JDDD IN ACTION

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Abstract

During the last two years the storage ring PETRA at DESY has been widely rebuild (now called PETRA III), to become soon one of the most brilliant X-ray sources worldwide. The vacuum controls of this third generation light source have been implemented using DOOCS and TINE on the hardware level and jddd (Java DOOCS Data Display)[1,2,3,4] on the GUI layer. jddd is a graphical editor for designing and running control system applications. It allows a simple creation of complex control panels with a rich set of ready-made components/widgets. The ongoing commissioning of PETRA III has proved that jddd fits the requirements of good control applications in terms of stability, reliability and performance. Currently four different control system interfaces are implemented in jddd: DOOCS, TINE, TANGO and EPICS. Values of these control systems can even be mixed, allowing an interoperability between the different worlds. That makes jddd interesting not only for DESY but also for other institutes. jddd is available as free software under the GNU General Public License (GPL). It is currently evaluated by various institutes like ESRF, PSI, Soleil, Trieste (using TANGO) and PSI, ITER, Cornell (using EPICS).

INTRODUCTION

jddd is a panel builder and runtime engine for control system displays. It has a graphical editor with a rich set of different ready-made components/widgets for control panel design. This editor is as powerful as the GUI builders of Netbeans or Eclipse. Synoptical displays are designed in a short time without any programming effort or knowledge. The created panels are saved in an xml file format and are parsed and executed in jddd run-time mode.

A subversion browser was developed to allow proper bookkeeping and history tracking of the jddd files. With this browser, files are committed to, loaded from, updated, moved or removed from a user specified subversion repository.

The jddd plot components are designed for high performance data presentation. Multiple channels can be displayed and new curves can be added at run-time by drag and drop. Using the mouse a data region may be selected to analyse the data in this selection, e.g. using fourier transformations, linear fits, displaying RMS, min/max values, showing histograms or making data correlations.

A plugin interface allows the import of external Java beans. Only the plugin.jar path has to be set in the jddd preferences. The beans which are included in the jar file will then automatically be available in the component palette of the jddd editor and may be added to a panel by drag and drop.

NEW JDDD FEATURES

During the last year the jddd development concentrated on bug fixes, performance tuning, the access of DOOCS DAQ[5] data and the implementation of the 4 different control systems.

A much better performance has been achieved using asynchronous calls, which means that the values are not polled by jddd but pushed by the servers. The asynchronous calls are working for all implemented control systems.
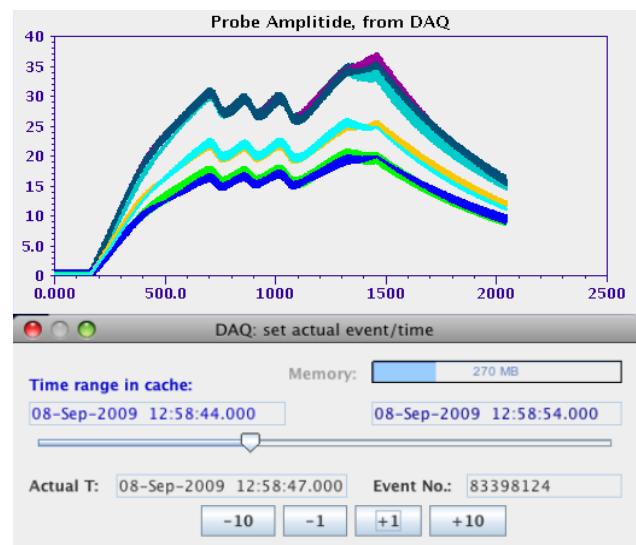

Figure 1: jddd panel displaying data from the DOOCS DAQ system.

A Java interface to the DOOCS DAQ system has been developed. History data can easily be displayed in running jddd applications. This allows the operator to compare current data with history data in order to investigate the past machine performance and to analyse problems of hardware and software. A screenshot of the archived cavity probe signal coming from the DAQ is shown in Fig. 1.

SUPPORTED CONTROL SYSTEMS

Doocs, Tine

These control systems are fully integrated now. The PETRA vacuum panels prove that all data types are displayed correctly by jddd control panels.

