Customization of MXCuBE (Qt4) Using EPICS for a Brazilian Synchrotron Beamline

Brazilian Synchrotron Light Laboratory

Beniz, D. B., douglas.beniz@lnls.br

Brazilian Center for Research in Energy and Materials

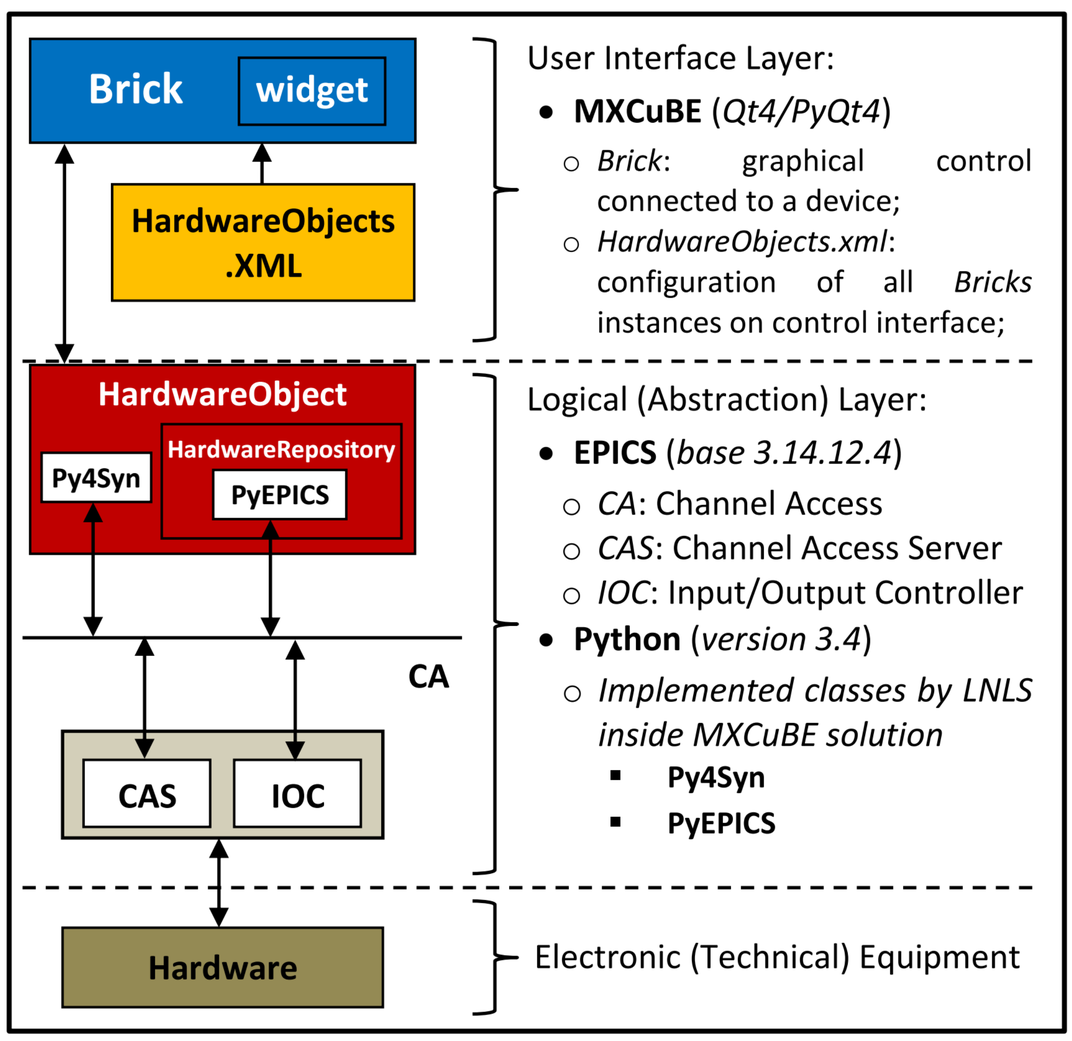
LNLS decided to adopt *MXCuBE* [1] for its macromolecular crystallography beamline, named *MX2*, considering it is a Python based solution, which is being largely used in our laboratory, its basic support to *EPICS*, the control system adopted for the LNLS beamlines and because of its stability. Then, existing *MXCuBE* implementation has been customized to fit LNLS requirements, considering that previously it was mainly ready to control systems other than *EPICS*.

