

draft-ietf-lpwan-schc-yang-data-model-07

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Model

- Draft: -07
- Yang Model: `ietf-schc@2022-02-15.yang`
- Covers RFC8724 and RFC8824
 - Rule definition (Compression/Fragmentation/No Compression)
 - Identifiers (FID, MO, CDA, Frag parameters,...}
 - *Compound-ack* and *OAM* augment the model

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?      uint64
        +--rw retransmission-timer?  uint64
        +--rw max-ack-requests?      uint8
        +--rw (mode)?
          +--:(no-ack)
          +--:(ack-always)
          +--:(ack-on-error)
          +--rw tile-size?          uint8
          +--rw tile-in-All1?      schc:all1-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* [position]
      | +--rw value?      binary
      | +--rw position   uint16
      +--rw matching-operator      schc:mo-type
    +--rw matching-operator-value* [position]
      | +--rw value?      binary
      | +--rw position   uint16
      +--rw comp-decomp-action      schc:cda-type
    +--rw comp-decomp-action-value* [position]
      +--rw value?      binary
      +--rw position   uint16
  +--:(no-compression)

```

Changes

- Dominique review :
 - Change some names to be closer to RFC8724
 - Max simultaneous frag: `max-interleaved-frames`
- Add some conditions for fragmentation parameter regarding the mode.

Hackathon results

- Implement JSON model:
 - Checked with yangson

```
/-----\
|Rule 6/3      110 |
+-----+-----+-----+
|IPV6.VER      | 4 | 1|BI|                               6|EQUAL       |NOT-SENT   | |
|IPV6.TC       | 8 | 1|BI|                               0|EQUAL       |NOT-SENT   |
|IPV6.FL       |20 | 1|BI|                               0|IGNORE      |NOT-SENT   |
|IPV6.LEN      |16 | 1|BI|-----|          |IGNORE      |COMPUTE-LENGTH|
|IPV6.NXT      | 8 | 1|BI|                               58|EQUAL       |NOT-SENT   |
|IPV6.HOP_LMT  | 8 | 1|BI|                               255|IGNORE      |NOT-SENT   |
|IPV6.DEV_PREFIX|64 | 1|BI|                200104701f2101d2|EQUAL       |NOT-SENT   |
|IPV6.DEV_IID  |64 | 1|BI|                0000000000000001|EQUAL       |NOT-SENT   |
|IPV6.APP_PREFIX|64 | 1|BI|-----|          |IGNORE      |VALUE-SENT   |
|IPV6.APP_IID  |64 | 1|BI|-----|          |IGNORE      |VALUE-SENT   |
+-----+-----+-----+
/-----\
|Rule 12/11    00001100 |
=====
|^ Fragmentation mode : NoAck      header dtag 2 Window  0 FCN  3                      UP ^!
|^ No Tile size specified                                         ^!
|^ RCS Algorithm: RCS_RFC8724                                     ^!
\=====
```

JSON representation

```
{'ietf-schc:schc': {'rule': [{'entry': [{'comp-decomp-action': 'cda-not-sent',
  'direction-indicator': 'di-bidirectional',
  'field-id': 'fid-ipv6-version',
  'field-length': '4',
  'field-position': 1,
  'matching-operator': 'mo-equal',
  'target-value': [{'position': 0,
    'value': b'AAY='}]},
  {'comp-decomp-action': 'cda-not-sent',
  'direction-indicator': 'di-bidirectional',
  'field-id': 'fid-ipv6-trafficclass',
  'field-length': '8',
  'field-position': 1,
  'matching-operator': 'mo-equal',
  'target-value': [{'position': 0,
    'value': b'AA=='}]},
  ...
  'matching-operator': 'mo-ignore'}],
  'rule-id-length': 3,
  'rule-id-value': 6},
{'direction': 'di-up',
  'dtag-size': 2,
  'fcu-size': 3,
  'fragmentation-mode': 'fragmentation-mode-no-ack',
  'rcs-algorithm': 'rcs-RFC8724',
  'rule-id-length': 11,
  'rule-id-value': 12}]}}
```

~ 2500 Bytes

CBOR representation

```
b' a11a000186faa10182a3058aa7061a000186e407040801051a000186b3091a000186f2011a000186b00d81a20100024106a7061a000186e107080801051a000186b3091a000186f2011a000186b00d81a201000240a7061a000186dd07140801051a000186b3091a000186f3011a000186b00d81a201000240a6061a000186e007100801051a000186b3091a000186f3011a000186aca7061a000186df07080801051a000186b3091a000186f2011a000186b00d81a2010002413aa7061a000186de07080801051a000186b3091a000186f3011a000186b00d81a201000241ffa7061a000186dc07400801051a000186b3091a000186f2011a000186b00d81a201000248200104701f2101d2a7061a000186db07400801051a000186b3091a000186f2011a000186b00d81a201000248000000000000000001a6061a000186d907400801051a000186b3091a000186f3011a000186b1a6061a000186d807400801051a000186b3091a000186f3011a000186b1181f06181e03a7181f0c181e0b031a000186b5181c1a000186f604021503161a000186f0'
```

~ 400 Bytes

CBOR representation (diagnostic)

