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
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