**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title |  |
| Date Submitted | [27 July 2016] |
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| Re: | [802.15 Standing Committees Meetings in San Diego, CA, July 2016] |
| Abstract | [IEEE 802.15 Maintenance and WNG Standing Committee Minutes] |
| Purpose | [Official minutes of the Standing Committee Session] |
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**IEEE 802.15 Interim Meeting – Session #103**

**San Diego, California**

**July 25-28, 2016**

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# SC Maintenance Minutes

## Tuesday 25 July PM2

**16:05** SC Maintenance called to order by Chair, Pat Kinney, Kinney Consulting

Chair asked if there were any issues or changes required to existing standards, there were none. Chair asked if there were any issues or changes required to the Operations Manual, there were none. Chair stated that he was willing to entertain a motion to adjourn.

**16:07** Motion to adjourn moved by C Calvert and seconded by J Holcomb. Upon no objection, the meeting was adjourned

# SC IETF Minutes

## Tuesday 26 July AM1

## 6tisch

### Draft-ietf-6tisch-minimal

Rev16 published, now in AD follow-up

### Draft-ietf-6tisch-6top-protocol

Rev 1 published, tested at ETSI plugtest

### Draft-ietf-6tisch-6top-sf0

Rev 1 published, tested at ETSI plugtest

### Draft-ietf-6tisch-architecture

Rev 10 published

### Next Step

Submission of Draft-ietf-6tisch-6top-sublayer to IESG

## Core

### draft-ietf-core-coap-tcp-tls-03

changes required to use CoAP over TCP, TLS, and WebSockets transports

### draft-ietf-core-resource-directory-08

direct discovery of resources is not practical due to sleeping nodes, dispersed networks, or networks where multicast traffic is inefficient. These problems can be solved by employing an entity called a Resource Directory (RD), which hosts descriptions of resources held on other servers, allowing lookups to be performed for those resources.

tutorial of above starts at page 13 of [**http://ipj.dreamhosters.com/wp-content/uploads/issues/2016/ipj19-2.pdf**](http://ipj.dreamhosters.com/wp-content/uploads/issues/2016/ipj19-2.pdf)

### draft-ietf-core-links-json-06

represent collections of Web links in JSON for outside of constrained environments, and in CBOR for inside constrained environments. This specification defines a common format for this.

In last WGLC

### Roadmap

relationship to LWM2M; should COMI and LWM2M converge, and, if yes, how?

## Core (Tuesday 2016-07-19)

### draft-ietf-core-block-21.txt is in the RFC editor queue.

### draft-ietf-core-etch–01:

WGLC is completed, issues discussed. To be determined: 4.12 vs. 4.09.  When that is settled, updated version to be submitted to IESG.

### draft-ietf-core-links-json–06 is

in the middle of WGLC and was briefly discussed.  There are some claims in the document that it considers a larger world of JSON-LD etc.; the intention however is to be a simple RFC 6690 mapping and those claims will be cut down.

### draft-ietf-core-coap-tcp-tls–03:

The merge of TCP/TLS, Websockets, Signaling, and BERT was completed in this version.  Several issues discussed.  In particular, there was in-room consensus to follow the lead of RFC 7252 and make the use of TLS mandatory to implement with the larger number of transport schemes now available

### draft-silverajan-core-coap-protocol-negotiation-03 was discussed.

There is good interest in this ongoing work, some of which is also related to other ongoing work in T2TRG.

### draft-ietf-core-resource-directory–08 is nearing WGLC; reviewers have been identified.

Brief introductions were made for

###  draft-gomez-core-tcp-constrained-node-networks–00,

###  draft-groves-coap-webrtcdc–00,

###  draft-zheng-core-coap-lantency-evaluation–00.

For draft-bormann-core-cocoa-04, there was in-room consensus for working-group adoption; to be confirmed on the list.

