Developing Status of PLS-II Beamline Data Acquisition Software Using Bluesky

Pohang Accelerator Laboratory

Sang-Woo Kim, Kyung-Hyun Ku and Woul-Woo Lee

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(1 day)

- Received over 20 issue and code modification notices in just one day's email.
- Observed upgrades involving hundreds of lines of code and comments.
- This level of activity exceeds what individuals or small groups can achieve, highlighting the need for collaboration.
- These reasons support the integration of bluesky into our beamline infrastructure.

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Current Status of PLS-II Beamline Utilizing Bluesky
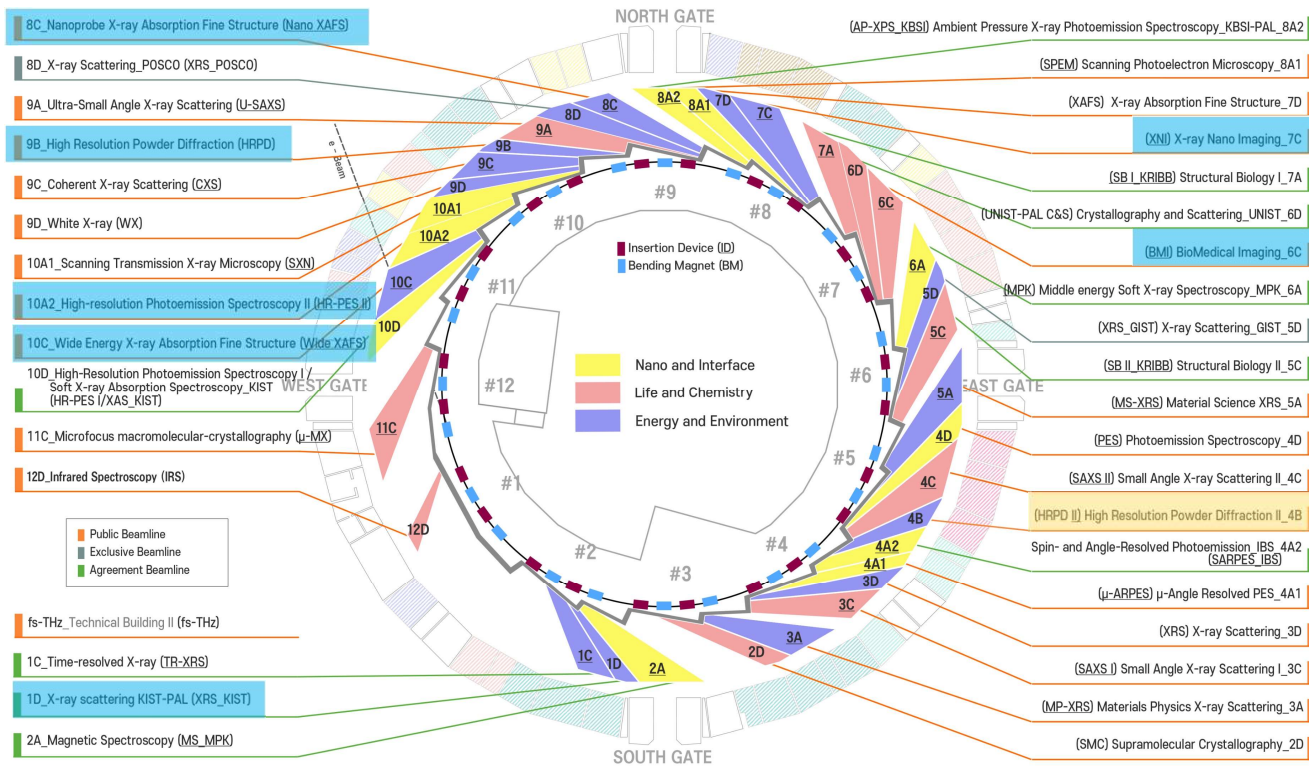
Blue : Beamlines utilizing Bluesky
Yellow : Under developing

Category	Beamlines
XAFS	1D, 8C, 10A2, 10C
Imaging	6C, 7C, 8C
HRPD	4B, 9B

- Out of 36 beamlines, Bluesky is currently used in 7 beamlines, including 4 for XAFS, 2 for Imaging and 1 for HRPD. Additionally, development of DAQ programs using Bluesky is currently underway in 2 beamlines.
- Gradual shift towards using the actively developed and widely utilized Bluesky project from various accelerator research institutions

HRPD Beamline (9B) DAQ User interface and PyDM Displays

Data acquisition user interface

PyDM Widget for Monitor & Control

The python user interface communicates with the queue server through Bluesky's queueserver_api,
And the management of the RunEngine is handled by QueueServer.

