areaDetector CSS opi screens deployment at NSLS2 beamlines

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BROOKHAVEN NATIONAL LABORATORY

a passion for discovery

U.S. DEPARTMENT OF ENERGY | Office of Science

areaDetector deployment

- Over 500 AD Detectors
  - GigE, Pilatus, Eiger, PCO, Andor3, XMAP, PE, Merlin, Lambda, Zebra/PanDaBox -> Pizza/‘Tiger’ box
- Base: R3.14.12.6, 7.0.1.1;
- areaDetector versions installed
  - AD 1-9 (most installations)
  - ADCore 3-2 (newer installs)
  - Other versions (2.1, 2.6, …)

areaDetector CSS screens

- NSLS2 has ‘100s of beamline AD devices
  - different AD ioc versions
  - how to minimize number of copies of opi screens?
- adl -> opi converter works well
- adl screens are flat – one folder (or set of folders)
- many detector screens depend on
  - ADCore
  - other modules (asyn, iocStats, …)

- **GOAL:** minimize CSS AD screen maintenance

NSLS2 beamline CSS opi

~26 branches/beamlines + accelerator

Folder		Comment
Flat	Common	Not every AD ioc upgraded
Flat	Each beamline	**75 -125** {beamlines x (5)AD versions}
Not flat	Each beamline	?
Not flat	Common	??

- Flat structure leads to many ‘identical’ screen folders –> maintenance ‘nightmare’ **X**
- Not flat – how to use new capabilities of css?

