

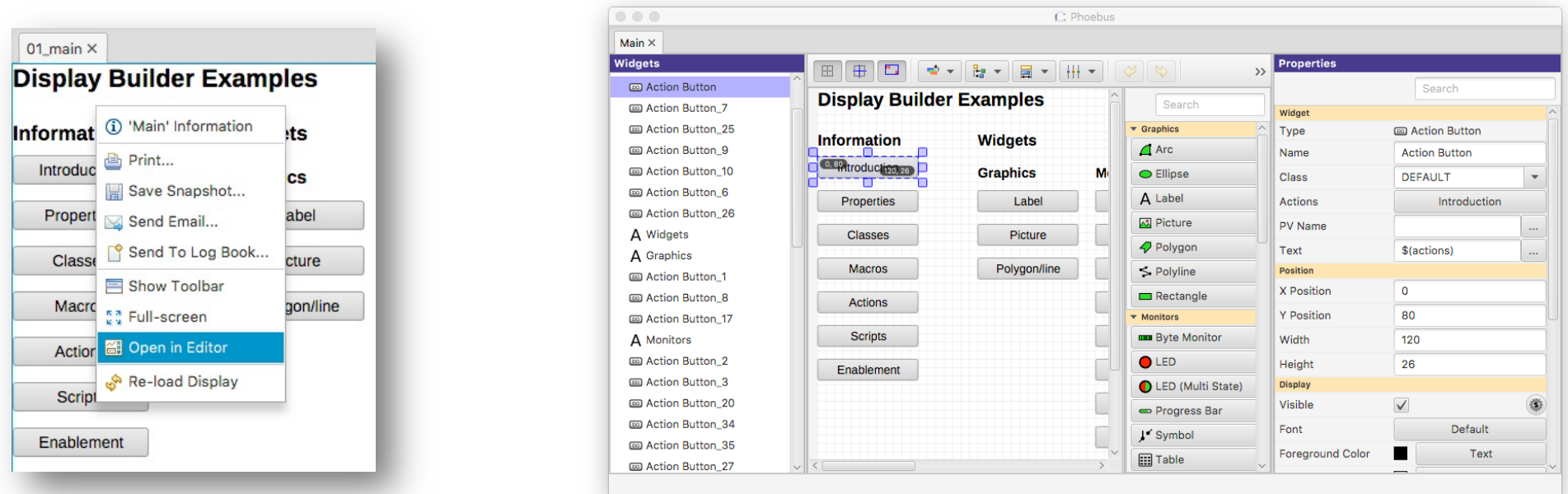
Display Builder Web Runtime

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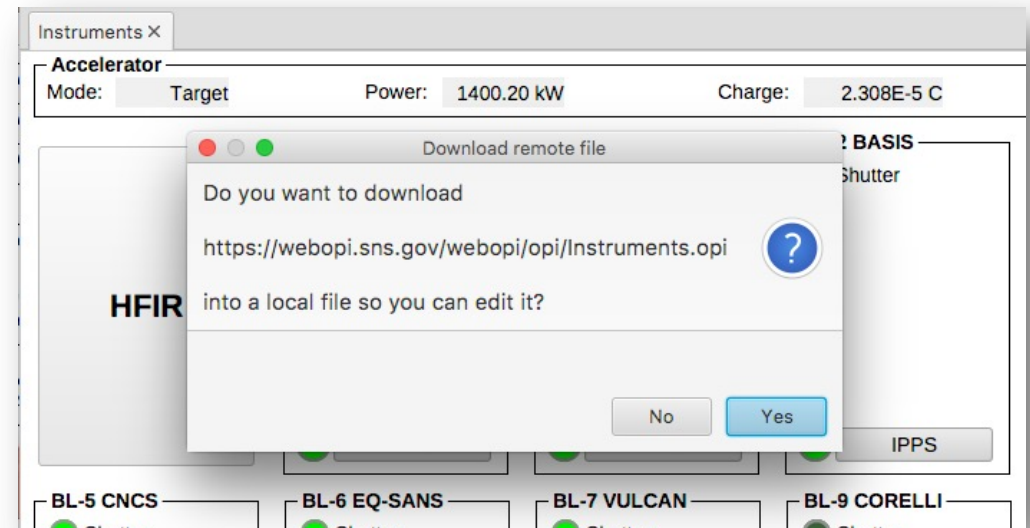
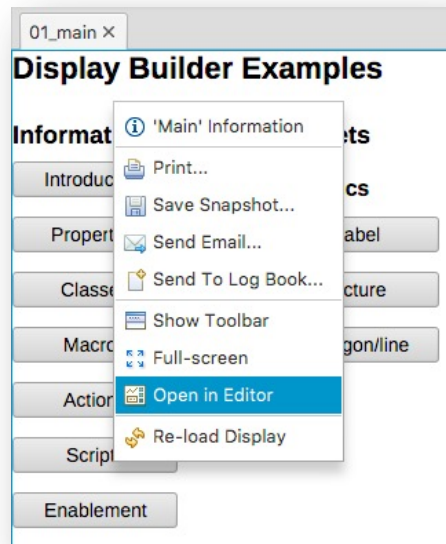
Display Builder in CS-Studio Desktop Tool



