LPWAN WG

WG Chairs:
Alexander Pelov <a@ackl.io>
Pascal Thubert <pthubert@cisco.com>

AD: Suresh Krishnan
<suresh@kaloom.com>
Note Well

This is a reminder of IETF policies in effect on various topics such as patents or code of conduct. It is only meant to point you in the right direction. Exceptions may apply. The IETF's patent policy and the definition of an IETF "contribution" and "participation" are set forth in BCP 79; please read it carefully.

As a reminder:
- By participating in the IETF, you agree to follow IETF processes and policies.
- If you are aware that any IETF contribution is covered by patents or patent applications that are owned or controlled by you or your sponsor, you must disclose that fact, or not participate in the discussion.
- As a participant in or attendee to any IETF activity you acknowledge that written, audio, video, and photographic records of meetings may be made public.
- Personal information that you provide to IETF will be handled in accordance with the IETF Privacy Statement.
- As a participant or attendee, you agree to work respectfully with other participants; please contact the ombudsteam (https://www.ietf.org/contact/ombudsteam/) if you have questions or concerns about this.

Definitive information is in the documents listed below and other IETF BCPs. For advice, please talk to WG chairs or ADs:

- BCP 9 (Internet Standards Process)
- BCP 25 (Working Group processes)
- BCP 25 (Anti-Harassment Procedures)
- BCP 54 (Code of Conduct)
- BCP 78 (Copyright)
- BCP 79 (Patents, Participation)

https://www.ietf.org/privacy-policy/ (Privacy Policy)
Reminder:

Minutes are taken *
This meeting might be recorded **
Presence is logged ***

* Scribe; please contribute online to the minutes at: https://etherpad.tools.ietf.org/p/lpwan
** Recordings and Minutes are public and may be subject to discovery in the event of litigation.
*** From the Webex login
Agenda bashing

[16:05] Administrivia [5min]
  o  Note-Well, Scribes, Agenda Bashing
  o  Status of drafts

[16:10] Last updates of SCHC IP/UDP (Dominique) [15min]
[16:25] SCHC YANG Data Model (Laurent) [25min]
[16:50] LoRAWAN IID (Olivier) [10min]
[17:00] AOB
## WG progress

### Milestones

<table>
<thead>
<tr>
<th>Date</th>
<th>Milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Done</td>
<td>Submit CoAP compression mechanism to the IESG for publication as a Proposed Standard</td>
</tr>
<tr>
<td>Done</td>
<td>Submit IP/UDP compression and fragmentation mechanism to the IESG for publication as a Proposed Standard</td>
</tr>
<tr>
<td>Done</td>
<td>Submit LPWAN specification to the IESG for publication as an Informational Document</td>
</tr>
<tr>
<td>Done</td>
<td>Adopt CoAP compression mechanism as a WG item</td>
</tr>
<tr>
<td>Done</td>
<td>Adopt IP/UDP compression and fragmentation mechanism as a WG item</td>
</tr>
<tr>
<td>Done</td>
<td>Adopt LPWAN specifications as WG item</td>
</tr>
</tbody>
</table>
# Document advancement

