TUA1 <abs0050bn>

Status of the TTF VUV-FEL Contron System

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DESY

The second phase of the TESLA Test Facility (TTF) started recently the operation. TTF was built by an international collaboration as a test bench for super conducting cavity technology. In addition this linear accelerator will be operated as a VUV-FEL user facility. The FEL needs a sophisticated diagnostics with a single bunch and shot to shot resolution and a high demanding data transfer rate. On the other hand the control system has to provide the flexibility for the test facility. As a further requirement the control system has to integrate the different systems of the collaboration partners. This paper gives an overview and describes the used technologies of the Distributed Object Oriented Control System (DOOCS) as the integrating part. To handle the high data rates a novel combination of a accelerator control system with a Data AQuisition system (DAQ) has been implemented.

Keywords — DOOCS, TTF, FEL, DAQ

TUA2 <abs0056ab>

A Distributed Control System for the Tandem-LINAC at NSC

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The control system for the Tandem-LINAC accelerator system at Nuclear Science Centre runs on a network of PCs under the GNU/Linux operating system. The control hardware consists of several CAMAC Crates, located around the accererator. The Crate Controllers have embedded PCs with ethernet interface. and boot GNU/Linux over the network on powering. The software is based on a client-server design. The Crate controllers run a server program to control/monitor the devices connected to the Crate and listens for client requests over the network. The operator interface is provided by client programs running PCs with X-window graphics and shaft encoder knobs interfaced to them. At present there are eight CAMAC crates and three operator consoles and system can scale without any change in software. The control system is designed following open hardware standards and using the free software tools available under Linux.

Keywords — distributed, embedded, accelerator, control

TUA3 <abs0016ng>

Advanced Beam Energy Spread Monitoring Systems and Their Control at Jefferson Lab*

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The most valuable beam energy spread monitoring systems at Jefferson Lab are based on the synchrotron light interferometry. The systems, known as Synchrotron Light Interferometers (SLI), are absolutely not invasive and routinely monitor the beam energy spread in a wide range of beam energies and intensities with a very high accuracy (~10-5). They are automated with the use of distributed, multi-level, and multi-component control software. The paper describes the SLI configuration, the structure of the SLI control software and its performance.

* Supported by DOE Contract #DE-AC05-84ER40150

Keywords — synchrotron light, beam diagnostics, controls

TUB1 <abs0132ee>

The User's Perspective

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Control systems engineers tend to view a control system from a perspective focusing on reliability and the availability or accessibility of the control points, not to mention security. An accelerator operator on the other hand is concerned with maximizing operation time and delivering beam. Do the tools provided by the control system enable the operator to achieve his goals in the most efficient and straightforward manner? Does the control system allow rapid identification and correction of any problems which might arise? In this paper we shall examine the perspective of the machine operator with regard to the control system and identify various points of concern, with emphasis on the automation of operational tasks and sequences.

Keywords — Automation, Operator Interface

TUB2 <abs0052kx>

Control Room Application Development Using .NET

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Many of the current ALS control room Windows applications make use of pre-existing ActiveX controls that encapsulate the detailed logic needed for control of complex devices in the accelerator. We have found that this methodology of Win32 application development based on these controls useful both because they are truly re-usable and also because they are accessible to most of the popular development tools available for Windows. We examine the .NET platform as the basis for future development here.

Keywords — SCA, .NET, ActiveX

TUB3 <abs0080kn>

Beating Commercial Products: Control System Office and Integrated Development Environment Are The Way To Go

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The success of Office suites is based on three fundamentals: consistent look and feel across applications, a common set of data manipulations (navigation, clipboards, undo/redo, copy and paste, find and replace etc) and the ability of different applications to process the same data (a table can be a part of a document in a word processor and a spreadsheet). This article discusses the same fundamentals in the context of control system software and shows that the “office paradigm” is relevant to it. To support office-like functions, data beyond raw measured quantities is required: we call this data metadata, and it encompasses – for example – machine-readable information about how different channels are logically organized into parallel hierarchies, how single values can be combined into group displays and how data items are interpreted differently according to the user interface context. We enumerate meta-data, describe how it is uniformly managed behind the scenes by Abeans, and how it enables generic applications such as table application, chart, archive or even IDE, to interoperate seamlessly as parts of an integrated suite.