HRPD Beamline (9B) Program schematics
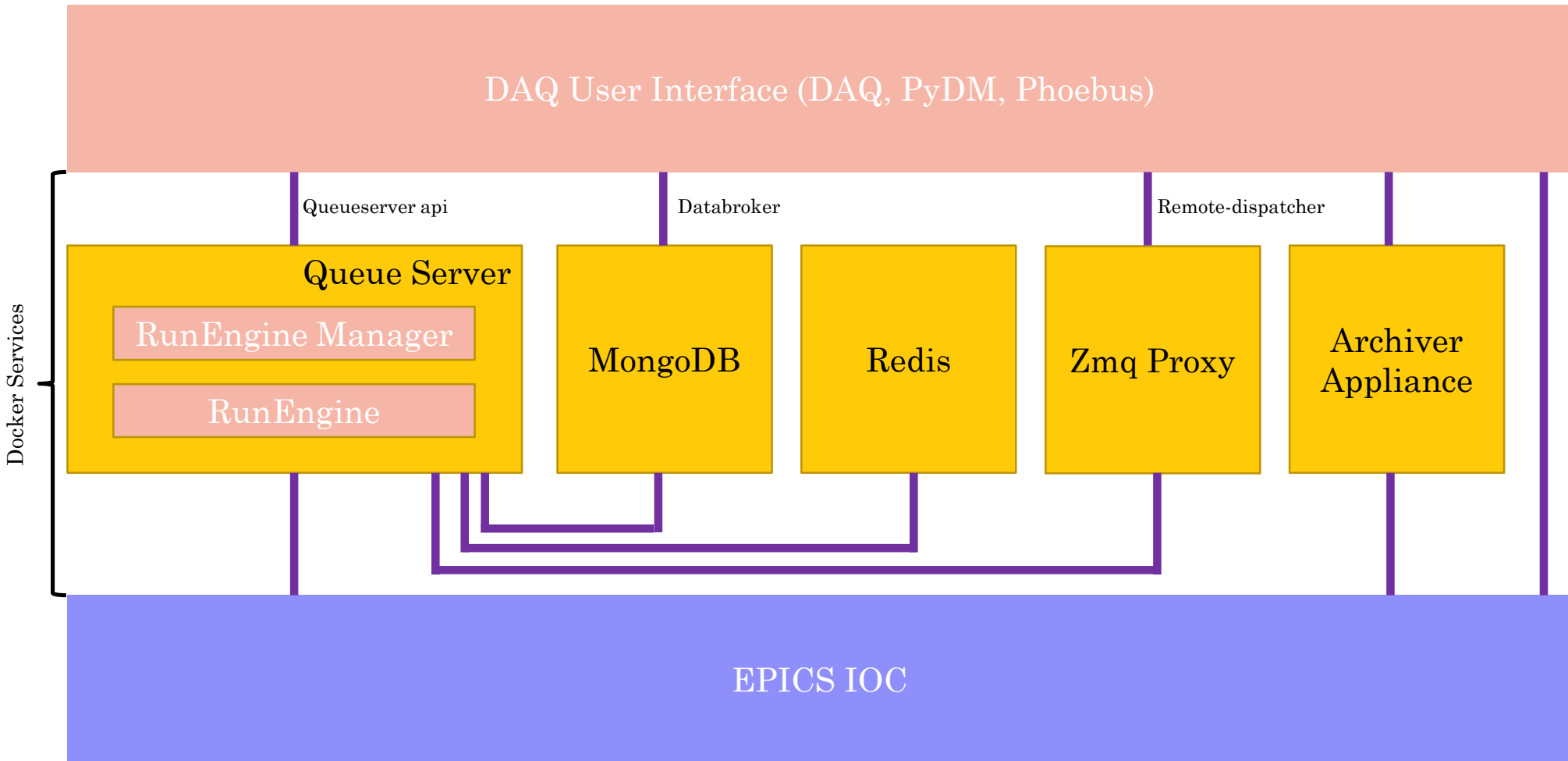
Beamline (7C) DAQ User interface and PyDM Displays

