

areaDetector CSS opi screens deployment at NSLS2 beamlines

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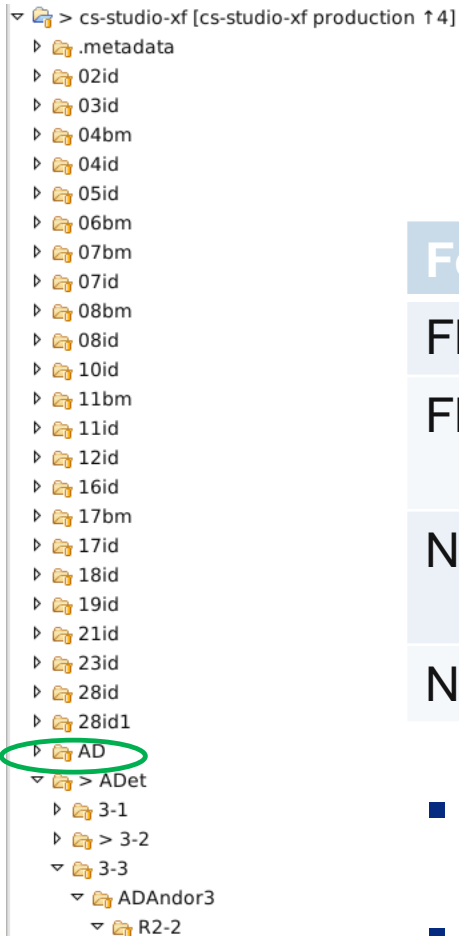
areaDetector deployment

- 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

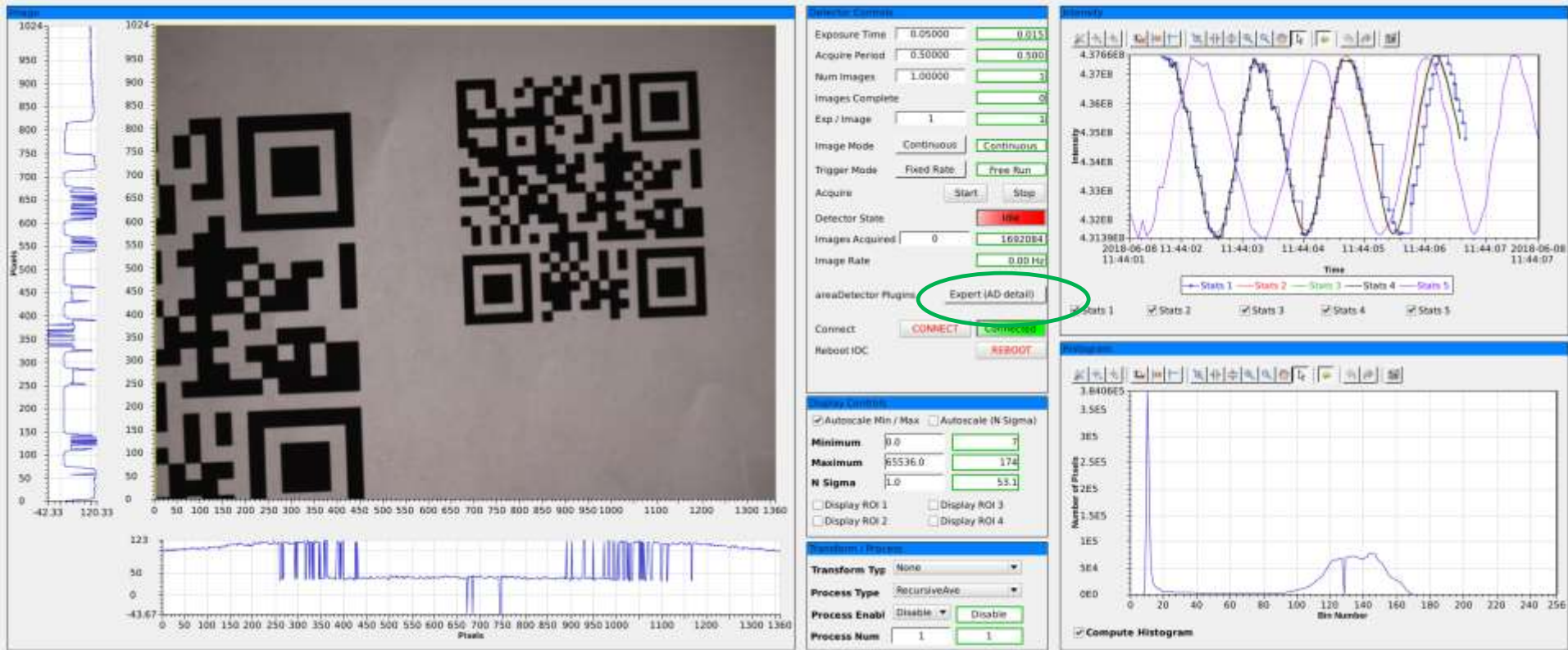


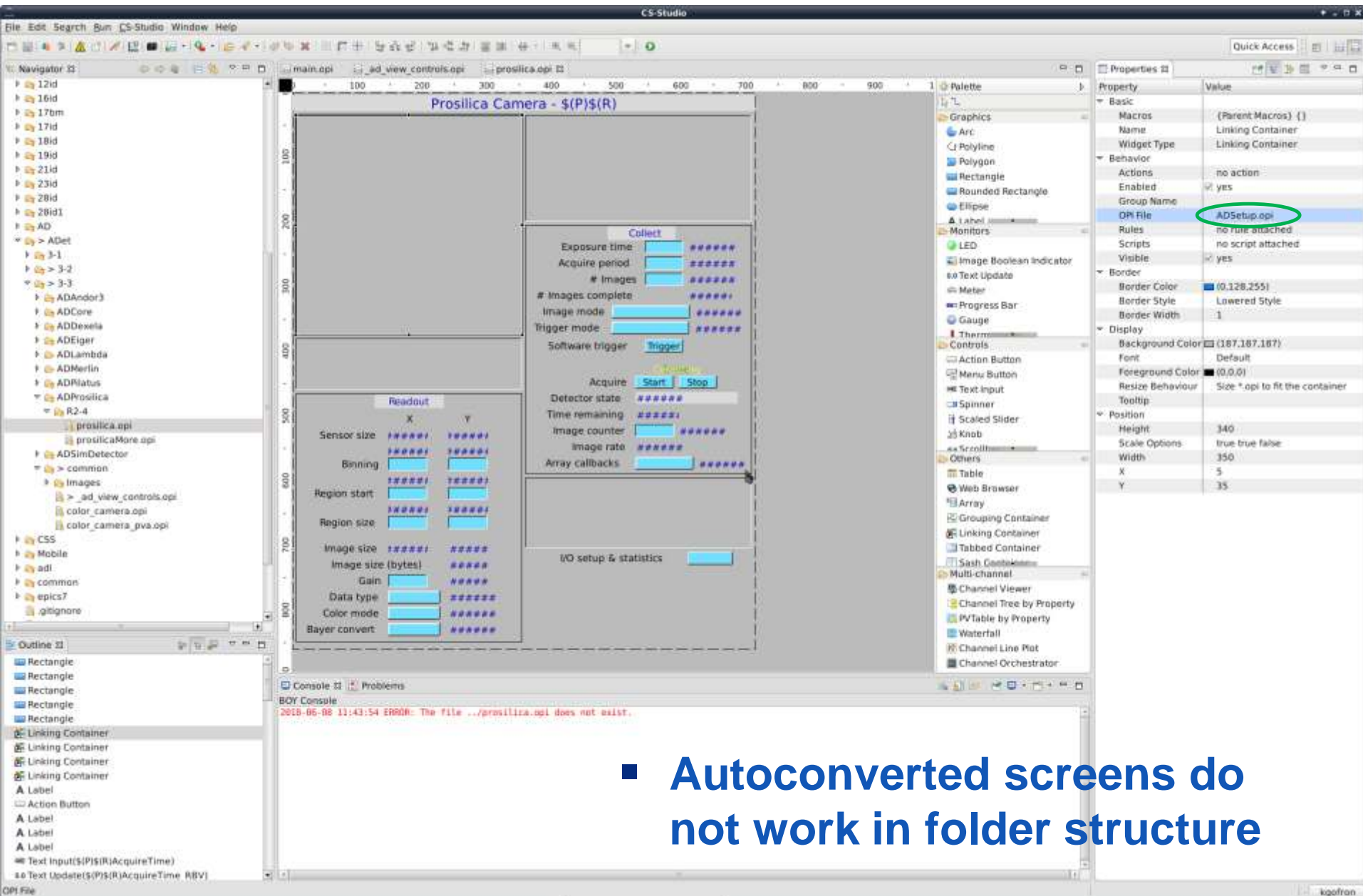
```
kgofron@xf10id-ws1:~/src/gitlab/cs-studio-xf/AD$ ls
ADAttrFile.opi      NDFileNexus.opi      NDTimeSeriesAll.opi
ADBase.opi          NDFileNull.opi       NDTimeSeries.opi
ADBuffers.opi       ND_File.opi           ND_TimeSeriesPlot.opi
ADCollect.opi       NDFile.opi            ND_Transform.opi
ADDriverFile.opi    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

CS-Studio

File Edit Search Run CS-Studio Window Help

100%

Navigator

main.opi _ad_view_controls.opi *prosilica.opi

Prosilica Camera - \$(P)\$(R)

Setup

asyn port *****

EPICS name \$(P)\$(R)

Manufacturer *****

Model *****

Serial number *****

Firmware version *****

SOK version *****

Driver version *****

ADCore version *****

Connection

Debugging

Collect

Exposure time

Acquire period

Images

Images complete *****

Image mode

Trigger mode

Software trigger