## Active Internet-Drafts (5 hits)

<table>
<thead>
<tr>
<th>Draft</th>
<th>Title</th>
<th>Date</th>
<th>Status</th>
<th>IPR</th>
<th>AD / Shepherd</th>
</tr>
</thead>
<tbody>
<tr>
<td>draft-ietf-lpwan-coap-static-context-hc-12</td>
<td>LPWAN Static Context Header Compression (SCHC) for CoAP</td>
<td>2019-12-10</td>
<td>AD Evaluation for 75 days Submitted to IESG for Publication: Proposed Standard Reviews: iotdir</td>
<td></td>
<td>Suresh Krishnan Pascal Thubert</td>
</tr>
<tr>
<td>draft-ietf-lpwan-ipv6-static-context-hc-24</td>
<td>Static Context Header Compression (SCHC) and fragmentation for LPWAN, application to UDP/IPv6</td>
<td>2019-12-05</td>
<td>RFC Ed Queue: EDIT for 28 days Submitted to IESG for Publication: Proposed Standard Reviews: genart, intdir, opsdir, secdir</td>
<td></td>
<td>Suresh Krishnan Pascal Thubert</td>
</tr>
<tr>
<td>draft-ietf-lpwan-schc-over-lorawan-05</td>
<td>Static Context Header Compression (SCHC) over LoRaWAN</td>
<td>2019-12-20</td>
<td>I-D Exists WG Document</td>
<td></td>
<td></td>
</tr>
<tr>
<td>draft-ietf-lpwan-schc-over-nbiot-01</td>
<td>SCHC over NB-IoT</td>
<td>2019-11-16</td>
<td>I-D Exists WG Document</td>
<td></td>
<td></td>
</tr>
<tr>
<td>draft-ietf-lpwan-schc-over-sigfox-01</td>
<td>SCHC over Sigfox LPWAN</td>
<td>2019-11-04</td>
<td>I-D Exists WG Document</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Related Internet-Drafts (5 hits)

<table>
<thead>
<tr>
<th>Draft</th>
<th>Title</th>
<th>Date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>draft-thubert-lpwan-schc-over-ppp-00</td>
<td>SCHC over PPP</td>
<td>2019-12-03</td>
<td>I-D Exists</td>
</tr>
</tbody>
</table>

Interim, January 8th, 2020
## IETF 107 Meeting Req

<table>
<thead>
<tr>
<th>Working Group Name:</th>
<th>IPv6 over Low Power Wide-Area Networks (lpwan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area Name:</td>
<td>Internet Area</td>
</tr>
<tr>
<td>Number of Sessions Requested:</td>
<td>1</td>
</tr>
<tr>
<td>Length of Session 1:</td>
<td>1.5 Hours</td>
</tr>
<tr>
<td>Number of Attendees:</td>
<td>60</td>
</tr>
<tr>
<td>Conflicts to Avoid:</td>
<td>Chair Conflict: 6lo roll rift core intarea raw 6man</td>
</tr>
<tr>
<td></td>
<td>Technology Overlap: detnet netconf lwg suit cbor lake</td>
</tr>
<tr>
<td></td>
<td>Key Participant Conflict: bier ace</td>
</tr>
<tr>
<td>Other WGs that included IPv6 over Low Power Wide-Area Networks in their conflict list:</td>
<td>intarea, babel</td>
</tr>
<tr>
<td>Resources requested:</td>
<td>None so far</td>
</tr>
<tr>
<td>People who must be present:</td>
<td>Suresh Krishnan</td>
</tr>
<tr>
<td></td>
<td>Pascal Thubert</td>
</tr>
<tr>
<td></td>
<td>Alexander Pelov</td>
</tr>
</tbody>
</table>
IETF 107 Dates

- **2019-12-16 (Monday)**: Working Group and BOF scheduling begins. To request a Working Group session, use the [IETF Meeting Session Request Tool](https://www.ietf.org). If you are working on a BoF request, it is highly recommended to tell the IESG now by sending an email to iesg@ietf.org to get advance help with the request.
- **2019-12-16 (Week of)**: IETF Online Registration Opens. [Register here](https://www.ietf.org).
- **2020-02-03 (Monday)**: Early Bird registration and payment cut-off at UTC 23:59. [Register here](https://www.ietf.org).
- **2020-02-07 (Friday)**: Cut-off date for BOF proposal requests to Area Directors at UTC 23:59. To request a BOF, please see instructions on [Requesting a BOF](https://www.ietf.org).
- **2020-02-07 (Friday)**: Cut-off date for requests to schedule Working Group Meetings at UTC 23:59. To request a Working Group session, use the [IETF Meeting Session Request Tool](https://www.ietf.org).
- **2020-02-07 (Friday)**: Cut-off date for Area Directors to approve BOFs at UTC 23:59.
- **2020-02-14 (Friday)**: Cut-off date for Area Directors to approve BOFs at UTC 23:59.
- **2020-02-21 (Friday)**: Final agenda to be published.
- **2020-03-09 (Monday)**: Internet Draft submission cut-off (for all drafts, including -00) by UTC 23:59. Upload using the [ID Submission Tool](https://www.ietf.org).
- **2020-03-09 (Monday)**: Standard rate registration and payment cut-off at UTC 23:59.
- **2020-03-16 (Monday)**: Registration cancellation cut-off at UTC 23:59.
- **2020-04-17 (Friday)**: Proceedings submission cutoff date by UTC 23:59. Upload using the [Meeting Materials Management Tool](https://www.ietf.org).
- **2020-05-11 (Monday)**: Proceedings submission corrections cutoff date by UTC 23:59.
draft-ietf-lpwan-ipv6-static-context-hc
status