Keywords — Office, GUI, IDE, Abeans, Java

TUB4 <abs0100re>

The Electronic Logbook @ the VUV-FEL -Making the Next Step

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Now more than three years have past since the first introduction of the electronic logbook (e-logbook) at DESY Hamburg. Triggered by the positive response from the various user sides, the e-logbook is now no longer only used at the VUV-FEL [1] at DESY, but also at a variety of other facilities (e.g.: Low Level RF, Cavity test stands, vacuum) and also different institutes (e.g.: SLAC (USA), INFN (Italy) and NSRRC (Taiwan)). The introduction of the e-logbook has fostered a new working culture in the daily accelerator operation. This triggered some extensions and changes within the original e-logbook concept, like e.g.: accessing the e-logbook from outside the hosting institute. After a brief introduction to the basic technology of the e-logbook, the extensions and changes to the original concept will be given. Furthermore the experience gathered from the last years e-logbook operation will be discussed to give an evaluation of the general usability of these web-services in the particle accelerator sector.

[1] See e.g.: http://tesla.desy.de

Keywords — electronic loogbook, XML, web-service

TUB5 <abs0082tg>

Beyond an Electronic Logbook

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The advantages of an electronic logbook over a paper logbook have been well-established by presenters at various conferences: multiple simultaneous access, readily attached supporting documentation, easy searching. At Jefferson Lab, we view these benefits as a start rather than an end. Instead of a mere repository of operational history, the electronic logbook should actively inform machine operations. We take advantage of a decision early in development to make our operational problem reporting system integral to the electronic logbook. Log entries requiring attention of system experts are dispatched directly from within the logbook. And more importantly, the follow-up and resolution of those same problems is also captured in the electronic logbook. The interface for making log entries is being extended to query the logbook database immediately when a new problem report is initiated and to search for similar resolved entries in the past. If close matches are found, they are presented to the person making a new entry. We hope that in many cases, this readily-accessible display of prior resolutions will allow the entry maker to solve many problems on-the spot and obviate the need to dispatch the problem to a system expert.

Keywords — logbook, database, problem-tracking

TUC1 <abs0112wv>

EPICS in PXI system

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The KSTAR(Korea Superconducting Tokamak Advanced Research) project, which aims to construct a superconducting tokamak, was launched in 1996. Many instrumentation and control progress has been made since then. In conceptual design phase, we consider some commercial products for system controllers and physics diagnostics such as PXI based LabView system. The commercial solution has some limitations in performance and moreover, we need large number of I/O implementations. Therefore EPICS control software will be used for KSTAR control, hence integration of LabView's PXI and EPICS is necessary. We are considering two types of integration; close integration and loose integration. For close integration, we can use EPICS software instead of LabView for the PXI system. We can use DAQmxbase or DDK API's, which are libraries provided by National Instruments, to build EPICS device/driver supports. EPICS works in its own device layer which were built with National Instrument's API, hence offering same functionality as VME. For loose integration, we can use shared memory to access LabView data from EPICS IOC, which is located on the same CPU. It is also possible to implement user defined protocol on TCP/IP application layer to communicate with RTLabView System. In particular, we developed a simple protocol for NI compact field point which operates on RTLabView and successfully controlled this device under EPICS. We describe details of our implementation here.

Keywords — EPICS, PXI, Linux

TUC2 <abs0101dz>

Porting EPICS Core Program onto micro-ITRON/SH4-based Device Controllers

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Experimental Physics and Industrial Control System (EPICS) is widely used for many accelerator control systems. The most important component of EPICS is iocCore, which is the core software to run on Input/Output Controllers (IOCs). In modern accelerator control systems, more and more intelligent controllers with an Ethernet interface, such as PLCs and custom device controllers, are used under the charge of a VME single board computer or a PC working as an IOC. However, in most cases, iocCore can run directly on the intelligent controllers themselves since they run a real-time kernel on a high performance CPU and tens of mega-bytes of memory. Running iocCore directly on the device controllers can reduce the depth of hierarchy in the system to make it simpler and more robust. As a first step towards this scheme, we have ported iocCore onto a target running a micro-ITRON real-time kernel and using a SH4 CPU. The technical detail of the porting is described.

