6TiSCH Minimal Scheduling Function (MSF)

draft-ietf-6tisch-msf

Presenter: Tengfei Chang (remotely)

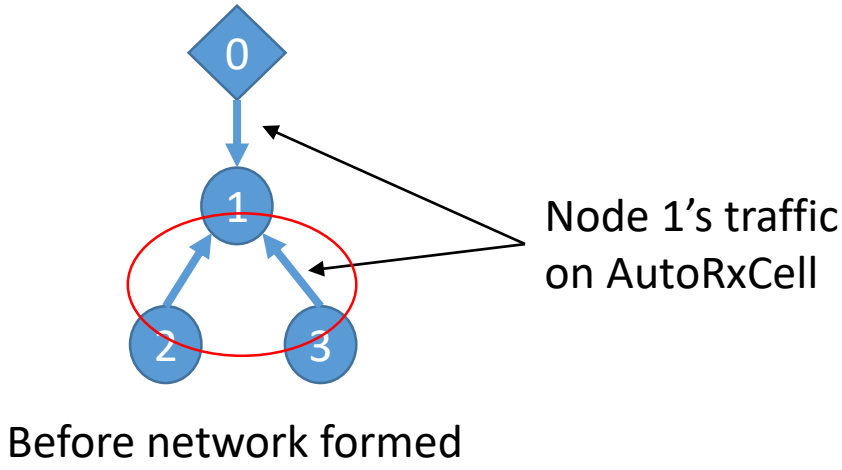
Authors: Tengfei. Chang, Mališa Vučinić, Xavier Vilajosana, Simon Duquennoy, Diego Dujovne

Issues proposed since IETF105

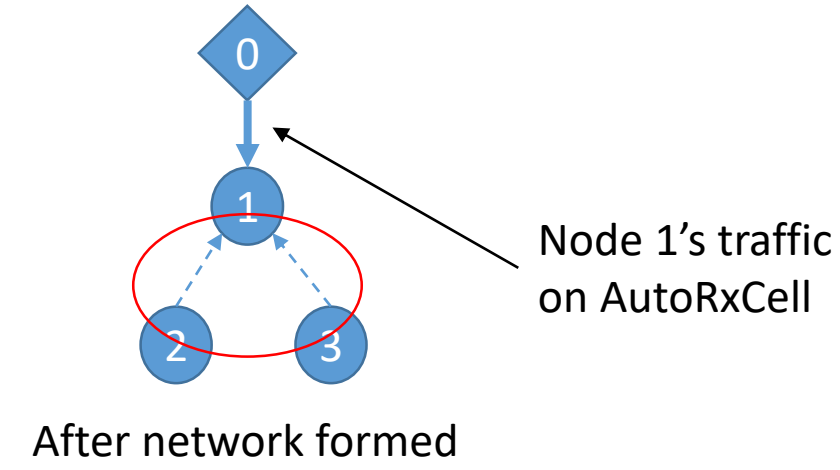
- Rules for CellList
  - Node MAY maintain a candidate cell pool for CellList
  - 6P request picks cells from the cell pool
- Schedule consistency
  - Caused by mote disappear (such as power-off)
  - Adding keep-alive mechanism back
    - Removed from version 03
- Downstream traffic adaptation
  - Strategy
  - Implementation result

Downstream traffic adaptation

- Strategy
  - NumCellsUsed_rx++ when:
    - A frame is received from its preferred parent on the Rx cell
  - NumCellsElapsed_rx++ when:
    - When the current cell is Rx cell to the preferred parent
  - Counting the AutoRxCell at beginning
    - Before network formed
      - Collision from children
    - After network formed
      - No collision most of time