- Best support for all widget types and their features
- Includes editor for creating / modifying displays

But: Users need to install the tool, somehow access the display files, and the PV data (Channel Access, PV Access)

Storing Display Files on Web Server

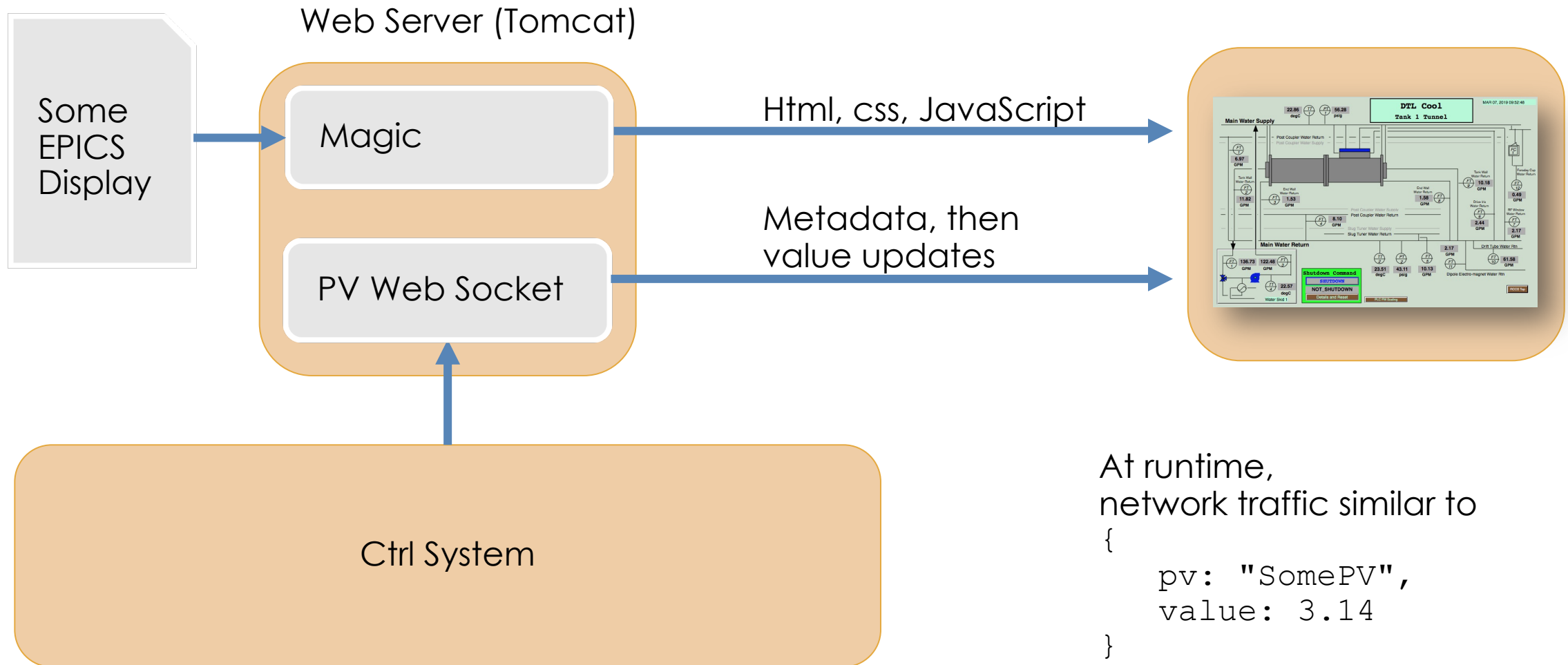


- Useful to make files available outside of control room
- Safe, read-only, always up to date
- .. But still using desktop tool.

