Wireless Communication and Applications

6TiSCH

Wilson Chanhemo

Individual Assignment, October 2015

Outline

Introducing 6iTSCH

- 6TiSCH is IPV6 over IEEE 802.15.4e TSCH.
- The aim of 6TiSCH standard is to use features from IEEE 802.15.4e TSCH to ensure: high throughput, reliability and power economy
- Will enable upper layer protocols such as 6loWPAN, RPL and CoAP to work with lower layers

Why 6TiSCH

- IEEE802.15.4e TSCH defines what a node does to execute a schedule, but does not detail how to build and maintain that schedule.
- Similarly, an IETF standard such as RPL organizes an existing topology into a multihop routing structure, but is agnostic to the underlying link layer technology, and hence to the notion of a TSCH communication schedule.
- The two above need to be glued in some way.

Why 6TiSCH cont...

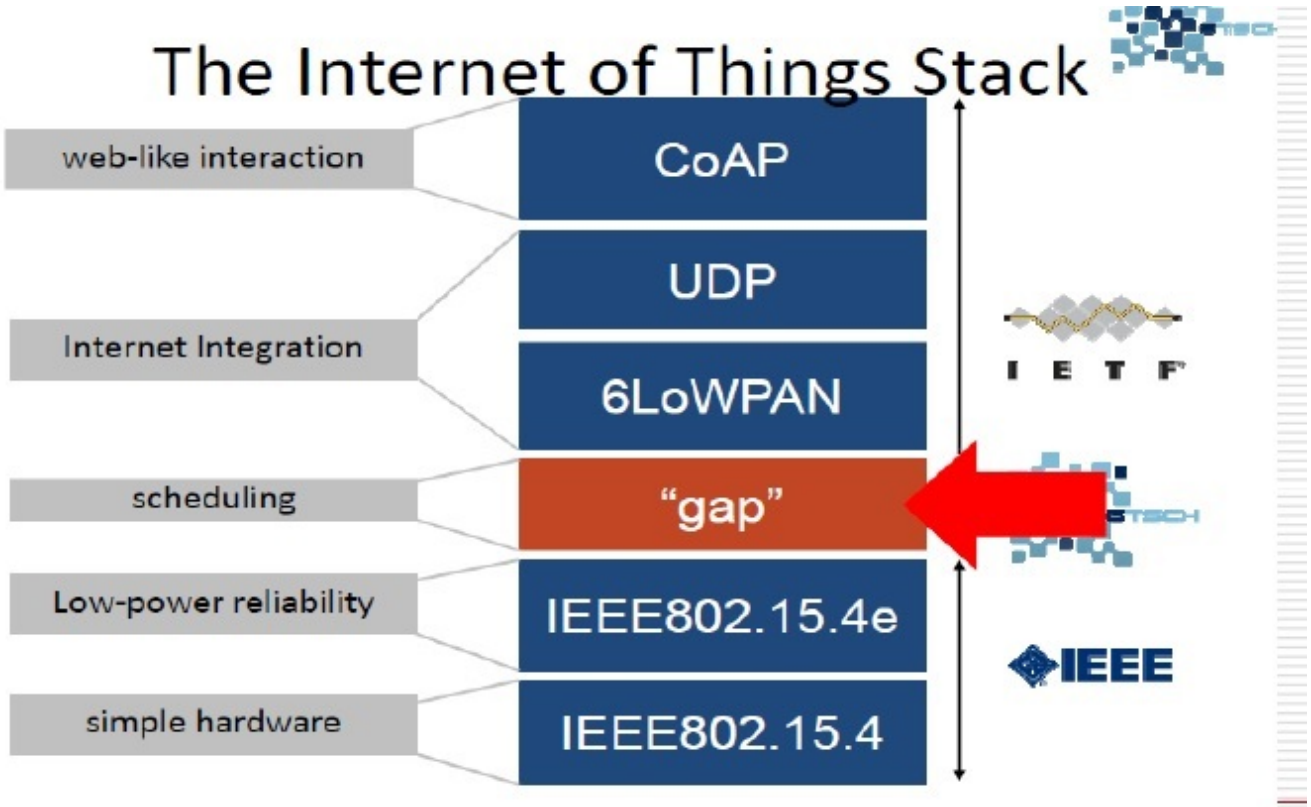

Figure: Research gap

6TiSCH Protocol Stack[Envisioned]

