EPICS Collaboration Meeting

Sunday, 8 October 2023 - Sunday, 8 October 2023

Century City Convention Centre

Book of Abstracts

Contents

EPICS Core and Device Support / 13

OPC UA Device Support - Update

Author: Ralph Lange[1]

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In a collaborational effort (ITER/HZB-BESSY/ESS/PSI), a Device Support for the OPC UA industrial SCADA protocol is under development. Goals, status and roadmap will be presented.

Topic:

Other

EPICS Core and Device Support / 14

EPICS Core Developments & Plans

Author: Ralph Lange[1]

Co-authors: Michael Davidsaver [2]; Andrew Johnson [3]

[1] *ITER Organization*

[2] *Osprey DCS*

[3] *Argonne*

Corresponding Author: ralph.lange@gmx.de

Recent developments and future plans for EPICS Base from the EPICS Core Developer's Group.

Topic:

EPICS 7

EPICS Organizational / 15

EPICS Documentathon report

Author: Timo Korhonen[1]

[1] *European Spallation Source ERIC*

Corresponding Author: timo.korhonen@ess.eu

The talk will give an overview of the Documentathon: what was achieved and what are the plans moving forward.

Topic:

Other

EPICS Organizational / 16

Accelerator Control Development at iThemba LABS: Road to EPICS and beyond

Author: Justin Abraham[1]

Co-authors: Hein Anderson [1]; Amien Crombie ; William Duckitt [2]; Cheslin Ellis [1]; Michael Hogan [1]; Ivan Kohler ; Hendrik Mostert ; Maria Mvungi ; Camelia Oliva [1]; John Pilcher ; Nieldane Stodart [1]

[1] *iThemba LABS*

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iThemba Laboratories for Accelerator Based Science (LABS) was established in the 1980s to support the nuclear physics research community and to produce radioisotopes for nuclear medicine applications. This paper outlines the development of the iThemba LABS accelerator control system from mini-computers running RTE and CAMAC instrumentation, through to a system based on a LAN of PCs running OS/2 and in-house developed SABUS instrumentation. In the late 2000s the accelerator control system was migrated to the EPICS platform. Several drivers were developed to interface with the existing CAMAC and SABUS hardware. In 2015, in order to meet the changing technology and user requirements, iThemba LABS adopted EtherCAT as its new industrial communication standard. A number of software and tools have been developed and several hardware modules integrated and tested. A new web-based framework, React Automation Studio (RAS), was also developed in-house for operation of control systems. Many of these tools are being used at the new South African Isotope Facility (SAIF). Various applications, challenges and the ongoing and future developments using EPICS are presented.
Keywords: iThemba LABS, control system, CAMAC, SABUS, OS/2, EPICS, EtherCAT, RAS, SAIF

Topic:

Other

Project Reports / 17

EPICS Beamline Controls Strategy for the APS Upgrade

Author: Joseph Sullivan[1]

Co-authors: Kurt Goetze [1]; Pete Jemian [1]; Keenan Lang [1]; Tim Mooney [1]

[1] *Argonne National Laboratory*

Corresponding Author: jpsullivan@anl.gov

<tbd>

Topic:

Other

EPICS Upgrades / **18**

The decade long transition from a custom control system to EPICS

Author: Edmund Blomley[1]

[1] *Karlsruhe Institut of Technology (KIT)*

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The Karlsruhe Research Accelerator (KARA) at the Karlsruhe Institute of Technology in Germany has been in operation for over 20 years now. It originally started with a custom control system using custom hardware control boards. After adding a second independent control system to be able to handle PLCs, the arrival of new diagnostics for the accelerator with built-in EPICS support triggered the decision to fully migrate to EPICS. After a period of over 10 years the very last remaining parts of the original control system were switched off this year. This presentation will discuss the process of this decade long transition process.

Topic:

Hybrid Systems

EPICS Core and Device Support / **19**

Running a major facility (almost exclusively) on pvAccess

Author: Timo Korhonen[1]

[1] *European Spallation Source ERIC*

Corresponding Author: timo.korhonen@ess.eu

ESS has been moving towards using pvAccess (PVA) as its main EPICS protocol. For the commissioning round this spring, we switched the default protocol for our user applications (CS-Studio Phoebus) to PVA. The talk reports our experience of running almost exclusively on PVA, the (few) issues we encountered and comparing the experience with CA.

Topic:

EPICS 7

Project Reports / **20**

Diamond-II Project and Controls

Author: Austen Rose[1]

[1] *Diamond Light Source*

Corresponding Author: austen.rose@diamond.ac.uk

The Diamond-II upgrade Project has been awarded funding from the UK Government. This talk will present the project and the impact on the control systems.