Keywords — EPICS, IOC, ITRON, SH4

TUC4 <abs0098cc>

Performance Evaluation of EPICS Channel Archiver via Python XMLRPC Interface

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To handle primary beams of the slow-extraction beam line at J-PARC, It is required for the control system to display real-time DC signals from a large number of thermometers, vacuum gauges and so on. It is also necessary to archive such kind of data every few seconds. As part of the R&D program to construct such control system, we have developed a prototype system to archive data with the EPICS Channel Archiver and to display them via Python XMLRPC interface. The performance and evaluation of this system will be presented.

Keywords — EPICS, Channel Archiver, Python, XMLRPC

TUC5 <abs0095gp>

miniEPICS - an EPICS Package for Small Accelerators/Experiments

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EPICS is a control toolkit developed for large ccelerators. The original EPICS assumes to use VME-bus controllers and a commercial license of real-tome operating system (VxWorks). However, from the version EPICS 3.14 which was released at 2002, it can run on many other operation systems. We are developing a customized EPICS package for small- scale accelerators and experiments, miniEPICS. miniEPICS has the following features: 1) can start from one Linux-PC and extendable to many PCs 2) use PLC with a network port as i/o interfaces 3) basic EPICS tools are pre-installed 4) run with dummy data, immidiately after an installation procedure 5) include good samples and documents suitable for beginners 6) insallation CD is included In this paper,we will report the development status of miniEPICS.

Keywords — miniEPICS, Linux, PLC

TUD1 <abs0113br>

Orbit Control for Indus-2 Storage Ring

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Indus-2 is a 3rd generation light source soon to enter commissioning phase at CAT, Indore. Other than the control system hardware and software common for all sub-systems, it uses an interactive orbit control package developed in Matlab, which provides for orbit control and simulation just by drag and drop. Implementation of orbit control requires handling matrix calculations efficiently. Well known for it's powerful mathematical and graphic routines, Matlab is an ideal choice as the mathematical engine for orbit control. The package provides support for number of orbit control algorithms and powerful and intuitive graphical display, simulation mode, commissioning and ramping support, orbit database and device control. The paper describes the scheme for slow global orbit control for Indus-2 and the use of a package developed in Matlab for the same.

Keywords — Orbit control, Matlab

TUD2 <abs0094bj>

An Accelerator Control Middle Layer Using Matlab

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Matlab is a matrix manipulation language originally developed to be a convenient language for using the LINPACK and EISPACK libraries. What makes Matlab so appealing for accelerator physics is the combination of a matrix oriented programming language, an active workspace for system variables, powerful graphics capability, built-in math libraries, and platform independence. A number of software toolboxes for accelerators have been written in Matlab -- the Accelerator Toolbox (AT) for machine simulations, LOCO for accelerator calibration, Matlab Channel Access Toolbox (MCA) for EPICS connections, and the Middle Layer. This paper will describe the “middle layer” software toolbox that resides between the high-level control applications and the low-level accelerator control system. This software was a collaborative effort between ALS (LBNL) and Spear (SSRL) but has been written to easily port to other machines. Five accelerators presently use this software. The Middle Layer functionality includes energy ramp, configuration control (save/restore), global orbit correction, local photon beam steering, insertion device compensation, beam-based alignment, tune correction, response matrix measurement, and script-based physics studies.

