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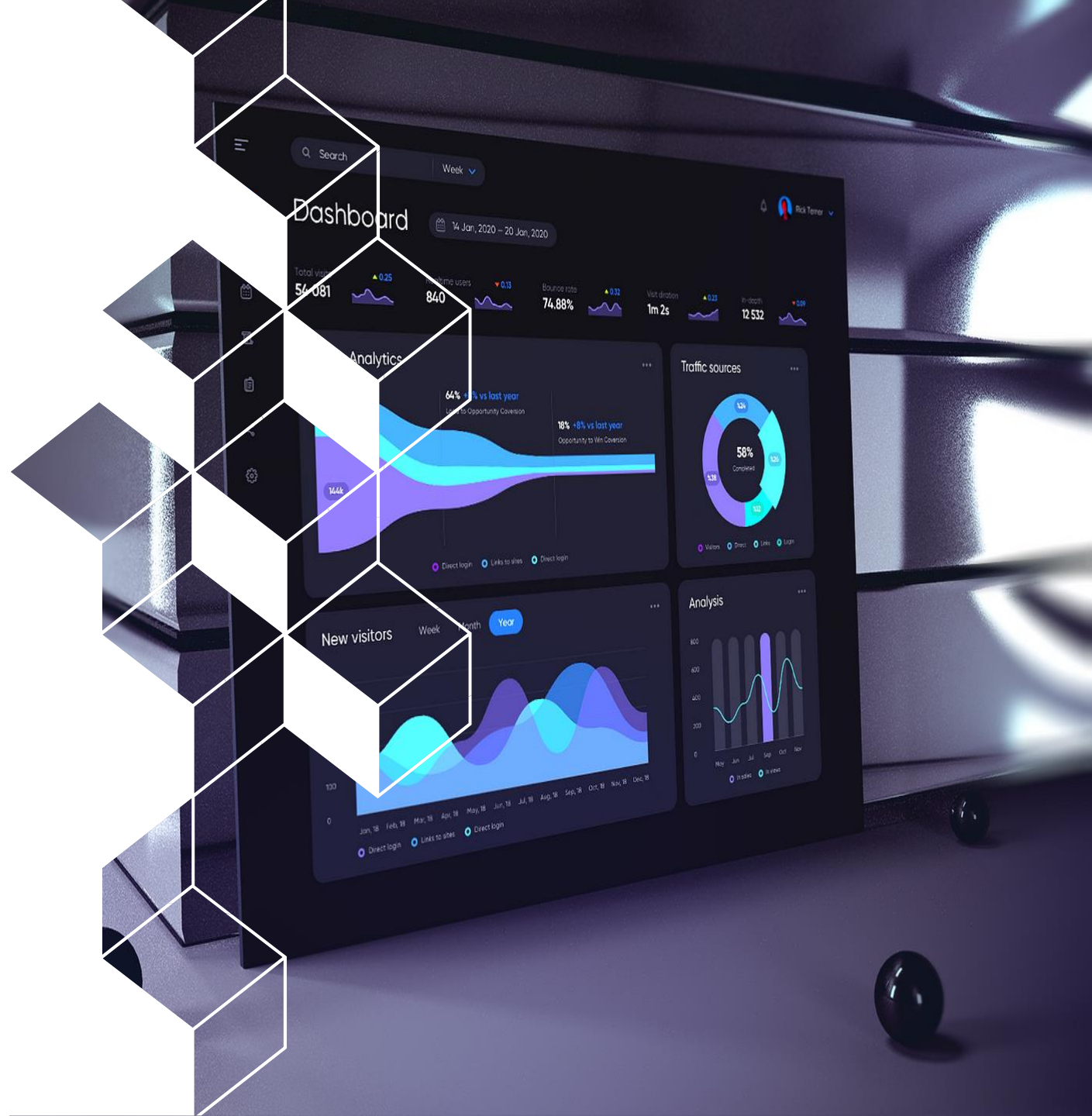
# GUI Strategies Workshop

**Katy SAINTIN**

IRFU, CEA, Université Paris-Saclay  
Gif-sur-Yvette, France



[katy.saintin@cea.fr](mailto:katy.saintin@cea.fr)