***MXCuBE* has been used on *MX2* beamline of LNLS since the end of 2016 with positive feedback from researchers.**

Main customization effort

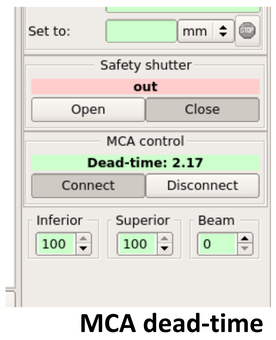
- **There were two principal challenges after have been take decision to adopt MXCuBE in LNLS:**
  1. **Upgrade MXCuBE from Python 2.7, that was default version when we started working with it, to Python 3.4, which was the minimal version required by our *Py4Syn* [2] library to operate over EPICS control layer;**
  2. **Develop customized classes to work with EPICS to perform common procedures of macromolecular crystallography beamlines.**
- **Both of them have been successfully overcome, working together MXCuBE developers team.**

Architecture Overview



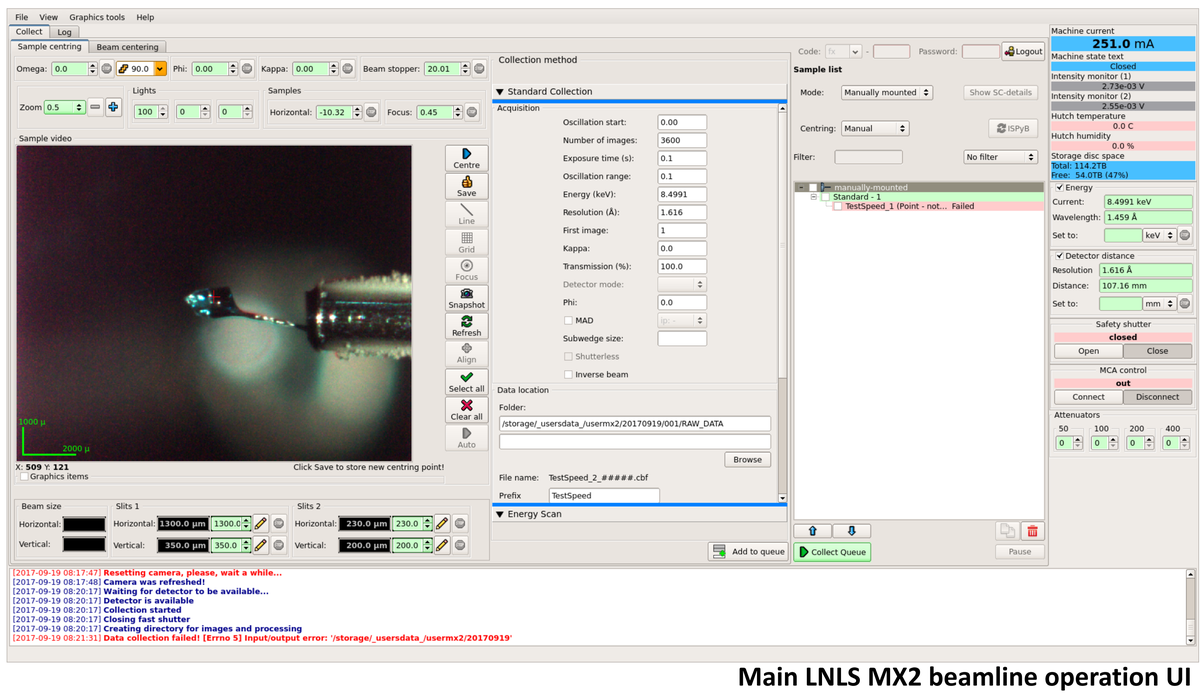
Some original LNLS *Bricks*

- **Attending some requirements of MX2 staff, some original widgets were implemented, like these:**
  - **Beam intensity automatic optimization**
    - ✓ ***Py4Syn* and *Matplotlib* Python libraries;**
  - **Embedded CBF viewer**
    - ✓ ***cbf* Python library of *PSI*;**
  - **Amptek MCA control of dead-time**
    - ✓ ***Py4Syn* Python library;**