```
{100090: {1:
  .... [{5:
    .... [{6: 100068, 7: 4, 8: 1, 5: 100019, 9: 100082, 1: 100016, 13: [{1: 0, 2: h'06'}]},
    .... {6: 100065, 7: 8, 8: 1, 5: 100019, 9: 100082, 1: 100016, 13: [{1: 0, 2: h'''}]},
    .... {6: 100061, 7: 20, 8: 1, 5: 100019, 9: 100083, 1: 100016, 13: [{1: 0, 2: h'''}]},
    .... {6: 100064, 7: 16, 8: 1, 5: 100019, 9: 100083, 1: 100012},
    .... {6: 100063, 7: 8, 8: 1, 5: 100019, 9: 100082, 1: 100016, 13: [{1: 0, 2: h'3A'}]},
    .... {6: 100062, 7: 8, 8: 1, 5: 100019, 9: 100083, 1: 100016, 13: [{1: 0, 2: h'FF'}]},
    .... {6: 100060, 7: h'', 8: 1, 5: 100019, 9: 100082, 1: 100016, 13: [{1: 0, 2: h'200104701F2101D2'}]},
    .... {6: 100059, 7: h'', 8: 1, 5: 100019, 9: 100082, 1: 100016, 13: [{1: 0, 2: h'0000000000000001'}]},
    .... {6: 100057, 7: h'', 8: 1, 5: 100019, 9: 100083, 1: 100017},
    .... {6: 100056, 7: h'', 8: 1, 5: 100019, 9: 100083, 1: 100017}],
    .... 31: 6,
    .... 30: 3},
  ....
  .... {31: 12,
  .... 30: 11,
  .... 3: 100021,
  .... 28: 100086,
  .... 4: 2,
  .... 21: 3,
  .... 22: 100080}]
  ....}
}
```

Impact of SID size mainly on identifiers

SID

+30

```

1000090 data /ietf-schc:schc
1000091 data /ietf-schc:schc/rule
1000092 data /ietf-schc:schc/rule/ack-behavior
1000093 data /ietf-schc:schc/rule/direction
1000094 data /ietf-schc:schc/rule/dtag-size
1000095 data /ietf-schc:schc/rule/entry
1000096 data /ietf-schc:schc/rule/entry/comp-decomp-action
1000097 data /ietf-schc:schc/rule/entry/comp-decomp-action-value
1000098 data /ietf-schc:schc/rule/entry/comp-decomp-action-value/position
1000099 data /ietf-schc:schc/rule/entry/comp-decomp-action-value/value
1001100 data /ietf-schc:schc/rule/entry/direction-indicator
1001101 data /ietf-schc:schc/rule/entry/field-id
1001102 data /ietf-schc:schc/rule/entry/field-length
1001103 data /ietf-schc:schc/rule/entry/field-position
1001104 data /ietf-schc:schc/rule/entry/matching-operator
1001105 data /ietf-schc:schc/rule/entry/matching-operator-value
1001106 data /ietf-schc:schc/rule/entry/matching-operator-value/position
1001107 data /ietf-schc:schc/rule/entry/matching-operator-value/value
1001108 data /ietf-schc:schc/rule/entry/target-value
1001109 data /ietf-schc:schc/rule/entry/target-value/position
1001110 data /ietf-schc:schc/rule/entry/target-value/value
1001111 data /ietf-schc:schc/rule/fcn-size
1001112 data /ietf-schc:schc/rule/fragmentation-mode
1001113 data /ietf-schc:schc/rule/inactivity-timer
1001114 data /ietf-schc:schc/rule/l2-word-size
1001115 data /ietf-schc:schc/rule/max-ack-requests
1001116 data /ietf-schc:schc/rule/max-interleaved-frames
1001117 data /ietf-schc:schc/rule/maximum-packet-size
1001118 data /ietf-schc:schc/rule/rcs-algorithm
1001119 data /ietf-schc:schc/rule/retransmission-timer
1001120 data /ietf-schc:schc/rule/rule-id-length
1001121 data /ietf-schc:schc/rule/rule-id-value
1001122 data /ietf-schc:schc/rule/tile-in-All1
1001123 data /ietf-schc:schc/rule/tile-size
1001124 data /ietf-schc:schc/rule/w-size
1001125 data /ietf-schc:schc/rule/window-size

```

A7

18 1F

0C

18 1E

0B

03

1A 000186B5

18 1C

1A 000186F6

04

02

15

03

16

1A 000186F0

```

# map(7)
# unsigned(31)
# unsigned(12)
# unsigned(30)
# unsigned(11)
# unsigned(3)
# unsigned(100021)
# unsigned(28)
# unsigned(100086)
# unsigned(4)
# unsigned(2)
# unsigned(21)
# unsigned(3)
# unsigned(22)
# unsigned(100080)

```