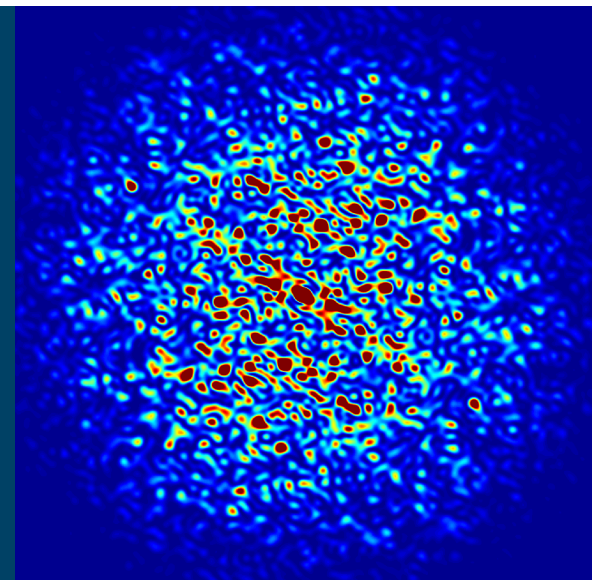


C2 Data Viewer: Visualization tool for EPICS7 Data Streaming



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Advanced Photon Source

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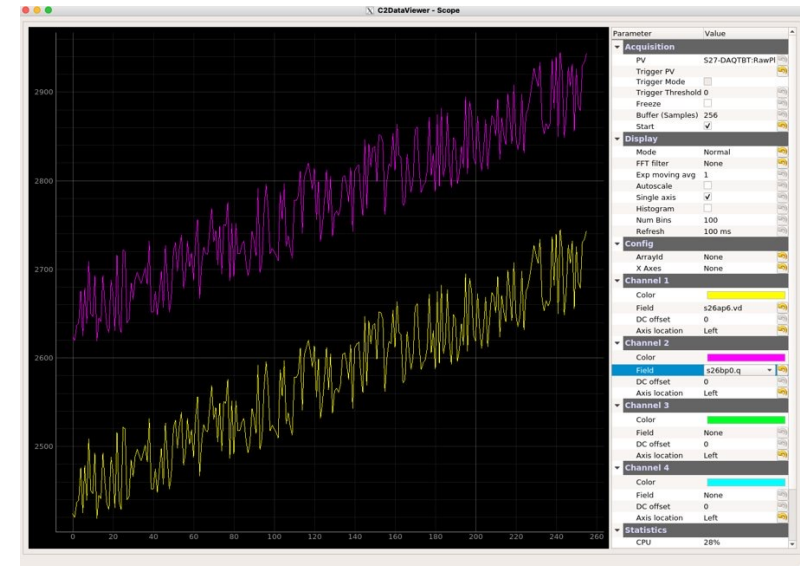
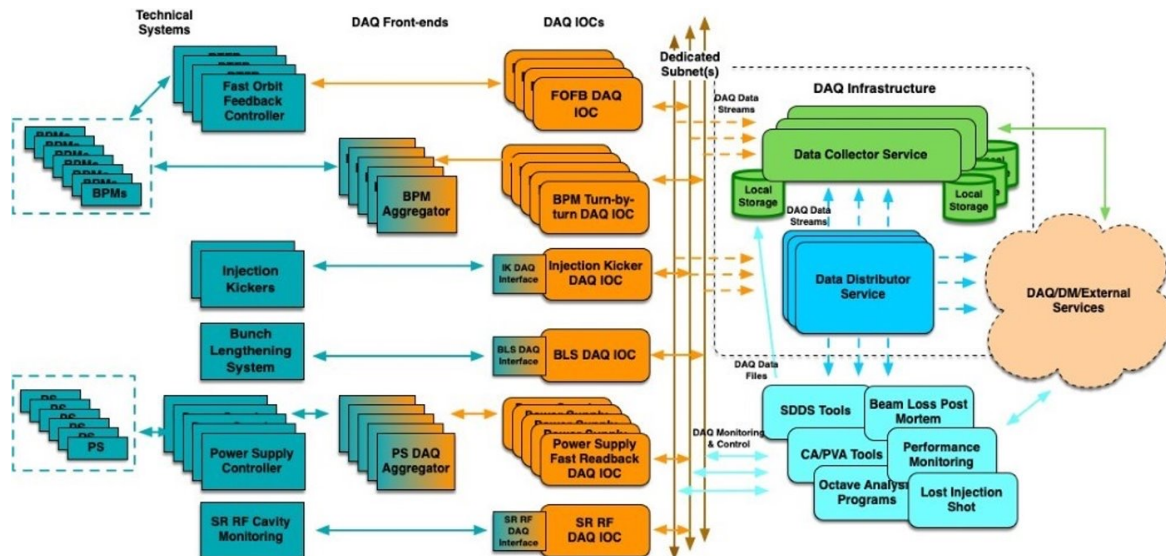
EPICS Collaboration Meeting Spring 2023

