Content

• What is your project about and who are your partners?
  - a brief history of SECoP
  - metadata in SECoP
  - SECoP@HMC project structure

• How can HMC support your project (infrastructure, tools, ...) to be successful?

• Where do you see the linkage to HMC and how do you plan to integrate your project results?
Neutrons

Photons

High Magnetic Fields
Rheometer, anton-paar.com

Humidity cell, HZB/ILL

Dilution Stick, Oxford Instruments

Experiment Control Software

HZB Helmholtz Zentrum Berlin

PAUL SCHerrer INSTITUT

PSI

ESS European Spallation Source

DESY

HZDR

TU Munich

HELMHOLTZ COOPERATION
Rheometer, anton-paar.com

Humidity cell, HZB/ILL

Dilution Stick, Oxford Instruments

Experiment Control Software

HZB Helmholtz Zentrum Berlin

Paul Scherrer Institut (PSI)

European Spallation Source (ESS)

DESY

HZDR

Jülich Forschungszentrum

Technische Universität München (TUM)

HMC Welcome Meeting, 30 March 2022, K. Kiefer
simple, inclusive, self explaining provides metadata

www.github.com/SampleEnvironment/SECoP

K. Kiefer et al.: An introduction to SECoP – the sample environment communication protocol
structure
SECoP Structure

- ECS
  - SECnode1
    - Module1.1
      - Parameter1
      - Parameter2
      - Parameter3
      - ...
      - Command1
      - Command2
    - Properties
    - Qualifiers
  - Properties
- SECnode2
  - Module2.1
  - Module2.2
  - Properties

SECoP: module:parameter
module:command
SECoP Structure

- ECS
  - SECnode1
    - Module1.1
      - Parameter1
      - Parameter2
      - Parameter3
      - Command1
      - Command2
  - Properties
  - Qualifiers
- SECnode2
  - Module2.1
  - Module2.2
  - Properties
- SECnode (VM-1)
  - temperature (module)
    - value (parameter)
    - target
    - status
  - magneticfield
    - value
    - target
    - ramp
    - status
    - stop (command)
  - heliumlevel
    - value
    - status

HMC Welcome Meeting, 30 March 2022, K. Kiefer
# SECoP messages: examples

<table>
<thead>
<tr>
<th>read request</th>
<th>request</th>
<th>read</th>
<th>module:parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>reply</td>
<td>reply</td>
<td></td>
<td>module:parameter value</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>change value</th>
<th>request</th>
<th>change</th>
<th>module:parameter value</th>
</tr>
</thead>
<tbody>
<tr>
<td>reply</td>
<td>change</td>
<td>changed</td>
<td>module:parameter value</td>
</tr>
</tbody>
</table>

> read temp1:value  
< reply temp1:value [295.13,{"t":1505396348.188}]  

> change temp1:target 295  
< changed temp1:target [300, {"t":1505396349.123}]
SECoP messages: examples

description request describe
reply describing SEC-node-id description

> describe
< describing .
{
  "description":"TestNode",
  "equipment_id":"HZB_Testnode1",
  "firmware":"SHALL server library (Git 70591a14f66f37b92dcf6386a17159b526fa2913)",
  "modules":
  {
    "temp1":
    {
      "interface_classes":["Writable","Readable"],
      "description":"a meaningful description of the module",
      "accessibles":
      {
        "value":
        {
          "description":"temperature",
          "datainfo":{"type":"double","unit":"K"},
          "readonly":true
        },
        "target":
        {
          "description":"target temperature",
          "datainfo":{"type":"double","unit":"K"},
          "readonly":false
        }
      }
    }
  }
}
SECoP messages: examples

description request describe
describing SEC-node-id description

"status":
{
   "description":"module status",
   "datainfo":
   {
      "type":"tuple",
      "members":
      [
         {
            "type":"enum",
            "members":{"DISABLED":0,"IDLE":100,
                        "WARN":200,"BUSY":300,
                        "STABILIZING":380,"ERROR":400}
         },
         {
            "type":"string"
         }
      ],
      "readonly":true
   }
}
Metadata in SECoP
Metadata in SECoP

- Description
- Equipment ID of a SEC-node
- Module meaning
- Data info of a parameter

Calibration curve of a sensor (static)

Additional information (e.g. valve position, Helium level,...)
Metadata plug&play

Predefined parameters
• value, status, target, ramp, …

Interface classes
• Readable, Writable, Drivable
• complex interface classes

Module property „meaning“
• meaning (tuple, optional)

• "temperature" (the sample temperature)
• "temperature_regulation" (to be specified only if different from 'temperature')
• "magneticfield"
• "electricfield"
• "pressure"
• "rotation_z" (counter clockwise when looked at 'from sky to earth')
• "humidity"
• "viscosity"
• "flowrate"
• "concentration"
Project structure
Work packages

**WP1: Standards for Sample Environment metadata in SECoP** (K. Kiefer, HZB)

**WP2: Standards for storage of Sample Environment metadata** (T. Kracht, DESY)

**WP3: Implementation into experimental control systems** (G. Brandl, FZJ)

**WP4: Outreach, Dissemination & Training** (T. Herrmannsdörfer, HZDR)
How can HMC support SECoP@HMC to be successful?
How can HMC support?

**WP1: Standards for Sample Environment metadata in SECoP**
- Completeness of the metadata information
- Feedback from HMC experts
- Links to other projects, user groups, other scientific fields

**WP2: Standards for storage of Sample Environment metadata**
- Mapping to a unified SE vocabulary / existing standards
- Feedback from HMC experts

**WP3: Implementation into experimental control systems**
- Test implementations at other facilities
- Feedback

**WP4: Outreach, Dissemination & Training**
- Visibility
- Outreach to other scientific fields
- Establishing SECoP as a control standard including metadata
Where do you see the linkage to HMC and how do you plan to integrate your project results?
Linkage and integration of project results

• Direct contact to experts
• Invitation to SECoP@HMC WP meetings
• HMC events, HMC Friday
• Asking for feedback at specific points during the project
• Presentation of project results
• Dissemination over HMC platform
Thank You