Authors:
Laurent Toutain <Laurent.Toutain@imt-atlantique.fr>
Carles Gomez <carlesgo@entel.upc.edu>
Ana Minaburo <ana@acklio.io>
Dominique Barthel <dominique.barthel@orange.com>
Juan Carlos Zuniga <juancarlos.zuniga@sigfox.com>
What has happened since IETF106?

- IETF106 LPWAN meeting on Nov 19th
- Issued -23 on Nov 28th
  - Several editorial improvements
  - App. A compression rules example update
- Carsten provided a second review, Nov 29th, on -23
  - About 60 comments/questions/edits
  - Thanks a lot, Carsten!
  - We responded to all points
What has happened since IETF106?

• Issued -24 on Dec 5th, lots of editorial improvements and also
  – Multiple compression Rules matching
  – Better use of RECOMMENDED in Integrity Checking
  – Better MUST about differentiating All-0 Fragment and ACK REQ
  – Better MUST about differentiating All-1 Fragment and Sender Abort
  – Clarified lifetime of DTag in ACK-Always/ACK-on-Error receiver
  – Clarified Attempts counter in ACK-Always receiver
  – Privacy-providing tunnel assumption in Security Considerations

• -24 approved by Suresh
• Released to RFC Editors on Dec 11th
Conclusions, next steps

• Worked hard to write a good enough specification
  – Functional
  – Efficient
  – Unambiguous
  – Understandable
  – While being mindful of elapsed time and risks associated with being late

• Now put to the test
  – schc-over-foo drafts being written, questions/comments by authors
  – Questions by implementers
Thank you!
SCHC yang data model

Ana Minaburo
Laurent Toutain

LPWAN Interim meeting 01/08/20
Yang data model

● Divided into 2 parts:
  ○ SCHC-ID : contains definition of types and identifier used in SCHC
    ■ Field-id id, MO id, CDA id
    ■ Type definitions for these fields
  ○ SCHC : defines the context model for compression and fragmentation

● Merged together when the model will be stable.
schc-id.yang

```yang
identity field-id-base-type {
  description "Field ID with SID";
}

identity fid-ipv6-version {
  base field-id-base-type;
  description "IPv6 version field from RFC8200";
}

identity fid-ipv6-trafficclass {
  base field-id-base-type;
  description "IPv6 Traffic Class field from RFC8200";
}

identity fid-ipv6-trafficclass-ds {
  base field-id-base-type;
  description "IPv6 Traffic Class field from RFC8200,
               DiffServ field from RFC3168";
}

identity fid-ipv6-trafficclass-ecn {
  base field-id-base-type;
  description "IPv6 Traffic Class field from RFC8200,
               ECN field from RFC3168";
}
```

