draft-ietf-lpwan-schc-yang-data-model-14

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Model

- Draft: -14
- YANG Data Model: ietf-schc@2022-07-11.yang
- Covers RFC8724 and RFC8824
  - Rule definition (Compression/Fragmentation/No Compression)
  - Identifiers (FID, MO, CDA, Frag parameters,...)
    - Compound-ack and OAM augment the data model
  - Timer values
Model

module: ietf-schc
  +--rw schc
    +--rw rule* [rule-id-value rule-id-length]
      +--rw rule-id-value       uint32
      +--rw rule-id-length      uint8
    +--rw (nature)?
      +--:(fragmentation) {fragmentation}?  
        | +--rw fragmentation-mode   schc:fragmentation-mode-type
        |     | +--rw l2-word-size?       uint8
        |     | +--rw direction           schc:di-type
        |     |     | +--rw dtag-size?          uint8
        |     |     | +--rw w-size?             uint8
        |     |     |     | +--rw fcn-size            uint8
        |     |     |     | +--rw rcs-algorithm?      rcs-algorithm-type
        |     |     |     | +--rw maximum-packet-size uint16
        |     |     |     | +--rw window-size?        uint16
        |     |     | +--rw max-interleaved-frames uint8
        |     +--rw inactivity-timer  uint8
        |     | +--rw ticks-duration?     uint8
        |     |     | +--rw ticks-numbers?      uint16
        |     | +--rw retransmission-timer uint8
        |     |     | +--rw ticks-duration?     uint8
        |     |     |     | +--rw ticks-numbers?      uint16
        |     | +--rw max-ack-requests?   uint8
        |     +--rw (mode)?
          |     +--:(no-ack)
          |     | +--:ack-always
          |     | +--:(ack-on-error)
          |     |     | +--rw tile-size?          uint8
          |     |     | +--rw tile-in-all-1?      schc:all-1-data-type
          |     |     | +--rw ack-behavior?       schc:ack-behavior-type
          |     +--:(compression) {compression}?
          |     |     | +--rw entry* [field-id field-position direction-indicator]
          |     |     |     | +--rw field-id           schc:fid-type
          |     |     |     | +--rw field-length       schc:fl-type
          |     |     |     |     | +--rw field-position      uint8
          |     |     |     |     | +--rw direction-indicator schc:di-type
          |     |     |     |     |     | +--rw target-value* [index]
          |     |     |     |     |     |     | +--rw value?             binary
          |     |     |     |     |     |     |     | +--rw index              uint16
          |     |     |     |     | +--rw matching-operator   schc:no-type
          |     |     |     |     |     | +--rw matching-operator-value* [index]
          |     |     |     |     |     |     | +--rw value?             binary
          |     |     |     |     |     |     |     | +--rw index              uint16
          |     |     |     |     | +--rw comp-decomp-action  schc:cda-type
          |     |     |     |     |     | +--rw comp-decomp-action-value* [index]
          |     |     |     |     |     |     | +--rw value?             binary
          |     |     |     |     |     |     |     | +--rw index              uint16
          |     +--:(no-compression)
## Time management

- SCHC for Real time systems
- SCHC for deep space communication
- Difficult to impose a range
  - Ticks duration: \(2^{\text{ticks-duration}}/10^6\)
  - Number of ticks: \(\text{ticks-numbers} \times \text{ticks-duration}\)
- Default tick-durations: 20
  - RFC 9011: 12 hours value

<table>
<thead>
<tr>
<th>Steps/precision</th>
<th>Max value</th>
</tr>
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<tbody>
<tr>
<td>00 0000y 00d 00h 00m 00s.000000&lt;-&gt;00000y 00d 00h 00m 00s.065534</td>
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<tr>
<td>...</td>
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<tr>
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</tr>
</tbody>
</table>
YANG doctor’s reviews

- Thanks to Martin Thomson and Joe Clarke
- Review result: Not Ready

- Very good comments to improve the document
  - Done on the mailing list

- A major issue on rule nature:
  - There is another empty case for the no-compression case in the nature choice. The description there says that a rule is required.
  - Can one have both features for compression and fragmentation? The choice seems to imply no, but I am curious. I didn't get the impression that they were mutually exclusive.
Proposed change

```plaintext
container schc {
  list rule {
    key "rule-id-value rule-id-length";
    uses rule-id-type;
  }

  choice nature {
    case fragmentation {
      if-feature "fragmentation";
      uses fragmentation-content;
    }

    case compression {
      if-feature "compression";
      uses compression-content;
    }

    case no-compression {
      description
      "RFC 8724 requires a rule for uncompressed header"
    }
  }

  grouping compression-content {
    list entry {
      key "field-id field-position direction-indicator";
      .......
    }
  }

  grouping rule-nature {
    leaf rule-nature{
      type nature-type;
      mandatory true;
      description "Specify the rule's nature."
    }

    choice nature {
      case fragmentation {
        if-feature "fragmentation";
        uses fragmentation-content;
      }

      case compression {
        if-feature "compression";
        uses compression-content;
      }
    }
  }
}
```
Future work

Device

Core/App

Get the right rules

Update the right rules

YANG DM
RFC 8724
RFC 8824

YANG DM
RFC 8724
RFC 8824

YANG DM
RFC 8724
RFC 8824
Device ID

- openSCHC: udp:A.B.C.D:8888, lorawan:1234567812345678
- RFC 9039: urn:dev:mac:0024beffff804ff1

- ASCII identifiers
  - Not efficient in CORECONF representation
  - URN in binary?
  - Define a YANG module?
YANG module for architecture draft

<table>
<thead>
<tr>
<th>IDs</th>
<th>P2P</th>
<th>star</th>
<th>mesh</th>
</tr>
</thead>
<tbody>
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<td>YANG DM</td>
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<td>Device ID</td>
</tr>
<tr>
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<td></td>
<td>Core ID</td>
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<tr>
<td>RFC 8824</td>
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