Tango

During the last year more and more people used jddd with the TANGO interface. A "-tango" start parameter

was implemented in jddd which enables special tango features like a tango address chooser and a tango error console. The advanced Java Webstart feature "lazy downloading" was used for the tango.jar file. Lazy downloading means that Java Webstart delays the download of a jar file until the application actually needs it.

An ATKPlugin was written which allows to use special Tango Java widgets in jddd. This plugin contains 16 additional beans which are available in the jddd component palette and may be added to a panel by drag and drop. A jddd display from HASYLAB where ATK widgets are used for displaying TANGO data is shown in Fig. 2.
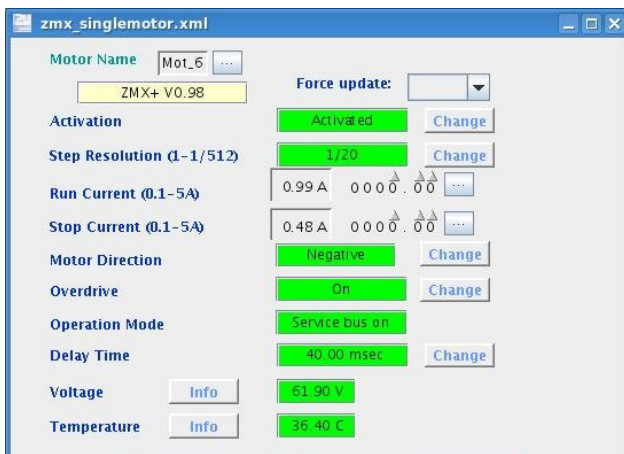

Figure 2: jddd panel from HASYLAB using ATK widgets for displaying TANGO data.

Epics

EPICS is now fully supported by jddd. The new interface is currently tested by Cornell University.

JDDD AT DESY

The development of jddd started three years ago. It was originally meant to be a replacement of the old ddd to build control panels for the new XFEL accelerator. During the last year the PETRA III vacuum controls have successfully been designed with jddd. The real live experience with these control panels helped finding bugs and improving the software.

A script was written to convert all old ddd panels of the FLASH accelerator (more than 3000) to the new jddd xml file format. One of these panels is shown in Fig. 5. It looks nearly similar to the old ddd version. The new jddd FLASH controls are available in the accelerator control room in parallel with the old ddd displays. It is planned to switch completely to jddd next year.

Because of many requests from different people a jddd tutorial was organized this summer at DESY. In this tutorial 25 participants, mostly engineers, were instructed in using jddd. The aim of this training was that technical groups without and programming and control system knowledge are able to design their own control panels.

The feedback of the participants after the tutorial was extraordinary positive. jddd is now used by the accelerator groups at DESY as well as Hasylab and the EMBL.

JDDD AT OTHER INSTITUTES

Various institutes like ESRF, PSI, Soleil, Trieste (using TANGO) and PSI, ITER, Cornell (using EPICS) are currently evaluating the jddd software.

The cooperation with these institutes provides us with valuable information and thus helps us tracking down control system specific problems. Based on the ideas and wishes of the control system experts jddd is permanently improved to fit all requirements.

jddd is started using Java Webstart. A simple creation of jnlp files allows creating start scripts including special options for each institutes. Java Webstart ensures that the users always get the most recent version of the application.
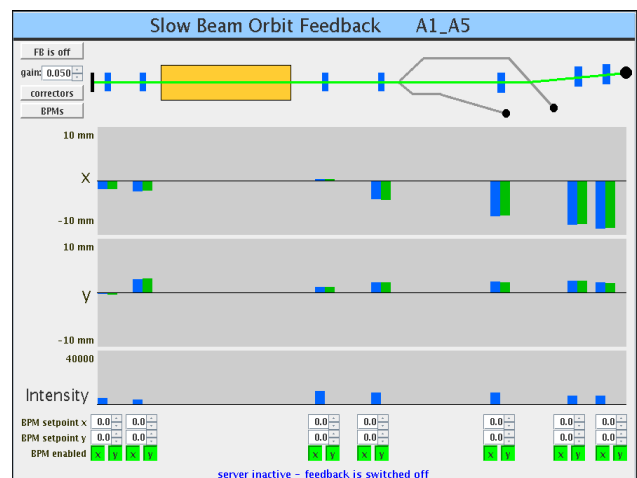

Figure 3: jddd controls at Cornell university.

