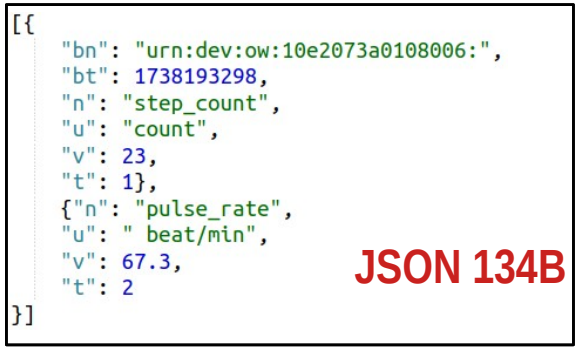
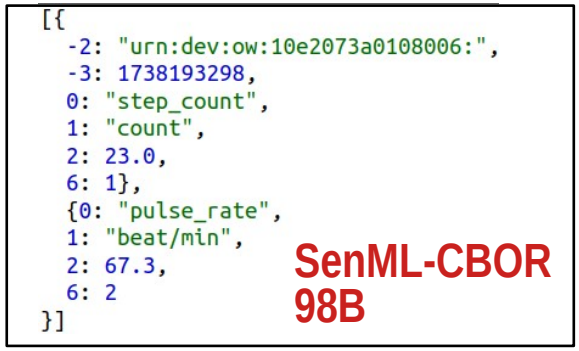
SenML-YANG followup

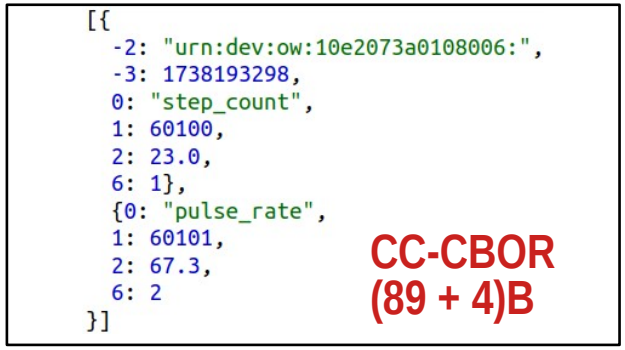
Making SenML rep. work as YANG-CBOR rep.

Why?

- CORECONF-CBOR encoding very similar to SenML-CBOR *(aka compressed SenML)*
  coincidence? conspiracy? aliens👽?
- CORECONF-CBOR can make SenML even more efficient: *draft-gudi-t2trg-senml-as-coreconf*







And there's more optimization to be found:

1. Molina Araque, S.; Martinez, I.; Papadopoulos, G. Z.; Montavont, N.; Toutain, L. Yet Another Compact Time Series Data Representation Using CBOR Templates (YACTS). Sensors 2023, 23 (11), 5124. https://doi.org/10.3390/s23115124
2. draft-bormann-lpwan-cbor-template-02
3. draft-ietf-cbor-packed-13

Why?

YANG model gives stronger guarantees for SenML relative to its CDDL

Also YANG has more mature ecosystem (yanglint, pyang)

example:

```
leaf bu {
    type string;
    must "(. = 'm' or .= 'kg' or .. )";
}
```

Heading towards SDF-YANG

- SenML↔YANG↔SDF↔Matter

  Why?

  - SDF can be thought of *machine readable ontological model* for IoT

    i.e. how iot devices interact and exchange data in a standardized way
  - SDF has wider semantic interoperability
  - Reusable models and IoT applications (smart home)
  - Richer data modelling using things, elements and affordances (property, action, events)

Existing work:
draft-kiesewalter-asdf-yang-sdf-01

interaction-models-matter-sdf

draft-ietf-asdf-latest

ietf-121-sdf-for-interactions-session

What: Issues

- Manually assigning SIDs to SenML-YANG Identifiers such that δ-encoded form match SenML-CBOR labels
- CBOR-SenML Label for “n” is 0 which is problematic
- Adding constraints to SenML-YANG:
  - Can units be modeled as *identityrefs* for better extensibility
  - Make leaf (v/vs/vb/vd) optional is “s” exists

Workarounds for *n* = *0* CBOR-SenML label

How: Suggestion #1

```
[{
  -2: "urn:dev:ow:10e2073a0108006:",
  -3: 1738193298,
  "n": "step_count",
  1: 60100,
  2: 23.0,
  6: 1},
        ...
```

Replace the δ for n from 0 to “n” in the diagnostic form.
That is to say, there is NO SID for “n”

Consistent with YANG SID Spec. 👍

Breaks SenML CBOR Spec. 👎

How: Suggestion #2

Name	Label	CBOR Label	JSON Type	XML Type
Base Name	bn	-2	String	string
Base Time	bt	-3	Number	double
Base Unit	bu	-4	String	string
Base Value	bv	-5	Number	double
Base Sum	bs	-6	Number	double
Base Version	bver	-1	Number	int
Name	n	0	String	string
Unit	u	1	String	string
Value	v	2	Number	double
String Value	vs	3	String	string
Boolean Value	vb	4	Boolean	boolean
Data Value	vd	8	String (*)	string (*)
Sum	s	5	Number	double
Time	t	6	Number	double
Update Time	ut	7	Number	double

Table 1: SenML Labels

Update CBOR-SenML label for “n” to something non-zero
OR
Create an alias for “n” with a non-zero CBOR-SenML label
OR
Stand-in tags for “n”

Consistent with YANG SID Spec. & SenML CBOR 👍

Backward incompatible 👎

How: Suggestion #3

Piggyback on existing records.

For instance: Use only base-name instead of name when using *SenML* encoded as *CORECONF-CBOR*

* Consistent with YANG SID Spec. and SenML CBOR 👍
* Backward compatible 👍
* Functionally basename not the same as name 👎
* Less efficient 👎

Example:

possible values: *honeywell_temperature*, *honeywell_current*
ordinarily **bn** : “honeywell_” & **n:** “temperature” or “current”

With this solution, **n** is NOT sent but **bn** is **resent,** ipso facto, less efficient

”The name is optional, if the Base Name is present. If the name is missing, the Base Name must uniquely identify the resource. This can be used to represent a large array of measurements from the same sensor without having to repeat its identifier on every measurement.”

Aim from the Interim

- We would like to understand
  - How widely is SenML used?
    - Some SenML implementations not updated
    - Most recent update on kpn-iot-thingsml library: 2 weeks ago
    - Since 2021on Google scholar: 214 research articles
  - Explore other problems with CORECONF-CBOR and SenML-CBOR encoding
  - Find out if there are better solutions for problems like *n=0*
  - If not, build consensus within the community to agree on one of the solutions