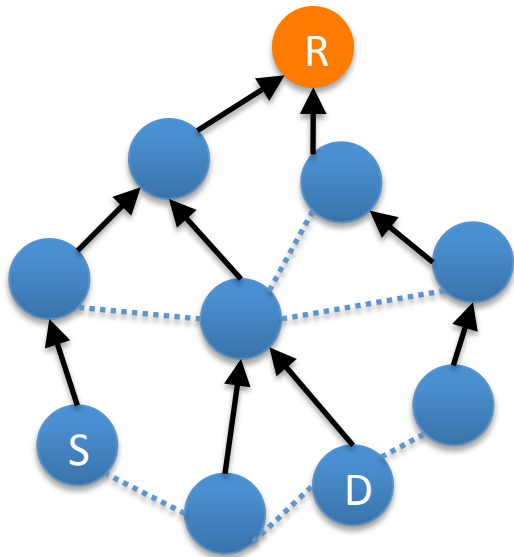


Reactive Discovery of Point-to-Point Routes in Low Power and Lossy Networks

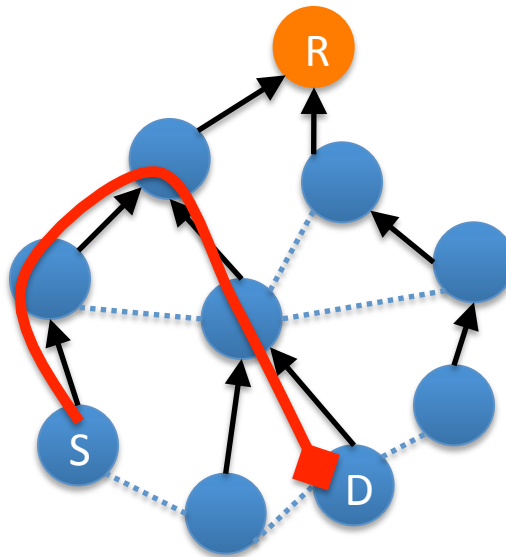
draft-ietf-roll-p2p-rpl

Goal

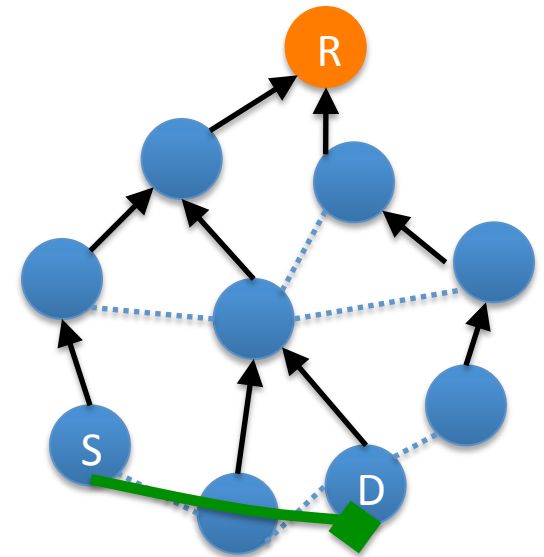
- Extension of the basic RPL spec
- Alternative, shorter sensor-to-sensor paths
- Reactive discovery request/reply mechanism