Control Panel
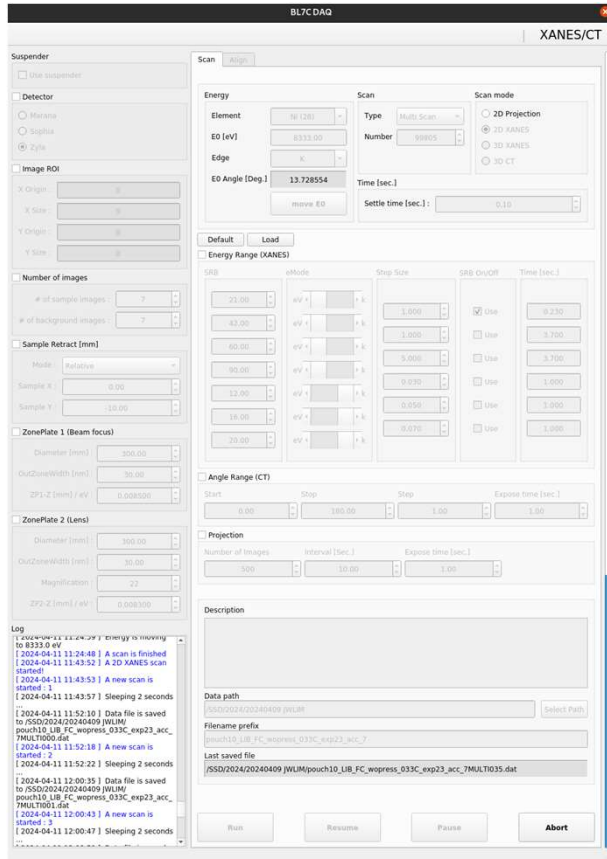
Data Viewer
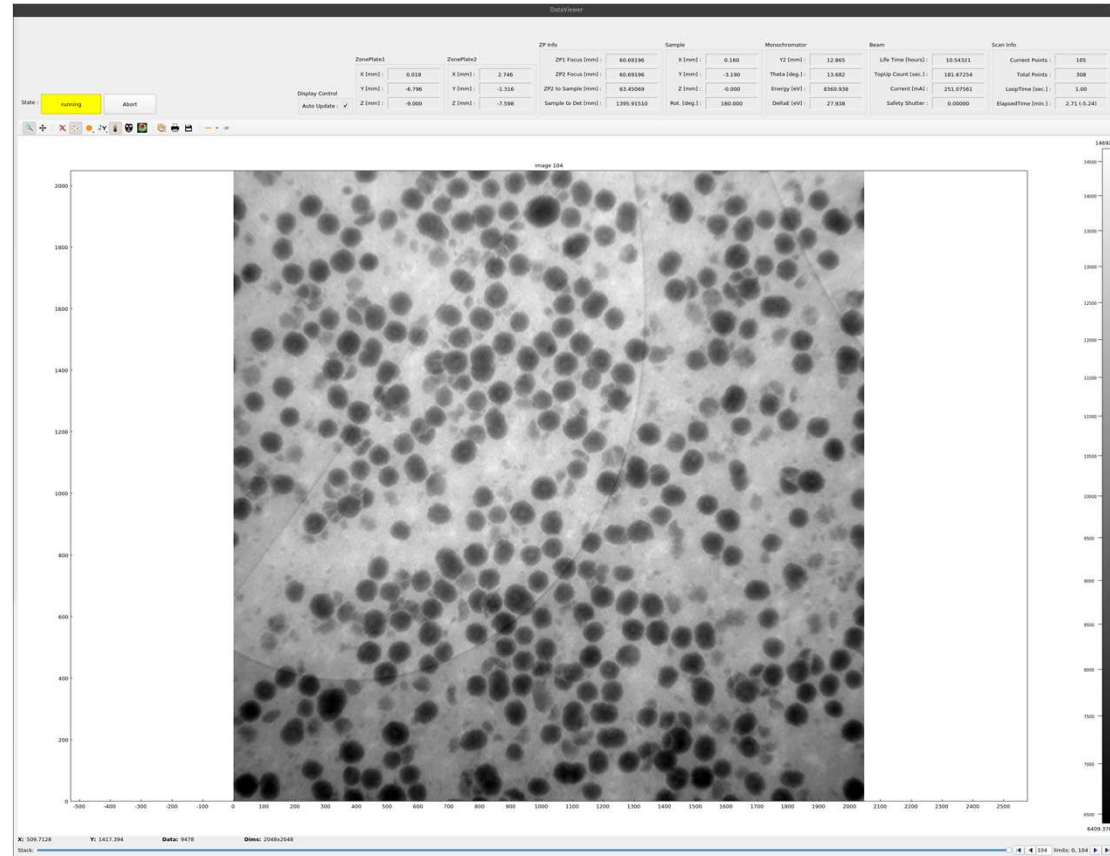
Two-dimensional XANES imaging of a battery cell, and it has been found that providing a GUI for standardized beamline experiments results in high satisfaction.

