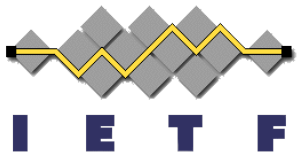
Optimal Transmission Window Option for ICMPv6 Router Advertisement

IETF 6lo WG meeting @ IETF#89
March 5, 2014



draft-savolainen-6lo-optimal-transmission-window-00

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Short history

- Presented first @ IETF#84 6man WG (July 2012)
  - draft-savolainen-6man-optimal-transmission-window-00
  - http://www.ietf.org/proceedings/84/slides/slides-84-6man-0.pdf
- The work was floating since then for various of reasons
- With more understanding now, update to I-D was made
- 6lo WG ***might*** be more suitable for this work, as charter says:
  - ”limited power, memory and processing resources”
  - ”* optimization of energy and network bandwidth usage”
  - ”Only specifications targeting constrained node networks are in scope.”

(if not, perhaps back to 6man...)

The Problem Background

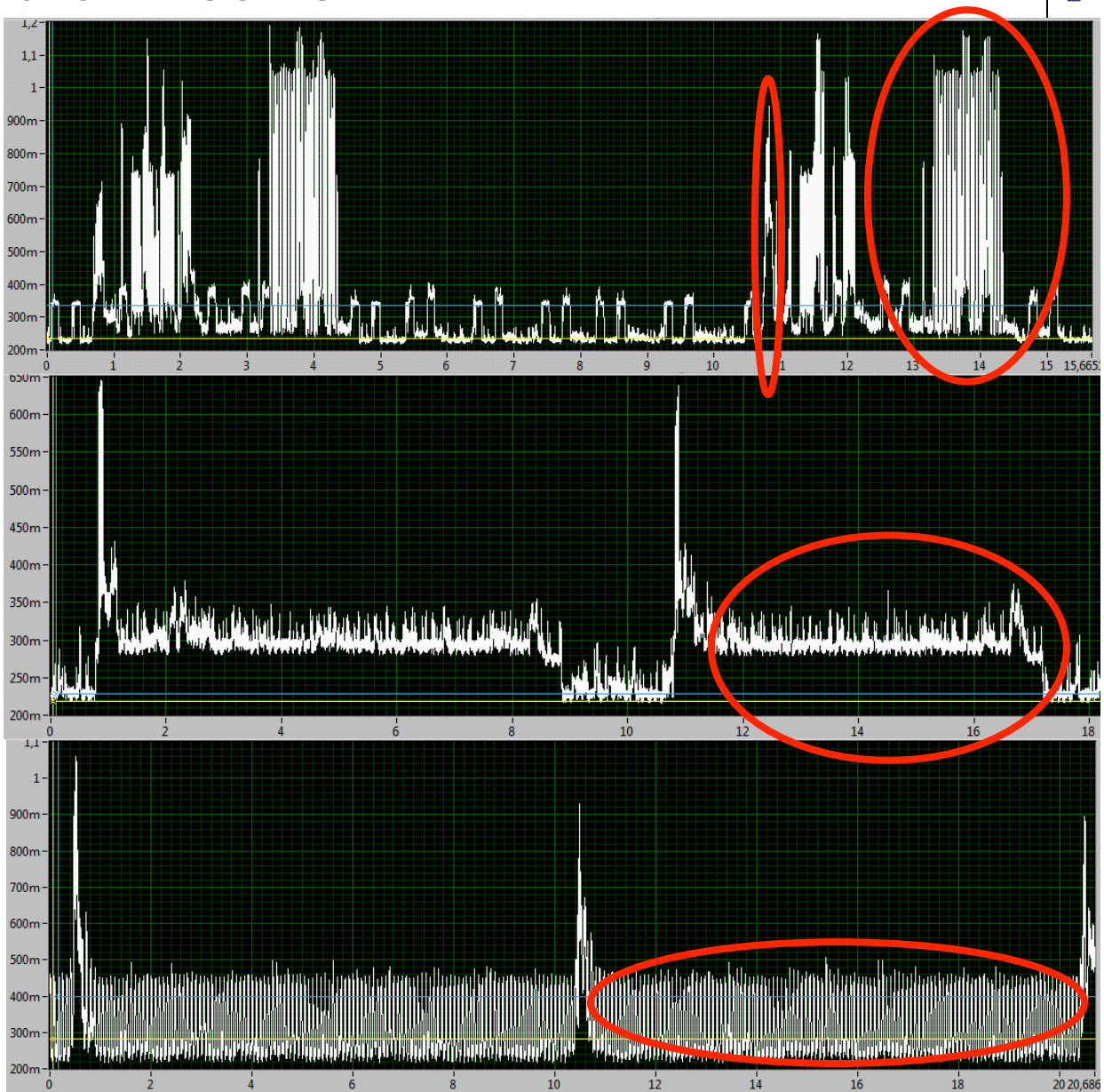
- Activation of a radio channel causes 1) ramp-up, 2) maintenance, and 3) tear-down costs in form of consumed energy – all in top of energy required for the actual data transfer
- This is especially true in 3GPP-based cellular access networks:
  - In 2G (GPRS, EDGE) networks power is required in particular for Temporary Block Flow (TBF) setup and teardown
  - In 3G (WCDMA, HSPA) networks power is required in particular for staying in Dedicated Channel state (CELL_DCH) and in Forward Access Channel state (CELL_FACH) for several seconds after actual transmission
  - In 4G (LTE) networks power is required for staying in connected mode for several seconds after actual transmission
- Optimizations **in 3GPP networks** exist in form of 3G Fast Dormancy, optimizations for timers and triggers that determine mode and state changes in 2G/3G/4G, and in LTE in form of Discontinuous Reception (DRX) that significantly decrease power consumed after last byte of transmission took place (when compared to non-DRX)…
- Optimizations ***within*** devices exist, such as heartbeat mechanisms triggering applications to perform updates at the same time wake-up cycle

