

COnstrained Objects Language (CoOL)

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CoOL is based on

- RFC 6020 (YANG)
A Data Modeling Language
- RFC 7552 (CoAP)
The Constrained Application Protocol
- [I-D.ietf-netmod-yang-json]
JSON Encoding of Data Modeled with YANG
- RFC 7049
Converting from JSON to CBOR
- RFC 6347
DTLS security

Managed Data Node IDs

- Managed Data Resource IDs avoid overhead and issues associated to unmanaged IDs (YANG Hash)
- Composed of two parts
 - 20 bits registered Module ID
 - 10 bits assigned YANG data node ID
- Long form vs short form
 - JSON qualified-member-name -> 30 bits Module ID | Node ID
 - JSON member-name -> 10 bits Node ID
- IANA registration of module ID
 - 1 048 576 Module IDs available to SDOs or manufacturers
 - Registration of bundle (1, 5, 10, 25, 50 module IDs)
 - 3/4 of the IDs reserved for future use (0x3FFFFFFF to 0xFFFFFFFF)
- Assignment of YANG data node ID
 - Automatic or manual using a new YANG statement
 - ID 0 to 23 are encoded using 1 byte, can be assign to frequently used nodes

CoAP GET

- Perform on a singleURI (e.g. GET /cdat)
- *Fields* option contain the list of data nodes
- *Fields* option encoded as CBOR array

REQ: GET /cdat?Fields([14337, 18, 19]) Token(0x324a)

RES: 2.05 Content Token(0x324a) (Content-Format: application/cbor)

```
{  
  Qualified Data Node ID (3 or 5 bytes in CBOR)  
  14337: 57,  
  18 : 76,  Unqualified Data Node ID (1 or 2 bytes in CBOR)  
  19 : 837  
}
```

CoAP GET (With indices)

- Fields which require indices are encoded as CBOR array [[<data node ID 1>, <index 1>, ... <index n>]]

Data node

Index

Index

REQ: GET /cdat?Fields([[14343, "Joe Cocker", "The Best Of Joe Cocker"], [7, "Joe Cocker", "The Best Of Joe Cocker"]]) Token(0x324b)

RES: 2.05 Content Token(0x324b) (Content-Format: application/cbor)

```
{
  14343 : "rock",
  7 : {
    8 : "Capitol Records",
    9 : "0777 7 80512 2 0"
  }
}
```

CoOL also supports

- Update, Create, Delete
Using CoAP PUT, POST, DELETE
- Patch
Based on [I-D.ietf-netconf-yang-patch]
- Protocol operations (YANG rpc)
Based on [I-D. ietf-netconf-restconf]
- Notification stream (YANG notification)
Based on RFC 5277
- Reporting
Based on [I-D.ietf-core-observe]
- Resource discovery based on YANG module(s)
(e.g. ietf-yang-library, ietf-restconf-monitoring)

For mode details

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