

RIKEN RI-BEAM FACTORY POWER SUPPLY CONTROL SYSTEM UPDATE

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Abstract

A new control system based on the Common Object Request Broker Architecture (CORBA) distributed object model has been in use of controlling new power supplies (PSs) for Radio Isotope Beam Factory (RIBF) Project at Riken[1]. While the existing EPICS based system depends on various file systems to manage the parameter data and others, under the new system, all the information on controls are stored and managed in an oracle RDBMS running on a linux server. There have been some updating with regard to the GUI functionality since the first introduction in 2003. The details of the updates are reported.

OBJECTIVES

CORBA is the industry standard for the deployment of heterogeneous distributed objects, and recent versions of Java language includes its core libraries by default. It has already been used in other large scientific facilities in the world such as ANKA [2], ESRF [3] and NIF [4]. Vendor independence, software sharing and interoperability are the main aims of the design goal. Abeans R2 [5] developed at Jozef Stefan Institute (JSI) of Slovenia as well as other Java programs developed by ourselves have been connected to our CORBA servers running on VMEs via plug-ins. [6]

Since the very first deployment using real power supplies, there have been numerous requests by operators in terms of functionalities of GUI. Various improvements which have been incorporated into the client software are to be described.

LIST OF IMPROVEMENT

The followings are the list of improvement incorporated over the past year.

- A) In the PS summary screen, so far all the PSs were shown regardless of the usage. Now, only the selected ones can be shown, even in alphabetically sorted order.
- B) In the PS group operation screen, the “Undo”, “Redo” functionalities are now available within five generations of “put” operations.
- C) An excel file can be generated as copy of setup information shown on the screen, by using Jakarta POI’s HSSF components [7]. Jython scripts have been written in order to make use of java packages

without compiling the main routine.

- D) In case of DB failure, a file system can be used to keep the system running.
- E) Most of SQL sentences which were hardcoded can be stored in a separate file now.

In the next section, the detailed explanation of the each functionality will be given.

SOFTWARE FEATURES

Order Sort

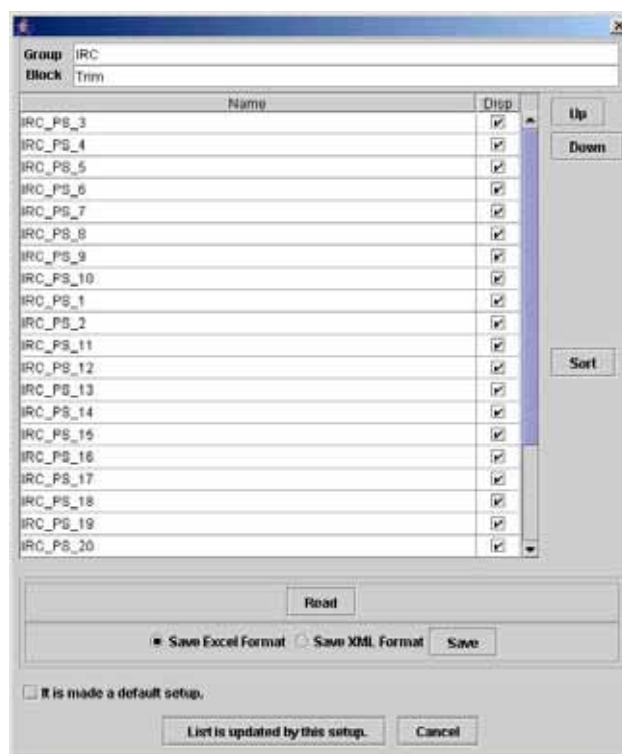


Fig.1: PS Summary Sort Screen.

Figure 1 shows the screen which handles sorting the order of PSs shown on the PS summary screen. The checkboxes in “Disp” column are used to select the necessary PSs to be shown. Using “Up” and “Down” buttons, one can manually arrange the order. By pressing the “Sort” button, the list will be sorted in alphabetical order based on the PS names.

One can also save the screen information either in a Excel file or in XML format. The stored data could be

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read back to the screen.

History Menu

When the first version of the client software was shown to our operators, one of them made a request to allow to undo/redo the current settings of PSs in order to recover the optimal values which had been past in previous settings. The new version allows the settings to be recovered within five generations of previous settings. One generation means one “put” action whether it is for one PS or for a group operation. Figure 2 shows an example of the “History” menu for this purpose.

System	Window	History
		2004/07/15 17:58:56
		2004/07/15 17:59:04
Primerly Particle		2004/07/15 17:59:23

Fig. 2: History Menu for Undo/Redo

Excel File Generation

It is always preferred by our operators that any parameter files or data files can be stored and opened by Microsoft Excel. Fortunately, the Jakarta project has an open source product called POI which is java program packages to handle various file formats based upon Microsoft's OLE 2 Compound Document format.

Even though it is possible to use only java programs to generate necessary excel files, it is often preferred to use a script language to do the same task when the execution speed is not an issue. Jython [8] is a java implementation of Python language and it is very useful to manipulate java packages.

The following script is used to produce an excel file containing the table information on the PS group operation screen.

```

from jp.go.riken.ribf.group import *
from org.apache.poi.hssf.usermodel import *
from java.io import *
from pawt import swing
import java

def getdata(e):
    data = PowerSupplyGroupFrame.getTableData()
    wb = HSSFWorkbook()
    sheet = wb.createSheet( "data" )
    for i in range( len( data ) ):
        row = sheet.createRow( i )
        for j in range( len( data[i] ) ):
            cell = row.createCell( j )
            cell.setCellValue( data[i][j] )
    fileout = FileOutputStream( "workbook.xls" )

```

```

wb.write( fileout )
fileout.close()

```

```

PowerSupplyGroupFrame.main( ["" ] )
frame = swing.JFrame('Jython Test', visible=1)
button = swing.JButton('Get data',
actionPerformed=getdata)
frame.contentPane.add(button)
frame.pack()

```

In Case of DB failure

The first version of the RIBF-PS control system was strongly intertwined with the DBMS. It is preferred that the system can be operational even when the DB has failed. Therefore, the codes have been modified to run by reading from XML files which were created from the DB information in advance as a backup. As for the data taken during the operation and stored into the DB, CSV files are created. They can be later stored into the DBMS when it is recovered from the failure.

SQL Sentences in Files.

Many SQL sentences were hardcoded in the first version of the programs. However, if the DB table configurations are changed, they should be modified and the program be recompiled. To avoid continual recompilation, the SQL sentences have been extracted from the codes and been stored in files. Now no recompilation is necessary and only contents in those files should be modified to adapt the change.

SUMMARY

A CORBA based PS control system has been implemented for the new cyclotrons in the RIBF project at RIKEN. Various improvement in terms of functionalities of the GUIs has been implemented. The RDBMS was initially closely tied to the system in order to manage the setup parameters of equipment, various data and operation logging. After the modifications, file-operation mode without DB connection has been established.

REFERENCES

- [1] <http://www.rarf.riken.jp/>
- [2] <http://www.anka-online.de/>
- [3] <http://www.esrf.fr/>
- [4] <http://www.llnl.gov/nif/>
- [5] <http://www.cosylab.com/>
- [6] http://icalepcs2003.postech.ac.kr/db/proc_papers/TH613/TH613.pdf
- [7] <http://jakarta.apache.org/poi/index.html>
- [8] <http://www.jython.org/>