

Title

Improving the software and system lifecycle for applications developed with the SCADA (Supervisory Control And Data Acquisition) tool PVSS.

Introduction

The control systems for the CERN Large Hadron Collider Experiments and part of the Accelerator have been developed using the SCADA tool PVSS provided by the Austrian company ETM. The PVSS package is oriented to build industrial distributed control systems.

Many of the activities of a developer working with PVSS involve software development (e.g. writing libraries, designing user interfaces, defining database schemas) and/or system configuration (e.g. defining the deployment model, applying patches, configuring the connections to the hardware).

In the last years, there has been a lot of progress in the software industry to improve the development tools with the so called IDEs (Integrated Development Environments) and the software distribution and installation tools. The software lifecycle is greatly simplified when using these tools, especially in projects like the ones at CERN that are complex, involve many people (few hundred) and last many years (about 20).

The users of PVSS will greatly benefit from its extension with the common features found in modern IDEs (e.g. configuration management, code analysis, debugger, etc.). Within the framework of the CERN Openlab, CERN's Information Technology (IT) Department and Siemens-ETM are collaborating to improve PVSS in this direction.

Tasks

Project 1: Improve the software development tools

1. Compare the current software development facilities offered by PVSS and by modern IDEs.
2. In agreement with CERN and ETM propose how PVSS could benefit from the inclusion of these facilities. A plug-in mechanism should be used when possible to keep the extensions generic enough to serve any PVSS customer.
3. Look into existing open source or commercial libraries that would help for the implementation.
4. Implement the facilities proposed in the previous points.
5. Apply these facilities to a real project to get feedback on their usage.

Project 2: Create a deployment tool

1. Study the installation and patching mechanism of PVSS and applications developed with it.
2. In agreement with CERN and ETM propose how to automate the installation and patching process using a configuration management tool to keep track of it.
3. Implement a tool to apply and keep track of patches in a PVSS distributed system.

4. Implement a tool to install and keep track of software components installed in a PVSS distributed system.
5. Use the tool in a real application to get feedback.

Required qualifications and skills

Required qualification

University or equivalent in computer science or a related field.

Required Experience and knowledge

- Up to 5 years knowledge and practical experience in software development projects
- Good knowledge of object oriented languages
- Good knowledge of software engineering practices

At least three of the following areas

- Modern programming environments (e.g. Eclipse)
- Configuration management systems (e.g. CVS or source code management)
- Basic administration knowledge of Windows and Linux
- Scripting languages (e.g. PERL, Shell scripting)
- Software distribution and installation systems (e.g. Linux RPM)
- SQL

Other areas of knowledge considered a plus

- SCADA systems in general, and PVSS in particular
- Distributed systems
- Qt toolkit

Other requirements

- Capability of learning new tools and techniques rapidly
- Good communication skills and the ability to liaise effectively with third parties are essential, as is the ability to work as part of a team
- Good knowledge of English or French; basic knowledge of the other language or an undertaking to acquire it rapidly

References

CERN: <http://www.cern.ch>

ETM: <http://www.etm.at>

PVSS: <http://www.pvss.com>