AD opi screen file structure

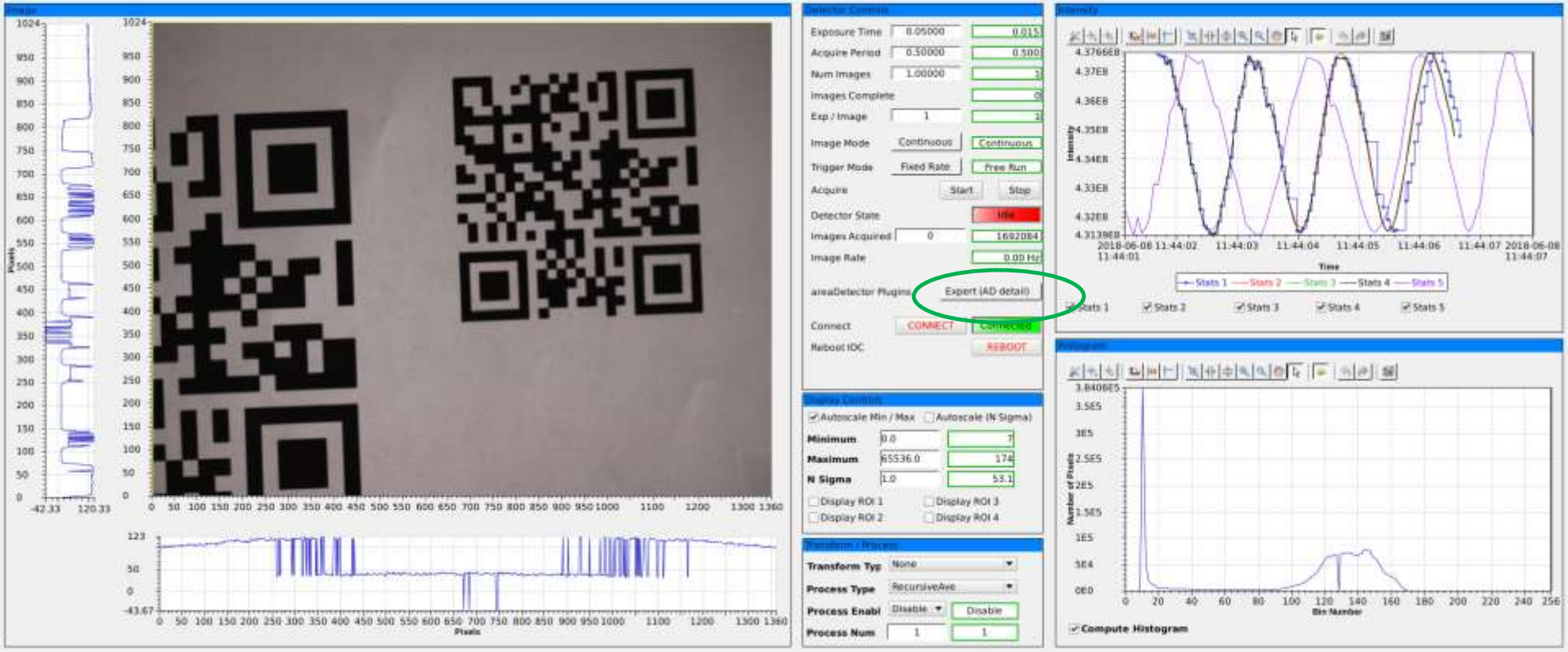
Flat

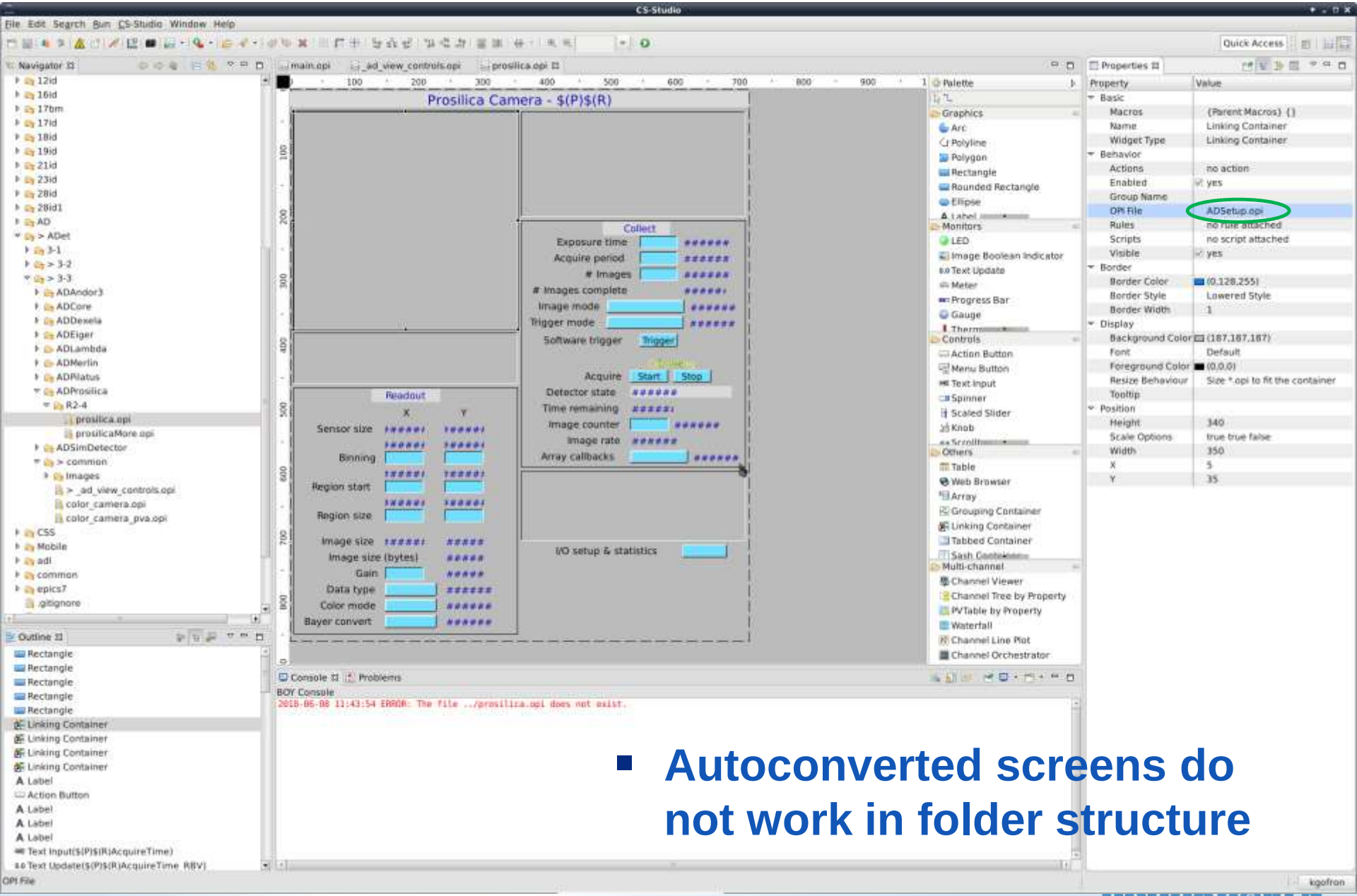
kgofron@xf10id-ws1:~/src/gitlab/cs-studio-xf/AD$ ls