# My experience in GUI development

1998 – 2001 : 

- LLB spectrometers at CEA of Saclay
- C++ developer on High Level Application - ILOG Views
- A new generation of software control spectrometers – NOBUGS 2000

2004 – 2017 :

- SOLEIL synchrotron – Beamlines & Accelerator -  **TANGO**
- Java developer on High Level Application – Swing and COOX
- COMETE: A Multi Data Source Oriented Graphical Framework – ICALEPCS 2011

Since 2017 :

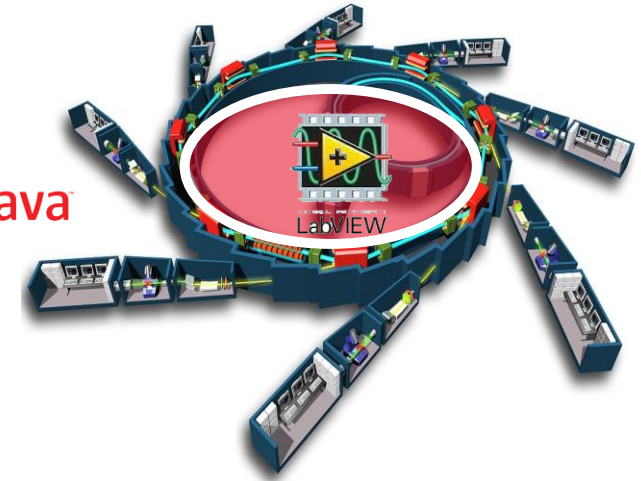
- IRFU CEA Saclay – MUSCADE & EPICS
- Java developer on High Level Application – Swing and CS-Studio
- Data Visualization With Data Browser Software – ICALEPCS 2019



# What technologies and for what ?

## TANGO @ SOLEIL :

- Java rich client application( ATKPanel, Jive, [DataBrowser](#))
- [COOX](#) SCADA in Java for beamline
- LabVIEW for accelerator supervision

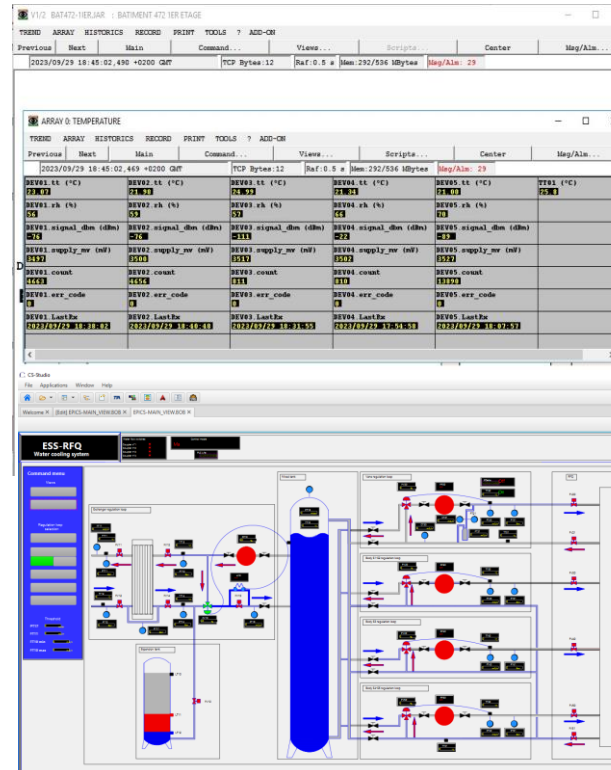


## MUSCADE @ IRFU :



**A** AUTOCAD

- Java rich client application (ANIBUS) and
- Android application for Smartphone
- Java Web Start



## EPICS @ IRFU :

**EPICS** **cs|studio**

- Java rich client application [CS-Studio](#)
- DBWR – Web View (Tomcat & JSP)