To edit, you'll be prompted for download

Display Builder Web Runtime

Client only has a web browser!

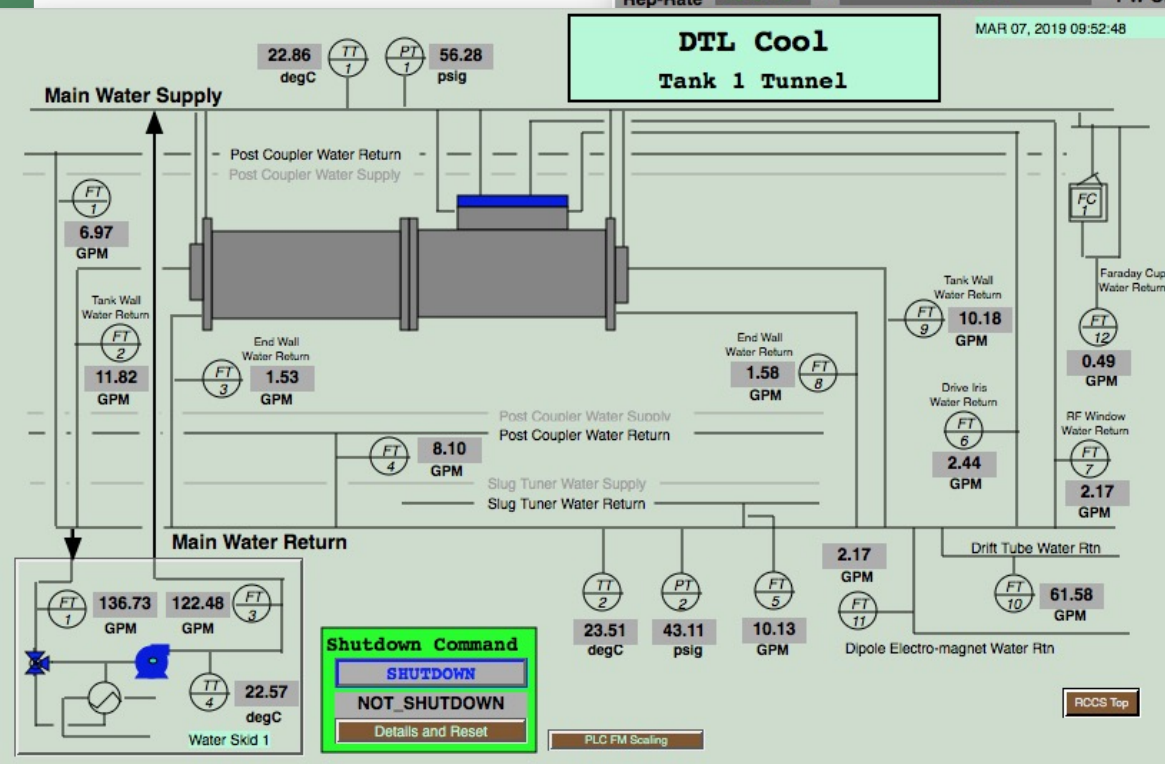


Web EDM

Ryan Slominski,
JLab,

2017 EPICS Meeting

The screenshot displays a complex control interface for the EDM system. At the top, there are navigation tabs for 'MPS', 'IOC Status', 'Cooling Overview', 'Diagnostics', 'ODH', 'PPS', 'MagPS', 'Timing', 'Vacuum', 'RF', 'Misc Tools', 'Web Links', 'OpenXAL', 'BLMs', and 'Help'. Below these, there are several data panels: 'Smoke Alarms' with a grid of 'CO2 DISCHARGE' buttons for various modules (RFQ, DTL, CCL, SCL); 'PLC' status with 'MPS to PPS' and 'Reset' buttons; and 'Site Map' with buttons for 'CHuMPS', 'Spark Counter', and 'Chopper Status'. A central panel shows 'Current Rep-Rate' at 59.9 @ 1.404 and 'PW On Max Turns' at 1059.66. Other panels include 'Errant Beam', 'Summations', 'Down Time Rec', 'Primary Substation', and 'Beam Halo One Minute Avg Temps on Target' with a table of values: 150.8, 383.6, 149.4, 390.8. A 'Reduce Page' button is also visible.



