IPv6 over the TSCH mode of IEEE 802.15.4

09 December 2016 Webex

Chairs:
Pascal Thubert
Thomas Watteyne

Etherpad for minutes:
http://etherpad.tools.ietf.org:9000/p/6tisch?useMonospaceFont=true
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*** From the Webex login
Agenda

• Administrivia [2min]
  • Agenda bashing
  • Approval minutes from last meeting
  • Status of drafts [5min]
• Update on security [5min]
• Wrap up ML discussions on 6top [25min]
• Next steps on SF0 [15min]
• AOB [2min]
Agenda [proposed]

• Administrivia
  • Agenda bashing
  • Approval minutes from last meeting
  • Status of drafts

• draft-ietf-6tisch-minimal-17

• Misc discussions on ML

• Update on security

• Wrap up ML discussions on 6top

• Next steps on SF0

• draft-ietf-6tisch-terminology-07

• AOB
Administrivia
Admin is trivia

• Approval Agenda
• Approval minutes
Draft status

- Minimal draft: IESG telechat - 2017-01-05
- Adopted security drafts
  - draft-richardson-6tisch-dtsecurity-secure-join
  - draft-vucinic-6tisch-minimal-security

=> Please resubmit as draft ietf *** 00 with NO CHANGE
- Paging Dispatch at 6lo => RFC 8025
- Routing Dispatch at ROLL, in IANA review
- Backbone router WG doc being split: RFC6775 update
  => In adoption call at 6lo
- draft-ietf-roll-dao-projection adopted at ROLL
Milestones

Apr 2016 - Second submission of draft-ietf-6tisch-minimal to the IESG
Apr 2016 - WG call to adopt draft-ietf-6tisch-6top-sf0
Apr 2016 - WG call to adopt draft-ietf-6tisch-6top-sublayer
Jul 2016 - ETSI 6TiSCH #3 plugtests
Dec 2016 - Initial submission of draft-ietf-6tisch-6top-protocol to the IESG
Dec 2016 - Initial submission of draft-ietf-6tisch-6top-sf0 to the IESG
Dec 2016 - Evaluate WG progress, propose new charter to the IESG
Apr 2017 - Initial submission of 6TiSCH terminology to the IESG
Apr 2017 - Initial submission of 6TiSCH architecture to the IESG
Dec 2017 - 6TiSCH architecture and terminology in RFC publication queue
draft-ietf-6tisch-minimal-17
draft-ietf-6tisch-minimal-17

- Lots of reshuffling of text following Suresh’s AD review
- No changes in technical contents
- Trust, but verify!!
Misc discussions on ML
Timeslot template and slot duration

https://www.ietf.org/mail-archive/web/6tisch/current/msg05037.html

From draft-ietf-6tisch-minimal-17:

Figure 3: Timeslot internal timing diagram (refer to Figure 6-43 in IEEE802.15.4-2015.)
update on security
(no slides)
draft-ietf-6tisch-6top-protocol-03
6P unclarities 1 [1/2]

https://www.ietf.org/mail-archive/web/6tisch/current/msg04977.html

Section 4.2.7: why do cells only have a recommended format? I guess it's up to the SF, but if so, this is worth stating explicitly.
→ Already stated explicitly: The SF MAY redefine the format of the CellList field.

Section 4.2.7: what happens when cells don't fit a single packet? This was answered here [1] but I couldn't find any info in the text.
→ I think this is already discussed?

Section 4.3: protocol behavior. only 2-way transactions are detailed, why not 3-way?
→ 3-way transaction is allowed but not worked out by any SF at this point

Section 4.3: when to use 2 or 3-way transactions? Is the latter for added reliability or only to handle the case where the request has CellList == []. Clarification needed IMO.
→ agree. A priori for case when it's the requestee that proposes cells.

Section 4.3: do we wait for a link-layer ACK on the Response (or Confirmation) before committing the transaction?
→ response/confirmation. L2 ACK doesn't carry any 6P meaning

Section 4.3: no description of the STATUS command?
→ Does it need a description?
6P unclarities 1 [2/2]

Section 4.3.2: interaction among different SFs: does LIST return only the current SF's cells or all cells in the system? Can DELETE remove cells installed by other SFs? Does CLEAR clear cells installed by other SFs?
→ Only this SF. Need text to mean ALL SFs?

Section 4.3.11.1: single bit for the GTX/GRX count value means two consecutive failed transactions will be forever unnoticed. Is that ok? Couldn't we use a single 4-bit counter instead of two 2-bit?
Wouldn't a simple counter work instead of lollipop?
→ Can you come up with example?

Terminology: I've seen both "2-steps" and "2-ways" used in the document
→ agreed, need to homogenize.

General / open: is there any option to install broadcast cells? (a bit tricky as this needs consensus over 2+ nodes, this probably takes a 2PC or 3PC, but can be needed)
→ No mechanism at this point. Needed?