Acquire

Detector state *****

Time remaining *****

Image counter

Image rate

Array callbacks

I/O setup & statistics

Readout

	X	Y
Sensor size	*****	*****
Binning	*****	*****
Region start	*****	*****
Region size	*****	*****
Image size	*****	*****
Image size (bytes)	*****	
Gain	*****	
Data type	*****	
Color mode	*****	
Bayer convert	*****	

Palette

Graphics

Arc

Polyline

Polygon

Rectangle

Rounded Rectangle

Ellipse

Label

Monitors

LED

Image Boolean Indicator

Text Update

Meter

Progress Bar

Gauge

Thermometer

Controls

Action Button

Menu Button

Text Input

Spinner

Scaled Slider

Knob

Scroll

Others

Table

Web Browser

Array

Grouping Container

Linking Container

Tabbed Container

Sash Container

Multi-channel

Channel Viewer

Channel Tree by Property

IVTable by Property

Waterfall

Channel Line Plot

Channel Orchestrator

Properties

Property	Value
Macros	(Parent Macros) {}
Name	Linking Container
Widget Type	Linking Container
Actions	no action
Enabled	<input checked="" type="checkbox"/> yes
Group Name	
DR File	./ADCore/R3-3/ADSetup.opi
Rules	no rule attached
Scripts	no script attached
Visible	<input checked="" type="checkbox"/> yes
Border	
Border Color	0,128,255
Border Style	Lowered Style
Border Width	1
Display	
Background Color	(187,187,187)
Font	Default
Foreground Color	(0,0,0)
Resize Behaviour	Size *.opi to fit the container
Tooltip	
Position	
Height	340
Scale Options	true true false
Width	350
X	5
Y	35

Console

Problems

BOY Console

2018-06-05 11:43:54 ERROR: The file ../prosilica.opi does not exist.

Linking Container(Linking Container)

- Provide relative path to ADCore

The screenshot displays the CS-Studio environment with a Prosilica Camera control panel. The panel is divided into several functional areas:

- Setup:** Fields for EPICS name, Manufacturer, Model, Serial number, Firmware version, SOK version, Driver version, and ADCore version. Includes 'Connect' and 'Disconnect' buttons.
- Shutter:** Controls for Shutter mode, Status (Det.), EPICS, Open/Close buttons, Delay, and EPICS shutter setup.
- Collect:** Controls for Exposure time, Acquire period, # Images, # Images complete, Image mode, Trigger mode, and Software trigger.
- Readout:** Displays sensor size, Binning, Region start/size, Image size, Image size (bytes), Gain, Data type, Color mode, and Bayer convert.
