

ROLL Interim Working Group Meeting

December 2010

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Re-chartering Discussion

Agenda

- *Discussion on re-chartering !*
- Before we start ...
- Propose schedule for the WG
 - *Discussion started in Beijing*
 - Discuss potential ideas/candidate topics until January
 - End of January: Chairs summarizing the discussion and go back to the WG with a proposal
 - End of February: Chairs proposing new charter to AD

ROLL Charter

Done Submit Routing requirements for Industrial applications to the IESG to be considered as an Informational RFC.

Done Submit Routing requirements for Connected Home networks applications to the IESG to be considered as an Informational RFC.

Done Submit Routing requirements for Building applications to the IESG to be considered as an Informational RFC.

Done Submit Routing requirements for Urban networks applications to the IESG to be considered as an Informational RFC

Feb 2009 Submit Protocol Survey to the IESG to be considered as an Informational RFC.

Apr 2009 Submit Security Framework to the IESG to be considered as an Informational RFC

May 2009 Submit the Routing for LLNs Architecture document to the IESG as an Informational RFC

Jul 2009 Submit Routing metrics for LLNs document to the IESG to be considered as a Proposed Standard.

Jul 2009 Submit first draft of ROLL routing protocol specification as Proposed Standard.

Nov 2009 Submit first draft of the MIB module of the ROLL routing protocol specification.

Feb 2010 Submit the ROLL routing protocol specification to the IESG as Proposed Standard.

Mar 2010 Submit the MIB module of the ROLL routing protocol specification to the IESG as Proposed Standard.

Apr 2010 Evaluate WG progress, recharter or close.

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Re-chartering Discussion

- Some items that have been proposed (for discussion, not exhaustive list):
 - *RPL enhancements: Multicast, neighbor adjacency, ...*
 - Management Model (Coap, SNMP, ...)
 - lightweight cryptographic algorithms (e.g., IPR unencumbered yet less expensive than RSA)
 - Label switching
 - Use of PCE for path computation
 - Siblings
 - ND options dissemination
 - DAD interaction with backbone link / router
 - RPL on not so lossy links
 - ...

RPL Enhancements

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Outline

- Multicast Enhancements
- Controlling DODAG Attachment
- Routing/Neighbor Adjacency Maintenance

Enhanced Multicast Mechanisms

Multicast is important for smart grid & industrial applications, etc.

- For example, for configuration, updates, and information requests sent to (potentially large) sets of nodes in the network

Efficient multicast data forwarding is essential

- RPL targets networks composed of resource-constrained low bandwidth devices
- Need to enable the efficient delivery of multicast packets to multicast group members, such that each multicast packet is transmitted as few times as possible within the network

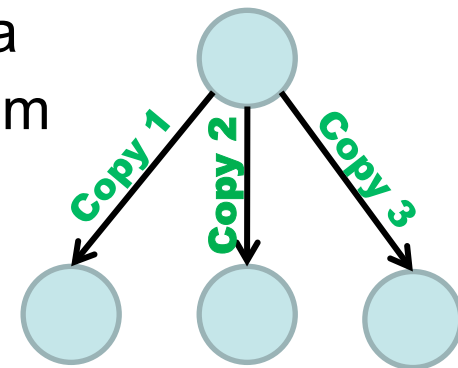
RPL and Multicast

Current Multicast Forwarding Mechanisms within RPL

1. A node records each node that has forwarded a DAO packet with a specific multicast group in its Target Option
2. When a node receives a multicast packet, it sends a copy of the packet to each node it recorded in 1) above.

Proposed enhancements

- Add mechanisms to enable the delivery of a multicast packet to all interested downstream one-hop neighbors using a single multicast link-layer transmission.
- Make optional the use of explicit state enumerating downstream multicast neighbors.



Additional Multicast-Related Issues

Multicast co-existence with non-storing mode

- It is important to be able to support both multicast and non-storing mode at the same time

Mechanisms to enable multicast source filtering

- To enable more granular control of multicast applications

Mechanisms for Controlling DODAG Attachment

Reject or discourage a node from trying to attach to a DODAG

- Because of storage or processing capacity limitations at the root (e.g., inability to support a DODAG beyond a certain size)
- Possibly due to capacity limitations at a node which the new node is trying to use as a parent in the DODAG (e.g., inability to support more than a certain number of downstream nodes)

Enhancements for Routing/ Neighbor Adjacency Maintenance

Need for mechanisms for neighbor adjacency maintenance

- Inefficient neighbor adjacency mechanisms can become the straw that broke the camel's back, neutralizing much of the efficiency built into the routing protocol
- To avoid the above, we need to explicitly define neighbor adjacency maintenance mechanisms for RPL