Contribution ID: **422**   Type: **Poster**

NICOS - an instrument control framework

Tuesday 18 September 2018 17:15 (15 minutes)

NICOS (Networked Instrument COntrol System) has all components needed to easily create an instrument control software. Due to the large number of configuration options it can be tailored to individual instruments' requirements.

There is a script execution component, components to create a history of measured data as well as of nearly all parameters of the instrument. A highly configurable graphical user interface with a lot of different modules allows instrument specific design. To display the status of the instrument the most important instrument parameters may be displayed on a screen or via an internet browser. A number of standard commands exist, and instrument specific commands are possible.

Various middleware systems currently TACO, TANGO and EPICS as well as protocols for plug-and-play integration of decoupled embedded systems, e.g. sample environments and further measurement options are supported. A newly developed protocol for cross facility integration of sample environment named SECoP has been integrated.

Nearly all components are written in Python which gives a high degree of platform independence (Linux, Windows, macOS). It also allows easy implementation of new features (devices, commands, data sinks, and GUI components). Python is also used as the scripting language.

At the MLZ, NICOS is now in use at around 20 instruments. An international collaboration with the SINQ at PSI and the ESS has started.

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Session Classification: Poster session 2

Track Classification: P1 Instrumentation and methods