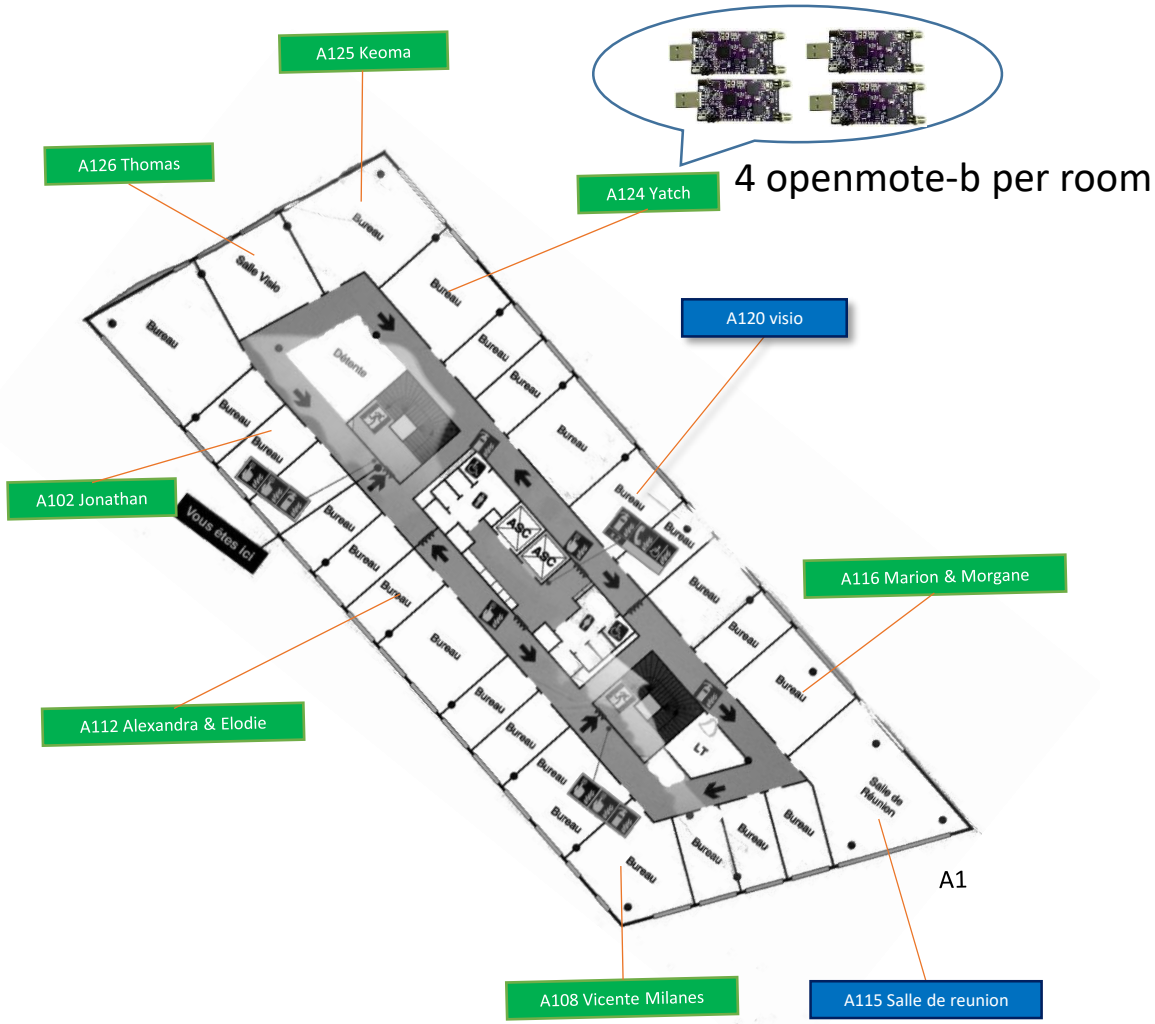
Before network formed



After network formed

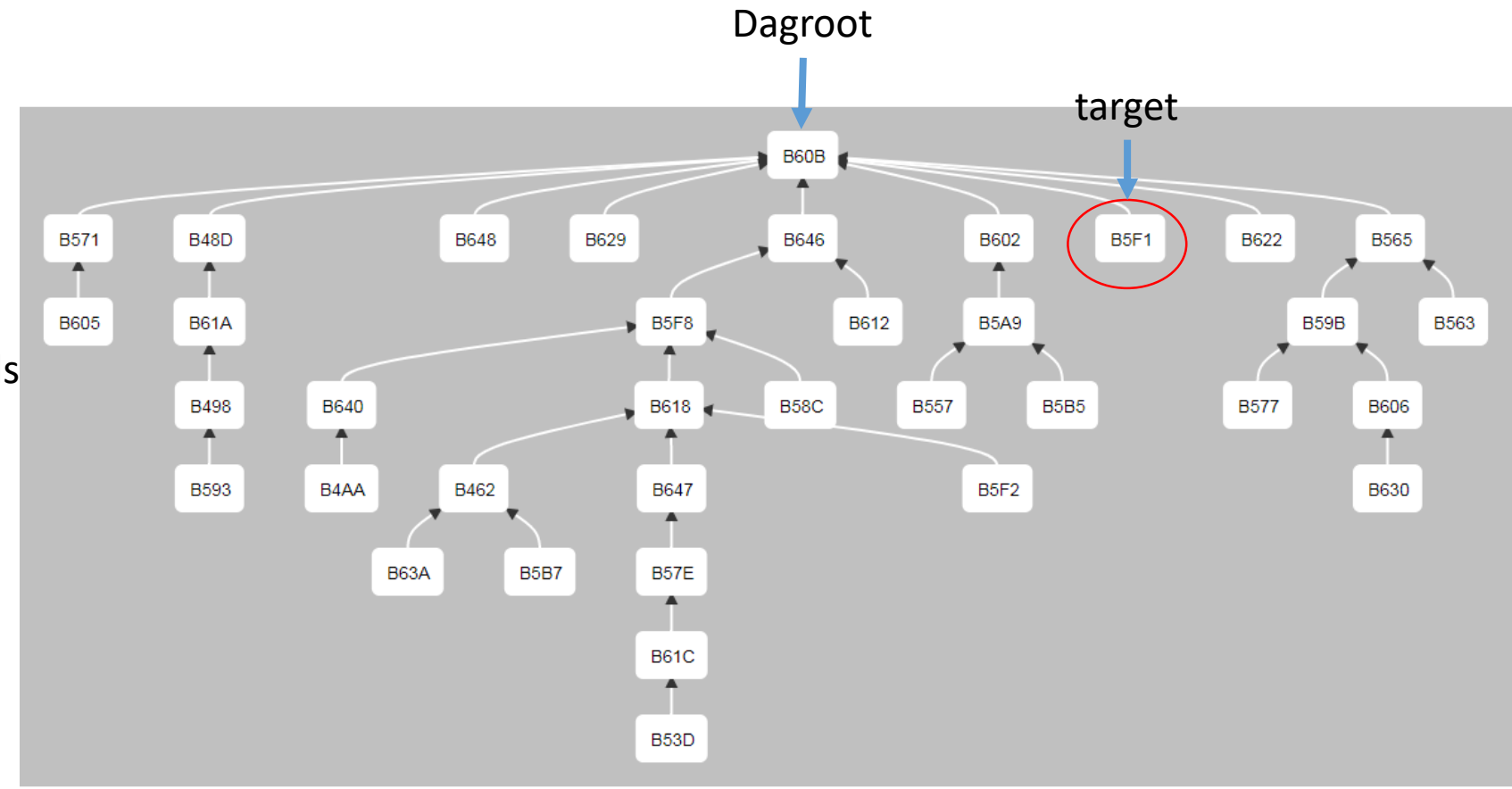
Downstream traffic adaptation

- Implementation
  - OpenWSN firmware
    - PR (merged): https://github.com/openwsn-berkeley/openwsn-fw/pull/483
  - OpenTestbed deployment
    - 36 OpenMote-B in an office building
    - Access OpenMote through MQTT architecture to
      - Flash the mote
      - Read serial output from mote