C2 Data Viewer

- Python QT based application that visualizes real-time EPICS data streams over both pvAccess (PVA) and Channel Access (CA)
- Supports plotting PVA waveforms, PV scalar data, and Area detector images
- Instrumental for monitoring, troubleshooting and diagnostics
- Implemented using pyqtgraph for generating the plots and UI and pvapy to communicate with pvAccess and Channel access protocol
- Install:
`pip install c2dataviewer`
- Run:
`c2dv --help`

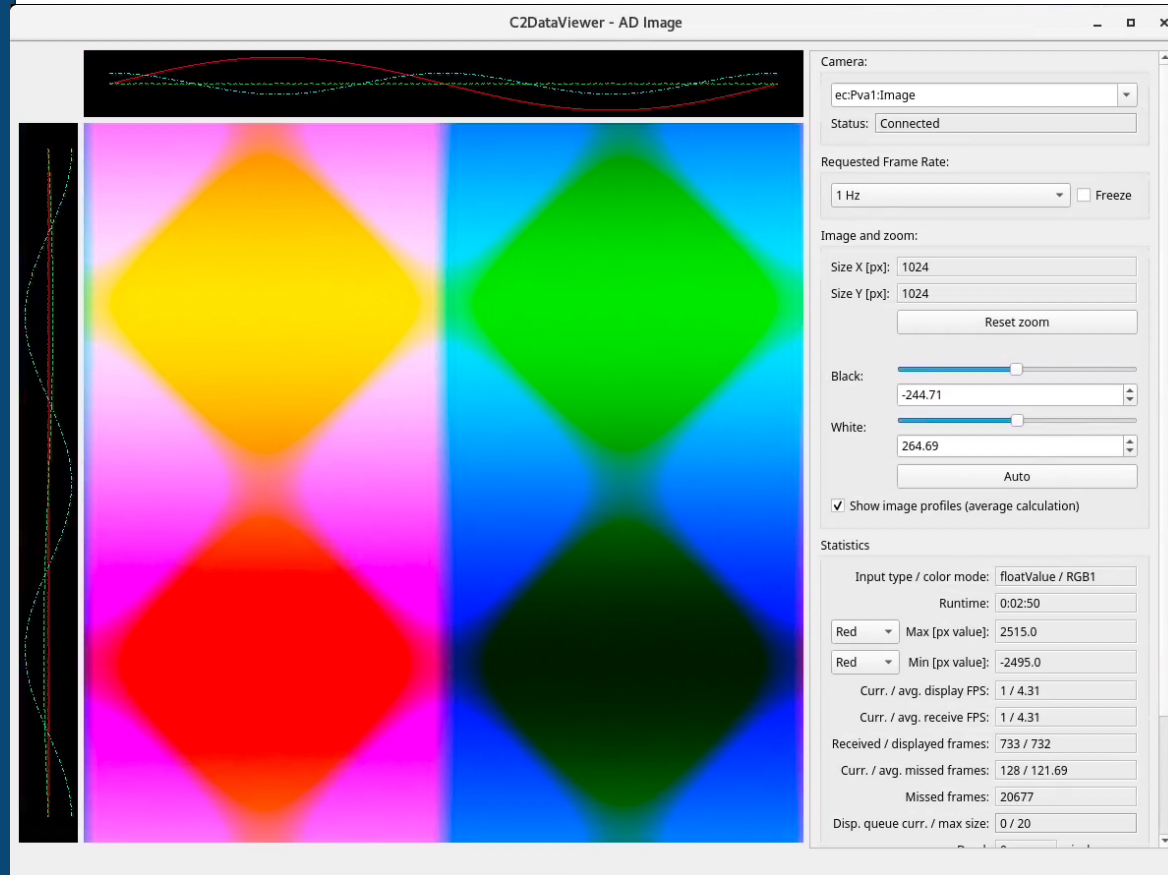
Motivation

- A high-performance data acquisition system (DAQ) has been under active development to meet APS Upgrade needs
- Acquires data from various technical systems and streams large volumes of data to downstream users via EPICS7 pvAccess (PVA), or saves the data to disk
- C2 Data Viewer originally developed as a DAQ “scope” application that monitored DAQ data in real-time with support from FFT, PSD, histograms, etc



