European XFEL

JDDD: A TOOL FOR OPERATORS AND EXPERTS TO DESIGN CONTROL SYSTEM PANELS

E. Sombrowski, A. Petrosyan, K. Rehlich, W. Schütte, DESY Hamburg, Germany

Abstract

jddd, a graphical tool for control system panel design, has been developed at DESY to allow machine operators and experts the design of complex panels [1-5]. No knowledge of a programming language nor compiling steps are required to generate highly dynamic panels with the jddd editor. After 5 years of development and implementing requirements for DESY-specific accelerator operations, jddd has become mature and is now commonly used for graphical controls. The focus meanwhile has changed from pure feature development to new tasks as archiving/managing a huge number of control panels, finding panel dependencies, book keeping/evaluation of panel usage and collecting possible failures in an automatic manner. Therefore technologies of the existing control system infrastructure like Servlets, JMS, Lucene, SQL, SVN are used. The concepts and technologies to further improve the quality and robustness of the tool are presented in this paper.

What is jddd?

Jddd is a synoptic display editor and runtime engine for control system panels. The editor is designed similar to other standard graphical editors used in NetBeans or Eclipse. It offers many predefined widgets for control panel design. Jddd has an interface which supports many control systems used at Desy: DOOCS, Tine, Tango and Epics.



Currently more than 110 people working in different groups at Desy are designing panels with the jddd editor. More than 3600 jddd panels have already been developed, approximately 1100 of them for FLASH (Free-electron-LASer in Hamburg).

Screenshots

- Slave Timing panel (THPPC093 The New Timing System for the European XFEL)
- Main Taskbar operator panel
- LLRF main station overview
- Universal camera display





Panel Archiving

All panels are stored as XML files in a central revision control system (Apache **SVN** repository). The text search engine library Apache **Lucene** is used as a powerful file search engine. The search result is provided via a Java **Servlet**.

Lucene indexes not only the file names but also the file dependencies. In the jddd editor a file dependencies dialog is available. It provides all information for a panel designer to check whether a change in a certain panel affects other panels:

Evaluation of panel usage

To collect panel usage statistics, the start and stop times of all panels are sent via JMS (Java Messaging Service) to an Oracle Database. These time stamps are evaluated using **SQL** and can be retrieved in the "About" dialog of each panel.

This dialog provides **general information** about the jddd display like file path, creation date, author name and description.

The **statistical information** is read from the database:

- Number of runs
- Total runtime in hours during the last 365 days
- Date of the last known usage

The new control system browser

Jddd provides all widgets needed for a simple DOOCS control system browser. Figure 4 shows a screenshot of this browser. It displays the address structure and allows the setting of single control system values. Regular expression filters help to sort and find a dedicated address. A mouse click on the properties name opens a special display for the value, for example a spectrum or history plot window or a camera image.



- Location(s) of a panel name in the SVN repository
- Filenames of included panels and panels opened on a button click
- Occurrence of filename in other panels

😑 🔿 🔿 /svn/group/mvs/up_pumpstand_win.V2.xml depe	2					
File occurences in SVN Included components File used i	n					
/svn/group/mvs/up_pumpstand_win.V2.xml						
● ○ ○ /svn/group/mys/up pumpstand win V2 xml dene						
Eile occurences in SVN Included components File used i	n					
Included Components:						
	-					
_up_ventil_hor.xml						
_ip_ping.xml						
	=					
Files opened on a Button :						

fl_op_win.xml						
up vp analog win.xml						
9 9 9 /svn/group/mvs/up pumpstand win.V2.xml depe	à					
File occurences in SVN Included components File used in						
File /svn/group/mvs/up_pumpstand_win.V2.xml is used in:						
/svn/PETRA/vac/vac_main.xml						
/svn/group/mvs/up_pump0_p.xml						
/svn/group/mvs/up_pump2_p.xml /svn/group/mvs/up_pumpstands_uebersicht_xml	=					
/svn/group/mvs/vac_main.xml						
/svn/user/anna/vac_main.xml						
Else filename "up numpstand win V2 xml" occurs in:						

/svn/FLASH/vac/includes/up_pump2_p.xml						
/svn/group/mvs/#indirekt.xml	•					

These data help to find out which panels are no more used at all and can be removed from the file system.



