



NICOS: Current state and requirements

Experiment Control and Data Acquisition (ECDC) group

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SKADI DAY @ DMSC, 13 JULY 2026

Agenda



1. Some definitions

- NICOS
- EPICS
- CS-Studio x NICOS
- ECDC scope

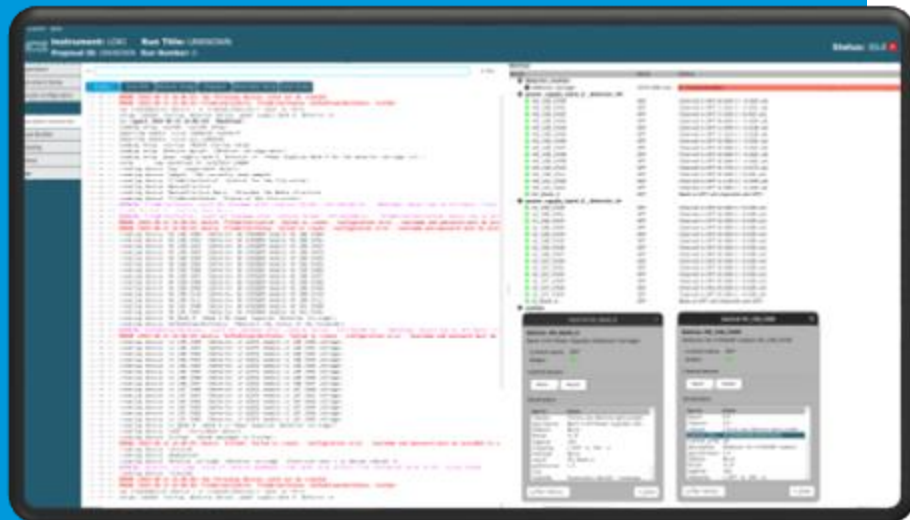
2. Requirements & Roadmap for NICOS



ESS standard UI experiment control at the instruments.

Supported by ECDC group.

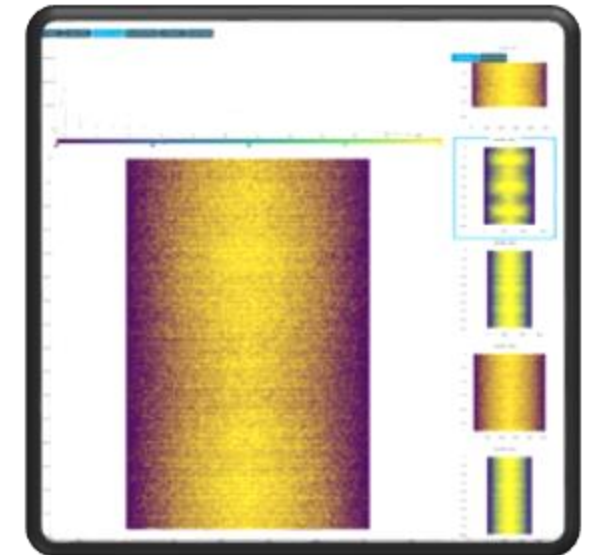
- Collaboration (ESS, PSI, MLZ)
- Open-source software
- Written in **Python**, reusable, flexible
- Client-server desktop application
- **Device** abstraction
- Routines, and custom user **scripts**
- Talks to **EPICS** control system