Keywords — Matlab, Accelerator Control

WEA1 <abs0070uu>

Development of a Handy Terminal Using PDA

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SPring-8

In SPring-8, VME-based network distributed control system is used to realize stability, scalability and versatility. When the network is stopped at the time of beamline maintenance various equipment cannot be controlled from remote terminals. We planned to develop a handy terminal as a local terminal. For handy terminal, a compact size, long battery backup time, and user-friendly interface was required. We selected a Linux-based PDA, Sharp Zaurus SL-C860. The MADOCA, which is a control software framework developed in SPring-8, was ported on it. The network technology that implements IP protocol to the physical layer of USB, USBNET, is adopted. It makes a peer-to-peer network communication between the VME system and the Zaurus, even if network stops. We made a GUI using Qt/Embedded to fit field operations such as beamline maintenance and set up. We plan to install a handy terminal system to beamlines in January 2005.

Keywords — handy, USB, PDA, Linux, Zaurus

WEA2 <abs0067zj>

Development of a Communication with PLC by Using the FL-net as Open Standard PLC Link

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SPring-8

We develop a control system for a linac interlock system of the SPring-8 with MADOCA framework. The system was made by PLC and PC with Linux and the FL-net which is the open standard protocol handled by the Japan Electrical Manufacturers' Association is used to communicate between a PC and a PLC. The FL-net is a UDP/IP based master-less token passing protocol and it supports a cyclic data transfer and a message transfer. We also talk about plan to use the FL-net at the SPring-8 control system.

Keywords — PLC, Open Standard Proocol

WEA3 <abs0051pq>

An Embeded Computer Controlled Multifunctional Accelerator High Power Test System

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An Embeded Computer Controlled Multifunctional Accelerator High Power Test System is developed in the accelerator lab of Tsinghua University, Beijing, China. The system can test S-band, C-band and X-band accelerating tubes used in medical and nondestructive evaluation accelerators. The whole system is controlled by an embeded computer named PC/104 PCM-3350. The whole system is small and multifunctional. All control processes are visible on a LCD and very friendly to users.

Keywords — Control Systems, Embedded systems, User Interfaces, Databases, Networking and Connectivity

WEA4 <abs0057yz>

The Disappearance of the Barrier in the Concept of the Computer

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The performance enhancement of the cheap computer quickly develops, and the effect also permeates in the field of equipment control of which the high reliability is required. The low power consumption technology used by the book-size personal computer practically is utilized even in the field of the equipment control. A demand of upgrading of a processing demand and short period of the development is strong in the equipment control, and in the conventional real-time multitask kernel, the dissatisfaction comes out in the functionality. The following are coming out : Goods and technology that there is a similar demand in various fields and that it solves it. It recently has the function of resemblance and DOS/V personal computer, and VME board of the low power consumption is also variously sold. It is possible to utilize advanced OS (Windows, LINUX, FreeBSD), and the workability is often more effective than the real-time multitask kernel for the short period development. The means of this species is utilized even in the control of 12GeV PS for a part of function. Intends to utilize and consider the technology of this species even in MR-Control of J-PARC. These outlines are introduced.

Keywords — VME, LINUX, FreeBSD, DOS/V

WEB1 <abs0023wu>

Data Acquisition System for VUV-FEL Linac

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For the VUV-FEL (Vacuum-Ultraviolet Free Electron Laser)at DESY, a 1 GeV superconducting LINAC is used and presently commissioned. The control system of this LINAC consists of more than 1000 fast and above 500 slow data channels producing about 5-300 MB/s of data, depending on the LINAC operation mode. To study, control and document the machine performance and parameters, a DAQ system has been developed which allows to store the machine parameters together with the user experiment data. The system will allow to correlate the accelerator status with the experimental data on a bunch-to-bunch basis. The paper will introduce the architecture of the DAQ system and give the description of its main components in detail.