ADAttrFile.opi	NDFileNexus.opi	NDTimeSeriesAll.opi
ADBase.opi	NDFileNull.opi	NDTimeSeries.opi
ADBuffers.opi	ND_File.opi	ND_TimeSeriesPlot.opi
ADCollect.opi	NDFile.opi	ND_Transform.opi
ADDriverFile.opi	NDFileTIFF.opi	NDTransform.opi
ADEpicsShutter.opi	NDOverlay8.opi	ND_Transform_Single.opi
ADPlugins.opi	_ND_OverlayN_Line.opi	PerkinElmerCollect.opi
ADReadout.opi	ND_Overlay_N.opi	PerkinElmerCorrections.opi
adsc.opi	NDOverlayN.opi	PerkinElmerInit.opi
ADSetup.opi	ND_Overlay.opi	PerkinElmer.opi
ADShutter.opi	NDOverlay.opi	pilatusAncillary.opi
ADTop.opi	ND_Overlay_Single.opi	pilatusDetector.opi
Andor.opi	NDPlot.opi	pixiradLV.opi
BIS.opi	NDPluginBase.opi	pixirad.opi
commonPlugins.opi	_ND_Plugin_Setup.opi	pointGreyFrameRate.opi
EPICS_ShutterControl.opi	ND_PluginTimeSeries.opi	pointGrey.opi
firewireFeatures.opi	ND_Process.opi	pointGreyPixelFormat.opi
firewire.opi	NDProcess.opi	pointGreyProperties.opi
firewireVideoFormats.opi	ND_Pva.opi	prosilicaMore.opi
mar345.opi	NDROI4.opi	Prosilica_More.opi
marCCDAncillary.opi	_ND_ROIN_Line.opi	prosilica.opi
marCCD.opi	ND_ROIN.opi	PSL.opi
ND_ColorConvert.opi	ND_ROI.opi	pvCam.opi
NDColorConvert.opi	NDROI.opi	RoperFile.opi
NDFFMPEG.opi	NDStats5.opi	Roper.opi
ND_FFTFreqSpectrumPlot.opi	_ND_StatsN_Line.opi	scan_more.opi
ND_FFT.opi	ND_StatsN.opi	simDetector.opi
_NDFile_Control.opi	ND_Stats.opi	simDetectorSetup.opi
NDFileHDF5.opi	NDStats.opi	title.opi
NDFileJPEG.opi	ND_Stats_Plot.opi	URLDriver.opi
NDFileMagick.opi	ND_StdArray.opi	URLDriverSetup.opi
NDFileNetCDF.opi	NDStdArrays.opi	