Power supplies



Choppers



Detector



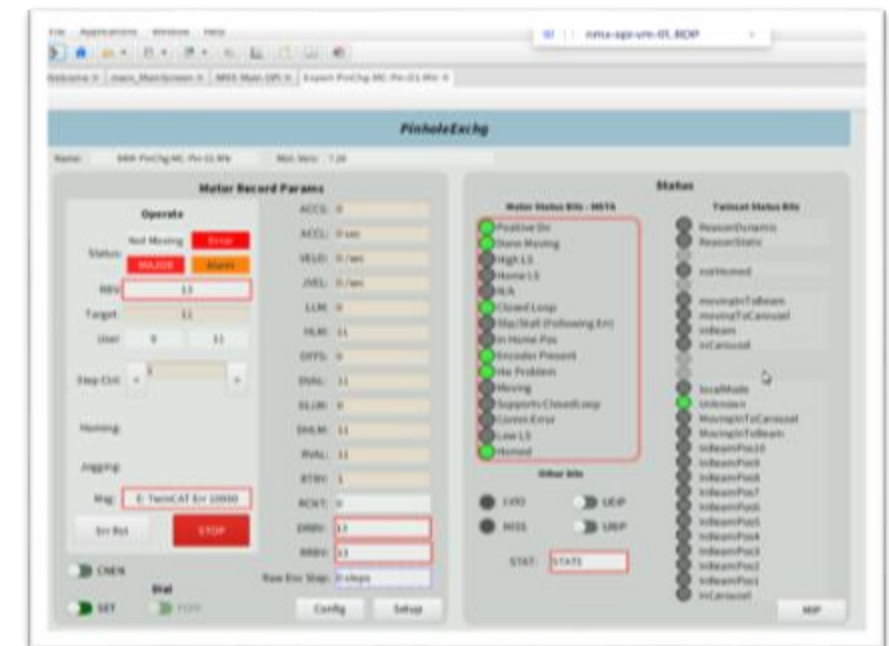
It's the ESS main control system framework.

Supported by ICS division
(NITIS group).



Experimental Physics and Industrial Control System

- **IOC:** Input-Output controller, publishes PVs on the network.
- **PV:** Process Variable (e.g., motor position, temperature, pressure) => **Remote control!**
- Main UI: **CS-Studio** (OPIs)

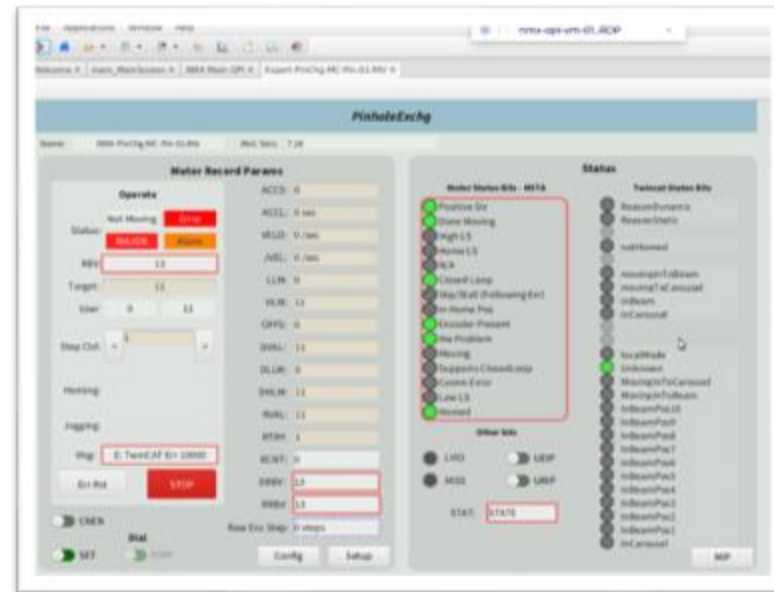


Pinhole device control in CS-Studio

CS-Studio x NICOS

Both are EPICS clients and GUIs,
but with different goals:

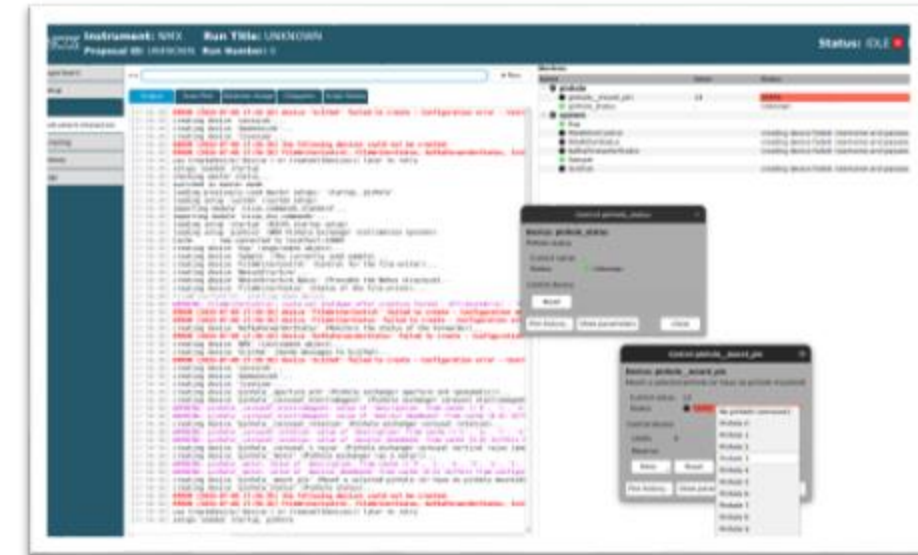
Control System Studio (OPIs)



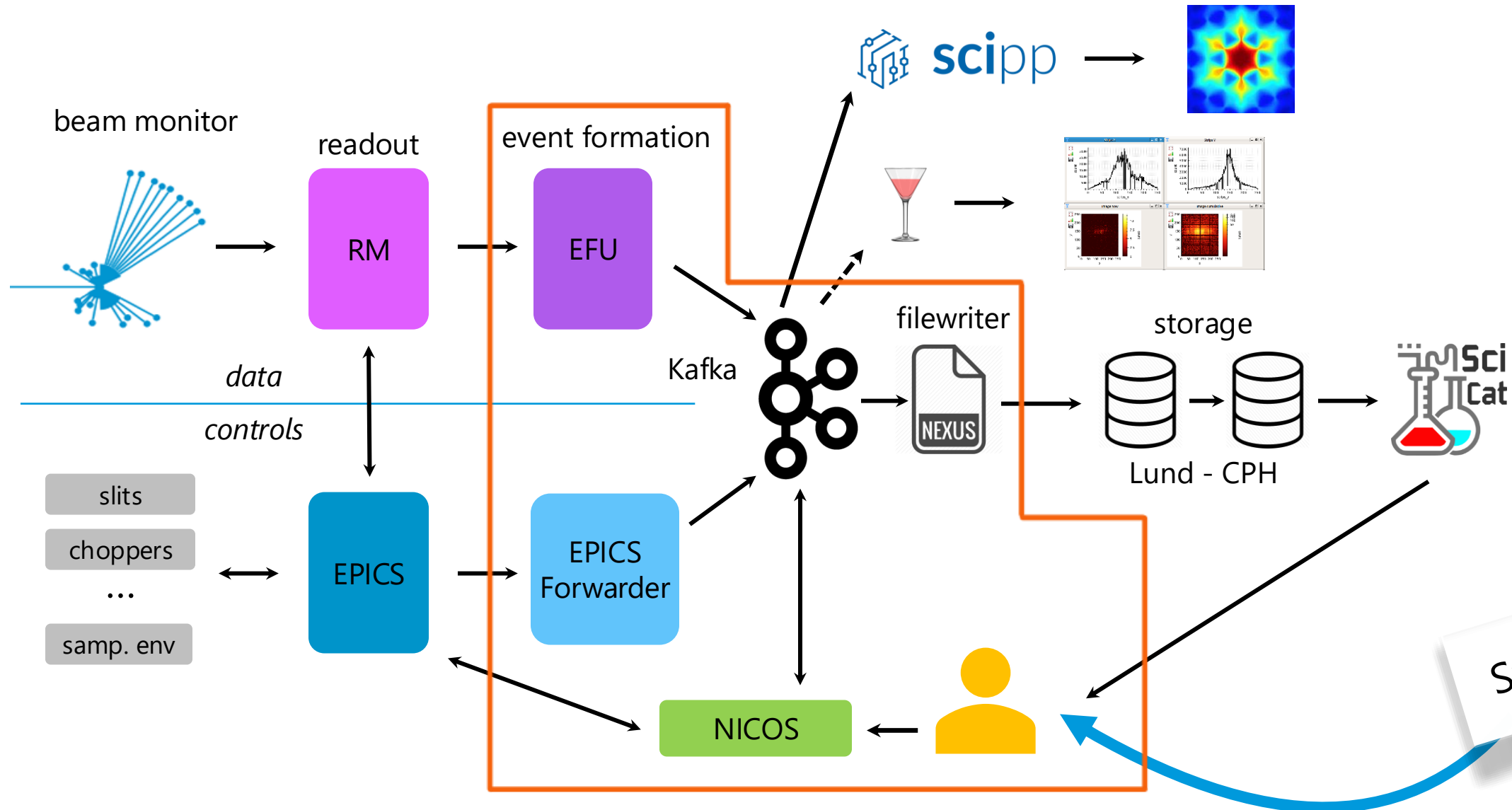
- Expert view, with much more PVs
 - Scripts are more restricted
 - Calibration and diagnostic by support groups and instrument staff (Archiver integration)



