

SLS Control System Software Management

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The main part of the SLS software for machine and beamlines control uses EPICS. Hundreds of control system applications running on about 250 IOCs (Input/Output Controllers) have been developed. With a growing number of applications it becomes increasingly difficult to maintain applications, to add new applications or to upgrade EPICS and VxWorks without disruption to machine and beamline operations. Thus software management becomes extremely important.

Application Development and Installation Structure

At SLS the applications source code is organized in the hierarchical structure and is stored in CVS (Concurrent Version System) projects. Each application, containing client and server part, belongs to a project and is stored in the CVS. The installation procedure pulls out a tagged version of a project and installs software needed to run IOC servers and client based files separately, see Fig.1. In order to use a unique installation procedure for all applications in SLS, we defined a common IOC application structure[1]. The server part includes all files needed to run an IOC on a VME crate or on a personal computer, specifically VxWorks, board support packages, drivers, EPICS, and configuration files. The client part software is used to view, monitor or write EPICS process variables. IOC application development comprise EPICS template, substitution files and startup scripts, as well as configuration files for utilities like archiver, alarm handler, operator panels and medm screens.

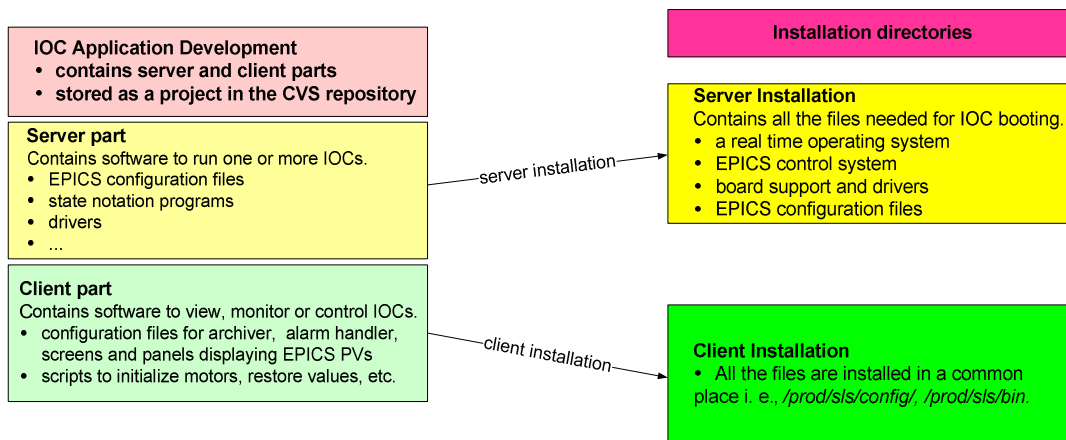


Fig. 1: IOC application development and installation structure.

IOCs and Projects

As one or more projects can be installed on one or more IOCs and each project could potentially require a different version of software, for example VxWorks, conflicts may arise, see Fig.2. To solve the problem the problem only an IOC responsible can choose underlying software versions. Afterwards projects installed on this IOC have to use them. The information is stored in an Oracle Database and accessible through the Web[2], see Fig.3. Each project retrieves the information from the database during the installation. For example, to an IOC controlling a beamline front end three projects are installed. One project contains software to control X-ray beam position monitors, another project contains vacuum and temperature control and the third project contains software to control motors of double slits, filters, etc.

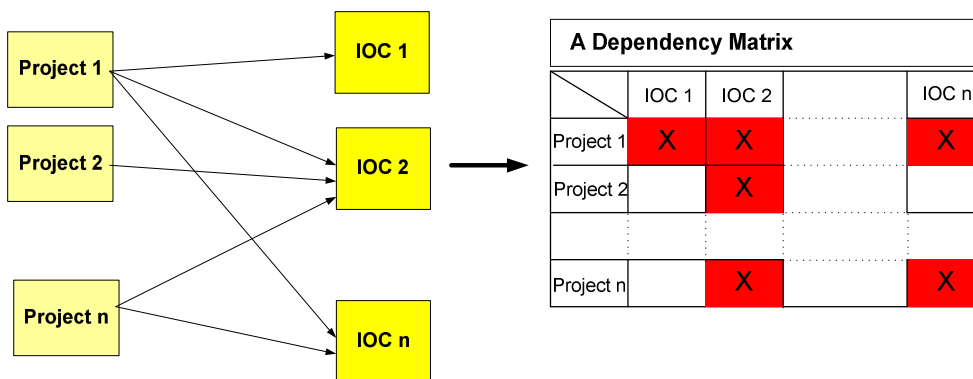


Fig. 2: Projects and IOCs dependencies.

