KaraboGUI: The Multi-Purpose Graphical Front-End for the Karabo Framework

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Karabo is the new integrated control, data acquisition and processing framework developed for the photon beamlines at the European XFEL.

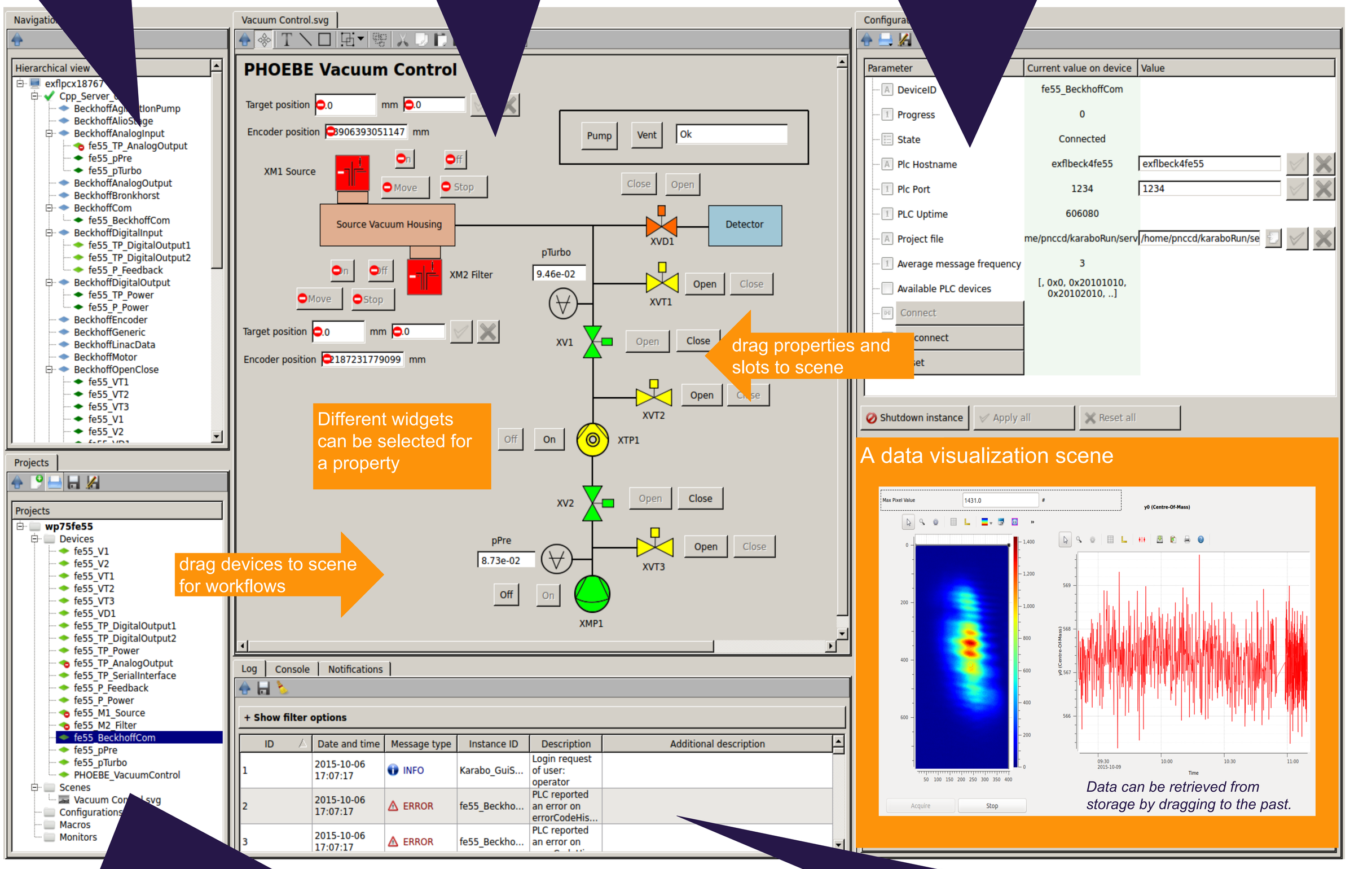
There is one graphical user interface for everything one can do with Karabo. This includes running and configuring devices, designing graphical interfaces, writing and executing macros.

The GUI allows visualization of slow control data and is capable to online monitor images provided by large 2D detectors during acquisition and processing steps, such as calibration and analysis.

The live navigation shows all running devices, their classes and the device server they are running on. Users can instantiate and shutdown devices.

Users can design scenes, graphical representations of the running system. Properties are dragged from the device's configuration to be shown in the scene.

With the device configurator the user can configure any running device, as well as pre-configure devices to be run. The configuration panel is autogenerated from the device parameters already known before instantiation.



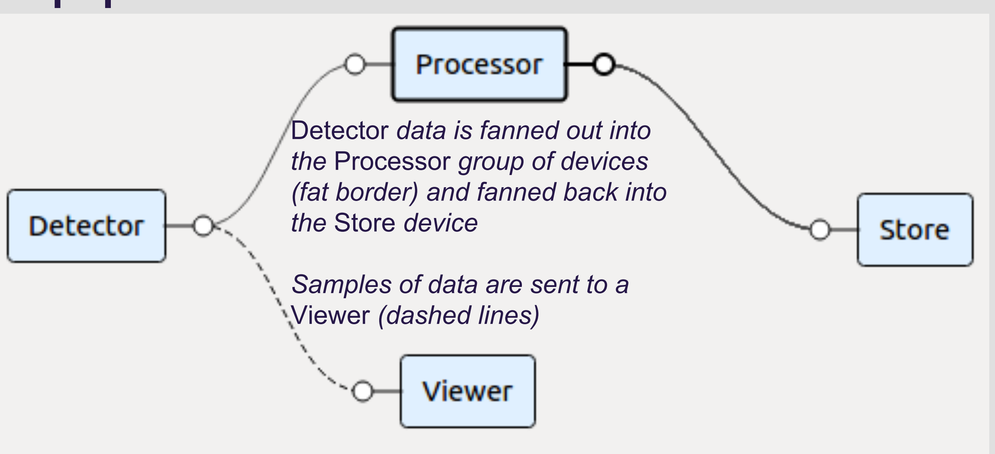
Data can be retrieved from storage by dragging to the past.

Projects are containers persisting everything needed for a specific task:

- A list of all devices that need to run, and their desired configuration
- The scenes graphically representing the task
- Specific configurations to be applied to devices
- Macros to program repetitive or sequential tasks
- A list of device parameters to be monitored for the task

- The logging widget logs all messages broadcast in Karabo.
- An IPython based console allows to use the macro language interactively.

Data pipelines



Karabo devices can communicate high-bandwidth data via direct links. These pipelines can be designed in the GUI as well.

Macros

```
from karabo import *

class Scan(Macro):
    start = Float(description="Start position")
    stop = Float(description="End position")
    steps = Int()

    @Slot()
    def run(self):
        """Start the scan"""
        with getDevice("motor") as m:
            m.targetPosition = self.start
            m.move()
```

Macros can be edited directly in the GUI, but then run on a dedicated macro server. They are class-based and are a special form of devices.
They are to be used for specific tasks only, generic tasks should be implemented as devices.