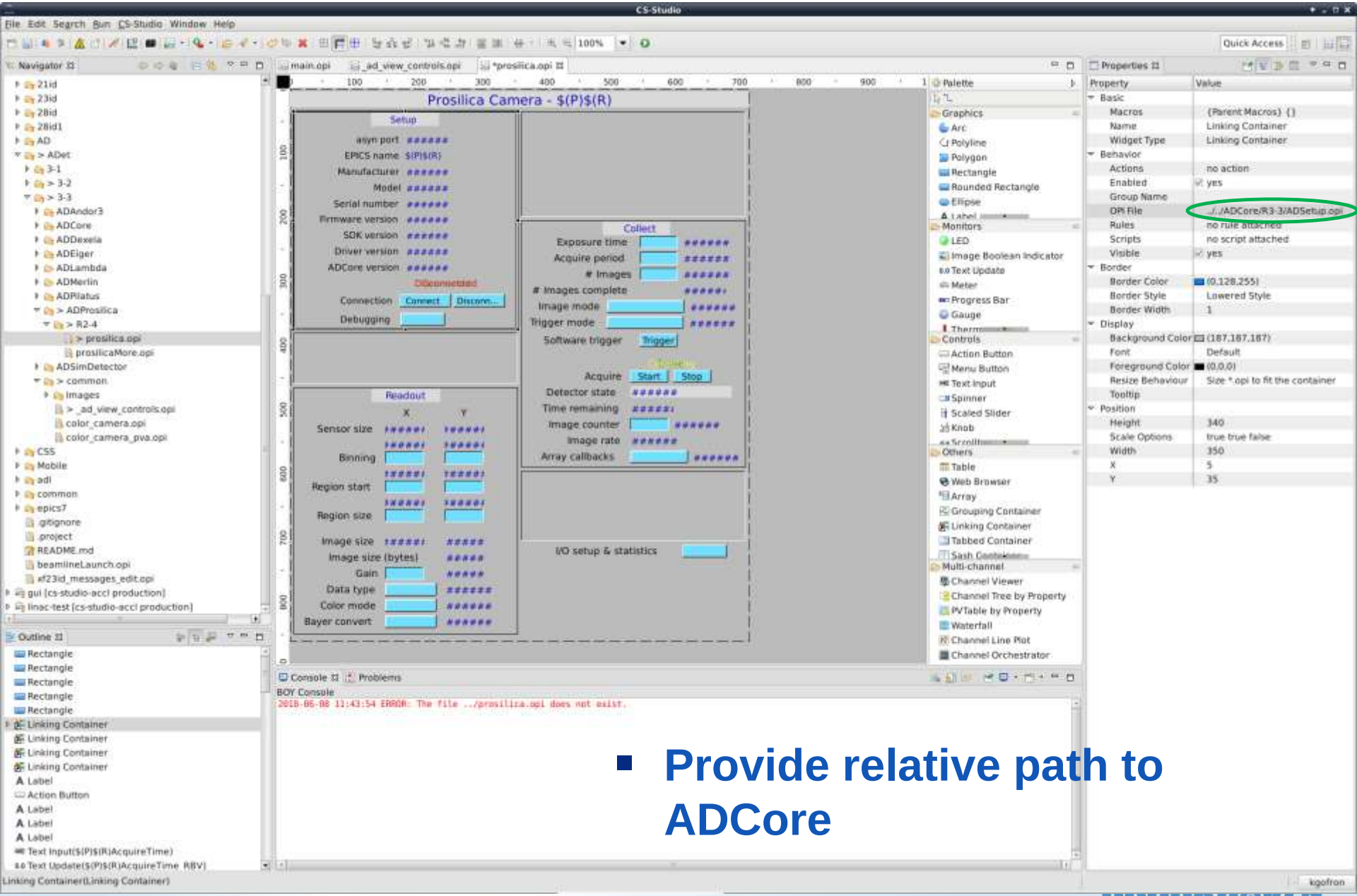
Folder

Prosilica main screen (@ NSLS2)