DAG



Path with basic RPL



Path with P2P extension

Functional Overview

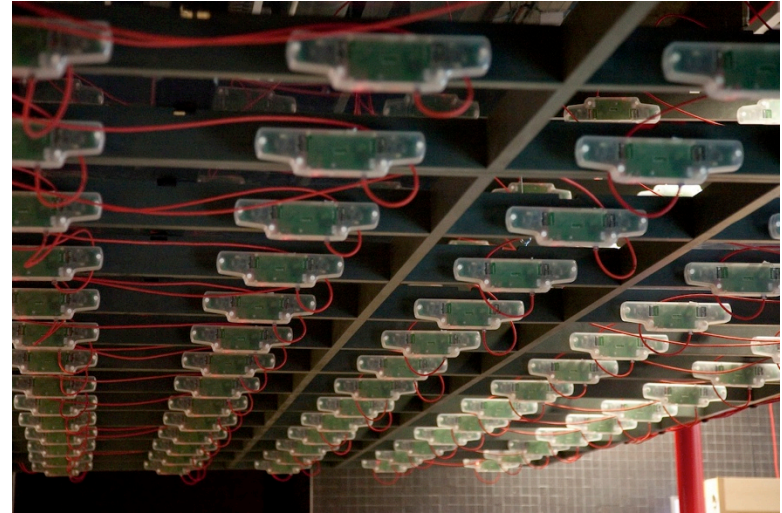
- DIO + Route discover option
- Trickle + link local multicast
- Temporary DAG rooted at source
- Target sends DRO back to source
- Hop-by-hop state or source route path establishment

Implementations

- INRIA implementation
 - MSP430, CC2420, 802.15.4
 - Available at <http://contiki-p2p-rpl.gforge.inria.fr/>
- Sigma Designs implementation
 - ZW0401, ZWAVE
- Other implementations (on ns2 from UWM, LIX)

Deployment & Interop

- Senslab Lille testbed
 - 256 nodes
 - 2.4 GHz IEEE 802.15.4



- Interop tests last November between:
 - INRIA implementation
 - Sigma Designs implementation
 - Interop report available:
<http://hal.inria.fr/hal-00661629>

Drafts Status

- draft-ietf-roll-p2p-rpl-09 last-call
 - Clarified spec according to detected interop bugs (default config, trickle tweaks, MaxRank field)
 - SRH mods according to RFC 6554
 - New MoP for interoperability with RPL
 - Please do send your comments before LC ends!

Measurement of P2P Route in LLNs

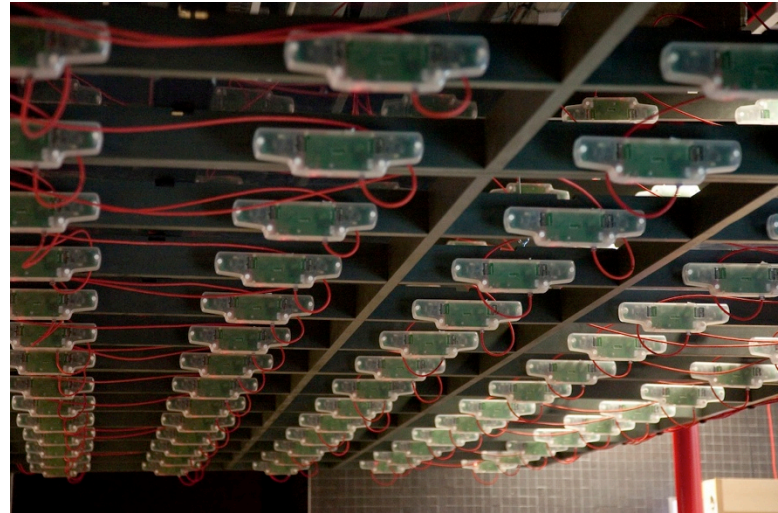
draft-ietf-roll-p2p-measurement

Functional Overview

- Measure quality of existing path
- Decide to initiate discover of better path
- Origin sends measurement request along path
- Request accumulates info along path
- Target unicasts back accumulated info

Implementations & Tests

- INRIA implementation:
 - MSP430, CC2420
- Senslab Lille testbed
 - 256 nodes
 - 2.4 GHz IEEE 802.15.4



