

# Static Context Header Compression (SCHC) for the Constrained Application Protocol (CoAP)

*draft-ietf-schc-8824-update-02*

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# Recap

- › **Adopted as a SCHC WG document in November 2023**
  - Following its presentation at IETF 118 (Prague)
- › **Document goal: obsolete RFC 8824**
- › **Document scope: same as RFC 8824, plus:**
  - Clarified and amended text originally from RFC 8824, also based on filed Errata
  - SCHC compression of CoAP options
    - › Clarified both in general and for specific CoAP options
    - › Defined for the Hop-Limit Option and for other recent options
    - › Updated for the OSCORE Option (extended by some CoRE documents)
  - Clarified SCHC compression for the CoAP payload marker
  - Spelled out SCHC compression in the presence of proxies, with examples provided

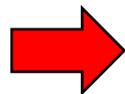
# Updates since version -00 (1/9)

## › Section 8.1: fixed an example of SCHC compression rule (resolution of Erratum 7623)

– <https://www.rfc-editor.org/errata/eid7623>

*A MO 'equal 1' has not been defined in the possibilities of SCHC. However, when this table was written and never updated, it was one option to say that we wanted to check only the first element. To comply with the RFC8724, the idea of only matching the first element of the path needs to be expressed in the corrected text way.*

Field	FL	FP	DI	TV	MO	CDA	Sent [bits]
CoAP Uri-Path	var	1	Dw	path	equal 1	not-sent	



Field	FL	FP	DI	TV	MO	CDA	Sent [bits]
CoAP Uri-Path	var	1	Dw	1st element of the path	equal	not-sent	

**OLD**

**NEW**

## › Open point: can TV be even simpler?

- The intent is that any value of the first occurrence of the Uri-Path option is not-sent
- FP=1 is already saying that this is about the first element of the URI path component
- Can TV simply be ‘element of the path’? Or ‘any’? Do we have a canonical “wildcard” for TV?

# Updates since version -00 (2/9)

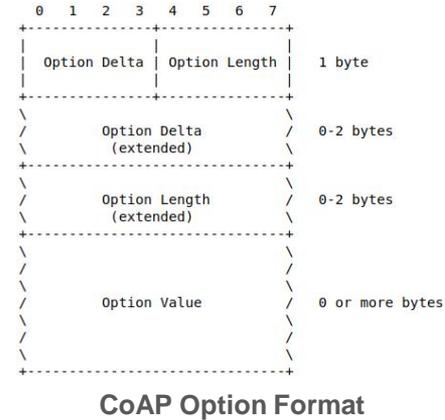
## Clarification – Section 5 “Compression of CoAP Options”

- › Semantics of Field Descriptors for CoAP options in SCHC Rules
- › Option format: Delta-Type/Length/Value → Option format Delta/Length/Value
  - No need to mention the Type
  - Type is embedded in the option number, which is recomputed from the Delta
- › FID is the option number → FID is an unambiguous identifier of the option (e.g., its name)
- › FL like in RFC 8724 → FL is the option length L, encoded consistent with RFC 8724
- › This means no change in the actual compression, or in the examples and their SCHC Rules

# Updates since version -00 (3/9)

## Clarification – Section 5 “Compression of CoAP Options”

- › High-level compression of CoAP options
- › MO and CDA operate only on the Option Value (V)
  - Option Delta (D) plays no role; thanks to the sorted Field Descriptors
  - Option Length (L) plays no role; thanks to FL in the Field Descriptor
- › Like any other field, a CoAP option is either:
  - Not sent (CDA “not-sent” and MO “equal”, paired with a well-known option value in TV)
  - LSB-sent (CDA “LSB” and MO “MSB(.)”, paired with sorted well-known option values in TV)
  - Fully-sent (CDA “value-sent” and MO “ignore”, paired with a not set TV)
- › In either case, D and L are never sent in the compression residue
- › This means no change in the actual compression, or in the examples and their SCHC Rules



# Updates since version -00 (4/9)

## Revision – Section 5.7 “CoAP Option ETag and If-Match Fields”

- › SCHC Compression of the ETag and If-Match CoAP options
- › Section 5.5 of RFC 8824 defined it as to be always sent as-is in the compression residue
  - Presented together with the options If-None-Match, Location-Path, and Location-Query
- › We can better use the same rationale used for the Request-Tag Option, see Section 5.11
  - Already enforced before WG Adoption
- › The option values are determined by the server; yet, they can be from a pre-defined set
- › New: rules for ETag or If-Match MAY use MO "match-mapping" and CDA "mapping-sent"

**Objections?**

# Updates since version -00 (5/9)

## Revision – Section 5.8 “CoAP Option If-None-Match”

- › SCHC Compression of the If-None-Match CoAP option
- › Section 5.5 of RFC 8824 defined it as to be always sent as-is in the compression residue
  - Presented together with the options ETag, If-Match, Location-Path, and Location-Query
- › However, If-None-Match is always empty (0-length value) – Section 5.10.8.2 of RFC 7252
- › New: If-None-Match is handled with (TV: empty; MO: "equal"; CDA: "not-sent")
  - Same as for the EDHOC option, also always empty (see Section 5.12)