# What issues with these technologies?



Framework	Pros	Cons
TANGO	<ul style="list-style-type: none"> <li>➤ QT, Python, Java, LabView</li> <li>➤ Color code is fixed</li> <li>➤ Object Oriented, common interface</li> <li>➤ Device database =&gt; naming and dynamics GUI</li> <li>➤ Documentation</li> <li>➤ Interoperability</li> </ul> COOX <ul style="list-style-type: none"> <li>➤ Common Layer</li> <li>➤ Reusable widget</li> <li>➤ Drag &amp; Drop technology</li> <li>➤ Java portability</li> <li>➤ Security management</li> </ul>	<ul style="list-style-type: none"> <li>➤ No web solution widely used by all institutes</li> <li>➤ COOX (not free) ( but JDraw is free)</li> <li>➤ No common strategy between institutes</li> <li>➤ No security management on TANGO</li> <li>➤ GUI only dedicated to TANGO devices</li> </ul>
MUSCADE	ANIBUS <ul style="list-style-type: none"> <li>➤ Optimized for small experiences</li> <li>➤ Adapted to PLC Programmer needs</li> <li>➤ Java portability</li> <li>➤ Security management (certificates)</li> <li>➤ Android application</li> </ul>	<ul style="list-style-type: none"> <li>➤ Support java only</li> <li>➤ Java Web Start not supported anymore</li> <li>➤ Not user friendly to build a GUI =&gt; AutoCAD</li> <li>➤ AWT GUI is old fashion look and feel</li> <li>➤ In-house solution on all stacks (No developer, no support anymore )</li> </ul>
EPICS	<ul style="list-style-type: none"> <li>➤ QT, Python, Java, LabVIEW</li> <li>➤ DBWR</li> <li>➤ Archiver Appliance</li> </ul> CS-STUDIO <ul style="list-style-type: none"> <li>➤ Open source</li> <li>➤ Widely used</li> <li>➤ Embedded Display</li> <li>➤ Based on known technologies</li> <li>➤ <i>Java portability (with issues sometimes Java FX)</i></li> <li>➤ Several data sources EPICS, TANGO, MQTT ...</li> </ul>	<ul style="list-style-type: none"> <li>➤ No web solution widely used</li> <li>➤ No common strategy between institutes (color code)</li> <li>➤ A PV is read or write</li> <li>➤ CS-STUDIO has no security management</li> <li>➤ Documentation is not clear and complete</li> <li>➤ No dynamic GUI</li> <li>➤ No PV index (Channel Finder have to be filled)</li> <li>➤ A PV can be defined several times on the same network</li> <li>➤ OS dependent due to Java FX</li> </ul>

# What is our GUI strategy ?

## Technical criteria :

- Portability and interoperability
- User autonomy (Drag and Drop technology)
- Modular and MVC design pattern
- Reusable views
- Web client without software installation (not Java Web Start)

## GUI guideline : Document defined at SOLEIL and at IRFU ([see guideline for CEA](#))

- Common layer definition
- Code color fix (TANGO CS it is fixed by the framework , for EPICS color.def configuration file for CS-STUDIO)
- LSAP (Less Smart As Possible) , all the business and logical should be managed by server. (Avoid script in the client)
- Name the widget according to its function . Ex : Textfield\_VoltageValue for a Textfield which displays a voltage value
- Reuse embedded display and defined MACRO or parameters

## Future development :

- Alarm management web client for EPICS
- Security implementation in CS-Studio
- PV Access IOC Migration => avoid Read and Write PV