- Plugins:** Includes 'All', 'File', and 'ROI' buttons.
- Attributes:** Fields for File, Macros, and Status.

The Properties panel on the right shows the 'OP File' property highlighted with a red circle, with the value './ADCoreR3-3/ADShutter'. The console at the bottom displays the following error message:

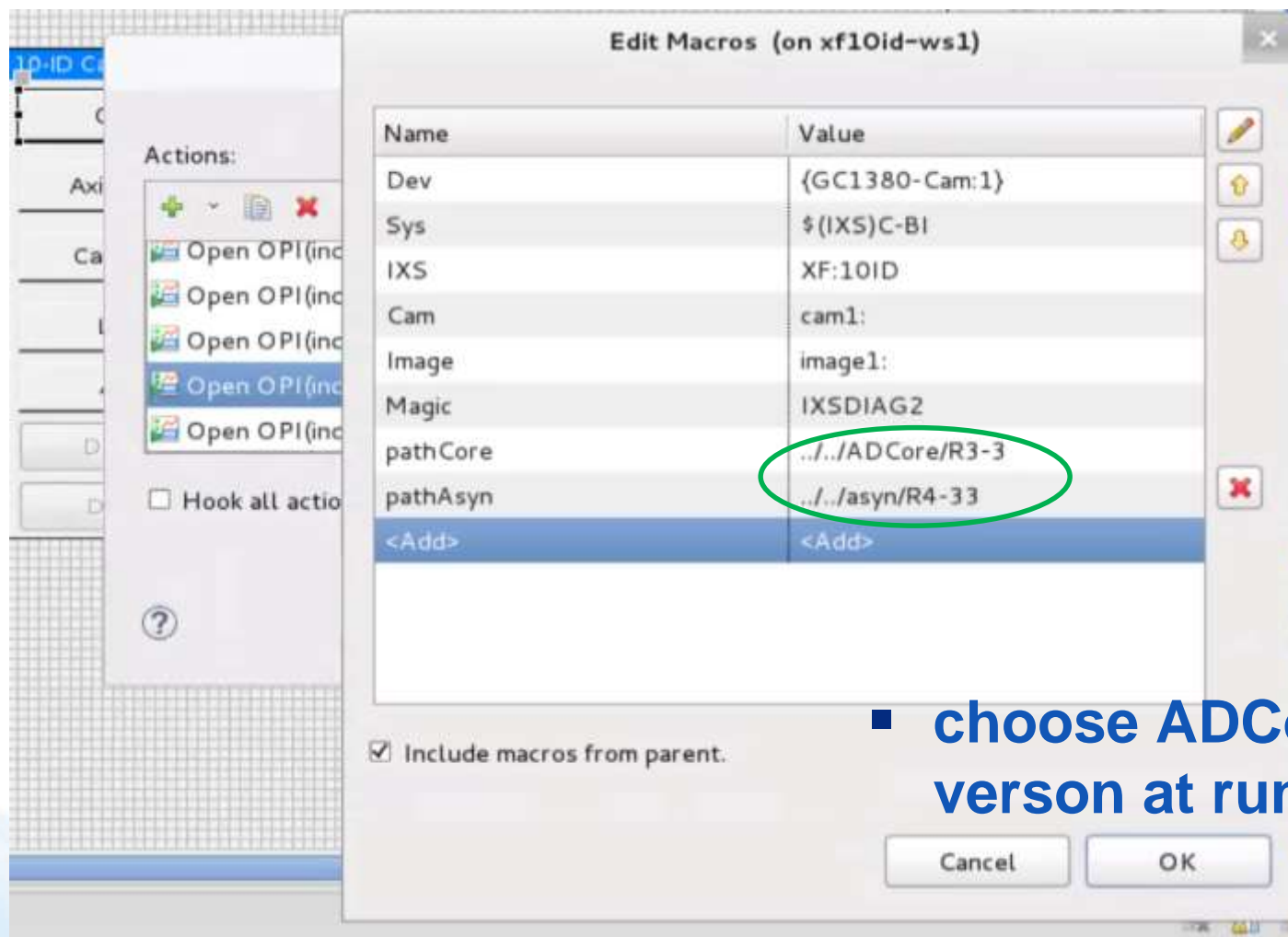
```
2018-06-05 11:43:54 ERROR: The file ../prosilica.opi does not exist.