Keywords — DAQ, linac, channel, control, system

WEB2 <abs0032rk>

Orbit Data Processing Using the Data Acquisition System DAQ at the TTF VUV-FEL

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The Vacuum Ultraviolet Free Electron Laser VUV-FEL at DESY is a linear electron accelerator with an undulator system to produce laser pulses of never reached qualities. In addition it is a test facility for future linear accelerators as the X-ray Free-Electron Laser XFEL or the International Linear Collider ILC. Besides the complexity of the VUV-FEL setup, high demands on the qualities of its laser pulses require sophisticated beam analysis. Especially the diagnostics of the beam trajectory ('orbit') plays an important role. It has to be fast, detailed and flexible. To meet this goal, an 'Orbit-Server' program processes the Beam-Position-Monitor (BPM) data. It provides the orbit of single bunches, spatial correlations, temporal orbit developments etc. to the operators and forms a middle layer module of the VUV-FEL Distributed Object-Oriented Control System DOOCS. For fast data transfer it reads the BPM data from the central Shared Memory (SHM, a unix interprocess communication facility) of the DAQ. The paper describes the functions of the Orbit-Server reading and processing the orbit data. Emphasis is put on the application of the SHM to show the benefits of using this technology for accelerator controls. Furthermore, the corresponding 'Orbit-Display' is discussed, which acts as the operator's graphical interface.

Keywords — VUV-FEL, XFEL, doocs, orbit, unix, bpm

WEB3 <abs0031hw>

Distributed DAC System-Area Network with Embedded SBC and DSP-based Nodes

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Advanced Systems for Data Acquisition and Control (DAC) are integrated in flexible multi level System-Area Network (SAN) Modular Architecture with Embedded distributed modern SBC and DSP-based modules in nodes, based on compatible PC Core and High-performance network protocols. There are two basic approaches in development of Distributed Systems with flexible topologies for DAC applications. The first is effective (price/performance) Open Architecture on the base of week interactions of microprocessor core in modern compact SBC and DSP-based nodes. The second is high-performance Flexible System Architecture with different topologies (2D or 3D or Tor) for effective Real-time Data Processing on the base on strong interactions between many Distributed processor nodes. The first approach is effective for slow and moderate Real-time DAQ, monitoring and Control Systems based on IP-protocol (tradition Ethernet 10/100/1000).. One of the advanced platform to realize Effective Systems Architecture is compact node with 2-3 PCI slots passive bus for SBC and DSP-based modules (DAC), integrated in Distributed Terminal Real-time Systems. This basic approach with compact Nodes and tradition week interactions between Cores is more effective, than more expensive cPCI/PXI-based systems platforms. Distributed System Architecture with weak interaction with SBC and DSP-based terminal nodes for Signal processing and Control in Real-time on the base of Ethernet is proposed and discussed. The second approach is high-performance systems, including DAQ applications for experimental Physics in first order. Both approaches can be integrated for more effective flexible modular Systems with the single Architecture complex, where tradition Ethernet can be used for installation, remote access, maintenance and data processing, when high-performance Distributed-memory Architecture with strong interaction of distributed nodes with required topologies (2D, 3D) can be used for data processing in Real-time. Advanced Joint Architecture can be effective for high-performance Systems on the base of new generation 64-bit microprocessors (Intel), integrated in Distributed modular System for DAC with flexible topologies. The Joint Approach to System Area Network for DAC (SAN DAC) are discussed and proposed.

Keywords — System Architecture, microprocessor, embedded systems , RT systems, SBC, DSP, Interconnect, Control Network, Modular systems , interfaces

WEB4 <abs0004ar>

PowerPC-based CAMAC and CAN-bus Controllers in VEPP-5 Control System

Dmitry Bolkhovityanov

In 2001 BINP began using Motorola MCF5200-based CAMAC controllers with integrated 100Mbit Ethernet and Linux onboard. Those proved to be very effective, but had a serious drawback: MMU-less CPU, which caused use of rather limited uClinux. In 2004 a new version with PowerPC CPU was born, which runs regular PPC-Linux. It is used in VEPP-5 control system since summer 2004 and seems to have many pros and much less cons. A similar device with CAN-bus interface instead of CAMAC is also begin being used. These devices are connected to control PCs via Ethernet. In this paper our experience of using these controllers together with Linux-based host PCs is discussed, as well as our architectural decisions.