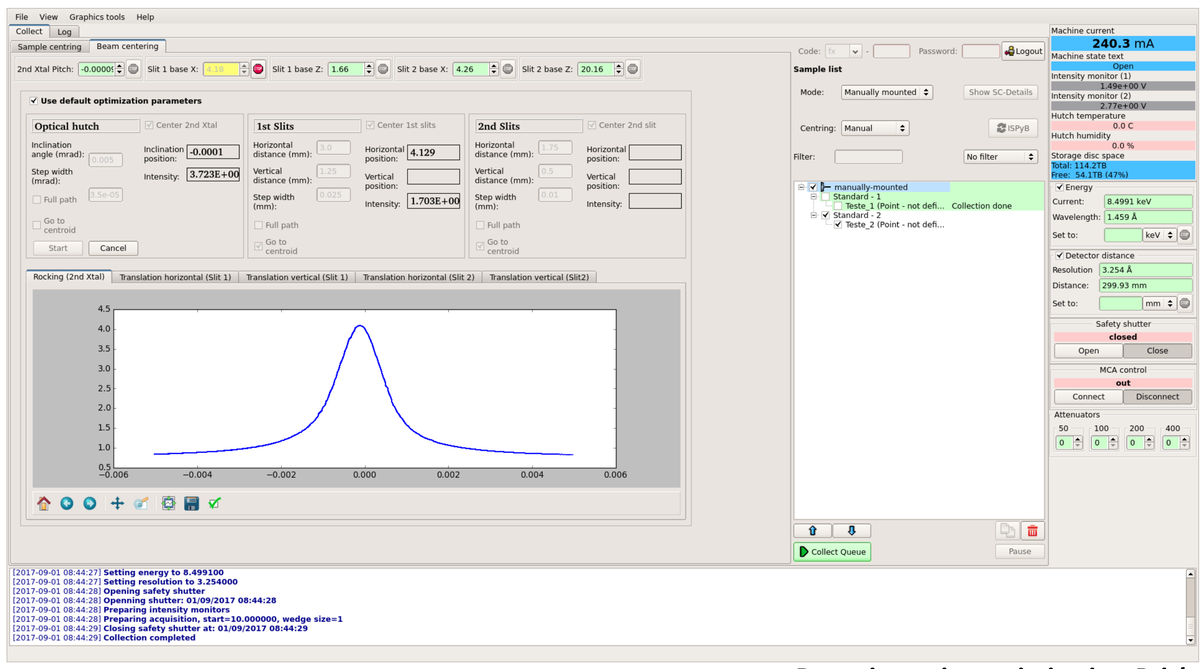


MCA dead-time monitoring

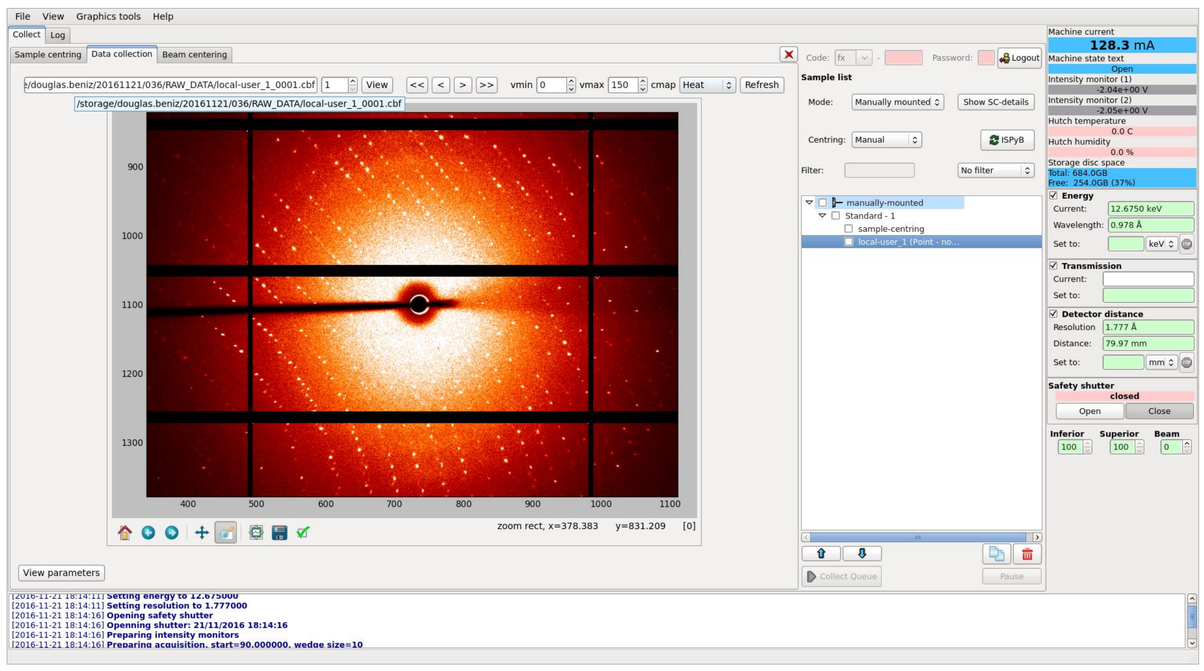
Screenshots of current operational UIs



Main LNLS MX2 beamline operation UI



Beam intensity optimization *Brick*



Embeded CBF viewer

References

[1] Gabadinho, J. et. al., 2010, "MXCuBE: a synchrotron beamline control Environment Customized for Macromolecular Crystallography Experiments". J. of Synchrotron Rad., V. 17, pp. 700-707.

[2] H. H. Slepicka et. al., 2015, "Py4Syn: Python for synchrotrons". J. of Synchrotron Rad., V. 22, pp. 1182-1189.

ICALEPCS2017