```

- 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 version at runtime

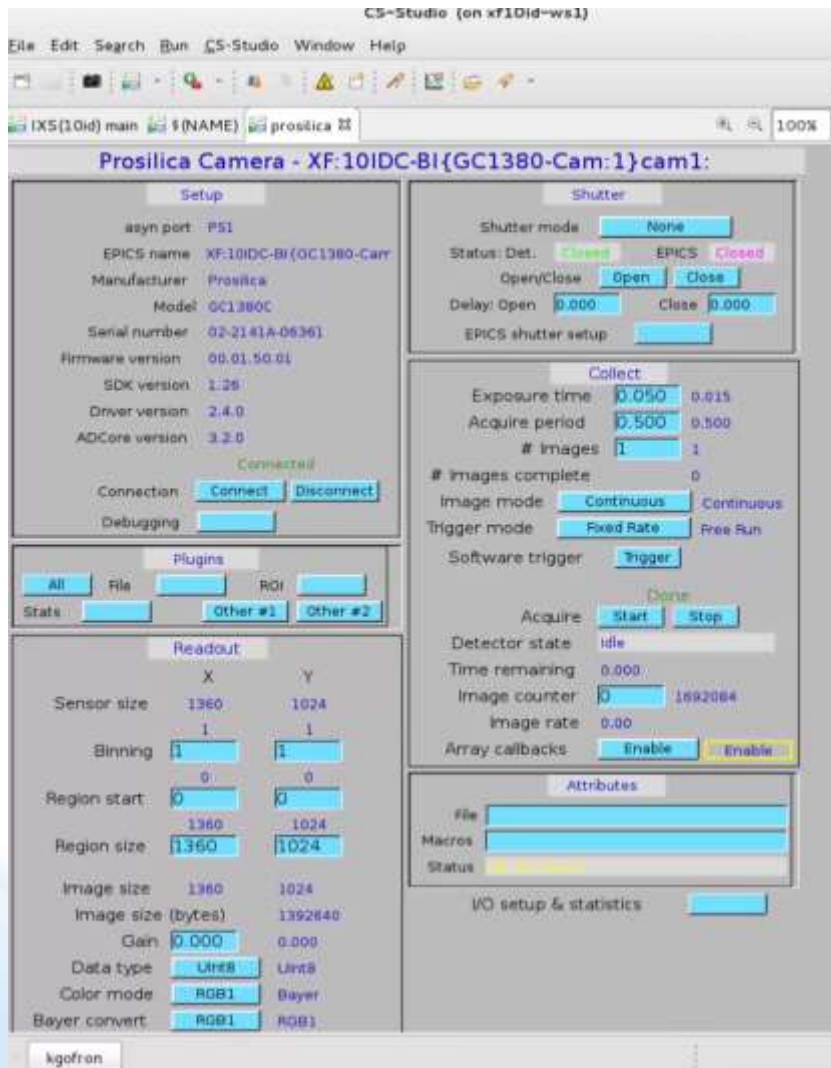
Prosilica run-time macro substitution

The screenshot displays the Prosilica software interface with a macro substitution in the OPI File property. The main window shows a control panel for the Prosilica Camera, including sections for Shutter, Collect, Plugins, and Readout. The Properties window on the right shows the OPI File property set to `$(pathCore)/ADSetup.opi`, which is circled in green. The Properties window also shows other properties such as Macros, Name, Widget Type, Behavior, Border, and Display.

Property	Value
Macros	(Parent Macros) ()
Name	Linking Container
Widget Type	Linking Container
Behavior	
Actions	no action
Enabled	<input checked="" type="checkbox"/> yes
Group Name	
OPI File	<code>\$(pathCore)/ADSetup.opi</code>
Rules	no rule attached
Scripts	no script attached
Visible	<input checked="" type="checkbox"/> yes
Border	
Border Color	(0,128,255)
Border Style	Lowered Style
Border Width	1
Display	
Background Color	(187,187,187)
Font	Default
Foreground Color	(0,0,0)
Resize Behaviour	Size *.opi to fit the containe
Tooltip	

- Provide macro substitution to choose ADCore version 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, pathlocStats,...
- 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.