

The Software Life-Cycle Based Configuration Management Tasks for the KNICS Project

Se-Woo Cheon and Kee-Choon Kwon

Korea Atomic Energy Research Institute, 150 Deokjin, Yuseong, Daejeon, 305-353 Korea, swcheon@kaeri.re.kr

1. Introduction

Software configuration management (SCM) is an activity, which configures the form of a software system (e.g., design documents and programs) and systematically manages and controls the modifications used to compile the plans, development, and operations resulting from software development and maintenance. The SCM tool, NuSCM, has been specifically developed for the software life-cycle configuration management of developing the KNICS plant protection system (PPS). This paper presents the application of NuSCM to the KNICS project.

2. The Activities of Software Configuration Management

Configuration activities refer to the entire life cycle of the software, which includes the change management of the software both before and after delivery. Software life cycle management is principally the baseline management.

BTP HICB-14 [1] provides the SCM review guidance. Reg. Guide 1.169 [2] endorses IEEE Std 828 [3] which describes the minimum required contents for the SCM plan. IEEE Std 1042 [4] that is a companion to IEEE Std 828 presents an expanded discussion or interpretation for the requirements in IEEE Std 828.

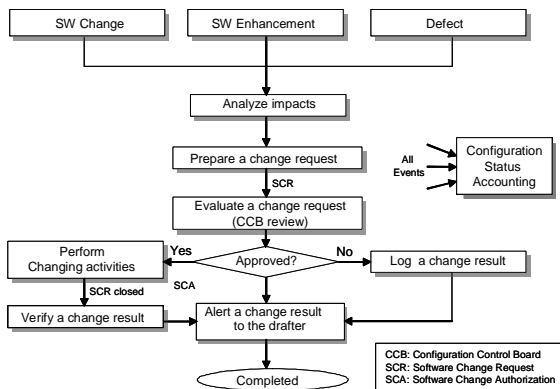


Figure 1. The general software change control process.

SCM activities are traditionally grouped into four functions: i.e., i) configuration identification, ii) configuration control, iii) status accounting, and iv) audits and reviews. The configuration identification activities should identify, name, and describe the documented physical and functional characteristic of the configuration items (CIs) elements to be controlled for the project. Figure 1 shows the general software change control process.

3. Software Configuration Management in the KNICS Project

NuSCM is a configuration management system centered on projects, based on developing software for nuclear power plants. The main menu functions in NuSCM include “Project,” “CIs,” “Request Forms,” “Organization,” “Query,” “Administrator,” and “Audit.” The relationships between the NuSCM functions can be represented as a UML (unified modeling language) class diagram, as shown in Figure 2.

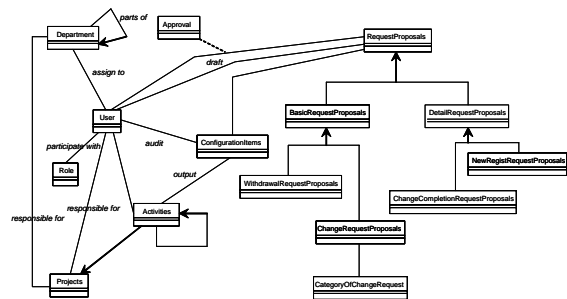


Figure 2. The class diagram of the NuSCM functions.

As shown in Figure 3, we have classified the higher-level activities according to the software life cycle phases (i.e., planning, requirement, design, implementation, integration, and installation).

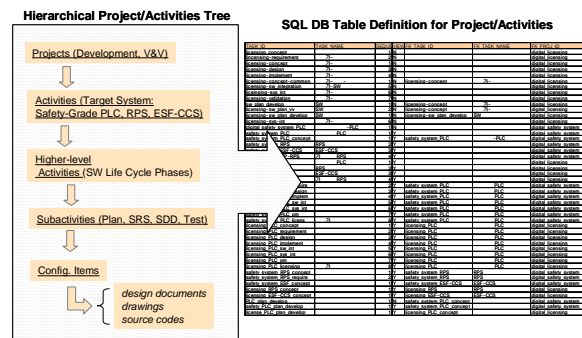


Figure 3. The Hierarchical Project/Activities classification.

The configuration items in NuSCM include design documents, drawings, and source codes/packages. Figure 4 shows the check-in process of the configuration item from a spreadsheet to a NuSCM input field form. Figure 5 shows the change flow of the configuration item in NuSCM.

The request forms are classified into the detailed request form and the basic request form (see Figure 2), depending on whether the information in the CI requires changes or additions. The detailed request form consists of a new registration request form and a change

completion request form, and the basic request form consists of a withdrawal request form and a change request form.



Figure 4. The check-in process of the configuration items.

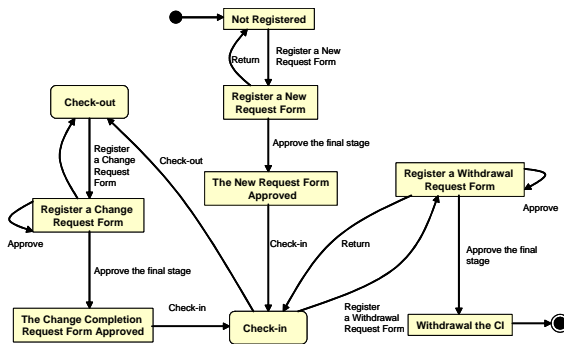


Figure 5. The change flow of the configuration item in NuSCM.

The new registration form is the application form that allows the user to have an authority to check-in a new CI to the server repository.

Figure 6 shows the main displays (such as the user login, the new CI registration tree, and the project/activities tree menu) of NuSCM.

4. Conclusion

We have described the application of NuSCM to the KNICS project. Based on the software life-cycle based projects and activities classification, the system can systematically manage the configuration items in the KNICS project.

REFERENCES

- [1] BTP HICB-14, NUREG-0800, Guidance on Software Reviews for Digital Computer-Based Instrumentation and Control Systems, USNRC, 1997.
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Figure 6. The main displays of NuSCM.