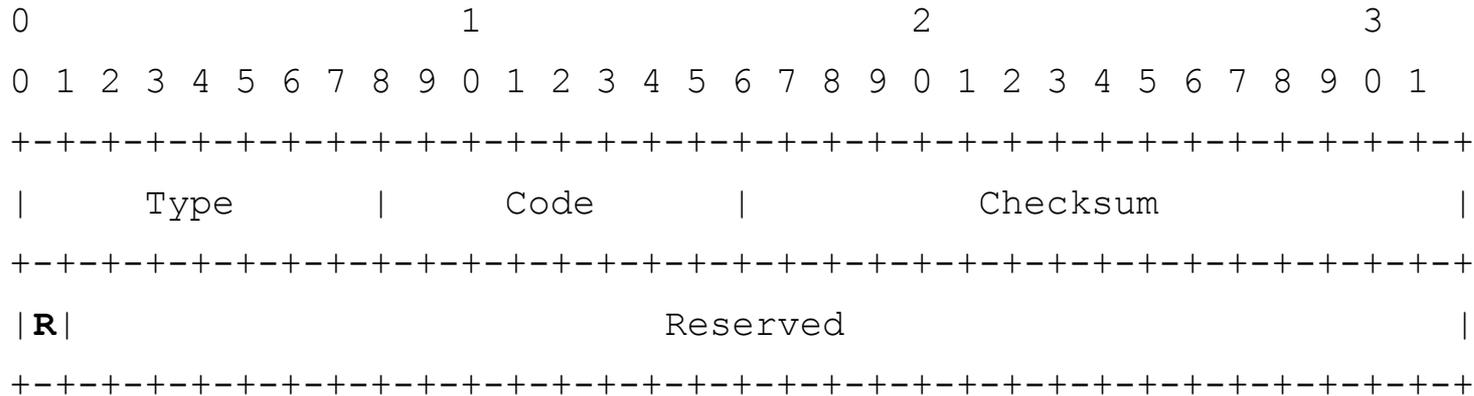IETF92
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# Problem

- Periodic multicast RA good fit on some links
  - Satellite, wired Ethernet
- Periodic multicast RA inefficient on others
  - Maybe WiFi - but RAs infrequent
  - draft-garneij-6man-nd-m2m-issues shows impact of paging causing multiplicative effect on 3GPP links
- Tinkering with maxRtrAdvInterval insufficient
  - Behavior on wakeup and link re-attach?
  - Distribute new information reliably?

# **Goals and Requirements**



- ● Operator can choose between unicast RS refresh or periodic multicast RAs
- ● Operator can tell whether link has legacy hosts
- ● Require that RS refresh hosts also implement resilient-RS
  - ○ No sense to rely on frequent periodic multicast RA to handle lost RSs

# New Router Solicitation Flag

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|     Type      |     Code      |           Checksum            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|R|                         Reserved                            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

R-flag:

When set indicates that the sending host is capable of doing unicast RS refresh.

# Refresh Time option in RAs

Sent by routers to tell hosts to do unicast RS refresh

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      Type       |    Length=1     |         Refresh Time       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                            Reserved                           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Refresh Time:

    16-bit unsigned integer.  Units is seconds.  The all-ones
    value (65535) means infinite.

# **Router Behavior**

- Routers SHOULD respond to unicast RS messages with unicast RAs
- RS with unspecified source address?
  - Router MAY respond with a RA unicast at layer 2 (sent to the link-layer source address of the RS), or
  - MAY follow the rate-limited multicast RA procedure in RFC4861

# Distribute Changes

- When router has a change, can multicast RA
  - RA content change through admin actions
  - RFC4861 says can multicast 3 RAs over ~48 sec
- Removing info is harder in 4861
  - Hosts can disconnect and not receive RAs
    - Prefix initially advertised with lifetime of 7 days
    - Admin expires prefix using lifetime=0 in 3 RAs
    - A host can reattach after 6 days and use prefix
- DNA doesn't even require re-validation

# **Sleeping hosts?**



- DNA says to unicast NS to old default router (s)
  - If response, assume on link
  - Also assumes nothing has changed
- Better to couple with RS refresh

  - If host sleeps or ignores multicast RA, then on wakeup send RS refresh
  - Could optimize to allow sleep < ~48 seconds
  - RS refresh can replace DNA NS/NA if unicast RA

# RFC4861 hosts without resilient-RS?

- If their RS is lost, then in 4861 has to wait for up to 1800 seconds for a periodic RA
- Talk of increasing this to 65535/3 seconds
  - See draft-krishnan-6man-maxra
  - 30 minutes today; 5 hours tomorrow
- Thus resilent-RS is a very good idea by itself
- RS refresh doesn't change that

# **Operational Considerations**

- Can I disable periodic multicast RAs?
  - If all hosts on link implement resilient-RS, then can tell if they support RS refresh from flag
  - Might not be worth-while unless controlled environment
- Multicast RA every 30 minutes or 5 hours?
  - Not a big deal - sleeping hosts can ignore
  - But hosts better implement resilient-RS if any risk of packet loss

# Open Issues

- Refresh Time 32 bits instead of 16? Max 18h
- Update DNA to use RS/RA when RTO?
  - Require sleeping host which ignore multicast RA use RS refresh?
- Possible optimization when nothing changes
  - Random/sequential epoch number in RA
  - Host includes that epoch in RS refresh to router
  - If current epoch then no prefix etc. options in RA
  - Otherwise router includes all the RA options

# Next Steps

- Accept as 6man WG document?
- Resolve open issues?
- More review and discussion?