Keywords — CAMAC, CAN-bus, Linux, Ethernet

THA1 <abs0105ub>

Control System of a FFAG Complex for the ADSR Project in KURRI

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An 150 MeV proton FFAG accelerator complex is now under construction as the proton driver for the feasibility study of accelerator driven subcritical reactor (ADSR) in Research Reactor Institute, Kyoto University (KURRI). The control system for this FFAG accelerator complex is based on conventional PCs and programmable logic controllers (PLC). PLC is popular as the low-cost and high-performance controller for a wide variety of devices in the industrial world. Recently PLC obtains the capability to handle TCP/IP and UDP/IP, thus it is possible for a PC without special software to communicate with PLC over the network. PCs serve the man-machine interface and PLCs govern the low level devices and manage the database of parameters for devices connected to PLC. Since the database on PLC can be accessed over the network, we can introduce any type of equipments or higher integrated applications to our control system as long as they can handle the network connection. We report the current status of the development and future upgrades, such as the trial to combine SAD with our control system over the network for the beam commissioning of our FFAG complex.

Keywords — FFAG, PLC, network, SAD

THA2 <abs0115wg>

Software Scenario for Control System of Indus-2

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Indus-2 control system software scenario presents an interesting mix of software, communication protocols between different layers, operator interfaces to machine, web interfaces to machine data, machine application programs and databases. While using a distributed, client server based control system architecture, a range of software pieces like Labview, commercial SCADA package, Java & C++ applications, Matlab, web interfaces, OPC, TCP/IP, Modbus, GPIB and serial instrument interfaces have been used. Use of different software environments poses it's own challenges. An overview of the software architecture and technologies in use is presented.

Keywords — Software, Architecture, OPC, DCOM, Middleware

THA3 <abs0134js>

Recent Progress of STARS

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STARS (Simple Transmission and Retrieval System) was originally developed as an interface program of COACK (Component Oriented Advanced Control Kernel) for non-Windows system and it is effective for various control system. At present, STARS is installed in beamline control system at the Photon Factory and it is reported to be useful by beamline staffs indeed. We are still developing various types of client programs of STARS. Recently, we have found that STARS is very effective for developing next version of COACK. We will describe recent status and progress of STARS and discuss about its availability as the core architecture of COACK system.

Keywords — STARS, COACK

THB1 <abs0086hw>

New Developments at Cosylab

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Cosylab

The word Cosylab stands for Control System Laboratory, which implies that new developments and technologies are at the centre of our efforts, as we have proven in previous conferences. In this article, we present the highlights of our new developments since the last PCaPAC conference and how they fit together as a whole. The main guideline is simplification for the user, be it the control system developer or the user of the control system. In order to achieve this, we have developed and improved such diverse components as a series of generic client applications, a native Java implementation of the EPICS channel access protocol, implemented load balancing and failover in ACS, replaced an expensive commercial tool with Visual DCT and developed a plug & play control system box with an embedded computer for integrating external devices. The presentation will conclude with successful examples of our technology transfer into other fields of computing and information technologies, such as Geographic Information Systems (GIS), which is becoming a new challenging field for Cosylab.

Keywords — ACS, Abeans, Visual DCT, micro IOC

THB2 <abs0074ub>

Cosylab Management System

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As a result of the free spirit in research institutions, project management is mostly considered a necessary but awkward task. We present a working solution tailored to academic projects that requires only a minimum of effort and discipline and results in huge benefits, which will be presented in this article. Cosylab is of academic origin, therefore the spirit, organization and work procedures are very much like in research institutes. In addition, we work on about a dozen projects simultaneously for customers on four continents, which requires a lot of travel and on-site work. Commercially available project management tools are not suited to manage such diversity. We have therefore adopted a set of open source tools, such as Request Tracker, Wiki, Sympa mailing lists, mySQL and maven, implemented some custom additions and integrated the tools into a coherent product to suit our purpose. It enables developers to track their work and communicate effectively; project managers to monitor progress of individual projects; and management to supervise critical parameters of the company at any time. In the article, the experiences gained by using the system are presented. As it has turned out in practice, the product is ideal also for research institutes, as it is demonstrated by its use at the Swiss Light Source (SLS).