EXAFS Beamline (8C) DAQ User interface

Control Panel

Data Viewer
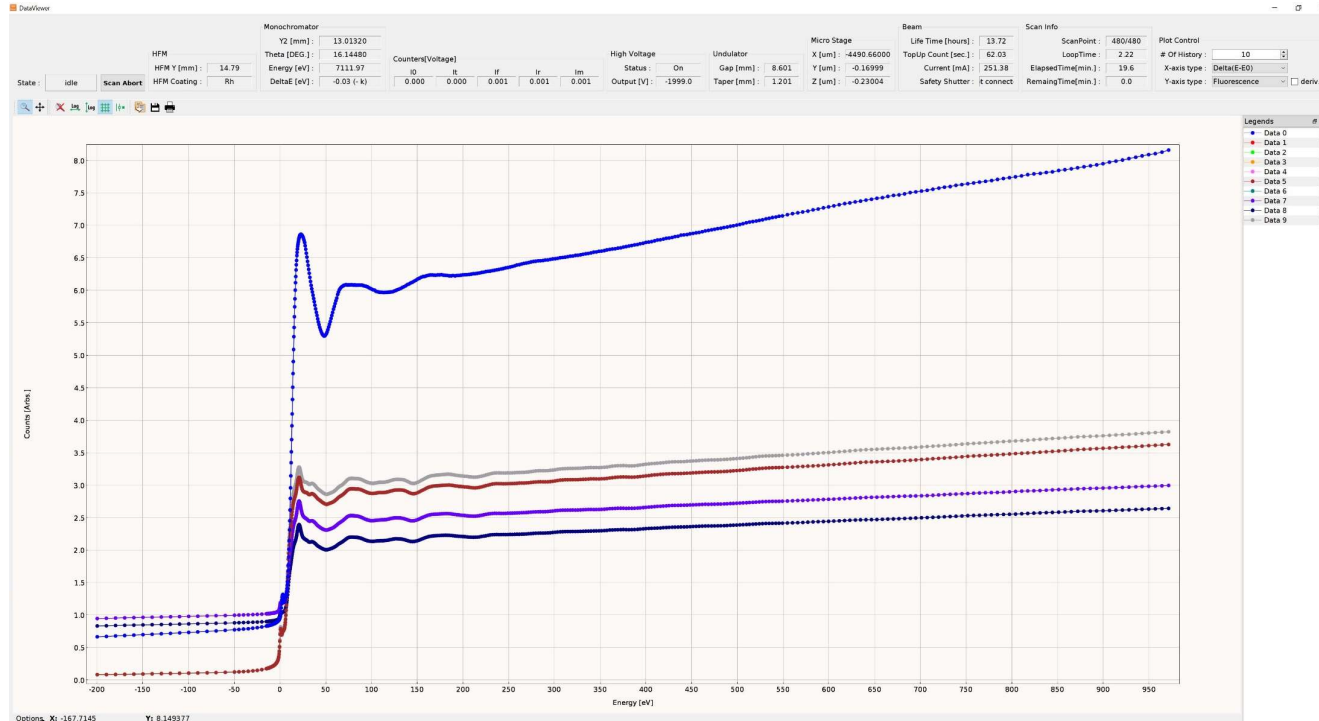
- Shared User Interfaces : The UI for both beamlines(7C, 8C) shares common features, optimized for energy scans.
- Automated Sample measurement: Users can input sample names, positions, and measurement counts into a table format.