Very useful and performant
for EDM displays
and Channel Access IOCs

- Limitations:
- No waveforms (plots, images)

Training Setup

- Start web server:
`cd /ics/tools/apache-tomcat*/bin`
`./startup.sh`
- In web browser, open
 - <http://localhost:8080/pvws>
 - <http://localhost:8080/dbwr>
- Stop:
`./shutdown.sh`

PV Web Socket - <http://localhost:8080/pvws>

- Based on Phoebus Stack
 - VType PV for loc://, sim://, ca://, pva://, ...
 - PV Pooling
 - RxJava Throttling
- Data Packaged as JSON
 - Sends metadata once
 - No separate connections to *.EGU, *.PREC, ...
 - Severity and value on change
 - Arrays packed as Base64-binary
 - JavaScript in client merges updates

Subscribe to PVs

A 'subscribe' JSON message requests updates for one or more PVs.

```
{ "type": "subscribe", "pvs": [ "sim://sine", "loc://x(4)" ] }
```

A 'clear' JSON message cancels updates for one or more PVs.

```
{ "type": "clear", "pvs": [ "sim://sine", "loc://x(4)" ] }
```

Messages

```
{  
  "type": "update",  
  "pv": "SCL_LLRF:IOC01a:Load",  
  "units": "%",  
  "precision": 0,  
  "severity": "NONE",  
  "value": 18.91891891891892  
}
```

Display Builder Web Runtime - <http://localhost:8080/dbwr>

Instruments Data Collection & Scan Status

SNS	Scan State	Progress	Scan Alarm	Run	Run Time	Pause	nED/ADnED
BL1A USANS	Running	64 %	No Alarm	Run	11154 s	Not Paused	● ●
BL1B NOMAD	Aborted	100 %	No Alarm	Idle	10 s	Not Paused	● ●
BL2 BASIS	Aborted	100 %	No Alarm	Run	276.7 s	Not Paused	● ●
BL3 SNAP	Finished	100 %	No Alarm	Run	6088 s	Not Paused	● ●
BL4A M-REF	Running	18 %	No Alarm	Run	4380.3 s	Not Paused	● ●
BL4B L-REF	Running	40 %	No Alarm	Run	389 s	Not Paused	● ●
BL5 CNCS	Running	7 %	No Alarm	Run	19 s	Not Paused	● ●
BL6 EQ-SANS	Aborted	100 %	No Alarm	Idle	715 s	Not Paused	● ●
BL7 VULCAN	Running	23 %	No Alarm	Run	846 s	Not Paused	● ●
BL9 CORELLI	Finished	100 %	No Alarm	Idle	126 s	Not Paused	● ●
BL10 VENUS							
BL11A POWGEN	Running	87 %	No Alarm	Run	9671 s	Not Paused	● ●
BL11B MANDI	Aborted	100 %	No Alarm	Run	2581 s	Not Paused	● ●
BL12 TOPAZ	Running	80 %	No Alarm	Run	22188.5 s	Not Paused	● ●
BL14B HYSPEC	Aborted	100 %	No Alarm	Run	484 s	Not Paused	● ●
BL16B VISION	Running	5 %	No Alarm	Run	2288 s	Not Paused	● ●
BL17 SEQUOIA	Running	65 %	No Alarm	Run	70 s	Not Paused	● ●
BL18 ARCS	Finished	100 %	No Alarm	Idle	10 s	Not Paused	● ●

Instruments

Accelerator Mode: Target Power: 1383.68 kW Charge: 2.323E-5 C Energy: 1011.448 Mev Rate: 59.9 Hz