Keywords — project management, maven, mySQL, Wiki, Sympa

THB3 <abs0078bn>

New Features for New Applications with Abeans 3.1

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Abeans are Java-based client framework for building control system applications. Cosylab has set as its primary design goal the ability to adapt them for a wide range of underlying architectures. By relying heavily on object oriented modelling, we have modularized them vertically into services, such as logging, exception handling, configuration and resource management; and horizontally into layers, such as plug layer, modelling layer and presentation layer. Portable generic applications as well as deployments in ANKA, ALMA, GSI, DESY, DIAMOND and SNS demonstrate that the basic premises of the design were sound. In this article we discuss, using a specific example of Control Desk application (a generic table application) developed originally for DIAMOND, the main features available by the generic nature of Abeans. We address the basic question of how to trade flexibility for performance, and are careful to distinguish various kinds of overhead (one-time initialization, memory footprint, CPU consumption etc.). Strategies used in Abeans to improve performance of Java are presented along with a comment about how these had to change in response to the evolution of Java Virtual Machine.

Keywords — Abeans, Java, performance

THB4 <abs0081kc>

Generic Types in Java: Abeans<T> specifically for you, Mr T?

Gasper Tkacik, Mark Plesko
Cosylab

Java 1.5 is not merely a revised Java 1.4 – it is an old language reborn to incorporate generic types, similar to C++ templates, and a host of various new improvements. Abeans, a client-side software library for modeling complex control systems, has been trying for several years (and three major releases) to strike a balance between ease-of-use and the capability of running on various control system architectures. More specifically, we designed custom solutions based on such advanced concepts as introspection, meta-data processing and code generation in order to foster existing and new Abeans deployments on diverse machines. New Java features will drastically reduce the code footprint and improve code clarity by generalizing naturally over atomic data types in the control system; by incorporating meta-data relevant for generic applications and code generators directly into source code itself; and by allowing Abeans code to monitor and modify itself during execution, a feature impossible to implement in pure Java before version 1.5. We believe that, if used properly, such advanced functionality can be a blessing to control system programmers. Consequently we discuss specific examples where the whole community can benefit from it and show how new concepts will be incorporated into future Abeans releases.

Keywords — Java, Abeans, generic applications

THB5 <abs0065hb>

A Long Successful Japanese-Slovenian Collaboration in CS Development

Gasper Pajor, Igor Kriznar, Mark Plesko, Igor Verstovsek
Cosylab

When Cosylab was founded 2001, Hitachi-Zosen (now NDS) was one of its first customers. Since then, we have successfully worked together on more than five control system software projects for various Japanese laboratories. For these projects we both agreed on well defined interfaces and used some innovative ways of defining specifications and reporting bugs. All of this resulted in clearly specified tasks and helped us both avoid language barriers and misunderstandings. When NDS and Cosylab parts were put together they fitted nicely and no on-site installation of Cosylab products was ever required. It is important that all sides comply to the interface specifications, so the extra work for fitting pieces together is minimal and the possible problems can be addressed to the group responsible for the particular part. We have used IDL (Interface Definition Language) and simulation servers for defining and testing the programming parts. For specifications and bug reports we used power point presentations and edited screenshots. All inter-company communication has been done via email. Our experience show that this kind of collaboration is very cost-efficient for both sides, but also requires both sides to be responsible partners. In this article we will discuss the collaboration between NDS and Cosylab as an example of successful collaboration between Japanese and European company.

Keywords — Japan, collaboration, Abeans, NDS, Cosylab

FRA1 <abs0035bh>

Porting the Scientific Online Proposal System of the European Synchrotron Radiation Facility to the Synchrotron Radiation Source ANKA

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The Scientific Management Information System (SMIS) handles around 1000 applications for beam time and per proposal round at the European Synchrotron Radiation Facility (ESRF). It manages the complete workflow of scientific proposals from the initial submission to the scheduling of beam time up to the final reporting on an experiment, hereby simplifying significantly the collaboration between users, beam line scientists, the user-office and peer- review grading committees. The system is based on an Oracle SQL database as well as UNIX and windows web servers. It relies on Java and Microsoft Visual Basic technologies. Due to the similar need to handle proposal submissions electronically, ANKA decided in 2003 to adapt the SMIS to its needs. This decision was mainly based on the proven stability and improvements of the system during the last 10 years at the ESRF. Between ANKA's decision and the start- up of the system at 15 November 2004, about one year of time and manpower were invested to adapt the SMIS. We will present the architecture of the SMIS installed at ANKA and ESRF, the prerequisites for the migration and the unexpected issues that had to be solved. Our contribution will conclude with a discussion on a standardized online proposal system for synchrotron radiation facilities