Draft Status & Implementation

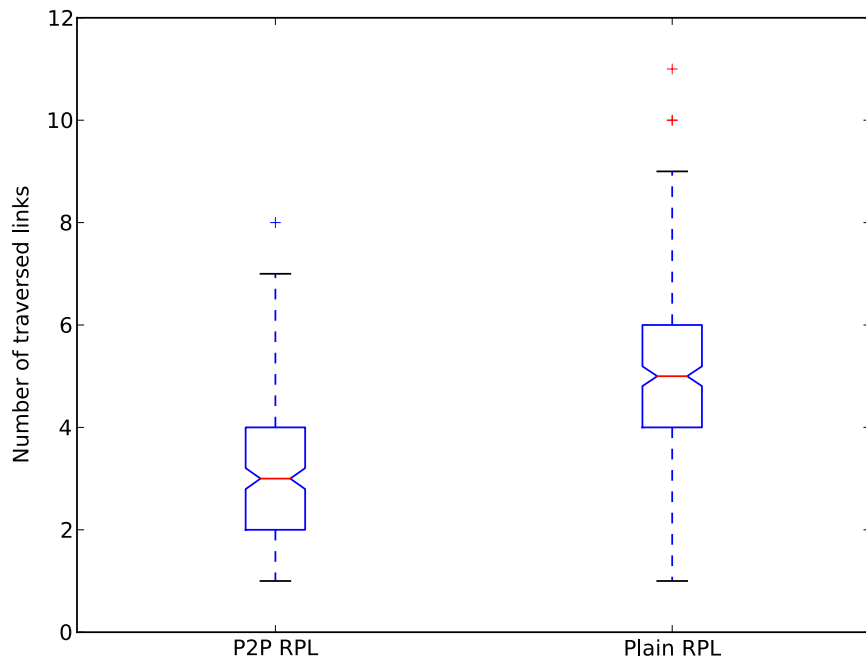
- draft-ietf-roll-p2p-measurement-04 last call
 - Comment from Phil Levis about clarifying how metric containers are updated along path

Thanks

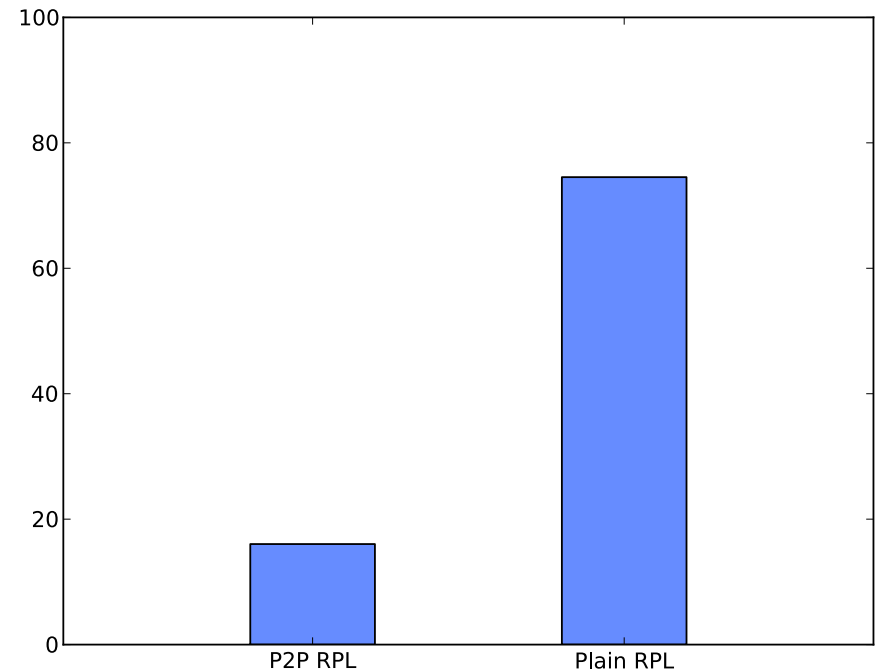
Questions?

Appendix: Experiment results

(Nov. 2011, Senslab Lille Testbed)



Significant path length
reduction



Significant traffic
reduction near root