Test OPI Creator

Tyler Lemon
Detector Support Group
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Test OPI Creator

• Creates two screens to test all functions of newly developed CSS screens
  – Test screen
    ▪ Replication of CSS screen to be tested with all PVs replaced with local PVs
      o See slide 7 for more information on local PVs
  – Control screen
    ▪ Replication of test screen with all controls changed to indicators (and vice versa)
    ▪ Also adds additional controls to trigger rules

• Python program developed to be executed from CSS
  – Utilizes CSS as a user interface
  – Uses built-in CSS features to read properties of screen’s widgets
    ▪ As consequence of using these features, it cannot be executed from any other environment but CSS
Motivation

- DSG is developing CSS screens for two system types
  - New system with no finalized PLC tags or EPICS PVs
  - Existing system with PLC tags and EPICS PVs already in use
- We want to test behavior of new screens
  - Without risk of writing to existing tags/PVs
  - Using PVs that do not exist in EPICS yet

<table>
<thead>
<tr>
<th>Hall</th>
<th>System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hall A</td>
<td>SoLiD Magnet</td>
</tr>
<tr>
<td>Hall B</td>
<td>RICH</td>
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<tr>
<td></td>
<td>SVT</td>
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<td>FT</td>
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<td></td>
<td>Gas System</td>
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<tr>
<td>Hall C</td>
<td>HMS Magnets</td>
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<td></td>
<td>SHMS Magnets</td>
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<tr>
<td></td>
<td>HMS Detector HV</td>
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<td></td>
<td>SHMS Detector HV</td>
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<tr>
<td></td>
<td>Neutral Particle Spectrometer</td>
</tr>
<tr>
<td></td>
<td>CAEN HV Test Station</td>
</tr>
<tr>
<td>Hall D</td>
<td>Detector Chillers</td>
</tr>
</tbody>
</table>
System Diagram of CSS-Controlled EPICS System

Local PVs are isolated in CSS’s runtime environment

Channel Access client reads PV data over network and passes it to running OPI

PLC publishes tags to network

IOC reads PLC tags and converts them to EPICS PVs

Instrumentation with built-in EPICS capabilities
Local PVs

- PVs that exist only in current CSS environment while screen is running
- Defined in CSS by “loc://” prepended before PV name
  - Can also be assigned a default value by appending that value in parentheses to PV name
  - Example:
    loc://voltage_tap_1(0.01)
    • Local PV that will be initialized to 0.01 when screen is run
- No PLC or IOC is necessary

正常PV

当地PV初始化为空时屏幕开始

- 控制和指示器显示为断开
- 正常PV在EPICS中不存在
- 控制可以使用
- 指示器显示进入控制的值

顶部和底部屏幕是相同的，除了底部屏幕中使用的PV是本地PV

本地PV初始化为空时屏幕开始
Manually Changing PVs to Local PVs

1. Open screen in CSS with OPI Editor

2. Select item to change its PV to a local PV

3. In item’s “Properties”, select “Value” column of “PV Name” row

4. Type “loc://” before item’s PV

5. If desired, type initialization value in parentheses after PV name
Using Test OPI Creator – User’s Perspective Flow Chart

1. Run OPI screen
2. Use file display control to select OPI to test
3. Select whether to verify PVs on OPI
4. Click “GO”
5. Answer any prompts
6. Program complete

Test OPI Creator CSS User Interface

Link to PDF for More Detailed View
Test OPI Creator – Program Flow Chart

1. Start
   - Read in PV from GUI for screen to convert
   - Read value of PV associated with GO button on GUI
   - GO = True?
     - File input to convert not empty?
       - True: Define end result test screen and control screen name.
       - False: Read in OPI file
     - False: Test screen output file name will be name of input test file with "_TEST" appended to it.
     - Control screen test name will be name of test screen with "_CONTROL" appended to it.
   - False: User indicated to check PV on screen?
     - True: Verify PVs
     - False: User indicated to check PV on screen?
       - True: Define end result test screen and control screen name.
       - False: Read in OPI file

2. Write to PV linked to status message on GUI "Making test screens."
   - Files with names of output files already exist?
     - True: Open pop-up window message inquiring if user wants to remake screens.
     - False: Remake?
       - True: Delete existing screens with the name of test screen and controls screen.
       - False: Remake?
         - True: Create Test screen
         - False: Remake?
           - True: Open Test screen
           - False: Remake?
             - True: Create Control screen
             - False: Remake?
               - True: Open Control screen
               - False: Remake?
                 - True: Return to start
                 - False: Return to start

3. Clear PV linked to status message on GUI
   - Set PV linked to GO button on GUI equal to False
   - Return to start

Link to PDF for More Detailed View
Verify PVs Flow Chart
Create Test Screen Flow Chart

Link to PDF for More Detailed View
1. Original OPI with standard PVs
   A. Disconnected (pink) PVs mean controls/indicators are unusable
2. Test OPI with local PVs
   A. Valid PVs
   B. Usable controls/indicators
   C. Rules are executable to change widget appearance
3. Control OPI with local PVs
   A. Valid PVs
   B. Indicators swapped for controls
   C. Controls swapped for indicators
   D. Extra Boolean controls to trigger rules
Conclusion

• Test OPI Creator creates screens that can be used to test all features of a CSS screen
  – Tests controls and indicator functions
  – Tests rule behaviors
• End result of program is two screens
  – Test screen
    ▪ Copy of CSS screen with local PVs
  – Control screen
    ▪ Copy of test screen with indicators swapped for controls
    ▪ Additional controls added to test rules
Thank You