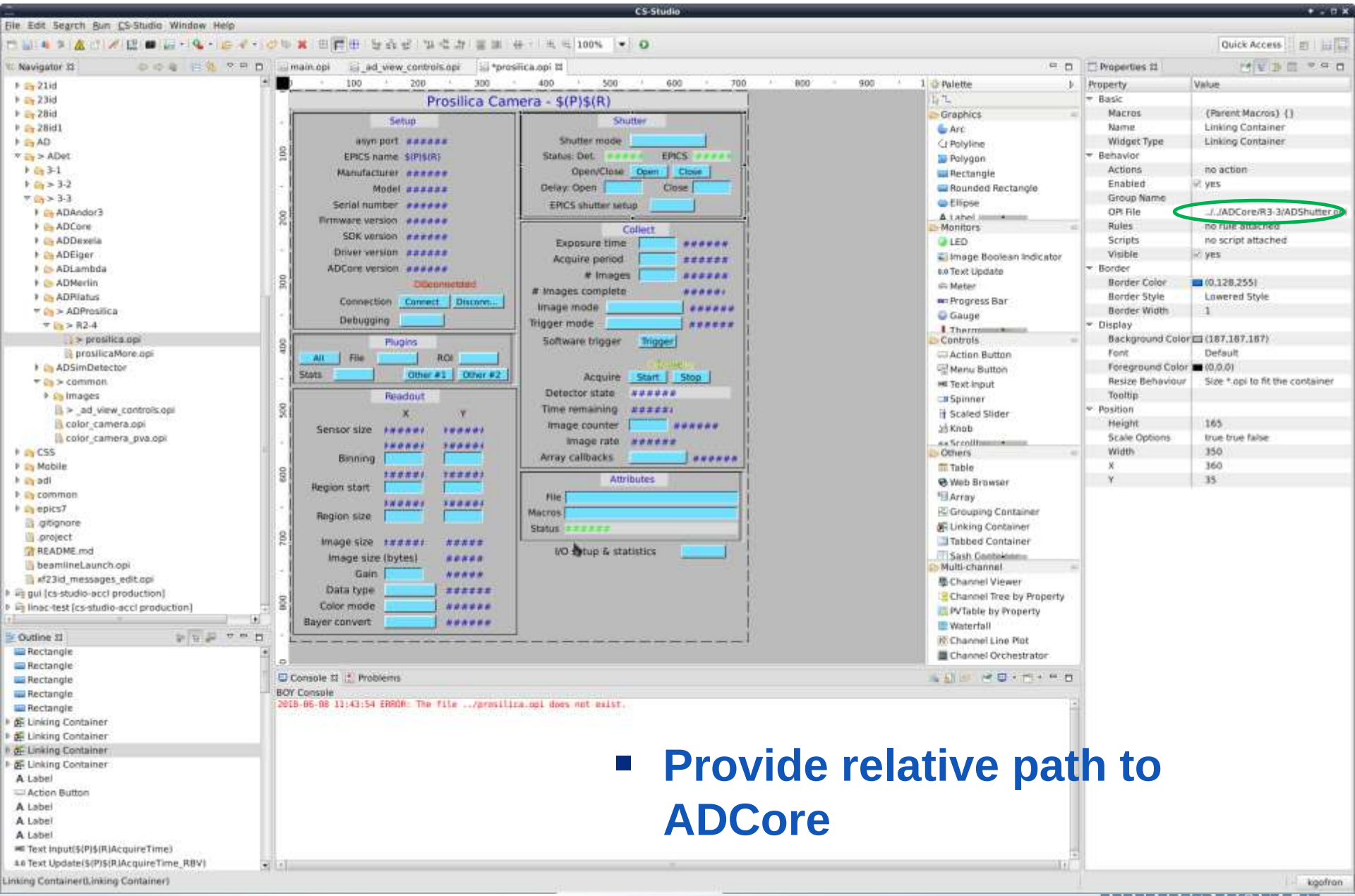




- **Autoconverted screens do not work in folder structure**



- **Provide relative path to ADCore**

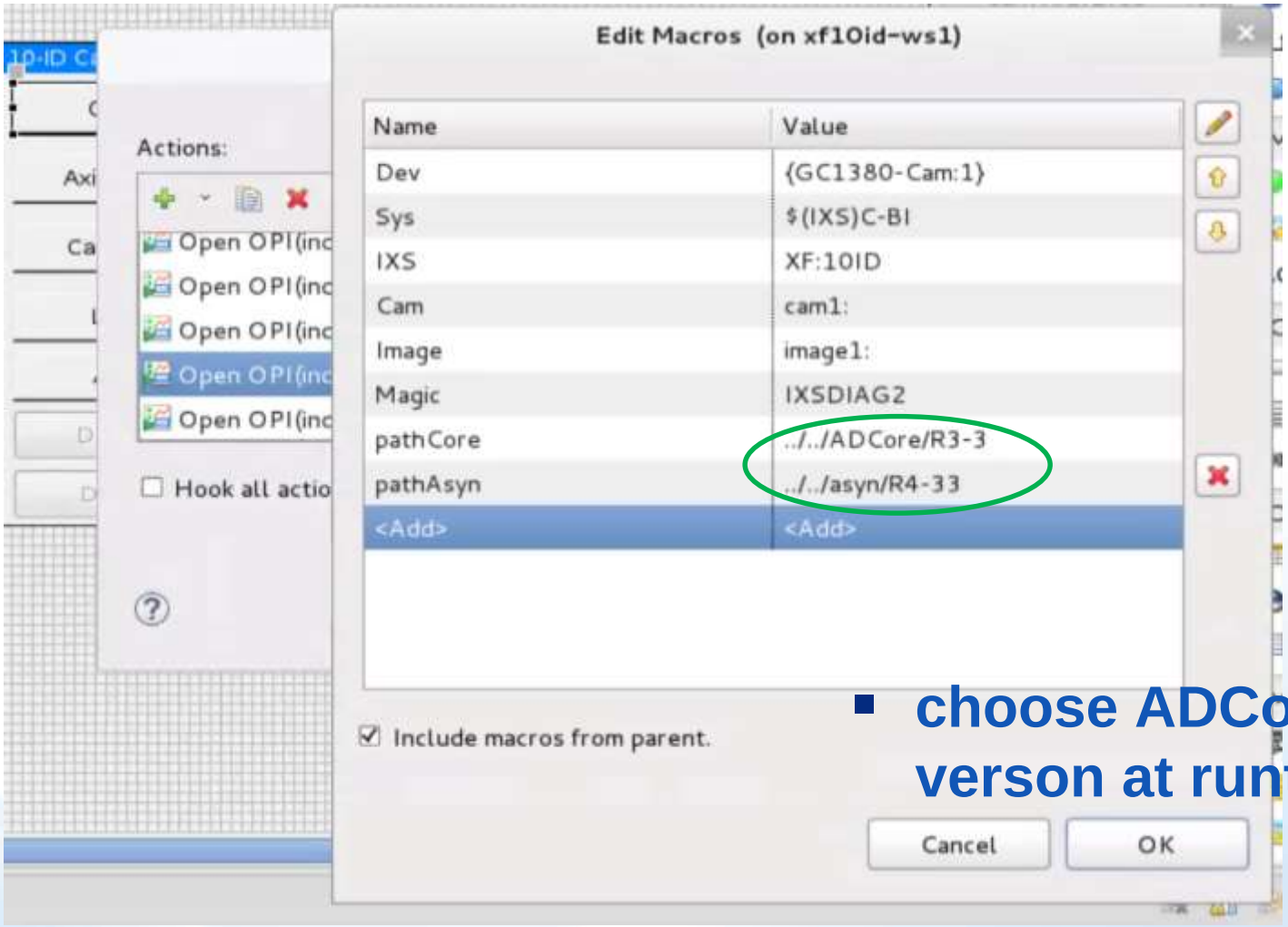


- **Provide relative path to ADCore**

Non flat opi folder structure

- Relative path resulted in one fixed configuration of areaDetector opi screens
  - No improvement over flat folder
    - {same number of multiple screen folders}