typedef field-id-type {
  description "Field ID generic type.";
  type identityref {
    base field-id-base-type;
  }
}
<table>
<thead>
<tr>
<th>SID</th>
<th>Assigned to</th>
</tr>
</thead>
<tbody>
<tr>
<td>10000</td>
<td>identity /compression-decompression-action-base-type</td>
</tr>
<tr>
<td>10001</td>
<td>identity /compression-decompression-action-base-type/cda-appiid</td>
</tr>
<tr>
<td>10002</td>
<td>identity /compression-decompression-action-base-type/cda-compute-checksum</td>
</tr>
<tr>
<td>10003</td>
<td>identity /compression-decompression-action-base-type/cda-compute-length</td>
</tr>
<tr>
<td>10004</td>
<td>identity /compression-decompression-action-base-type/cda-deviid</td>
</tr>
<tr>
<td>10005</td>
<td>identity /compression-decompression-action-base-type/cda-lsb</td>
</tr>
<tr>
<td>10006</td>
<td>identity /compression-decompression-action-base-type/cda-mapping-sent</td>
</tr>
<tr>
<td>10007</td>
<td>identity /compression-decompression-action-base-type/cda-value-sent</td>
</tr>
<tr>
<td>10008</td>
<td>identity /direction-indicator-base-type</td>
</tr>
<tr>
<td>10009</td>
<td>identity /direction-indicator-base-type/di-bidirectional</td>
</tr>
<tr>
<td>10010</td>
<td>identity /direction-indicator-base-type/di-down</td>
</tr>
<tr>
<td>10011</td>
<td>identity /direction-indicator-base-type/di-up</td>
</tr>
<tr>
<td>10012</td>
<td>identity /field-id-base-type</td>
</tr>
<tr>
<td>10013</td>
<td>identity /field-id-base-type/fid-coap-code</td>
</tr>
<tr>
<td>10014</td>
<td>identity /field-id-base-type/fid-coap-code-class</td>
</tr>
<tr>
<td>10015</td>
<td>identity /field-id-base-type/fid-coap-code-detail</td>
</tr>
<tr>
<td>10016</td>
<td>identity /field-id-base-type/fid-coap-mid</td>
</tr>
<tr>
<td>10017</td>
<td>identity /field-id-base-type/fid-coap-option-accept</td>
</tr>
<tr>
<td>10018</td>
<td>identity /field-id-base-type/fid-coap-option-block1</td>
</tr>
<tr>
<td>10019</td>
<td>identity /field-id-base-type/fid-coap-option-block2</td>
</tr>
<tr>
<td>10020</td>
<td>identity /field-id-base-type/fid-coap-option-content-format</td>
</tr>
<tr>
<td>10021</td>
<td>identity /field-id-base-type/fid-coap-option-end-option</td>
</tr>
<tr>
<td>10022</td>
<td>identity /field-id-base-type/fid-coap-option-etag</td>
</tr>
<tr>
<td>10023</td>
<td>identity /field-id-base-type/fid-coap-option-if-match</td>
</tr>
<tr>
<td>10024</td>
<td>identity /field-id-base-type/fid-coap-option-ifsbs-matching</td>
</tr>
<tr>
<td>10025</td>
<td>identity /field-id-base-type/fid-coap-option-if-none-match</td>
</tr>
<tr>
<td>10026</td>
<td>identity /field-id-base-type/fid-coap-option-location-path</td>
</tr>
<tr>
<td>10027</td>
<td>identity /field-id-base-type/fid-coap-option-location-query</td>
</tr>
<tr>
<td>10028</td>
<td>identity /field-id-base-type/fid-coap-option-max-age</td>
</tr>
<tr>
<td>10029</td>
<td>identity /field-id-base-type/fid-coap-option-no-response</td>
</tr>
<tr>
<td>10030</td>
<td>identity /field-id-base-type/fid-coap-option-observe</td>
</tr>
<tr>
<td>10031</td>
<td>identity /field-id-base-type/fid-coap-option-proxy-scheme</td>
