# 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

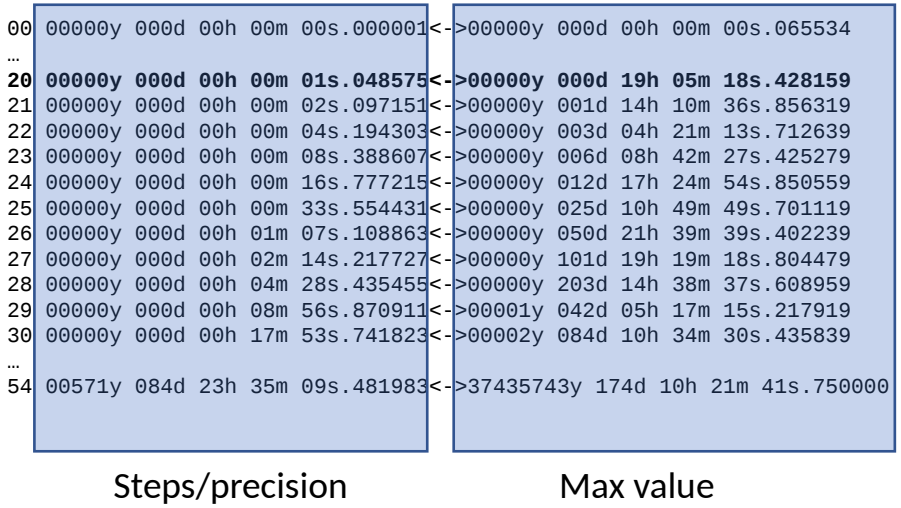
# Model

```
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
              |  |  +--rw ticks-duration?   uint8
              |  |  +--rw ticks-numbers?    uint16
              |  +--rw retransmission-timer
              |  |  +--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:mo-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^ticks-duration/10^6
  - Number of ticks :
    ticks-numbers * ticks-duration
- Default tick-durations: 20
  - RFC 9011 : 12 hours value



| | Steps/precision | Max value |
|---|---|---|
| 00 | 00000y 000d 00h 00m 00s.000001 | 00000y 000d 00h 00m 00s.065534 |
| … | | |
| **20** | **00000y 000d 00h 00m 01s.048575** | **00000y 000d 19h 05m 18s.428159** |
| 21 | 00000y 000d 00h 00m 02s.097151 | 00000y 001d 14h 10m 36s.856319 |
| 22 | 00000y 000d 00h 00m 04s.194303 | 00000y 003d 04h 21m 13s.712639 |
| 23 | 00000y 000d 00h 00m 08s.388607 | 00000y 006d 08h 42m 27s.425279 |
| 24 | 00000y 000d 00h 00m 16s.777215 | 00000y 012d 17h 24m 54s.850559 |
| 25 | 00000y 000d 00h 00m 33s.554431 | 00000y 025d 10h 49m 49s.701119 |
| 26 | 00000y 000d 00h 01m 07s.108863 | 00000y 050d 21h 39m 39s.402239 |
| 27 | 00000y 000d 00h 02m 14s.217727 | 00000y 101d 19h 19m 18s.804479 |
| 28 | 00000y 000d 00h 04m 28s.435455 | 00000y 203d 14h 38m 37s.608959 |
| 29 | 00000y 000d 00h 08m 56s.870911 | 00001y 042d 05h 17m 15s.217919 |
| 30 | 00000y 000d 00h 17m 53s.741823 | 00002y 084d 10h 34m 30s.435839 |
| … | | |
| 54 | 00571y 084d 23h 35m 09s.481983 | 37435743y 174d 10h 21m 41s.750000 |

# 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 8724**.*

# Proposed change

```
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
      }
```

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