General / open: should we recommend / force having at least one rendez-vous cell (via minimal or otherwise), so as to guarantee reachability of all nodes? Else, a single failed CLEAR transaction results in definitive loss of connectivity between two nodes.
→ policy, not mechanism?
6P unclarities 2 [1/4]

https://www.ietf.org/mail-archive/web/6tisch/current/msg04978.html

Section 4.2.2: [Q] Why must the value of SeqNum increment *by exactly one* at each new 6P request to a certain neighbor?
→ Why not?

Section 4.2.6: [C] There are ineffective combinations of CellOptions in Figure 11, for example, "TX=0,RX=0,S=1".
→ agreed, added for completeness

[C] I'd suggest listing only valid combinations of CellOption bits and mentioning others are invalid.
→ isn't that policy?

[C] The phrase, "marked as", in Figure 11 is a bit ambiguous... Something like "its linkOptions matches exactly" is better?
→ editor?
Section 4.2.13: [C] The length of "Num. Cells" is 2-octet long in the text, but 1-octet in the figure.

# The Wirehark patch for draft-03 treats the field as a
# one-octet field.

When responding to an STATUS request, the "Other Field"
draft contains the number of cells scheduled between node A and node
draft B that match the CellOptions field, encoded as a 2-octet
draft unsigned integer. This is shown in Figure 12.

draft>   |Version| T | R |     Code      |     SFID      | SeqNum|GAB|GBA|
draft>   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

draft>   | Num. Cells    |

draft>   +-+-+-+-+-+-+-+-+

                         Figure 12

→ Good point. Editor?
Are the following sentences correct? They allow a pair of nodes to open two transactions in parallel. I think these transactions might cause inconsistency in their schedule generations.

Only a single 6P Transaction between two neighbors, in a given direction, can take place at the same time.

Nodes A and B MAY support having two transactions going on at the same time, one in each direction.

Here is a simple example in which nodes update their schedule generation counters after receiving a MAC-level ACK for a 6P Response frame:

Step-1: Node A Send Request (GAB=0, GBA=0) : Queued
Step-2: Node B Send Request (GAB=0, GBA=0) : Queued
Step-3: Node B Recv Request : Send MAC-ACK
Step-4: Node B Send Response (GAB=0, GBA=0) : Queued
Step-5: Node A Recv Request : Send MAC-ACK
Step-6: Node A Send Response (GAB=0, GBA=0) : Queued
Step-7: Node A Recv Response : Send MAC-ACK
Step-8: Node B Update GTX/GRX : (GTX=0, GRX=1)
Step-8: Node B Recv Response (GAB=0, GBA=0) : Detect Inconsistency
6P unclarities 2 [4/4]

[C] I'm not sure typical use cases of the LIST operation. When does a SF use STATUS and LIST...? I think these commands would be useful for the purpose of management or administration. But, it's not within the scope of SF, is it? I'd be nice that a typical use case of LIST is provided in the text.
→ Recover after reset

[C] The draft implies that a MAC address of the peer is set to the "macNodeAddress" attribute of a allocated cell. If this is the case, it'd be better to mention that in the text.
→ agreed. Editor?

I have a couple of related questions in addition to what Simon asked:

[Q] What if a node has a short address as well as an extended address?
→ To be discussed, probably node has to learn both long and short address of its neighbor

- Is there any plan for 6P to support the following cells?
  - a cell whose macNodeAddress is a group MAC address or a 16-bit multicast address
→ No. Use case?
  - a dedicated TX cell to multiple recipients
→ IEEE802.15.4e question, multiple cells?
  - a RX cell shared with multiple senders
→ supported
6P signaling traffic

• https://www.ietf.org/mail-archive/web/6tisch/current/msg05018.html
• Is there (should there be) a recommendation on which cells to use for 6P signaling traffic?
AOB 6P?
sending a CLEAR request to old parents

- https://www.ietf.org/mail-archive/web/6tisch/current/msg04962.html
- Rough consensus:
  - Step 1: keep CLEAR command
  - Step 2: 4.3.X. Disconnecting from a neighbor
    - If the SF realizes connection to a particular neighbor is no longer needed (for example a change in parent by the routing protocol),
    - the SF MAY send a CLEAR request to that neighbor to speed up the cleanup process of the cells allocated with that neighbor.
- Action item: Diego to take into account
draft-ietf-6tisch-terminology-07
Update from Maria Rita
(no slides)
The "6top Scheduling Function" (SF) is the policy inside the "6TiSCH Operation Sublayer" (6top) which decides when to add/remove cells. General guidelines for designing a SF are provided in [I-D.wang-6tisch-6top-protocol].

The "6top Scheduling Function" (SF) the cell management entity that allocates or deallocates cells dynamically based on its allocation policy in order to fulfill cell requirements. Its cell negotiation with a neighbor is done with use of 6P. General guidelines for designing a SF are provided in [draft-ietf-6tisch-6top-protocol].
AOB ?
Rechartering

• Use of DAO projection?
• 6top along tracks
Thank you!