</tr>
<tr>
<td>10032</td>
<td>identity /field-id-base-type/fid-coap-option-proxy-url</td>
</tr>
<tr>
<td>10033</td>
<td>identity /field-id-base-type/fid-coap-option-size1</td>
</tr>
<tr>
<td>10034</td>
<td>identity /field-id-base-type/fid-coap-option-size2</td>
</tr>
<tr>
<td>10035</td>
<td>identity /field-id-base-type/fid-coap-option-uri-host</td>
</tr>
<tr>
<td>10036</td>
<td>identity /field-id-base-type/fid-coap-option-uri-path</td>
</tr>
<tr>
<td>10037</td>
<td>identity /field-id-base-type/fid-coap-option-uri-query</td>
</tr>
<tr>
<td>10038</td>
<td>identity /field-id-base-type/fid-coap-option-uri-query</td>
</tr>
<tr>
<td>10039</td>
<td>identity /field-id-base-type/fid-coap-token</td>
</tr>
<tr>
<td>10040</td>
<td>identity /field-id-base-type/fid-coap-version</td>
</tr>
<tr>
<td>10041</td>
<td>identity /field-id-base-type/fid-ipv6-appiid</td>
</tr>
<tr>
<td>10042</td>
<td>identity /field-id-base-type/fid-ipv6-appprefix</td>
</tr>
<tr>
<td>10043</td>
<td>identity /field-id-base-type/fid-ipv6-deviid</td>
</tr>
<tr>
<td>10044</td>
<td>identity /field-id-base-type/fid-ipv6-devprefix</td>
</tr>
<tr>
<td>10045</td>
<td>identity /field-id-base-type/fid-ipv6-flowLabel</td>
</tr>
<tr>
<td>10046</td>
<td>identity /field-id-base-type/fid-ipv6-hoplimit</td>
</tr>
<tr>
<td>10047</td>
<td>identity /field-id-base-type/fid-ipv6-nextheader</td>
</tr>
<tr>
<td>10048</td>
<td>identity /field-id-base-type/fid-ipv6-payloadlength</td>
</tr>
<tr>
<td>10049</td>
<td>identity /field-id-base-type/fid-ipv6-trafficclass</td>
</tr>
<tr>
<td>10050</td>
<td>identity /field-id-base-type/fid-ipv6-trafficclass-class</td>
</tr>
<tr>
<td>10051</td>
<td>identity /field-id-base-type/fid-ipv6-trafficclass-ecn</td>
</tr>
<tr>
<td>10052</td>
<td>identity /field-id-base-type/fid-udp-app-port</td>
</tr>
<tr>
<td>10053</td>
<td>identity /field-id-base-type/fid-udp-checksum</td>
</tr>
<tr>
<td>10054</td>
<td>identity /field-id-base-type/fid-udp-devport</td>
</tr>
<tr>
<td>10055</td>
<td>identity /field-length-base-type/fid-udp-traillength</td>
</tr>
<tr>
<td>10056</td>
<td>identity /field-length-base-type/fid-token-length</td>
</tr>
<tr>
<td>10057</td>
<td>identity /field-length-base-type/fid-variable</td>
</tr>
<tr>
<td>10058</td>
<td>identity /matching-operator-base-type/mo-equal</td>
</tr>
<tr>
<td>10059</td>
<td>identity /matching-operator-base-type/mo-ignore</td>
</tr>
<tr>
<td>10060</td>
<td>identity /matching-operator-base-type/mo-matching</td>
</tr>
<tr>
<td>10061</td>
<td>identity /matching-operator-base-type/mo-observe</td>
</tr>
<tr>
<td>10062</td>
<td>identity /matching-operator-base-type/mo-proxy-scheme</td>
</tr>
<tr>
<td>10063</td>
<td>identity /matching-operator-base-type/mo-proxy-url</td>
</tr>
<tr>
<td>10064</td>
<td>identity /matching-operator-base-type/mo-size1</td>
</tr>
<tr>
<td>10065</td>
<td>identity /matching-operator-base-type/mo-size2</td>
</tr>
<tr>
<td>10066</td>
<td>identity /matching-operator-base-type/mo-observe</td>
</tr>
</tbody>
</table>
Questions - CoAP identityref