C2DV Image Viewer

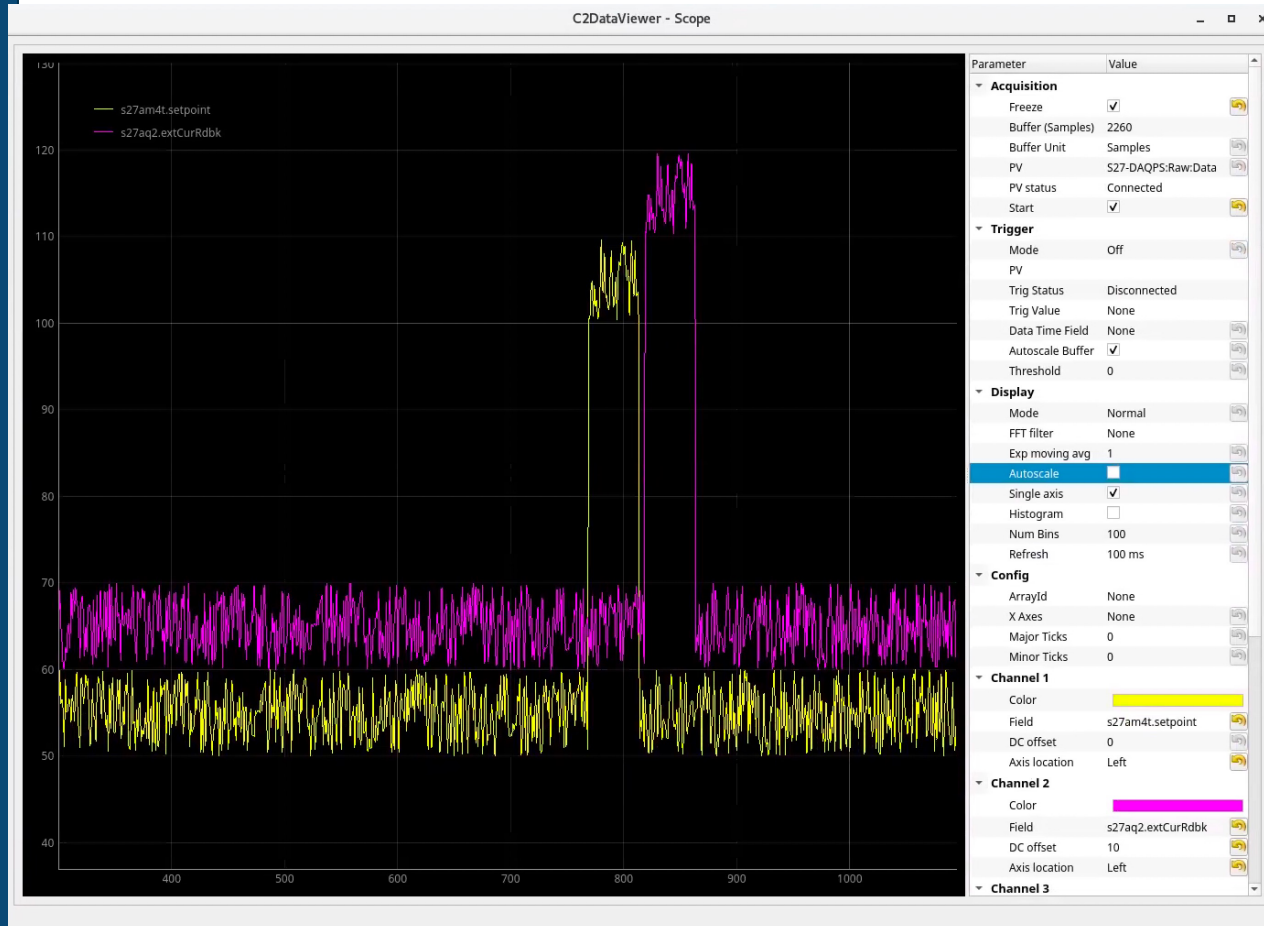
- Displays images from the Area Detector pvAccess plugin



- Used by both accelerator and x-ray science divisions for monitoring and troubleshooting beamline data
- Designed to handle data streaming at high rates, and automatically adjusts processing rate based on CPU and network usage
- Supports adjustable black/white points, image profiles. Recently added blosc compression support and ability to hide panel
- To run:
`c2dv --app image --pv PVNAME`