## Core (Thursday 2016-07-21)

draft-ietf-core-http-mapping-13 took some minor fixes and has been submitted to IESG

For the core-interfaces draft, the split was confirmed into draft-ietf-core-interfaces–05 and draft-groves-core-dynlink–00 (plus some material that was removed and maybe can be picked up by T2TRG); as not enough people had read the split-off draft-groves, we will take the otherwise obvious adoption to the list.

draft-ietf-core-yang-cbor–02: target is to do some additional validation with the NetMod experts and check again by end of September. There are a couple of implementations ongoing.

draft-somaraju-core-sid–01. One suggestion was to use an OID subtree. Too few people had read the newest version for room consensus on working-group adoption, but no one against; to be taken to the list.

draft-veillette-core-cool & draft-vanderstok-comi: around 6 people read the draft, agreement on splitting out the more advanced features so a basic specification can be completed by the end of the year. Work ongoing on mapping YANG and LWM2M/IPSO objects. Some concerns about the diagnostic value of SIDs in debugging and possible problems with YANG "choice", work needs to continue.

draft-hartke-core-e2e-security-reqs–01: good rewrite; further requirements are being identified, discussion to be taken to the mailing list.

draft-selander-ace-object-security–05: room consensus to adopt as WG item, to be confirmed on the mailing list.

draft-ietf-core-senml–02: good ongoing discussion that should be completed on the mailing list.

draft-koster-core-coap-pubsub–05: brokerless pubsub has been added. Take adoption to mailing list but clear room consensus already (~10 people), reviewers identified.

## 6lo

### draft-ietf-6lo-dispatch-iana-registry-03

This document updates RFC4944 and RFC6282 by defining the ESC extension byte code points including registration of entries for known use-cases at the time of writing of this document

Ready for IESG submission after draft edits

### draft-ietf-6lo-paging-dispatch-02

introduces a new context switch mechanism for 6LoWPAN compression, expressed in terms of Pages and signaled by a new Paging Dispatch

Passed last call but missing Shepard Review

### draft-thubert-6lo-rfc6775-update-00

update to 6LoWPAN Neighbor Discovery to clarify the role of the protocol as a registration technique, and provide enhancements to the registration capabilities, in particular for the registration to a backbone router for proxy ND operations

### draft-ietf-6lo-privacy-considerations-01

how a number of privacy threats apply to technologies designed for IPv6 over networks of resource-constrained nodes, and provides advice to protocol designers on how to address such threats in adaptation layer specifications for IPv6 over such links.

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## ROLL

When to use RFC 6553, 6554 and IPv6-in-IPv6

draft-ietf-roll-useofrplinfo

Presenter noted that ‘draft-ietf-6man-rfc2460bis-05’ could have a positive impact on routing and presented three scenarios with and without 2460bis

Source-Routed Multicast for RPL

draft-bergmann-bier-ccast

Use of Bloom filter concept

Concept uses a hash function, noting that although false positives create spurious transmissions wasting energy, the behavior is still functionally correct. Question as to how bad is energy waste compared to the energy saved by sending less packets.

Presented a numerical analysis with up to 100 forwarders

Introduces MLAO. Might use a 6LoRH header.

Noted that this was implemented in Contiki in 2013 (along with a non-storing mode)

DIS modifications

 draft-gundogan-roll-dis-modifications-00

 desiring to make it quieter, there are 3 behaviors to modify:

DIS type and Trickle timer: Proposes DIS flags to have better control on responses, and response spreading in time if collisions are expected.

Selectivity of DIS requests: described current behavior of selectivity of multicast DIS messages and proposed improved behavior.

Information carried by DIO. Desired: be able to tell in the DIS which information should be included in DIO response; proposed R flag and TLV to do that.

MPL Forwarder Select

draft-vanderstok-roll-mpl-forw-select

dense network with MPL forwarding creates lots of forwarding.

to reduce the number of forwarders an algorithm that automatically selects the forwarders could be advantageous. Assumption used is net is relatively stable.