7C, 8C Beamlines User interface Schematics

Control Panel

Data Viewer, Phoebus, PyDM

RunEngine

Remote Dispatcher

DataBroker

Docker/Native Services

Databroker

MongoDB

Zmq Proxy

File Writer

Archiver Appliance

EPICS IOC
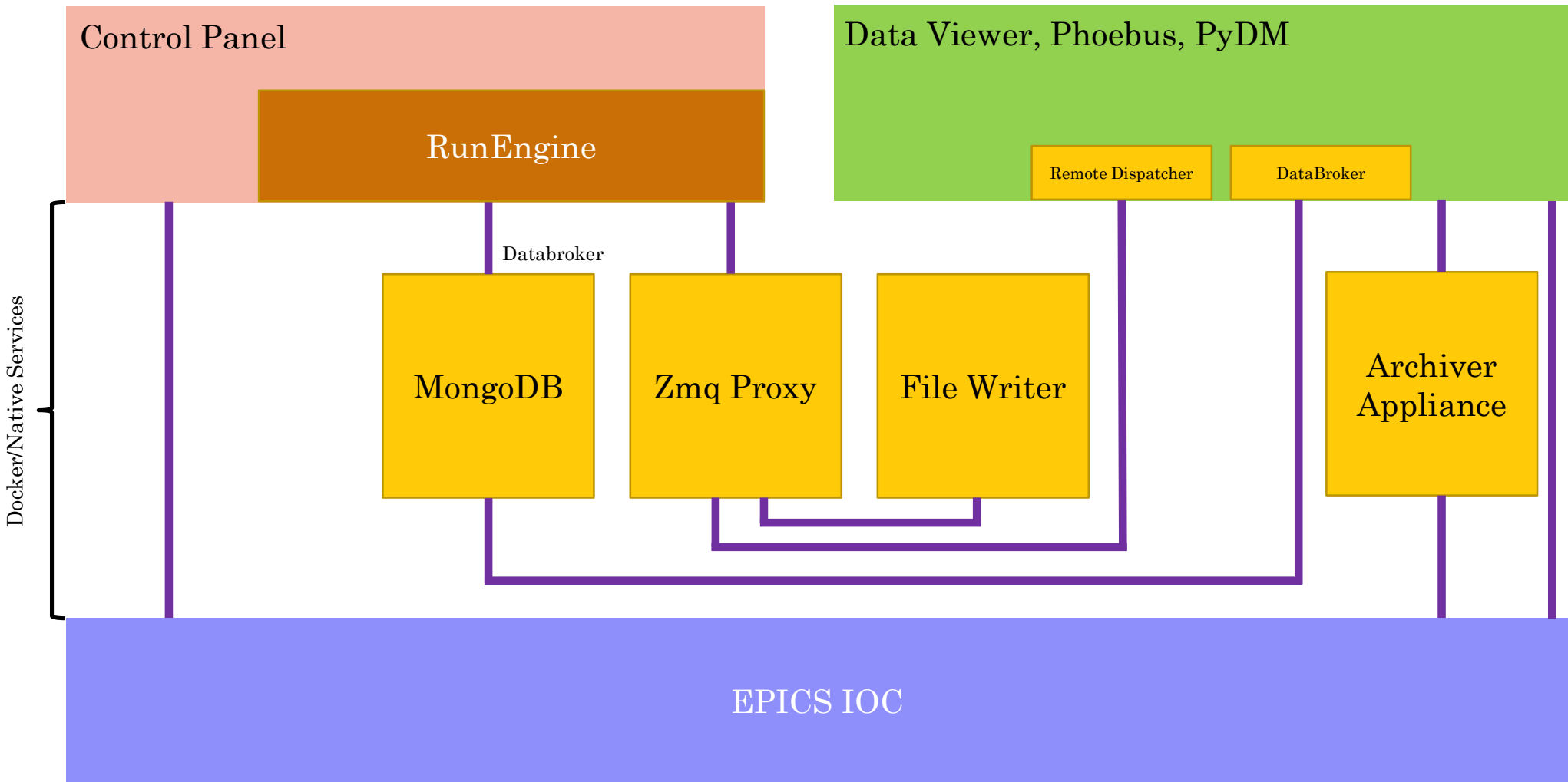
Summary and future works

- User-Friendly Design: Transitioning beamline interfaces to Bluesky while maintaining familiarity for ease of use by existing users.

- Backend Services: Utilizing Docker for efficient management of backend services.

- Remote Experimentation: Planning to conduct web-based remote experiment tests using QueueServer.

- Continuous Bluesky Integration: Proactively implement Bluesky in new and upgraded beamlines to enhance data acquisition.