STANDARD DEVICE CONTROL VIA PVSS OBJECT LIBRARIES IN ALICE

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The device control in the Large Hadron Collider (LHC) experiments at CERN is already based on OPC servers and PVSSII Supervision Control And Data Acquisition (SCADA) systems. A software framework enables in addition the user to set up his PVSS project for the different devices used. To achieve a homogeneous operational environment for the ALICE experiment, these devices need to be controlled through standard interfaces. PVSS panels act as the upper control layer and allow for full control of the devices. The PVSS object oriented feature has allowed the development of device Object Libraries. This poster gives an overview of the device control architecture including PVSS, software framework, and OPC server. It describes the Object Libraries developed for some devices, and it explains how these libraries are integrated in the ALICE controls environment.

The ALICE Experiment & Collaboration

The ALICE experiment is dedicated to heavy ion physics. It consists of 18 sub-detectors.

More than 1000 physicists, engineers and technicians from 90 institutes in 30 countries contribute to the project.

ALICE Detector Control System

The primary task of the Detector Control System (DCS) is to ensure safe and correct operation of the ALICE experiment. It provides configuration, remote control, and monitoring of all experiment devices. The system consist of 130 computers and servers.
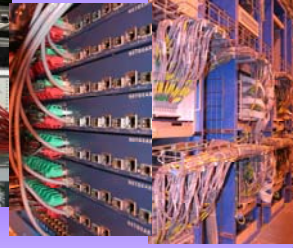
The Device Control in ALICE

Devices X 1400

The devices communicate via the DCS Network to which about 1400 devices are connected and via field busses lengths up to 200 meters.

Server OPC

The interface to the field devices is largely based on the OPC standard. The manufacturers provide OPC servers for their devices.
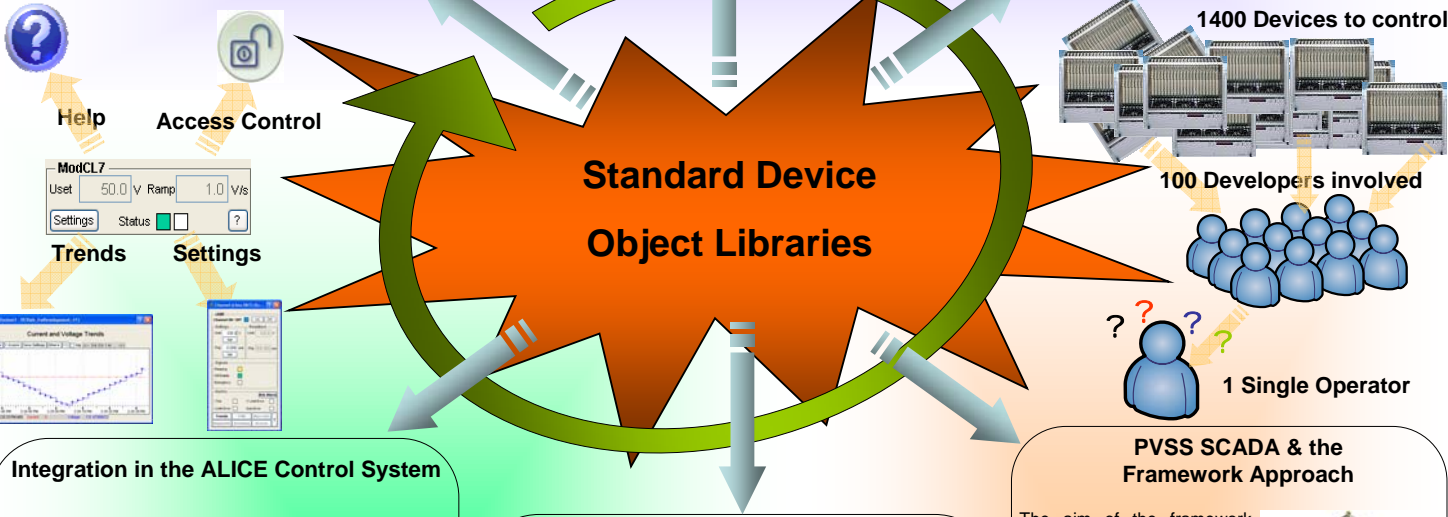
Client PVSS

PVSSII is the core software of the control system. It is used to connect to hardware devices and to acquire the data they produce.
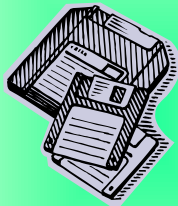
Control

PVSSII applications are managed as projects and store all relevant information needed for an application (databases, panels, etc.).

Standard Device Object Libraries

Help

Access Control

ModCL7 — Uset 50.0 V Ramp 1.0 V/s — Settings Status ?

Trends

Settings

1400 Devices to control

100 Developers involved

1 Single Operator

Integration in the ALICE Control System

The Object Libraries have been developed on top of the Framework Component. To build a panel, the developers simply have to drag and drop the different objects from a catalog and to connect them to the data referring to the device.

A full system can be controlled via a single panel. the users have the possibility to control 192 high voltage channels regrouped in 24 boards and 3 crates via a single panel. The information is displayed in an uniform way (fonts, colors, size, etc.) and integrated in the ALICE user interface.
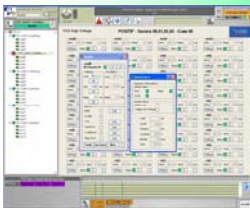
Object Libraries Description

The Object Libraries are divided between main objects and sub-objects. Each main object is dedicated to control a device (crate, board, or channel) and to monitor the basic information. The sub-objects enable the expert users to set some commands, to display more information, and to access expert settings.
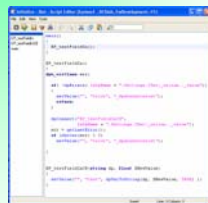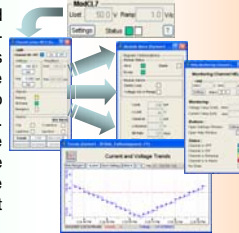
Various developers involved in the ALICE DCS have different coding practices, and very different level of knowledge of PVSS The upper layer of the control consists of the panels and the object libraries force the developers to use object-oriented programming.

PVSS SCADA & the Framework Approach

The aim of the framework approach is to standardize, and to provide a common solution to the many different developers. The Framework helps to reduce the development effort of the control system developer in many ways. It eases the creation, configuration and control of the devices.
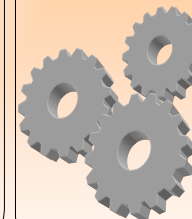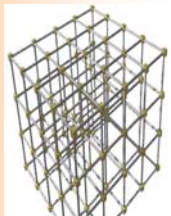
The framework component enables the organization of the data in an appropriate structure following the device or the full system configuration.

Object Libraries have been developed for ISEG High Voltage devices and Wiener VME Crates in the ALICE experiment. Several developers and users have currently integrated these libraries into their projects. More libraries will be developed in a near future to cover the majority of standard devices in ALICE. Combined with the Finite State Machine and other standard tools developed at CERN, the Object Libraries enable the users to control the full detector in a homogeneous way. More features need to be implemented such as the access control. As many devices are CERN standard, the Object Libraries will be integrated in all the LHC experiment control systems.