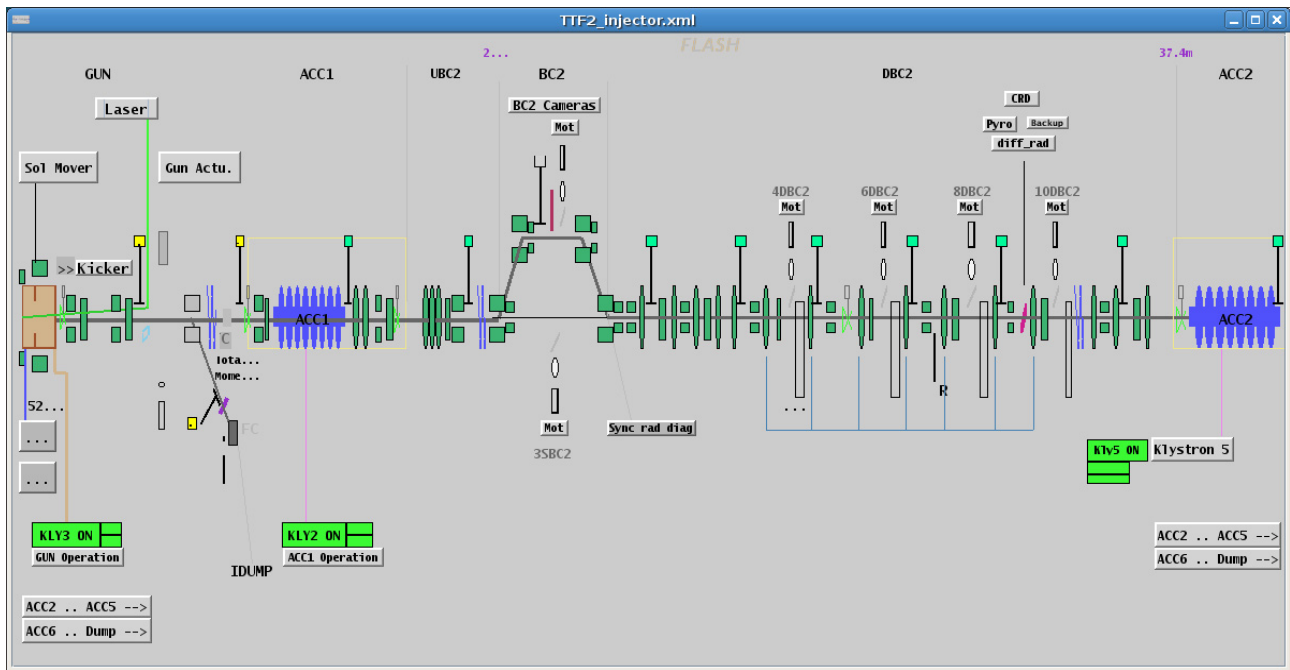Figure 4: PETRA vacuum controls displaying DOOCS and TINE data.

Operational Tools

Figure 5: FLASH injector display. This display is an old ddd panel, which was converted to the new jddd file format.

CONCLUSION

The operation of jddd for PETRA vacuum controls, overall at DESY and worldwide shows a good acceptance of the jddd concept. It is possible to shift a big part of the work for control panel design to the system experts of the technical groups.

The positive feedback of the DESY tutorial participants proved that using the jddd editor is easy to use and even complex control panels are designed in a short time with only a few mouse clicks.

jddd has it's own homepage[1]. On this web page multiple screenshots, examples, a detailed help, a jddd tutorial and the Java Web Start links for the editor and runtime version are available.

REFERENCES

[1] http://jddd.desy.de.
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[3] E. Sombrowski, A. Petrosyan, K. Rehlich, P.Tege, "jddd: A Java Doocs Data Display for the XFEL", ICALEPCS'07, Knoxville, Tennessee, October 2007.
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