Keywords — SMIS, ANKA, ESRF, online beam time application, proposal submission

FRA2 <abs0048dv>

SPARC Control system

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We describe the control system for the new injector project in construction at the Laboratori Nazionali di Frascati INFN (SPARC). The control system must be operative in the 2006 for this reason we have made some choice in the system development. PCI based industrial PC as standard front-end processors give us the access to a big quantity of different hardware solution. Small form factor PC as console to have a possibility to tune the number and performance. Linux PC as general purpose server. Ethernet Gigabit LAN as data transfer channel give all band necessary to any kind of data exchange. Labview as control system environment give us the possibility to find a ready to use data acquisition system and reuse some part of software already written to DAFNE control system.

Keywords — Control, Labview

FRA3 <abs0133cu>

TANGO Control System Framework

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In the year 2000 ESRF started to design a new control system framework around CORBA named TANGO. TANGO is based on distributed objects and distributed services. It can be scaled to control a large accelerator complex, a beam line or a small embedded system. In 2002 ESRF and SOLEIL in Paris have signed an agreement for a collaborative development of TANGO. In 2004 ELETTRA in Trieste then ALBA in Spain decided to use TANGO for the control of their accelerators and beamlines and joined the collaboration. Thanks to this fruitful collaboration, TANGO has been largely improved and completed. The source packaging allowed several users over the world to download it and use it. . It includes an automatic code generator, a set of services to administrate, archive, display or control equipment. A set of binding allows controlling TANGO devices from commercial software such as Matlab, Labview, Igor , SCADA... Briges have been written allowing interfacing other systems such as EPICS or OPC. The 4 institutes involved are setting up a set of abstract patterns to standardize the interface of common equipment used in accelerators and beamlines. This abstraction is a step forward in the interoperability of software between institutes.

Keywords — Collaborative development, distributed objects, Corba, Linux, embedded

FRA4 <abs0106qa>

CEBAF Control Room Renovation

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The Machine Control Center at Jefferson Lab's Continuous Electron Beam Accelerator Facility was initially constructed in the early 1990s and based on proven technology of that era. Through our experience over the last 15 years and in our planning for the facilities 12 GeV upgrade we reevaluated the control room environment to capitalize on emerging visualization and display technologies and improve on workflow processes and ergonomic attributes. This effort also sets the foundation for the redevelopment of the accelerator's control system to deliver high reliability performance with improvements in beam specifications management and information flow. The complete renovation was performed over a three-week period with no interruption to beam operations. We present the results of this effort.

FRA5 <abs0060ks>

The Conceptual Design of the Control System for the Future Low-Emittance Light Source PETRA III at DESY

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At DESY, the accelerator PETRA II predominantly used as booster for the proton / electron collider HERA will be transformed into a 3rd-generation light source (PETRA III)after the final shutdown of HERA operation mid 2007. In addition, the existing technical systems of the electron or positron pre-accelerators LINAC II and DESY II will be improved to fulfill the stringent requirements of the future PETRA III operation modes such as top-up injection. Within this effort, the control system will be upgraded to serve beam operation for a further 10 years. The anticipated changes aim (1) to reduce the dependency on specific computer platforms,(2) to establish the TINE (Threfold Integrated Network Environment)software suite for remote control of all accelerators involved,(3) to standardize and modernize the front-end controllers and interfaces,(4) to reduce the future maintenance and development effort, and (6) to fulfill the state-of-the-art safety requirements for a open control system. In this paper, the conceptual design of the control system which has been recently developed will be presented.

Keywords — system upgrade, platform independence, embedded systems, middleware, safety