Oracle Database Tools - Hosts

We store all the information about each host in SLS in a relational database. Hosts are IOCs, switches, boot PCs, Linux consoles, Windows PCs, etc. The information like responsible, location or description is useful for example during on-call service when some host manifests problems. Another information shows relation, one can find out, from which computer an IOC boots or get a switch name it is connected to. The information about VxWorks, EPICS and board support packages, used during the IOC installation is stored also here, see Fig. 3.

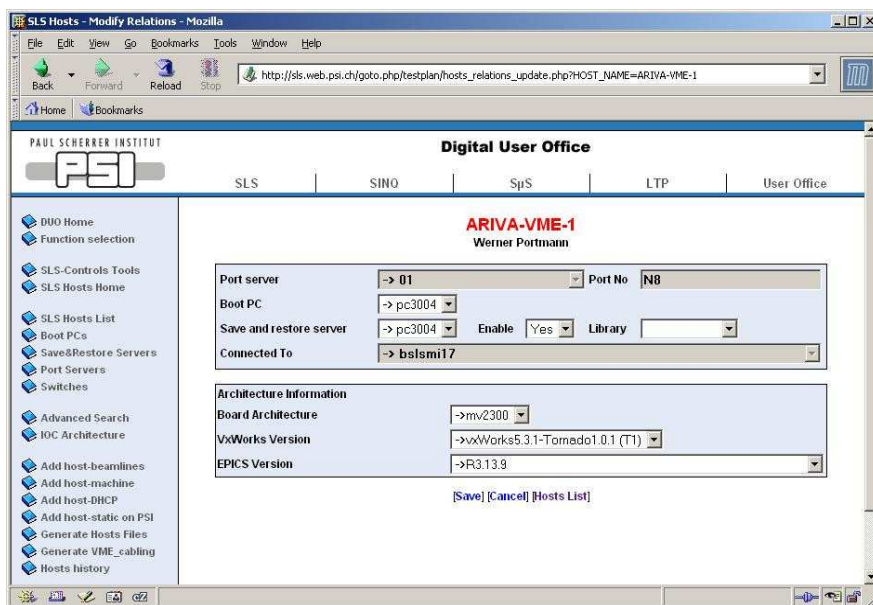


Fig. 3: Web interface example for accessing IOC information.

Installation Procedure

At SLS an application development consists of development, installation for testing purposes and tests. After successful testing, the project has to be committed to the CVS. Only well tested and CVS tagged applications are installed to the production. The installation to the production directory has a following scenario. The software to be installed is sent to a server, called “Replica”. Computers installing software, for example installation server, periodically ask if a request for an installation has been issued. Then they get the software from “Replica” server and copy it to the installation directory.

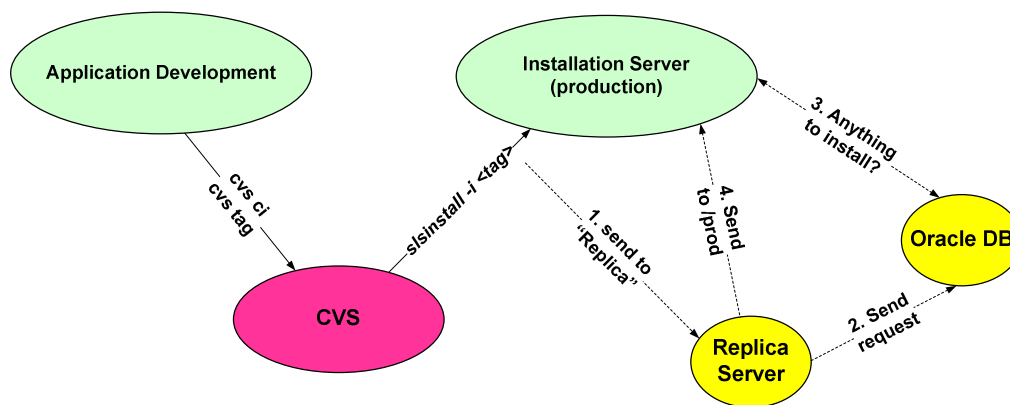


Fig. 4: Application installation process.

We have defined a set of standard installation rules not only for the IOCs but also for the software associated with this particular IOC. A generic PHP based installation script was implemented for this purpose. It supports also uninstall and a rollback. Information about all installed applications is recorded in the Oracle Database and can be viewed by using the Web.

Software Test Plans

In order to keep track of software modifications we use software test plans[3]. Test plans documents govern the installation, testing and release of applications, containing information like reasons for change and potential impacts, software components involved in the application, dependencies, as well as test procedures and test results. All the information is entered via Web and stored in the Oracle Database.

References

1. <http://www.sls.psi.ch/controls/software/sls-software.pdf>
2. http://sls.web.psi.ch/goto.php/testplan/hosts_home.php
3. http://sls.web.psi.ch/goto.php/testplan/testplan_home.php