

## **ROLL WG Session, Wednesday, March 28, 2012.**

### **1300-1500 Afternoon Session I**

#### **1) WG Status (Chairs - 15 mn)**

- Slides: <http://www.ietf.org/proceedings/83/slides/slides-83-roll-3.pptx>
- One Item removed: “Applicability Statement for the Routing Protocol for Low Power and Lossy Networks (RPL) in AMI Networks” - draft-ietf-roll-applicability-ami-05. Author could not be present.
- New ROLL co-chair Michael Richardson, Michael also brings security expertise. Thanks to the outgoing co-chair David Culler. JP especially wanted to note that “David, you were right”.
- A number of new RFCs (6550, 6551, 6552, 6553 and 6554).
- A number of ROLL Applicability documents exist, it was suggested that the authors try to maintain terminology consistency.
- WG will need to continue discussions, led by Michael Richardson, of various Security aspects of LLNs and associated protocols.

#### **2) The Minimum Rank with Hysteresis Objective Function**

draft-ietf-roll-minrank-hysteresis-of-06 - (Phil Levis)

- Slides: <http://www.ietf.org/proceedings/83/slides/slides-83-roll-1.pdf>
- An optimization was discussed and one reason to save ETX was to use rank instead, is to save a few bytes. The document does highlight that some care must be taken when configuring and avoid using high values

#### **3) Recommendations for Efficient Implementation of RPL (Phil - 5mn) [30]**

draft-gnawali-roll-rpl-recommendations-03 - (Phil Levis)

- Slides: <http://www.ietf.org/proceedings/83/slides/slides-83-roll-1.pdf>
- Request for further feedback from RPL implementers.
- Co-chair asked for clarification of statement “TinyOS open source implementation on TelosB, which has 10KB of RAM, is known to limit the routing table size to 30”. Phil mentioned that for this specific study this was the case. Co-chair wanted to highlight that we need to be careful not to infer too much from this specific example and it should not be used as indicative of scalability per se.
- Overall it is important to look at scalability, now that the RPL protocol is “stable”. Consideration of the routing table limit/minimum size of a RPL routing table entry is required for future scalability discussions. This would be better than anecdotal evidence.
- A general observation was given (based on three implementations) for RPL routing table limit and scalability, although 30 (table size based on 10Kb) may not be the exact figure, it does feel close. Further data points are needed and we also need to put the table size/memory usage in context with other engineer requirements (packet queue size, etc.).
- A final comment did mention that potential routing optimization may benefit scalability issues as well.

#### 4) Update on P2P

Reactive Discovery of Point to Point Routes in Low Power and Lossy Networks - draft-ietf-roll-p2p-rpl

Measurement of P2P Route in LLN - draft-ietf-roll-p2p-measurement-04

- Slides: <http://www.ietf.org/proceedings/83/slides/slides-83-roll-2.pdf>
- A new MoP for interoperability with RPL was recently introduced, it was highlighted that perhaps it would have been nice to introduce two (redundant bit), which is similar to RPL behavior.
- If you do not support this MoP then the default RPL rule will be used, i.e., P2P will not function.
- Authors were asked if any scalability characteristics/results (overhead, metrics, etc.) exist. Currently they (authors) are using an existing deployment based on floors in a building (40 nodes) for example. They do plan to test and document results in other situations.
- Again scalability was raised (including "Discovery"), it would be good to identify the factors that have a major impact on scalability (discovery, dag size, creation frequency, route entries, etc.), and this would help with deployment considerations.
- WG were reminded that the document status is "Experimental".

#### 5) Multicast requirements for control over LLN (Peter van der stok) [65]

Multicast Requirements for LLN in Buildings - draft-vanderstok-roll-mcreq-00

- Slides: <http://www.ietf.org/proceedings/83/slides/slides-83-roll-5.pptx>
- Author was asked how to tune the protocol mechanisms (flooding with limited rebroadcasting) as previous attempts were found to be unsuccessful, due to once the topology changes, then it breaks. In essence the mechanisms were found to be too fragile to topology variations. Authors are optimistic and are looking for advice for solutions.
- First observation, there is "multicast" and "multicast". We do not want to flood the network, just a make a few copies. Perhaps the question here is not related to multicast, it is more like flooding.
- Second observation, speed is a primary objective of a multicast/flooding mechanism.
- Finally the authors, and other WG members, are interested in discussing applications that require group message delivery (not just service and name discovery). Then further discussion as to group delivery mechanisms (TCL multicast, "other" multicast, unicast, caching, SMF, et al.) can be reviewed and discussed.

#### 6) Experiences with RPL (Thomas)

IPv6 Routing Protocol for Low power and Lossy Networks - draft-clausen-lln-rpl-experiences-01

- Slides: <http://www.ietf.org/proceedings/83/slides/slides-83-roll-4.pdf>
- Author highlighted in his presentation that disconnections from the DODAG root occurred. Author was asked how often this happened, and responded that although measurements were not specific it was on the order of 5-7.

- Fragmentation was highlighted as problem not just relevant to RPL, the 6LowPan WG have also been discussing this issue. This issue with RPL (in non-storing mode), you do not know what the ultimate MTU is used. The problem is with non-storing is that you do not know what MTU you can use. In general it seems we have theoretical solutions for solving the fragmentation issue but do we have all the use cases to validate the work effort.
- Question from chair: have you tried to use 15.4g to avoid fragmentation ? Answer is “no”
- Positive feedback for the document, the data (what works and does not work) is valuable and helpful for implementers.
- Co-chair did mention that a new document looking at a 4000 node deployment will be submitted or IETF 84.

## 7) Discussion on Security (Discussion led by Michael)

- Discussion was focused on three difference problems:

draft-dvir-roll-security-authentication (Amit)

- Slides: <http://www.ietf.org/proceedings/83/slides/slides-83-roll-0.ppt>

draft-qiu-roll-kemp-00 (QIU Ying)

- Slides: <http://www.ietf.org/proceedings/83/slides/slides-83-roll-6.ppt>

draft-alexander-roll-amikey-lln-key-mgmt (Roger Alexander)

General Security Discussion

- No specific questions/objections were raised against the three “classes” of problems.
- Client issues include how does a client connect to the network without prior knowledge of the key?
- IEEE 802.15.9 chair provided an update will facility KMP over the MAC. It will not be a single KMP. Instead it will be decided on applicability. Non-4e-enabled devices will use a 6LowPan “type” allocation. Their intention is to make any device, regardless of layer, to have a standard method for key establishment. The goal is to have a document ready for IETF 85 (Atlanta).
- In summary for this section. Michael highlighted that we need to look at keying and authentication. We need to look at use cases/problems, especially where equipment may move around and how this would affect security (layer-2 versus layer-3 mechanisms). Public keys are feasible but concerns with IPR and scalability (algorithms, power, state, bits) need to be navigated.