```
  grouping compression-content {

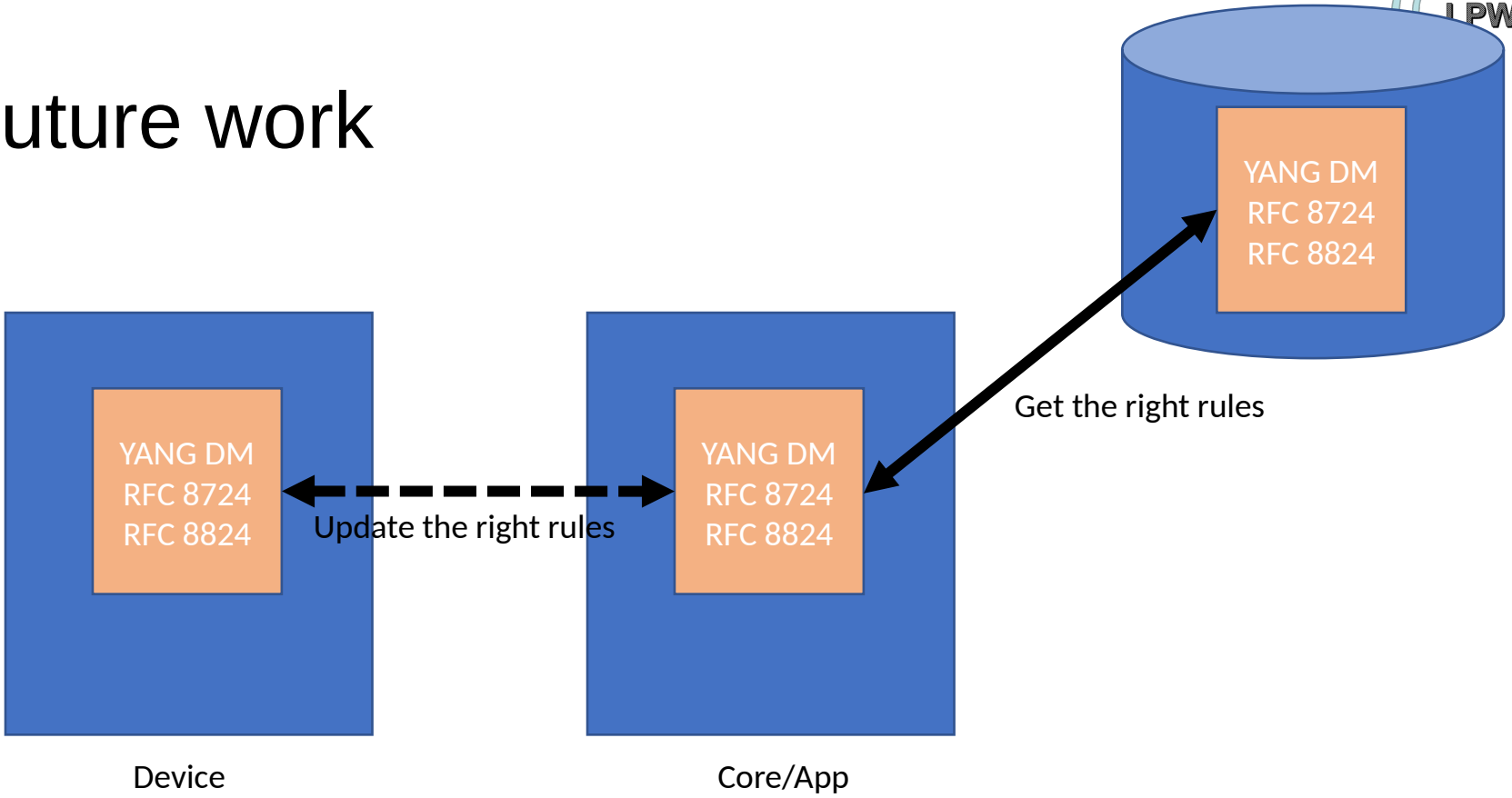
    list entry {

      key "field-id field-position direction-indicator";
```

```
grouping compression-content {

  list entry {
    must "derived-from-or-self(../rule-nature, 'nature-comp
      error-message
        "Rule nature must be compression";
    }
    key "field-id field-position direction-indicator";
```

# Future work

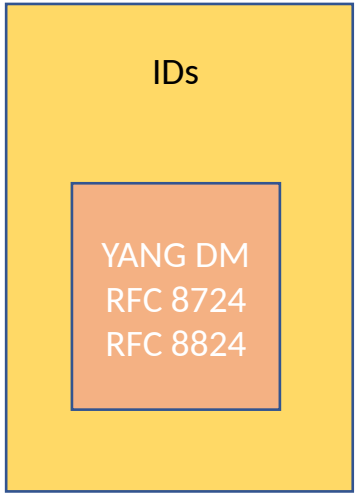

YANG DM
RFC 8724
RFC 8824
Get the right rules
YANG DM
RFC 8724
RFC 8824
Update the right rules
YANG DM
RFC 8724
RFC 8824
Device
Core/App

# 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




| P2P | star | mesh |
|---|---|---|
| None | Device ID | Device ID<br>Core ID |