HFIR

BL-1A USANS

● Shutter

● Run Run

● Scan Running

Main

● T0 Chopper

● IPPS

BL-1B NOMAD

● Shutter

● Run Idle

● Scan Aborted

Main

● T0 Chopper

● Choppers

● Vacuum

● IPPS

BL-2 BASIS

● Shutter

● Run Run

● Scan Aborted

Main

● Vacuum

● IPPS

BL-3 SNAP

● Shutter

● Run Run

● Scan Finished

Main

● T0 Chopper

● IPPS

BL-4A MRef

● Shutter

● Run Run

● Scan Running

Main

● Choppers

● IPPS

BL-4B LRef

● Shutter

● Run Run

● Scan Running

Main

● Choppers

● IPPS

BL-5 CNCS

● Shutter

● Run Run

● Scan Running

Main

● Choppers

● IPPS

BL-6 EQ-SANS

● Shutter

● Run Idle

● Scan Aborted

Main

● Vacuum

● Choppers

● IPPS

BL-7 VULCAN

● Shutter

● Run Run

● Scan Running

Main

● Detector

● Choppers

● IPPS

BL-9 CORELLI

● Shutter

● Run Idle

● Scan Finished

Main

● Vacuum

● Choppers

● T0 Chopper

● IPPS

BL-10 VENUS

BL-11A POWGEN

● Shutter

● Run Run

● Scan Running

Main

● Vacuum

● Choppers

● T0 Chopper

● IPPS

BL-11B MANDI

● Shutter

● Run Run

● Scan Aborted

Main

● Vacuum

● Choppers

● IPPS

BL-12 TOPAZ

● Shutter

● Run Run

● Scan Running

Main

● IPPS

BL-13 FNPB

● Shutter

Main

● Choppers

● IPPS

BL-14B HYSPEC

● Shutter

● Run Run

● Scan Aborted

Main

● Choppers

● IPPS

BL-15 NSE

● Shutter

● IPPS

BL-16B VISION

● Shutter

● Run Run

● Scan Running

Main

● Vacuum

● T0 Chopper

● IPPS

BL-17 SEQUOIA

● Shutter

● Run Run

● Scan Running

Main

● Vacuum

● Choppers

● Detector/nED

● IPPS

BL-18 ARCS

● Shutter

● Run Idle

● Scan Finished

Main

● Vacuum

● Choppers

● IPPS

Summaries

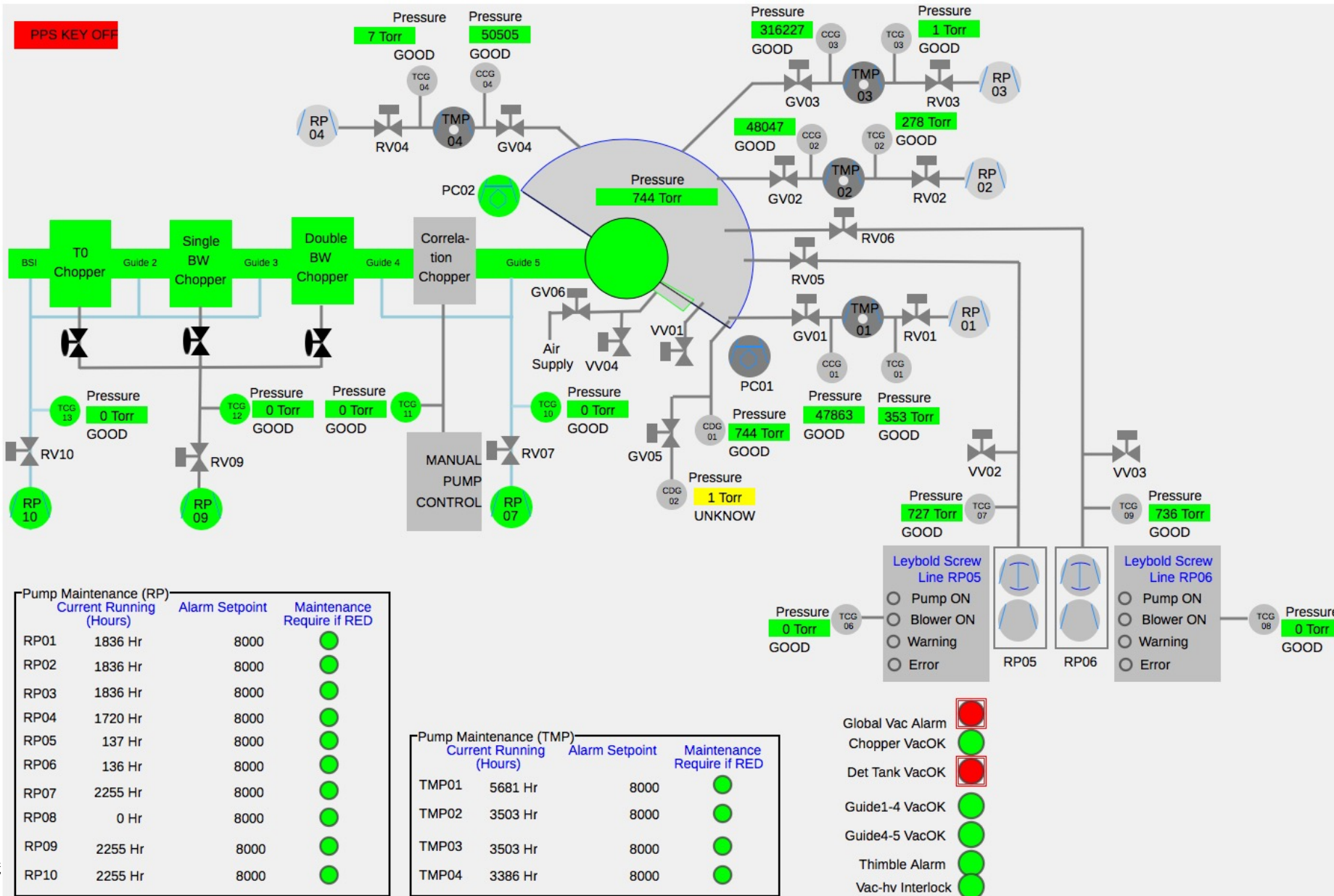
SE Cage CMF NCL Gateways ODH Instruments Data Archives Vacuum

