Standardised Metadata Provision in the Communication Protocol SECoP - SECoP@HMC

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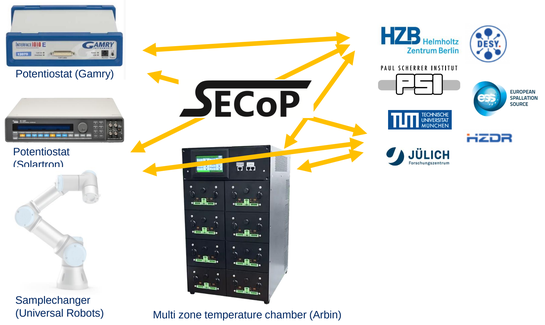
Abstract

The Sample Environment Communication Protocol (SECoP) provides a generalized way for controlling measurement equipment – with a special focus on sample environment (SE) equipment. In addition, SECoP holds the possibility to transport SE metadata in a well-defined way.
The project SECoP@HMC strengthened the metadata provision in SECoP and established SECoP as a standard protocol for SE equipment.

The SECoP Idea



Generalize the way for controlling measurement equipment and transport SE data & metadata in a well-defined way.

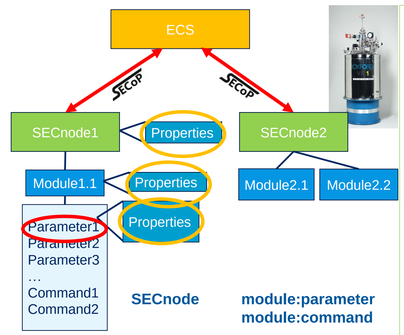
The SECoP Philosophy

simple, inclusive, self explaining, provides metadata

FAIR: Findable Accessible Interoperable Reusable

Follow the concept for full machine readability on all levels (general system description to individual parameters and metadata).

Structure & Metadata



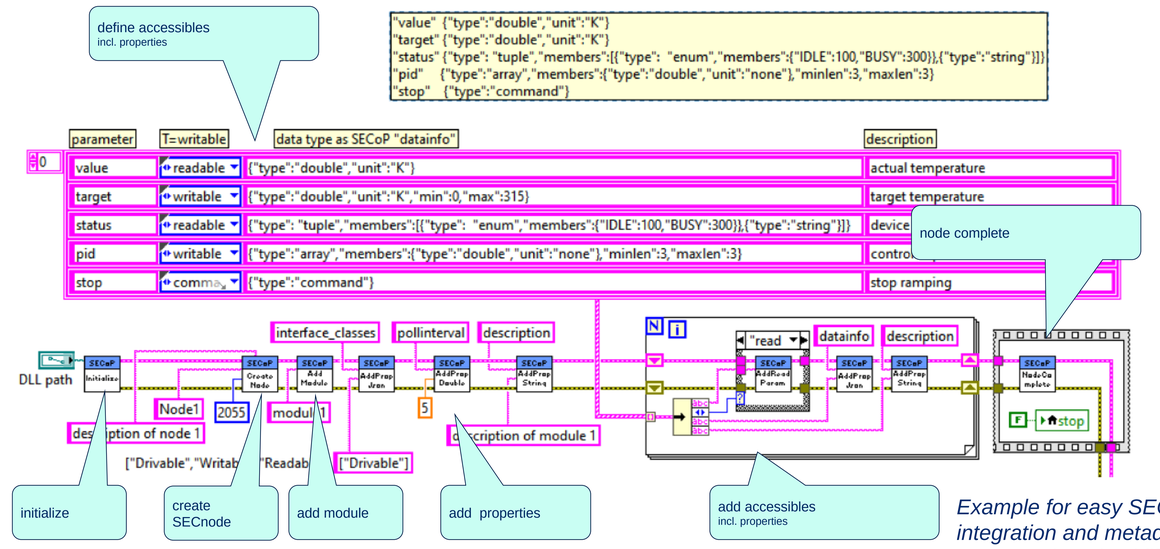
SECnode (“wet cryostat”)
- temperature_sam (module)
  - value (parameter)
  - _sensor_value
  - _calibration_table
  - status, …
- temperature_reg
  - value
  - target
  - ramp
  - stop (command)
  - ctrlpars [p, i, d, …]
  - control_active
  - status, …
- heliumlevel
  - value
  - status

Message Example

read request	request	**read**	*module:parameter*
	reply	**reply**	*module:parameter value*
change value	request	**change**	*module:parameter value*
	reply	**changed**	*module:parameter value*

```
> read temperature_sam:value
< reply temperature_sam:value
          [295.13,{"t":1505396348.188}]

> change temperature_reg:target 295
< changed temperature_reg:target
          [300,{"t":1505396349.123}]
```



Example for easy SECoP integration and metadata provision (e.g. LabVIEW)

SECoP & Vocabularies

A redefinition of the SECoP property “meaning” now includes a link to vocabularies, glossaries and ontologies.

```
"meaning":{"link":
"https://w3id.org/nfdi4cat/voc4cat_0000051",
"key": "synthesis temperature"}
```

This enables a machine-readable definition of metadata directly at the source.

References

An introduction to SECoP – the sample environment communication protocol.
https://doi.org/10.3233/jnr-190143

Metadata in SECoP:
doi:10.18429/JACoW-ICALEPCS2023-THPDP014

SECoP on GitHub:
https://github.com/SampleEnvironment/SECoP

International Society for Sample Environment (ISSE)
https://sampleenvironment.org/

Project Results

- Further development of SECoP standard, frameworks & easy access tools
- Proposal for SECoP to NeXus integration: basis for discussion with NIAC
- Standardisation of the use of vocabularies/glossaries/ontologies in SECoP
- The worldwide application of SECoP has further expanded

Contact

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