NICOS



- Focus on PVs related to the experiment
- Routines, e.g., scans, filewriting, Python custom user scripts
- Experiment orchestration

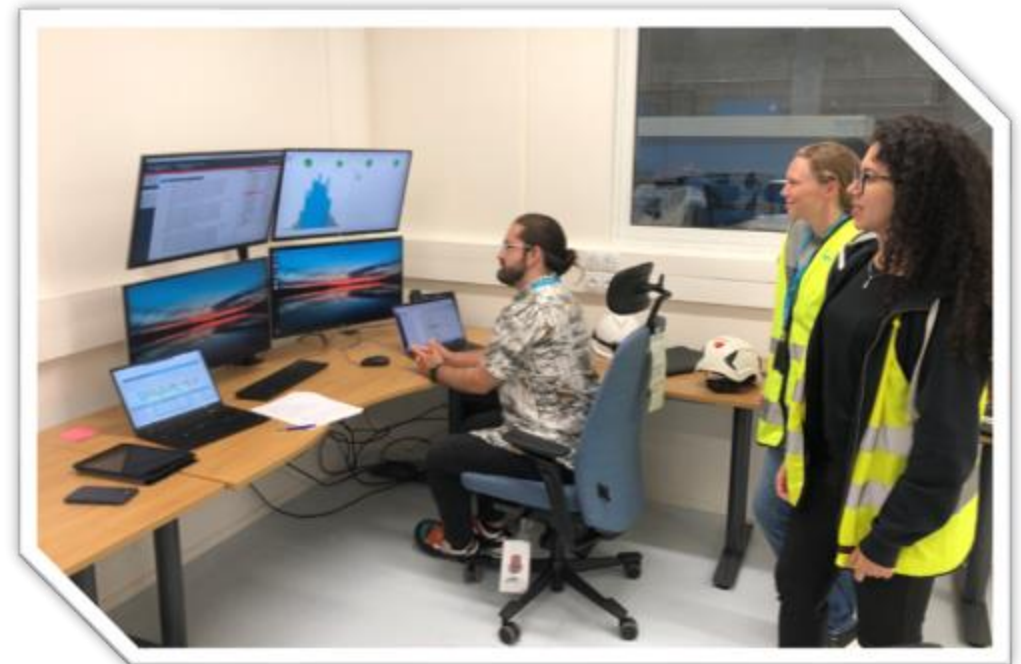


Requirements and roadmap

What do we do to have NICOS at the instrument?



- Meetings between ECDC and instr. staff for **requirements**.
- ECDC Readiness page
 - We already have one for [SKADI](#)
- Hutch PC installed (for NICOS GUI)
- Device installed, and its **EPICS IOC**.
- Instr. CC Verification Plans (CHESS)
 - Usually, a good guide to prepare NICOS for the instrument.
 - Helps to identify PVs that should be in NICOS and/or Nexus.