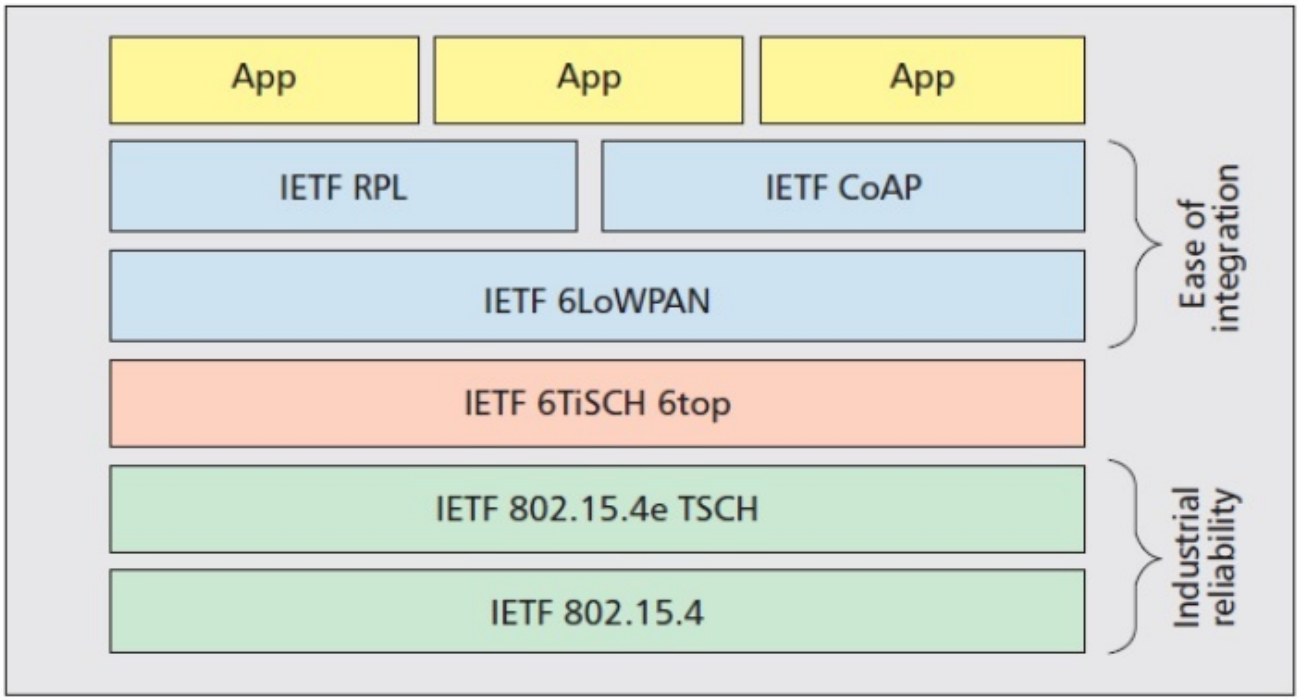

Figure: Envisioned IETF 6TiSCH stack

Current Proposals on Scheduling

- Centralized Scheduling.
  Palattella et al., Traffic Aware Scheduling Algorithm for Multi-Hop IEEE 802.15.4e Networks, Personal Indoor and Mobile Radio Communications (PIMRC), 2012 IEEE 23rd International Symposium on, 2012, pp. 327-332
- Distributed Scheduling
  D.Dujovne et al.,6TiSCH On-the-Fly Scheduling, Internet Draft [Work in progress], IETF Std., Rev. draft-dujovne-on-th-fly-02, 14Feb.2014

Research Challenges

- Optimization between different protocol interactions
  Z. Shelby et al., Neighbor Discovery Optimization for IPv6 over Low-Power Wireless Personal Area Networks (6LoWPANs), IETF 6LoWPAN Std. RFC4861,sept 2007
- Dynamic allocation of time slots in distributed scheduling
  Shanjiang Tang, Bu-Sung Lee, Bingsheng He DynamicMR: A Dynamic Slot Allocation and Scheduling Framework for MapReduce Clusters
- Security issues for data protection and Communication link protection

Questions

- ?