AODV-RPL

draft-satish-roll-aodv-rp

No-Path DAO Problem Statement

draft-jadhav-roll-no-path-dao-ps-00

## Detnet

Use cases – update

draft-ietf-detnet-use-cases-10

Slides: http://www.ietf.org/proceedings/96/slides/slides-96-detnet-1.pptx

DetNet Architecture

draft-finn-detnet-architecture-06

DetNet Data Plane Protocol and Solution Alternative

draft-dt-detnet-dp-alt-01

DetNet service model

draft-varga-detnet-service-model-00

DetNet flow information model

draft-zha-detnet-flow-info-model-00

## lp-wan (bof)

### Applicability and Gap analysis

draft-minaburo-lp-wan-gap-analysis

draft-gomez-lpwan-ipv6-analysis (Analysis of IPv6 over LPWA: design space and challenges)

### Technology slot 1: 3GPP LPWA (NB-IoT / EC-GSM-IoT / Cat-M1)

draft-ratilainen-lpwan-nb-iot-00

use licensed band from already deployed networks instead of unlicensed bands such as sigfox

three operation modes: use one gsm band, use the guard band (whitespace) in band using LTE band

receiver sensitivity -141dBm, QPSK, 180 kHz bandwidth.

Packet data convergence protocol (PDCP) right below IP, 1600 bytes. Use all the already existing mechanisms (NAS: Non access stratum and AS: Access Stratum)

Mutual authentication. Shared secrets on the user.

### Technology slot 2: IEEE LPWA (Wi-SUN, IEEE 802.15.4g)

[**https://www.ietf.org/proceedings/96/slides/slides-96-lpwan-8.pdf**](https://www.ietf.org/proceedings/96/slides/slides-96-lpwan-8.pdf)

LPWAN’s target is narrower than the domain covered by IEEE802.15.4

802.15.4 is highly flexible with a range of different capabilities

Allows for optimized L1/L2 approaches depending on application (in-building, Industrial IoT, Field Area Networks of various classes, etc)

Supports both structured and ad hoc, self forming network architectures

### Technology slot 3: LoRa

draft-vilajosana-lpwan-lora-hc-00

Modulation - LoRa (spread spectrum), Frequency - Sub-GHz ISM

Channel bandwidth - 125-500 KHz, Data rate - 300 bps – 50 kbps

Gateway sensitivity -142 dBm/300bps, Range 10+ km, deep indoor coverage

Payload size 11 – 242 bytes (variable)

Battery consumption 10mA RX / 32mA (14dBm) TX -- 10+ year

Communication type Bidirectional unicast, network multicast

### Technology slot 4: SIGFOX

 draft-zuniga-lpwan-sigfox-system-description-00

#### Uplink

Channelization mask: 100 Hz (600 Hz in the USA)

Uplink baud rate: 100 baud (600 baud in the USA), Modulation scheme: DBPSK

Link budget: 155 dB (or better)

In Europe, the UNB uplink frequency band is limited to 868,00 to 868,60 MHz, with a maximum output power of 25 mW and a maximum mean transmission time of 1%

#### Downlink

Channelization mask: 1.5 kHz, Downlink baud rate: 600 baud Modulation: GFSK

TX power: 500 mW (4W in the USA), Link budget: 153 dB (or better)

In Europe, the UNB downlink frequency band is limited to 869.40 to 869.65 MHz, with a maximum output power of 500 mW with 10% duty cycle

Unicast asynchronous communications

Max limitation: 140 Uplink vs. 4 Downlink messages per day

Limitations can be slightly relaxed depending on system conditions

Fragmentation and encryption at application layer

L2 security

Message authentication code and unique device ID

Key management: pre-provisioned

### Charter Point 1

Produce an Informational document describing and relating some selected LPWA technologies. This work will document the common characteristics and highlight actual needs that the IETF could serve; but it is not an intention to provide a competitive analysis. It is expected that the information contained therein originates from and is reviewed by LPWA stakeholders, and that this WG may leverage the resulting document to suggest new activity in other WGs

### Charter Point 2

Produce best practice documents highlighting potential areas where IETF technologies may be leveraged; these documents may eventually be published as Informational RFCs. It is an expectation that the resulting document(s) may contribute to the interaction with LPWA stakeholders and lead to additional work in the future. Envisioned topics include security, management, and cross-layer optimizations.