TTF2.DIAG	KLY.CONTROL	KLY.LOLA	▼ KLY.FIL_VOLT.POLYPARA	Refresh Table	Show Value
TTF2.VAC	KLY.CONTROL	 FLASHPLCSVR1SVR 	TTF2.DIAG/KLY.CONTROL/KLY.LO	Value	type
TTF2.RF	BCM.ML	KLY.LOLA	KLY.ON.80 klystron heater 80%	0	0/1
TTF2.DIAG	TEST.BCM.ML		KLY.ON.80.DESC description	klystron heater 80%	ABC
TTF2.DAQ	BEAMPOWER		KLY. ON. 80. HIST history	TDS array length = 205	TOS
TTF2.EXP	TEST.BEAMPOWER	=	KLY ON 80 FILT data history filter		IFFF
TTF2.MAGNETS	LOLA.CONTROL		KLY ON 80 EGU engineering units	0 0.03 0.0 0.0	
TTF2.UTIL	IQ_DRIVER		KLY ON 80 DESC description	klusteen heater 20%	STR
TF2.KRYO	ADCDMA		KLY ON 100 Kusters Laster 100%	a a a a a a a a a a a a a a a a a a a	<u></u>
TF2.FEL	DELAY		KLY.ON.100 REVETON heater 100%		<u>w1</u>
TF2.SYSTEM	TOROID		KLY.ON.100.DESC description	Klystron heater 100%	MBC
TF2.CRATE	TOROID.ML		KLY.ON.100.HIST history	TDS array length = 197	ID S
TF2.FEEDBACK	TEST.TOROID.ML		KLY.ON.100.FILT data history filter	0 0.05 0.0 0.0	urr r
TF2.SYNCH	CHARGE.CALC		KLY.ON.100.EGU engineering units	0 0.0 0.0 0	STR
LASH.DIAG	TEST.CHARGE.CALC		KLY.ON.100.DESC description	klystron heater 100%	ABC
LASH.RF	TEST.ML.TEST		KLY.FIL_VOLT klystron heat voltage	6.0	ea
LASH.SYSTEM	FARADAY		KLY.FIL_VOLT.HIST history	TDS array length = 2000	TDS
LASH.CRATE	ADC		KLY.FIL_VOLT.FILT data history filter	0 0.05 0.0 0.0	UFFFF
TTF.CRATE	MAINS		KLY.FIL VOLT.EGU engineering units	0 0.0 270.0 0 V	
TTF.VAC	BCM		KLY.FIL VOLT.DESC description	klystron heat voltage	ABC
TF.RF	BCM.MOTOR		KLY.FIL VOLT.RAW raw data	6.0	(<u>)</u>
TF.UTIL	DARKC.DIO		KLY.FIL VOLT.POLYPARA for data	0 0.05 0.0 0.0	IFFF
TF.KRYO	DARKC.DAC		KLY.FIL CURR klystron heat current	0.1	0.3
TF.SYSTEM	DARKC_MON		KLY FIL CURP HIST history	TDS array length = 2000	TOS
MTF.VAC	PHASE_MON		KLY ETL CUPP ETLT data history filter		
MTF.RF	CRD		KLY ETL CUPP EGU engineering units	0 0 0 6 0 0 0	
AMTE.SYSTEM	HALO	-	KLY FTL_CURP. DECC. description		STR
		·	KLT PIL LUKK UPSC description	KINSTEAN NEAT CULTERT	MBC
			Read 0 0.05 0.0 0.0		Se

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