# Updates since version -00 (6/9)

## Addition – Section 5.5 “CoAP Option Proxy-CRI and Proxy-Scheme-Number Fields”

- › SCHC Compression of the Proxy-CRI and Proxy-Scheme-Number CoAP options
- › Defined in *draft-ietf-core-href*
- › Proxy-CRI Option
  - Equivalent to Proxy-Uri, but conveying a CBOR data item encoding a CRI equivalent to a URI
  - SCHC compression: same as for the Proxy-Uri Option (see Section 5.4)
- › Proxy-Scheme-Number Option
  - Equivalent to Proxy-Scheme, but conveying an unsigned integer acting as scheme identifier
  - SCHC compression: same as for Proxy-Scheme Option (see Section 5.4)

# Updates since version -00 (7/9)

## YANG data model

- › Populated and incrementally revised Appendix A “YANG Data Model”
- › Built on and extending the *ietf-schc* module defined in RFC 9363
  - It includes only additions that this document has made with respect to RFC 8824
  - Also available at:  
<https://github.com/marco-tiloca-sics/draft-ietf-schc-8824-update/blob/main/ietf-schc-coap%402024-07-08.yang>

- › Elements sorted in two categories
  - Field ID
  - Function Length

- › Now it also passes the YANG validation in the Datatracker! 😊

### Yang Validation

🔍 0 errors, 0 warnings

```
draft-ietf-schc-8824-update-02.txt:
xym 0.7.0:
Extracting 'ietf-schc-coap'
  Removed 0 empty lines
```

```
ietf-schc-coap@2024-07-08.yang:
pyang 2.6.1: pyang --verbose --ietf -p {libs} {model}:
# module search path: a/www/ietf-ftp/yang/rfcmod:/a/www/ietf-ftp/yang/draftmod:/a/www/ietf-ftp/yang/
ianamod:/a/www/ietf-ftp/yang/catalogmod/./usr/local/share/yang/modules
# read ietf-schc-coap@2024-07-08.yang (CL)
# read /a/www/ietf-ftp/yang/rfcmod/ietf-schc@2023-03-01.yang
```

```
yanglint 50 1.10.17: yanglint --verbose -p {tmplib} -p {rfcplib} -p {draftlib} -p {ianalib} -p
{cataloglib} {model} -i:
No validation errors
```

# Updates since version -00 (8/9)

## IANA Considerations

- › Section 13.1 - New entry for the "IETF XML" registry (RFC 3688)
- › Section 13.2 - New entry for the "YANG Module Names" registry (RFC 6020, RFC 8407)
- › Section 13.3 - New registry "SCHC Compression of CoAP Fields"
  - Problem: if one defines a new CoAP option or updates an existing one ...
    - › ... we cannot expect/demand them to define how SCHC works with it
    - › The SCHC processing might be separately defined later on
    - › Yet, we do not want to obsolete/update again and again the latest RFC about SCHC for CoAP
  - Goal: collect a simple list of defined ways to do SCHC compression of CoAP fields
  - Rationale: enable a strong decoupling of two orthogonal and independent tasks:
    - › Definition or amendments of CoAP header fields, especially of CoAP options
    - › Definition or amendments of SCHC Compression for those fields



# Updates since version -00 (9/9)

- › Section 13.3 - New registry "SCHC Compression of CoAP Fields"
  - Field: a unique identifier of the CoAP field/subfield
    - › Used in the "Field" column of a SCHC Compression Rule
    - › It must have a corresponding item or set of items in the YANG data model
  - Description: description of the CoAP field/subfield, together with public references to the resources that define it
  - Reference: public references to the resources that define how a SCHC Compression Rule works for this CoAP field/subfield
- › The registry is pre-populated with the entries in Section 11
- › Registration Policy: "Specification Required"
  - Guidelines for the expert reviews are provided in Section 13.4

# Next steps

## › Section 4 “Compression of CoAP Header Fields”

- Add explicit subsections on the TKL field (make explicit what is tacitly assumed)

## › Section 12.1 “YANG Module”

- Add security considerations for the YANG data model (see RFC 8407)
- Guidelines at <https://wiki.ietf.org/group/ops/yang-security-guidelines>

## › More to consider

- Need for new function length (i.e., like ‘tkl’) for further CoAP fields?
- Synch with content of other documents (e.g., -schc-architecture, -core-oscore-capable-proxies)

## › Administrivia

- Sources are now hosted at <https://github.com/marco-tiloca-sics/draft-ietf-schc-8824-update>
- Can we instead have a repo in the LPWAN Github organization? <https://github.com/lp-wan>

Thank you!

Comments/questions?

<https://github.com/marco-tiloca-sics/draft-ietf-schc-8824-update>