HFIR

	Scan State	Progress	Scan Alarm	Run	Run Time	Pause	nED/ADnED	ADnED	SMS
HB2B NRSF2	Finished	100 %	No Alarm	Idle	148.3 s	Not Paused	● ●	Idle	OK
HB2C WAND	Finished	100 %	No Alarm	Idle	5 s	Not Paused	● ●	Idle	OK
CG1D IMAGING	CG1D:CS:Sca	CG1D:CS:Sca	CG1D:CS:Sca						

Labels, LEDs, Text Updates
Groups, Embedded displays, Macros

'Static' Widgets



Lines,
Circles,
Rectangles, ..

Limited 'Rule'
Support:
Some colors,
Hide/Show

Line and Detector plots

VULCAN Neutron Stats
Favorites

East Detector

ROI Left: 0 Top: 0 Width: 200 Height: 200 Default
 DSpace ROI Start: 1.241 End: 1.205 Default
 Detector ROI: 618110 DSpace: 168122

East Cursor (only available at beamline)
Info

West Detector

ROI Left: 0 Top: 0 Width: 160 Height: 30 Default
 DSpace ROI Start: 1.766 End: 1.831 Default
 Detector ROI: 465727 DSpace: 2716

West Cursor (only available at beamline)
Info

LPSD Detector

ROI Left: 0 Top: 7 Width: 78 Height: 253 Default
 DSpace ROI Start: 3.257 End: 3.468 Default
 Detector ROI: 951542 DSpace: 0