Topic:

Other

EPICS Upgrades / **21**

Progress of the EPICS Transition at the ISIS Accelerators

Author: Ivanfinch Finch[1]

[1] *STFC ISIS*

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The ISIS Neutron and Muon Source accelerators have been controlled using Vsystem running on OpenVMS / Itaniums, while beamlines and instruments are controlled using EPICS. We outline the work in migrating accelerator controls to EPICS using the pvAccess protocol with a mixture of conventional EPICS IOCs and custom Python-based IOCs primarily deployed in containers on Linux servers. The challenges in maintaining operations with two control systems running in parallel are discussed, including work in migrating data archives and maintaining their continuity. Semi-automated conversion of the existing Vsystem HMIs to EPICS and the creation of new EPICS control screens required by the Target Station 1 upgrade are reported. The existing organisation of our controls network and the constraints this imposes on remote access via EPICS and the solution implemented are described. The successful deployment of an end-to-end EPICS system to control the post-upgrade Target Station 1 PLCs at ISIS is discussed as a highlight of the migration.

Topic:

EPICS 7

Overflow and Discussion / **22**

Review of the open source EtherCAT Motion Control Framework

Authors: Alvin Acerbo[1]; Anders Sandström[1]

[1] *Paul Scherrer Institut*

Corresponding Authors: anders.sandstroem@psi.ch, alvin.acerbo@psi.ch

The open source EtherCAT Motion Control (ECMC) framework originally developed at the European Spallation Source is a real-time Ethernet-based fieldbus system for distributed and synchronized systems. ECMC is built on top of the open source Etherlab master to communicate with and control EtherCAT devices, and is available as an EPICS module. The ECMC framework together with commercially available hardware is now in use at several light source facilities for digital and analog input/output and motion control for low to mid-performance applications. Here, we review the basic hardware and software requirements for a minimal EtherCAT system, the ECMC framework itself, the interface between ECMC and EPICS, and several supported motor operating modes. We will also review basic functionalities such as positioning, homing, limits, and PID loop tuning, and how more advanced features such as multi-axes synchronization, triggering, and interlocking can be used. Some recently added features will be presented as well.

Topic:

Other

EPICS Organizational / 23

The Oxfordshire Series of EPICS Meetings

Author: Ronaldo Mercado[1]

Co-author: Austen Rose [1]

[1] *Diamond Light Source*

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A brief discussion of the Oxfordshire series of EPICS Meetings.

Topic:

Other

Project Reports / 24

Integrated Control System Architecture for STS Project

Authors: Steven Hartman[None]; Kay Kasemir[None]; Matt Pearson[1]

Co-author: Jay Yan [1]

[1] *ORNL*

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STS Integrated Control Systems (ICS) provide integrated controls, data acquisition, computing infrastructure, and protection systems across all the STS technical areas. The development of ICS for the STS project builds on the existing SNS control system infrastructure that is based on the EPICS toolkit. This presentation will give an overview of STS control system architecture including software development environment, equipment management, device naming, and system integration.

Topic:

Other

EPICS Upgrades / 25

Current and future soft IOC usage at SIRIUS

Author: Erico Nogueira Rolim[1]

[1] *LNLS/CNPEM*

Corresponding Author: erico.rolim@lnls.br

The SIRIUS synchrotron light source uses soft IOCs that extensively communicate with other IOCs and soft IOCs, in the accelerator itself and at the beamlines, to perform high level computations or orchestrations. Most of these soft IOCs are implemented in Python using the PCASpy library and, in some specific cases, the EPICS Sequencer module was also employed. This presentation not only aims to showcase these IOCs and our experience with them, but also to explore the future: our current solutions only work with the CA protocol, what are the options moving forward? Given the existence of solutions like Bluesky, which aspects of experiment control should happen in a soft IOC and which should happen somewhere else?

Topic:

EPICS 7

EPICS and Cyber Security / **26**

SLAC Initiatives in Accelerator Cyber Security

Author: Gregory White[1]

[1] *SLAC*

Corresponding Author: gwhite@stanford.edu

We describe a program at SLAC to truly understand accelerator cyber vulnerabilities as the exist at SLAC and similar facilities, improve accelerator cyber security generally, engage the U.S. Department of Energy in collaboration and funding and provide the concomitant upgrades to EPICS base for the accelerator community.

Topic:

Cyber

EPICS Organizational / **27**

Welcome

Author: Karen White[1]

[1] *ORNL*

Corresponding Author: whiteks@ornl.gov

Welcome from the organizers and EPICS Council. Day plan.

Topic:

Other

EPICS and Cyber Security / **28**

Plans to add TLS to EPICS

Author: George McIntyre[1]

[1] *Level N*

Corresponding Author: george@level-n.com

This talk describes plans to add a Transport Security Layer (TLS) to EPICS.

Topic:

Cyber