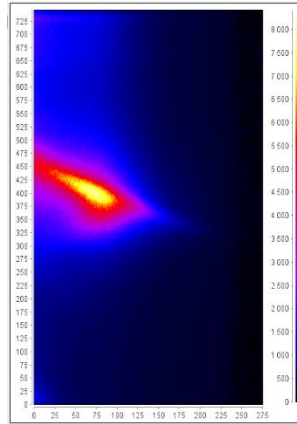


# Screenshots (common layer and color code)

TANGO

# Screenshots ( COMETE MVC design pattern)

COMmunity of Extensible Toolkit for Experiment



ImageViewer SWT

## COMETE Widgets

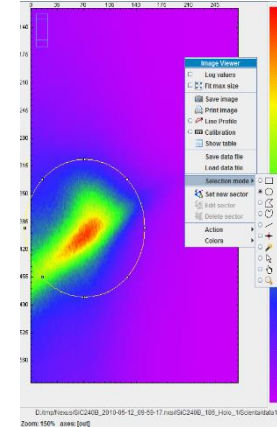
Comete  
SWT

Comete  
AWT

Comete  
SWING

Data Source

CDMA



ImageViewer SWING



	0	1	2	3	4
0	123.0	243.0	171.0	227.0	158.0
1	152.0	189.0	233.0	222.0	380.0
2	164.0	227.0	170.0	143.0	142.0
3	126.0	113.0	190.0	183.0	382.0
4	165.0	145.0	155.0	128.0	186.0
5	185.0	138.0	185.0	172.0	147.0
6	196.0	138.0	217.0	177.0	151.0
7	143.0	183.0	170.0	179.0	191.0
8	189.0	180.0	130.0	161.0	221.0
9	246.0	183.0	154.0	153.0	110.0
10	180.0	174.0	141.0	175.0	126.0
11	166.0	175.0	170.0	128.0	142.0
12	118.0	142.0	144.0	158.0	380.0
13	200.0	160.0	168.0	157.0	383.0
14	176.0	163.0	240.0	212.0	170.0
15	259.0	277.0	176.0	159.0	380.0
16	172.0	204.0	209.0	187.0	245.0
17	161.0	236.0	161.0	185.0	385.0
18	174.0	133.0	164.0	253.0	222.0
19	192.0	162.0	136.0	223.0	198.0
20	213.0	207.0	214.0	223.0	185.0
21	189.0	174.0	222.0	196.0	173.0
22	138.0	165.0	200.0	281.0	170.0
23	225.0	187.0	207.0	143.0	227.0
24	244.0	226.0	233.0	202.0	361.0
25	280.0	204.0	173.0	239.0	280.0
26	199.0	227.0	273.0	241.0	230.0
27	226.0	214.0	220.0	133.0	198.0
28	302.0	220.0	197.0	172.0	198.0
29	209.0	273.0	157.0	200.0	244.0

**3 Clicks Centring**

STANDBY Phisican terminated

Centring 3 Clicks Click1  
Click2  
Click3

**Sample Visualization**

Focus 10.000 Zoom 1

Horizontal Translation X 0.00 Vertical Translation Z 0.0101

Back Light Front Light

**OMEGA Axis**

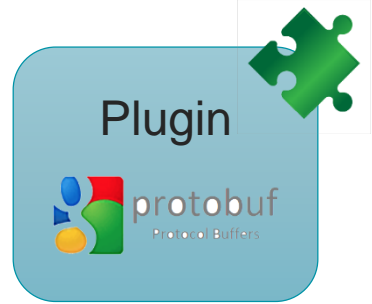
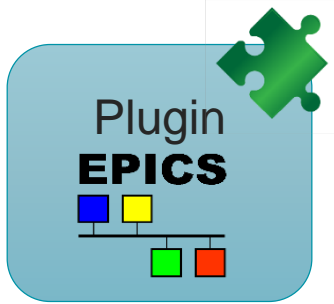
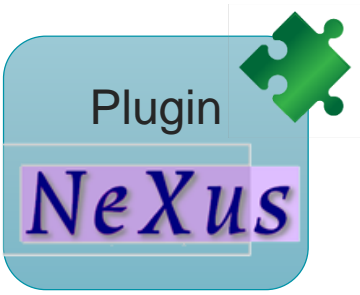
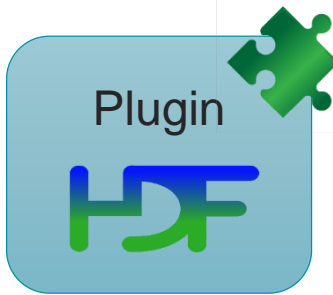
Position 90.442  
Rotation 0.00

Name	Type	X	Y	Width	Height	Width (um)	Height (um)	Length	Length (um)
50 micro	Rectangle	0	0	50	50	50	50		
	Oval	301	243	50	50	50	50		

# CDMA Framework (Data source abstraction)



Common Data Model







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**Any questions ?**

Thank you for your attention