Some measurements for CoAP over live cellular network

2G
EDGE

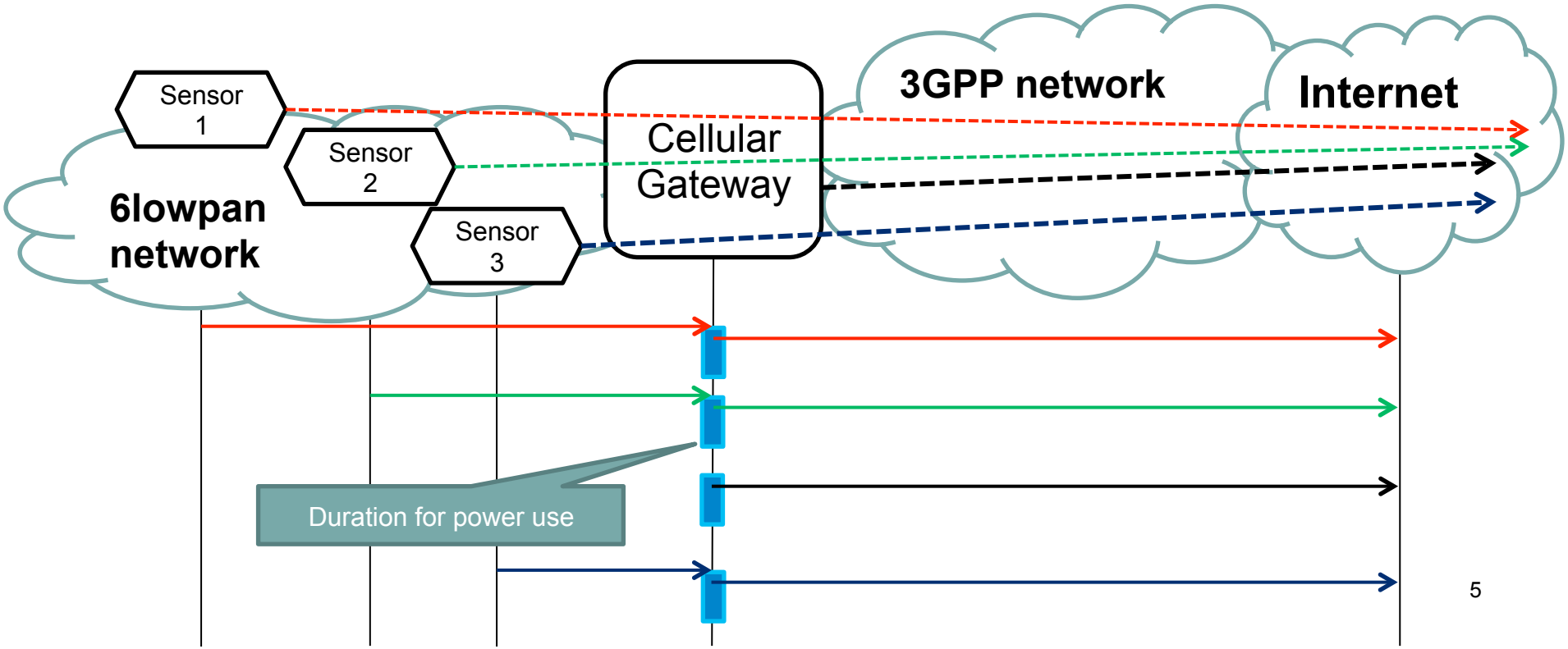
3G
HSPA

4G
LTE



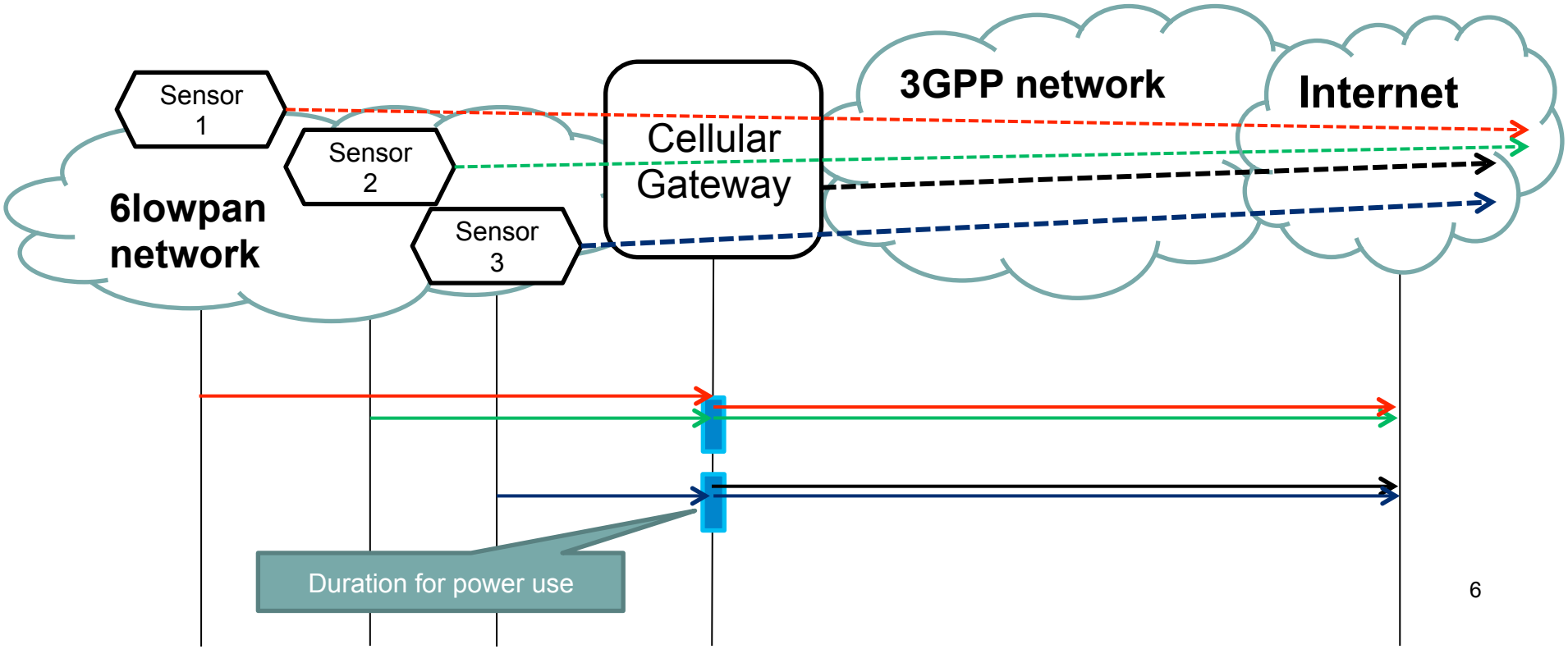
The Problem

A multitude of devices transmitting (periodically),
through a cellular using constrained gateway,
causing (possibly unnecessary) power consumption actions for every event



The Goal for a Solution

Attempt to group (periodic) transmissions, with the goal to **reduce** number of connectivity events over cellular access



One Solution

- Let nodes behind a gateway learn about periodic optimal transmission window and its timing
- Router Advertisements for information delivery
- Described in `draft-savolainen-6lo-optimal-transmission-window-00.txt`
  - Frequency of optimal transmission windows
  - Duration of windows
  - When next window occurs
  - If window is *now*

Interest in this WG?

- Any thoughts on the presented problem?
  - Do you know of other access networks where such costs are present?
- Any thoughts on the proposed solution and its usefullness?
- Is the work under the scope of this WG – or would e.g. 6man be better?