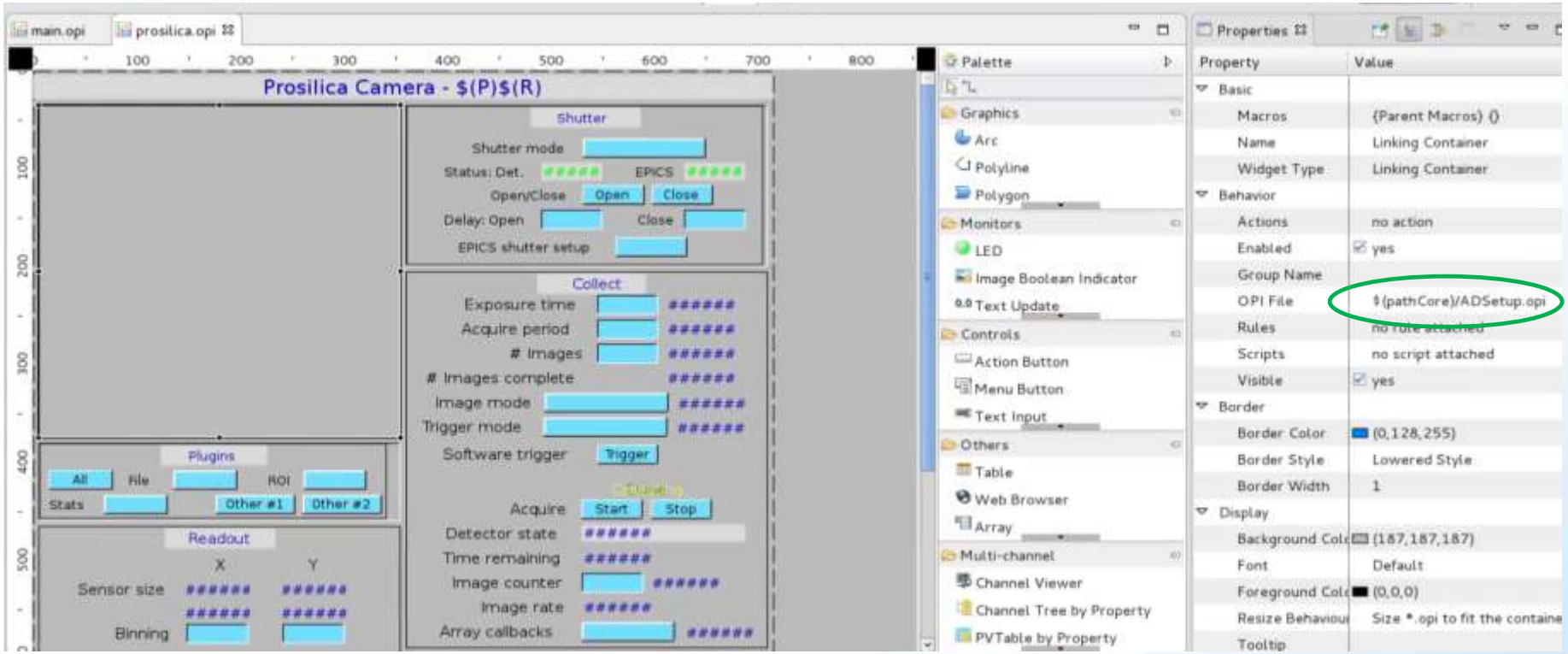
Run-time macro substitution



Relative Path

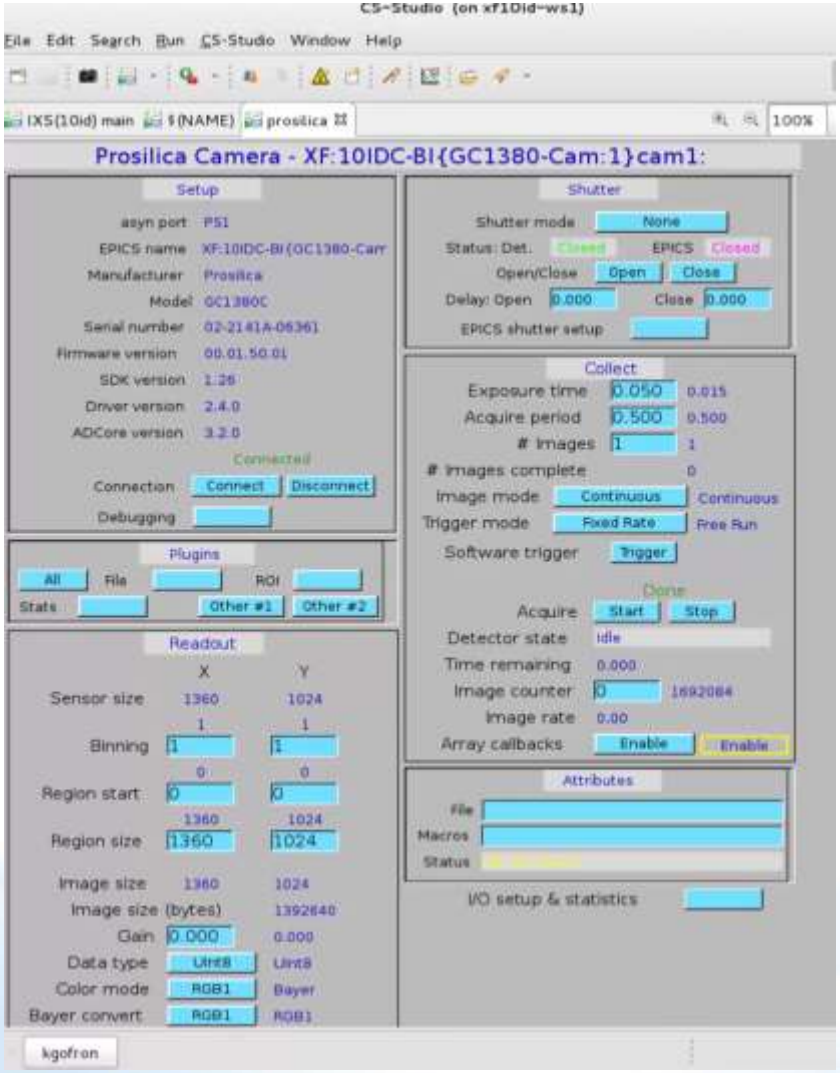
- choose ADCore verson at runtime

Prosilica run-time macro substitution



- **Provide macro substitution to choose ADCore verson at runtime**

Prosilica runtime with pathCore



- Relative path
  - one copy of areaDetector opi screens
  - copy of folder still works (individual specific beamlines)
  - Easier maintenance than multiple copies of flat legacy medm screens

Macro substitution for modules

- Relative path to modules
  - **one** copy of areaDetector opi screens
  - Major improvement over multiple copies of flat folder opi
- Use Macro substitution for module Paths
  - Replace relative path to ADCore with CSS macro
  - Relative paths for other modules
  - pathCore, pathAsyn, pathIocStats,…
- Use script to insert path Macro in opi files
  - Generate any run-time combination of the ADCore, asyn, other modules from **one set of AD opi screens**

Relate to mdm, edm, caQtDM

- **No need to change the autoconverted screens**
- Medm
  - EPICS_DISPLAY_PATH {folder(s) where screens are}
  - Runtime
  - No need to change autoconverted screens
- Edm
  - Real time choice
  - Ioc and screens are co-located
- caQtDM
  - ??

areaDetector ioc @ NSLS2

```
kaz@xf10id-is1:/epics/iocs/cam-GC1380$ ls -l
drwxrwxrwx 4 kaz kaz   4096 Oct  2  2017 as
-rw-r--r-- 1 kaz kaz     71 May  2 16:42 config
-rw-r--r-- 1 kaz kaz   1457 May  2 17:07 envPaths
-rwxr-xr-x 1 kaz kaz   4855 May  2 17:15 st.cmd
```

Conclusions

- Use **one** set of areaDetector opi screens to support any version of the AD ioc.
  - Opi screen placed in common CSS area
  - pathMacro substitution to select releases of
    - ADCore,
    - asyn,
    - etc.