17 March 2017 Webex

IPv6 over the TSCH mode of IEEE 802.15.4

Chairs:
Pascal Thubert
Thomas Watteyne
Etherpad for minutes:
http://etherpad.tools.ietf.org:9000/p/6tisch?useMonospaceFont=true
Note Well

This summary is only meant to point you in the right direction, and doesn't have all the nuances. The IETF's IPR Policy is set forth in BCP 79; please read it carefully.

The brief summary:
• By participating with the IETF, you agree to follow IETF processes.
• If you are aware that a contribution of yours (something you write, say, or discuss in any IETF context) is covered by patents or patent applications, you need to disclose that fact.
• You understand that meetings might be recorded, broadcast, and publicly archived.

For further information, talk to a chair, ask an Area Director, or review the following:
• BCP 9 (on the Internet Standards Process)
• BCP 25 (on the Working Group processes)
• BCP 78 (on the IETF Trust)
• BCP 79 (on Intellectual Property Rights in the IETF)
Reminder:

Minutes are taken *
This meeting is recorded **
Presence is logged ***

* Scribe; please contribute online to the minutes at:
http://etherpad.tools.ietf.org:9000/p/6tisch?useMonospaceFont=true

** Recordings and Minutes are public and may be subject to discovery in the event of litigation.

*** From the Webex login
Agenda

- Administrivia  [2min]
  • Agenda bashing
  • Approval minutes from last meeting
- Status of drafts (chairs)  [5min]
- Update on security (Michael)  [15min]
- Update on 6P (Xavi)  [10min]
- Update on SF0 (Xavi)  [10min]
- Preparation for IETF 98 (Pascal)  [15min]
- AOB  [3min]
Draft status
draft-ietf-6tisch-minimal-21

OPSDIR Last Call Review (of -20): Ready
SECDIR Telechat Review (of -19): Has Issues
GENART Telechat Review (of -19): Ready
SECDIR Last Call Review (of -17): Serious Issues
GENART Last Call Review (of -17): Almost Ready
INTDIR Early Review (of -15): Ready with Nits
INTDIR Early Review (of -13): Ready
Meetings occurred:
2017-01-17, 2017-01-31, 2017-02-14,
2017-02-21 (extra), 2017-02-28.
next: 2017-03-14

Typically present:
Michael Richardson, Tero Kivinen, Pascal Thubert,
Thomas Watteyne, Mališa Vučinić, Göran Selander, Toerless Eckert, Peter van der Stok

Recent minutes so far:
https://www.ietf.org/mail-archive/web/6tisch-security/current/msg00661.html
Update on 6P
4.2. Message Format ................................. 6
  4.2.1. 6top Information Element ................. 7
  4.2.2. General Message Format .................. 7
  4.2.3. 6P Message Types ....................... 8
  4.2.4. 6P Command Identifiers ................. 8
  4.2.5. 6P Return Codes ....................... 9
  4.2.6. 6P CellOptions ......................... 9
  4.2.7. 6P Cell Format ......................... 10
  4.2.8. 6P ADD Request Format ................. 10
  4.2.9. 6P DELETE Request Format .............. 11
  4.2.10. 6P STATUS Request Format ............ 11
  4.2.11. 6P LIST Request Format ............... 12
  4.2.12. 6P CLEAR Request Format .............. 12
  4.2.13. 6P RELOCATE Request Format ........... 13
  4.2.14. 6P Response Format .................... 13
  4.2.15. 6P Confirmation Format ............... 13

4.3. Protocol Behavior ............................. 14
  4.3.1. Version Checking ......................... 14
  4.3.2. SFID Checking .......................... 14
  4.3.3. Concurrent 6P Transactions ............. 15
  4.3.4. Timeout ............................... 15
  4.3.5. SeqNum Mismatch ....................... 15
  4.3.6. Clearing the Schedule .................. 16
  4.3.7. Adding Cells with 2-step Transaction .. 16
  4.3.8. Aborting a 6P Transaction ............. 17
  4.3.9. Deleting Cells ......................... 17
  4.3.10. Listing Cells .......................... 18
  4.3.11. Cell Relocation ....................... 18
  4.3.12. Cell Suggestion ....................... 18
  4.3.13. Generation Management ............... 18
  4.3.14. Handling error responses ............. 19

4. 6top Protocol (6P) .............................. 21
  4.1. 6P Transaction ............................ 21
    4.1.1. 2-step 6P Transaction ............... 21
    4.1.2. 3-step 6P Transaction ............... 22
  4.2. Message Format ............................ 22
    4.2.1. 6top Information Element ............. 22
    4.2.2. Generic 6P Message Format .......... 22
    4.2.3. 6P CellOptions ........................ 23
    4.2.4. 6P CellList ........................... 23
  4.3. 6P Commands and Operations .............. 23
    4.3.1. Adding Cells .......................... 23
    4.3.2. Deleting Cells ........................ 23
    4.3.3. Relocating Cells ...................... 24
    4.3.4. Counting Cells ....................... 24
    4.3.5. Listing Cells .......................... 24
    4.3.6. Clearing the Schedule ............... 24
  4.4. Protocol Functional Details .............. 24
    4.4.1. Version Checking ....................... 24
    4.4.2. SFID Checking ........................ 24
    4.4.3. Concurrent 6P Transactions ........... 24
    4.4.4. Timeout ............................... 24
    4.4.5. SeqNum Mismatch ....................... 25
    4.4.6. Aborting a 6P Transaction ............ 25
    4.4.7. Generation Management ............... 25
    4.4.8. Handling Error Responses ............. 25