C2DV Scope Viewer

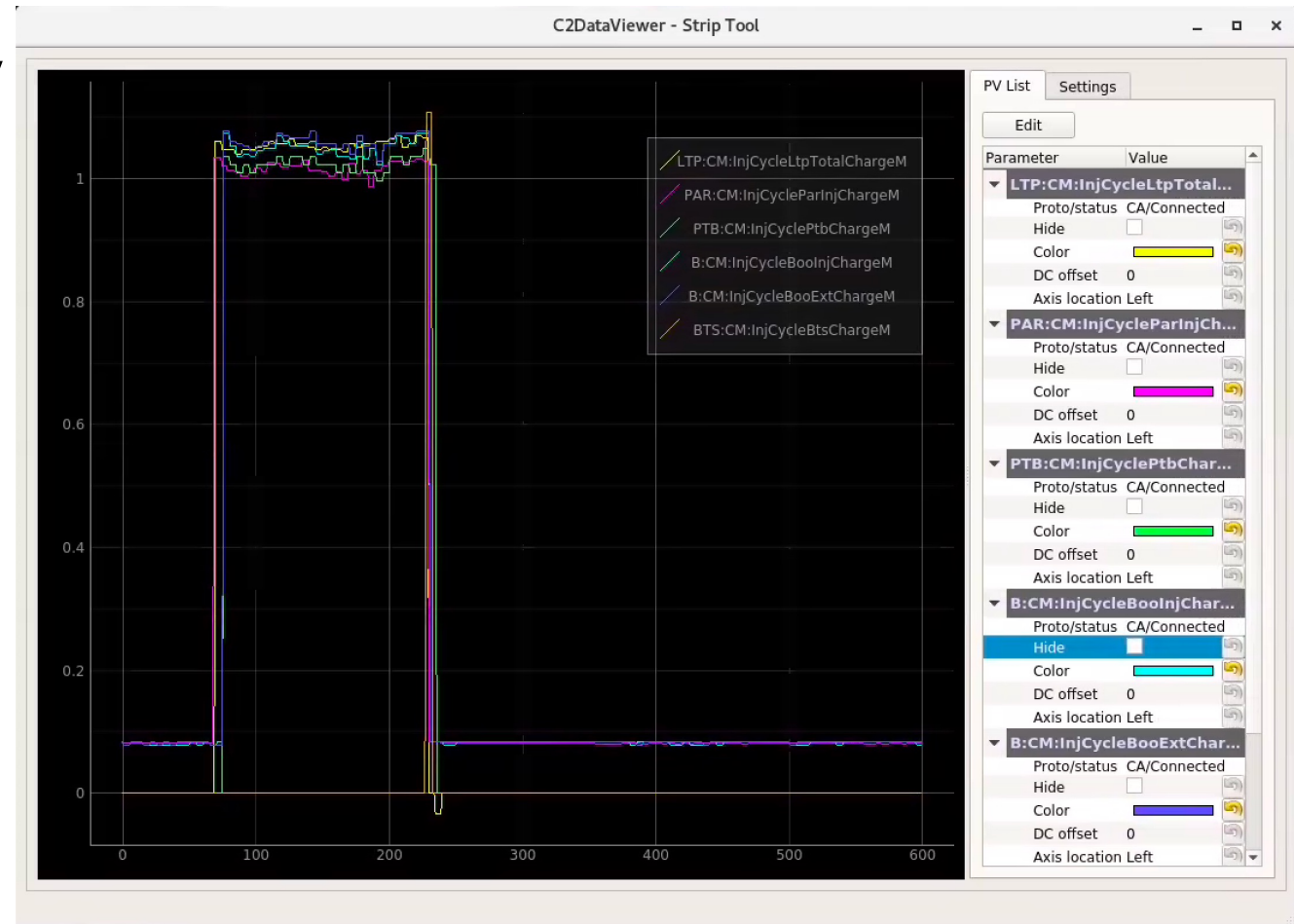
- Scope viewer displays waveforms from PV structures transported using pvAccess and Channel Access



- Used extensively for supporting operations of APS Radio Frequency (RF) systems and development of RF and DAQ systems for the APS Upgrade
- Supports plotting FFT, moving average and histogram, trigger mode, pvAccess nested structures
- To run:
 - `c2dv --app scope --pv PVNAME`
 - Select channel fields
 - Click “Start”

C2DV Striptool

- Striptool displays PV scalar data transported using either PvAccess or Channel Access
- Shares common display functionality with scope viewer
- Supports plotting FFT, moving average, and histogram
- To run:
`c2dv -app=striptool`



Demos

- [Link to Image Viewer video](#)
- [Link to Scope Viewer video](#)

Future work

- Save and restore settings configured from UI
- Support display PV structures in StripTool
- Save streaming data to disk
- Display PV object metadata in Scope Viewer
- Source code and Documentation: <https://github.com/epics-extensions/c2dataviewer>