draft-ietf-6tisch-tsch-03

Using IEEE802.15.4e TSCH in an IoT context:
Overview, Problem Statement and Goals

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Status

- Status:
  - Adopted at IETF88 Vancouver
  - Latest version **-03** published on **10.27.2014** available at: https://datatracker.ietf.org/doc/draft-ietf-6tisch-tsch/

- Changes since IETF90
  - **A lot of re-wording and better explanations** provided based on heavy discussion on the ML, and calls (*thanks to Ines, Rene, Pat, Pat, Timothy, Michael, Pascal for their review/feedback*)
  - v.02 published on 10.17.2014, updated w/ v.03, including others minor changes
  - All changes were tracked in the ietf-tracker

Reviews

- Ines: Issues 22, 24, 25 and 26
  - why EB are sent on all frequencies
  - use of join priority
  - use of MLME-TSCH-MODE.request
  - replace generic terms "length“
- Pascal: Issue 27
  - Compound issue, mostly misc. editorials
- Pat, Timothy: Issue 29
  - homogenize the use of "mote" and "node"

Issue 22: clarify why EB are sent on all frequencies

http://trac.tools.ietf.org/wg/6tisch/trac/ticket/22

Nodes already part of the network can periodically send Enhanced Beacon (EB) frames to announce the presence the network. These contain information about the size of the timeslot used in the network, the current ASN, information about the slotframes and timeslots the beaconing node is listening on, and a 1-byte join priority. **Even if a node is configured to send all EB frames on the same channel offset, because of the channel hopping nature of TSCH described in <xref target="sec_channel_hopping" />, this channel offset translates into a different frequency at different slotframe cycles. As a result, EB frames are sent on all frequencies.**

This results in "channel hopping": even with a static schedule, pairs of neighbors "hop" between the different frequencies when communicating. **A way of ensuring communication happens on all available frequencies is to set the number of timeslots in a slotframe to a prime number.** Channel hopping is a technique known to efficiently combat multi-path fading and external interference.

Issue 23: high level description about joining node behavior

http://trac.tools.ietf.org/wg/6tisch/trac/ticket/23

A node wishing to join the network listens for EBs. **Since EBs are sent on all frequencies, the joining node can listen on any frequency until it hears and EB. What frequency it listen on, of whether it slowly changes frequency during this joining period is implementation-specific.** Using the ASN and the other timing information of the EB, the new node synchronizes to the network. Using the slotframe and link information from the EB, it knows how to contact the network.

Issue 24: clarify use of join priority

http://trac.tools.ietf.org/wg/6tisch/trac/ticket/24

We did reach consensus this discussion (and related details) do not belong to the 6tisch-tsch draft

Motes already part of the network can periodically send Enhanced Beacon (EB) frames to announce the presence of the network. These contain information about the size of the timeslot used in the network, the current ASN, information about the slotframes and timeslots the beaconing mote is listening on, and a 1-byte join priority. **The join priority field gives information to make a better decision of which node to join**.

Issue 25: clarify use of MLME-TSCH-MODE.request primitive during joining?

http://trac.tools.ietf.org/wg/6tisch/trac/ticket/25

We did reach consensus this discussion (and related details) do not belong to the 6tisch-tsch draft

A node wishing to join the network listens for EBs. Since EBs are sent on all frequencies, the joining node can listen on any frequency until it hears an EB. What frequency it listens on is implementation-specific. **Once it has received one or more EBs, the new node enables the TSCH mode and uses the ASN and the other timing information of the EB to synchronize to the network.** Using the slotframe and cell information from the EB, it knows how to contact other nodes in the network.

Issue 27: Pascal's review

http://trac.tools.ietf.org/wg/6tisch/trac/ticket/27

- *Indicate IEEE802.15.4e TSCH will be merged in the upcoming IEEE 802.15.4-2015*
- *Clarify TSCH is not only suitable for industrial applications*
- *Specify the order of precision that can be obtained during synchronization*
- *Refer to several IoT related IETF working groups with which 6TiSCH will work (not only limited to 6Lo, ROLL and CORE)*
- *Add a "Requirements Language" section, a "security" section and a "IANA" section*
- *Fix some references*
- *Re-organize some paragraphs*
- *Fix typos, and use more appropriate terms*

Issue 29:homogenize the use of "mote" and "node"

http://trac.tools.ietf.org/wg/6tisch/trac/ticket/29

- used the term "**node**" in the whole text

- added the following paragraph:

IEEE802.15.4e has been designed for low-power constrained devices, often called "motes". Several terms are used in the IETF to refer to those devices, including "LLN nodes" [RFC7102] and "constrained nodes" [RFC7228]. In this document, we use the generic (and shorter) term "node", used as a synonym for "LLN node", "constrained node" or "mote".