Reordering
Changes

• Full reordering of commands
  – Put together frame format and description of the operation
• Renamed STATUS to COUNT
• Removed cell suggestion example (was confusing)
Next Steps

- Will be published the 27\textsuperscript{th} of March
- Authors will be looking for feedback during IETF meeting.
  - Important is relation with SF0.
- Will ask for Last Call
6TiSCH 6top Scheduling Function Zero (SF0)

draft-ietf-6tisch-6top-sf0-03
Cell Estimation Algorithm

- Changed to Alternative 3 presented at IETF97:

\[
\text{Number of Used Cells} + \text{OVERPROVISION} = \text{REQUIRED CELLS}
\]

- SF0 is based on a neighbor-to-neighbor negotiation.
- We do not know if the incoming requested add/delete cell destination is the local node or if it will be routed to another neighbor.
- Including it would add unnecessary uncertainty, resulting in possible under- or over-provisioning.
- OVERPROVISION value is implementation-specific.
PDR Calculation

- Added PDR Calculation:
- “Packet Delivery Rate (PDR) is calculated per cell, as the quotient of the number of successfully delivered packets to 10, for the last 10 packet transmission attempts, without counting retransmissions.”
- Is 10 a good value for the sliding window? Shall leave the value as implementation-specific?
Timeout Calculation

- Yasuyuki´s proposal without MAC-level timeout (Dec 12)
- Requires 6P modification.
Timeout Calculation

(3-step.1) Request is lost: A gets Timeout

Same as (2-step.1)

(3-step.2) Response is lost: A and B gets Timeout

\[
\begin{align*}
\text{A} & : \text{Send Add Req.} + \text{Start Timer} \\
\text{B} & : \text{Recv Add Req.} \\
\text{A} & : \text{Send Res.} \quad \text{Res. x<-} + \text{Start Timer} \\
\text{B} & : \text{Timeout} \\
\text{A} & : \text{Timeout}
\end{align*}
\]
Timeout Calculation

(3-step.3) Confirmation is lost: B gets Timeout

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send Add Req.</td>
<td>Recv Add Req.</td>
</tr>
<tr>
<td>+ Start Timer</td>
<td>+ Start Timer</td>
</tr>
<tr>
<td>Recv Res.</td>
<td>Send Res.</td>
</tr>
<tr>
<td>+ Stop Timer</td>
<td>+ Stop Timer</td>
</tr>
<tr>
<td>Send Conf.</td>
<td>+ Conf.</td>
</tr>
<tr>
<td></td>
<td>Timeout</td>
</tr>
</tbody>
</table>

(3-step.4) Everything is fine: no timeout

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send Add Req.</td>
<td>Recv Add Req.</td>
</tr>
<tr>
<td>+ Start Timer</td>
<td>+ Start Timer</td>
</tr>
<tr>
<td>Recv Res.</td>
<td>Send Res.</td>
</tr>
<tr>
<td>+ Stop Timer</td>
<td>+ Stop Timer</td>
</tr>
<tr>
<td>Send Conf.</td>
<td>Recv Conf.</td>
</tr>
<tr>
<td></td>
<td>+ Stop Timer</td>
</tr>
</tbody>
</table>
Typos and text changes

• Eliminated the term “effectively” from “effectively used cells”. Now we have only non-allocated, allocated and used cells, following Randy’s and Yasuyuki’s comments.

• Forced Deletion: Implementation Specific
Cell Relocation

- **PDR_THRESHOLD**: Defined as a percentage of the average of the PDR of the rest of the scheduled cells,

- SF0 relocates each of the cell(s) to a number of available cells selected randomly.

- **PDR_THRESHOLD** is out of the scope of this document and it is implementation-dependent.
Preparation for IETF 98
Meeting

- Thomas remote, Michael sitting
- 6P: Xavi and Qin remote
  - 15mn? Ready for LC? Std track?
- SFO: Diego Present
  - 15mn? Ready for LC? Exp track?
- Security:
  - 4 drafts: 1 hour + ?
Volunteers

notetaker 1: Dominique Barthel
notetaker 2: Geraldine Texier
notetaker 3: Francesca Palombini (?)
notetaker 4: Alexander Pelov
notetaker 5: Tero Kivinen
notetaker 6: Xavi Vilajosana
notetaker 7: Pascal Thubert
Jabber scribe: Ines Robles, MCR
Agenda

- Intro and Status (Chairs) [10min]
  - Note-Well, Blue Sheets, Scribes, Agenda Bashing [5min]
  - draft-ietf-6tisch-minimal-21, draft-ietf-6tisch-terminology-08, progress vs. charter [5min]
- Security [75min]
  - Presenting the drafts and the flow between them (Michael) [25min]
  - draft-ietf-6tisch-dtsecurity-secure-join-01 (Michael) [15min]
  - draft-ietf-6tisch-minimal-security-02 (Mališa) [15min]
  - draft-richardson-6tisch-join-enhanced-beacon-01 [10min]
  - draft-richardson-6tisch-minimal-rekey-01 [10min]
- 6top protocol draft-ietf-6tisch-6top-protocol-03 (Xavi) [15min]
- Service Function 0 draft-ietf-6tisch-6top-sf0-03 (Diego) [15min]
- Architecture draft-ietf-6tisch-architecture-11 (Pascal) [10min]
- Detnet backhaul draft-wang-detnet-backhaul-architecture-00 (Lun) [10min]
- AOB, News from IEEE [15min]
draft-...-6tisch-...

Author1
Author2
Author3
Meeting

• STATUS -> COUNT?
AOB ?
Thank you!