LPSD Cursor (only available at beamline)
Info

Instrument Pole Plot

ROI Left: 11 Top: 24 Width: 23 Height: 30
 Detector ROI: 0
 500.000

Material Pole Plot

ROI Left: 66 Top: 18 Width: 83 Height: 57
 Detector ROI: 1245
 500.000

500.000 500.000 500.000

Summary

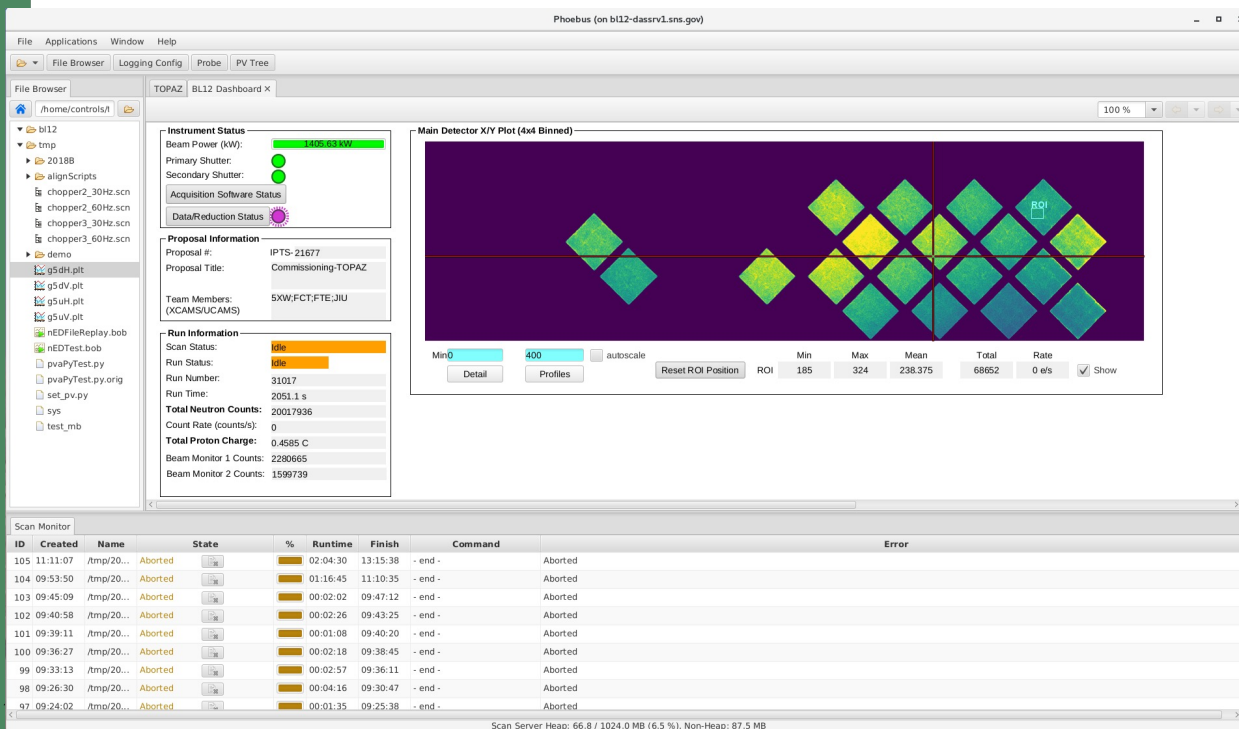
Detector ROIs: 2035465	2245 e/s	DSpaces: 170837	Beam Power: 1410847 Watts	Proton Charge: 6E+11 pC
BM1 Counts: 422883	433 e/s	<input type="button" value="Time-Of-Flight"/>	<input type="text" value=""/>	Run time: ##.###
BM2 Counts: 1649309	1817 e/s			

CS-Studio on Desktop vs.

- Integrated Product
- Easy Development
 - Type checking
 - Single-Language

Web Runtime

- Just Display Runtime
- Scattered Development
 - No type checking
 - Client: HTML, CSS, JS
 - Server: Java, Python, ...
 - Different Web Browsers



*Still:
Read-only web view of
control system is extremely
convenient and useful!*

Status: New Project, but already very useful

- Label
- Rectangle
- Ellipse
- Arc
- Polyline
- Polygon
- Text Update
- Text Input
- Text formatting (precision, units, enum labels)
- LED
- Multi-State LED
- Action Button to open display or web link
- Combo
- Group with group border
- Embedded Displays
- Tabs
- XYPlot
- Image
- Macro support
- Alarm-sensitive border based on PV
- Limited Rule support: Color of rect/circle/label, visibility
- Caching

Summary

Display Builder *Web Runtime* offers web access to much of the *Desktop* version

<https://github.com/kasemir/pvws>
<https://github.com/kasemir/dbwr>

➔ http://your_tomcat/dbwr

1. git clone
2. ant
3. copy *.war to Tomcat
4. Set environment:
EPICS_CA_ADDR_LIST, ..

