Device Error Handling in ChimeraTK

M. Killenberg*, J. Timm†, J. Georg, M. Hierholzer, C. Kampmeyer, T. Kozak, N. Shehzad, G. Varghese
(Deutsches Eletronen-Synchrotron DESY, Hamburg)

Motivation
- Large fractions of code in control system applications are error handling.
- Many errors are device errors, often I/O errors.
- Error handling usually is similar.
  - Report the error to the control system.
  - Wait until the error condition is resolved.
  - Resume normal operation.

Goal
- Handle device errors in the framework.
- Business logic should not have to deal with device errors (it can just read and write).

Device Error Handling

ProcessVariable::read()
Each process variable has its own exception detection and reporting.

backend.read()
The backend provides the implementation which performs the read or write operations. In case of I/O errors or communication problems it will raise a runtime_error exception, which is caught in the process variable and reported to the device module thread.

Waiting for recovery
After reporting the error, the read() or write() function will wait for a message from the device module that the backend is operational again. It will then retry the read()/write() such that the action eventually is performed correctly. This automatically will block the calling application module until the device is available again. No further handling is required in the business logic.

Resources
- All ChimeraTK components are published under the GNU GPL or the GNU LGPL.
- Ubuntu 16.04 packages are available in the DESY DOOCS repository.
- API documentation: https://chimeratk.github.io/
- Ask us for tutorials and live demos.
- e-mail support: chimeratk-support@desy.de

Device Access
- Access to hardware control system middlewares – EPICS
- DOOCS
- OPC UA
- Your control system

Application Core
- Library to write modular control applications

Control System Adapter
- Connect applications to various control system middlewares – EPICS
- DOOCS
- OPC UA
- Your control system

ChimeraTK
A tool kit for creating control applications