- Do you agree to divide fields into sub-fields (coap-code-class, coap-code-detail, ...) ?
- CoAP option naming space:
  - Carsten proposes to reserve the whole space to link the option repository to the id
  - How can we do that in Yang ?
  - What size we reserve ?
    - Largest one in IANA : 2053 OCF-Content-Format-Version [Michael_Koster]

  0-255 IETF Review or IESG Approval
  256-2047 Specification Required
  2048-64999 Expert Review
  65000-65535 Experimental use (no operational use)

  - LT: may be a waste of space, what procedure when new option created ?
- CoAP End Option (0xFF) is treated as an option
  - Conflict if Core uses this value for a specific option.
SCHC model

module: schc
    +--rw version? uint64
    +--rw rule* [rule-id rule-length]
        +--rw rule-id uint32
        +--rw rule-length rule-length-type
    +--rw (nature)?
        +--:(fragmentation)
            |   +--rw dtagsize? uint8
            |   +--rw wsize? uint8
            |   +--rw fcnsize? uint8
            |   +--rw (mode)?
            |       |   +--:(no-ack)
            |       |   +--:(ack-always)
            |       |   +--:(ack-on-error)
            |       |   +--rw ack-method? enumeration
            |   +--:(compression)
        +--rw entry* [field-id field-position direction-indicator]
            +--rw field-id schc-id:field-id-type
            +--rw field-length? schc-id:field-length-type
            +--rw field-position int8
            +--rw direction-indicator schc-id:direction-indicator-type
            +--rw target-values* [position]
                |   +--rw numerical? uint64
                |   +--rw string? string
                |   +--rw position uint8
            +--rw mo? schc-id:matching-operator-type
            +--rw mo-value* [position]
                |   +--rw numerical? uint64
                |   +--rw string? string
                |   +--rw position uint8
            +--rw cda? schc-id:cda-type
            +--rw cda-value* [position]
                +--rw numerical? uint64
                +--rw string? string
                +--rw position uint8
Open questions - a version number?

- Added a version for the context
  - Can be useful to check version between a device and core
  - Not a key to simplify queries (don’t recopy version in each query)
  - How to structure the version number? an int or int.int.int? a identityref?
Open questions - fragmentation TBD

- Fragmentation is not defined here
  - Use openSCHC table?
  - How to implement profile (technology dependant)
    - What are the technologies (SF, LoRaWAN DRx, NB-IoT, ...)

Interim, January 8th, 2020
Open questions (Compression)

- Target value:
  - Generalization of the matching-list
    - I.e. a single value has position 0
  - Pos + value:
    - value: int64 or string
    - Can be only a number (for compactness representation)
    - Int64 can be too small (i.e. IPv6 address)
  - Yang uses strings for 128 bit identifiers
  - No bit arrays in yang data types

```c
grouping target-values-struct {
    leaf numerical {
        type uint64;
    }
    leaf string {
        type string;
    }
    leaf position {
        type uint8;
    }
}
```
Open Questions (Compression)

- MO and CDA have an argument entry:
  - Currently no usage for CDA
  - Structured as a TV
  - Several arguments
    - Limitation is one argument is also a list of arguments.
    - Who cares?
LPWAN interim
LoRaWAN IID

08/01/2020

Olivier Gimenez
Current IID proposition

1. key = LoRaWAN AppSKey
2. cmac = aes128_cmac(key, devEui)
3. IID = cmac[0..7]

Potential issue: LoRa Alliance might refuse to reuse AppSKey
Other proposition

• Based on RFC7217 where the IID is "stable for each subnet":
  • RID = F(Prefix, Net_Iface, Network_ID, DAD_Counter, secret_key), where Net_Iface can be DevEUI and Network_ID the LoRaWAN netid.

• How secret_key is setup?
• Potential issue: will not change over time
AOB ?