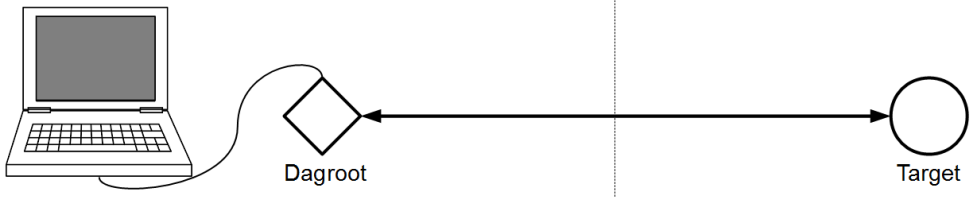


Downstream traffic adaptation

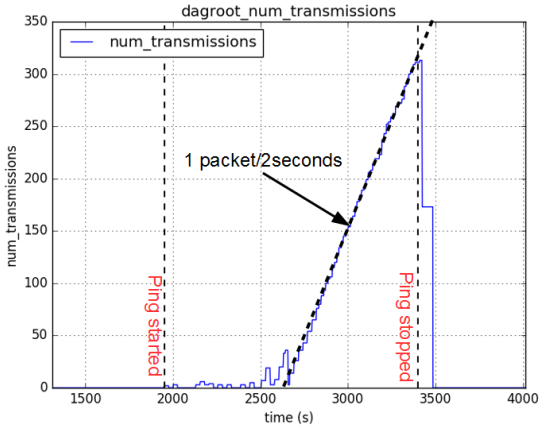
- Experiment settings
  - Wait until routing is established
  - Background upstream traffic
    - 1packet/30seconds
  - Generate downstream traffic
    - Ping mote b571 every 2 seconds
      - Roughly 1 slotframe duration
  - Data Record
    - Traffic changes
      - Number of transmission per seconds
    - Number Tx Cells
      - AutoTxCell
      - NegotiatedTxCell

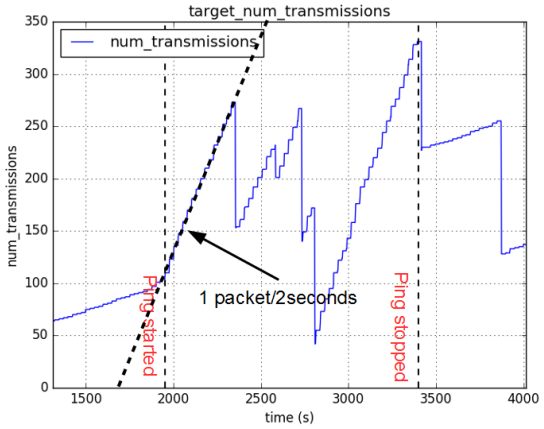


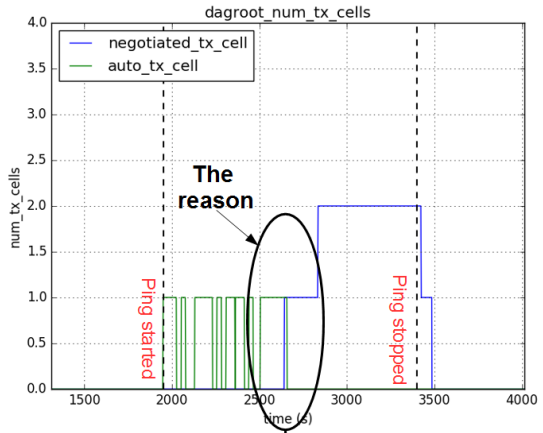
Downstream traffic adaptation

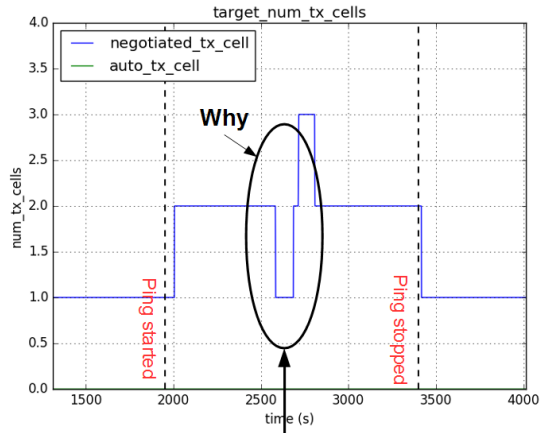


- Experiment Result
  - dagroot mote
    - Using AutoTxCell to send after pinging starts
    - Two Rx cells to target are installed
    - Two Rx cells to target are removed
  - Target mote
    - Installed a Tx Cell to dagroot after pinging starts
    - Removed a Tx cell to dagroot after ping ends
  - Number of Tx cell Fluctuation on target mote
    - Sixtop response packets is in back-off









The negotiated Tx cell to target is not installed on time.
(6P response is not sent out on time since it's in back-off)

Ping request traffic (downstream) is buffer'ed in queue.

MSF adapts traffic to delete one cell.

Ping response traffic load (upstream) decreses because of less incoming request packets.

WGLC on draft-ietf-6tisch-msf-07

- WGLC on 6TiSCH mailinglist
  - Oct 18th – Nov 1st
  - No comments
- MSF-08 is published before the IETF meeting
  - With just typo fixing, words refining
- Next step
  - MSF team: MSF is ready to submit to IESG
  - Comments required from 6TiSCH chairs