NICOS operation at instrument

Requirements and roadmap

What do we do to have NICOS at the instrument?



ECDC NICOS team:

- NICOS server (virtual machine)
- NICOS setup files (motion, temperature, pressure, det slow control etc.)
- Just-bin-it (acquisition debug)
 - Next: ESSLiveView
- ECDC pre-test windows (as preparation for CC official tests)



NICOS developers testing at an instrument

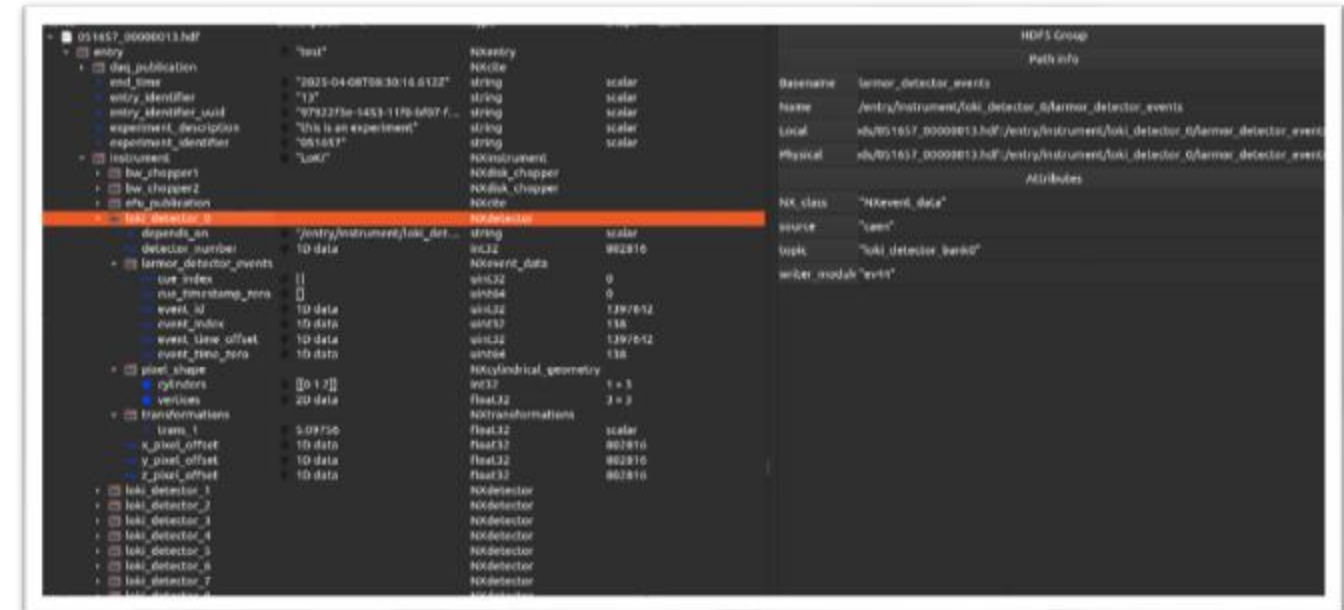
Requirements and roadmap

What do we do to have NICOS at the instrument?



ECDC Data Collection:

- EFU
- Kafka configuration (topics)
- Daqlite, AR51 (visualization)
- Filewriter



Nexus file viewer

Nexus file:

- NICOS calls filewriter, external ECDC service (command: 'start_filewriter()')
- Nexus JSON template (possible path: simulation files -> Moreniius -> Nexus JSON)

References

Sub-headline



- **ESS-5706535** - NICOS Operation Manual
- [ECDC Confluence page](#)
- [NICOS official page](#)
- [NICOS ESS code \(Gitlab\)](#)





Thank you!



ess.eu



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Attachments

Extra materials



Instruments' Network & Controls Architecture