### Charter Point 3

Produce Standard Track documents to enable the compression of a CoAP/UDP/IPv6 packet over LPWA. Considering the extreme constraints, the work will focus on a generic YANG data model to describe the compression, and protocols to install the related state at the compression end-points; the work will also include, for the selected technologies, specific Standard Track documents to describe how the fields relevant to the decompression are encoded over the air, if any

### Charter Point 4

Produce a document to enable the fragmentation of larger packets over LPWA, either as a Best Practice leveraging existing technology, or as new Standard Track document if that is deemed necessary.

## IEEE 802.15 and IETF liaison communications

6lo: Neighbor discovery (RFC6775) could be further optimized to reduce neighbor discovery traffic. SC IETF will define edits to RFC6775 to show possible optimization.

lp-wan: SC IETF can identify solutions to numerous problems stated for lp-wan. SC IETF could produce a document describing the behaviors in 802.15.4 (LECIM) and 802.15.9 (KMP) that address the noted problems.

6lo: SC IETF could identify header compression methods that apply to IP but could be extended to MAC and PHY by IEEE 802.15.

# Joint Meeting between 802.15 and 802.1

## Tuesday 26 July PM3

# Agenda approval

## WiFi liaison stating a perceived market need to interwork between 802.11ah and 802.15.4g at layer 2

### Consensus at the meeting was that the liaison request was not sufficiently detailed to indicate why a router would not fulfill the use case needs.

### Action Item: 802.1 and 802.15 to draft a reply to the WiFi request asking for additional details along with an expert at the San Antonio session.

## 802.15 Relevant TG status reports

### Update on 802.15.10: L2R status

### Update on 802.15.12: ULI status

### Update on 802.15.3

802.15.3m: Revision

802.15.3d: 100 Gbit/s Wireless

802.15.3e: High Rate Close Proximity

# 802.1 efforts that should be considered by 802.15

# SC WNG meeting

## Wednesday 27 July AM2

**11:05** SC WNG called to order by Chair P Kinney, Kinney Consulting

There were two presentations:

## IEEE Standards for Low Power Wide Area Networks (15-16-486-01) by Jörg Robert

* + Q: Shannon capacity is about 20 dB more than most, but about 10 dB is due to real life implementation. Is it worth trying to develop a scheme to get better results R: A 10 dB improvement would be worth it, but a couple of dB may not be useful.
	+ C: Given a tower installation, 3 – 4 dB would be worth the effort
	+ C: Some pilots are being deployed, results will be important
	+ C: IEEE 802.22 is a current standard that seems to be for similar uses. R: not aware of 802.22. Q: what specific frequency band? R: licensed and unlicensed.
	+ Q: slide 13 – SigFox is working on ETSI ERM TC28, but there is an Internet draft that has more information. R: will revise this document given additional information.
	+ C: devices use a smaller bandwidth than the maximum stated in the presentation, so noises will be lower.
* Chair asked Jörg as to what action he desired from the WG as to his presentation; Jörg replied that he wished to form an IG. Chair asked the attendees, via a show of hands, of those persons willing to participate in an IG focused on LP-WANs? There were about 40. An LP-WAN IG will be started, Jörg volunteered to chair the IG.

## History and Implementation of the IEEE 802 Security Architecture (15-16-0489-01) by Meareg Abreha

##  802E Privacy Report (11-16-1029-00) Juan Carlos

**12:18** meeting adjourned