AN ARCHITECTURE FOR PERSONAL ACHIEVEMENT EVALUATION SYSTEM IN AN UNIVERSITY BY APPLYING OPEN SOURCE ECM AND BI SOFTWARE

Muslin Ridhrod --- Taratip Suwannasart --- Arthit Thongtak

[1,2,3]*Software Engineering Laboratory Department of Computer Engineering, Faculty of Engineering Chulalongkorn University, Bangkok, Thailand*

ABSTRACT

Personal achievement evaluation process is necessary to understand each employee's abilities, competencies, and relative merits which are very important for an organization. The results of evaluation process are analyzed between achievement targets and actual achievement scores, which are collected and stored from many data sources and documents such as evaluation patterns, groups of person, and kinds of workload. Furthermore, for each evaluation period, flexible policies and procedures are needed. This study presents an architecture for personal achievement evaluation system in an university by using an open source ECM software tool for managing their links of the supporting document with actual data, and BI technology is used to inspect, evaluate, and create personal achievement reports by applying open source software principles to be able to gather all data and store the supporting documents into an evaluation database. XML schema is a dynamic mechanism for managing constant change. We propose a formulate principle and an implementation procedure which is expected to be able to apply with other university's departments to support their personal achievement evaluation process.

Index Terms: ECM (Enterprise Content Management), BI (Business Intelligence), Personal achievement evaluation, XML.

1. INTRODUCTION

Personal achievement evaluation process is a very important tool for organizations. It is not only used in a business domain but it can also be implemented in an education sector. In an university, personal achievement evaluation process results are analyzed against achievement targets for each academic's employee. There is a lot of data to consider which are individually different for an evaluation's period such as kinds of work, kinds of person, academic position, degrees, and etc. As, there are no data repository that store previous evaluation, evaluators are not be able to assured with results, workload scores, and work's evidence documents.

To prevent the problem, there are three technologies and software tools that would support. First, the ECM (Enterprise Content Management) technology would manage documents and work's evidences for each employee by using DM (Document Management) function. Second, the software tool that provides BI (Business Intelligence) ability which makes evaluation results be drilled and clear-cut in every data's dimension. And third, the global schemas which can support variant and changeable evaluate conditions data. The focus of the study presents here is an architecture for personal achievement evaluation system in an university implemented in the open source ECM "Alfresco Community Edition", BI "JasperSoft BI" software tool, and global schema "XML". The personal achievement evaluation system for a departmental organization is selected as a case study; however, an architecture application can be applied to other business domains in organizations as well.

The rest of the paper is organized as follows: Section I is an introduction of this paper. Section II describes a theory and the overview of the related work. Section III describes an architecture for personal achievement evaluation system and a conclusion is described in section VI.

2. PERSONAL ACHIEVEMENT EVALUATION PROCESS IN AN UNIVERSITY AND RELATED WORK

A. Personal Achievement Evaluation Process in an University

A personal achievement evaluation process has become an important factor of an university which a certain efficiency, traceability, collaboration, and improvement system are needed. A period of personal achievement evaluation process was started after a head of department known as evaluator had committed term of achievement evaluation with all academic employees known as evaluate (Baehr, 2005).

Then evaluatees collect and record their own actual work results with achievement score that could be changeable for each period, which are related to their term of achievement evaluation and other related documents. At the end of evaluation period, evaluatees format those documents and send to the evaluator for evaluating and conclude the results which are represented by UML Use Case diagram shown in Fig. 1.

Fig-1. Personal Evaluation Process
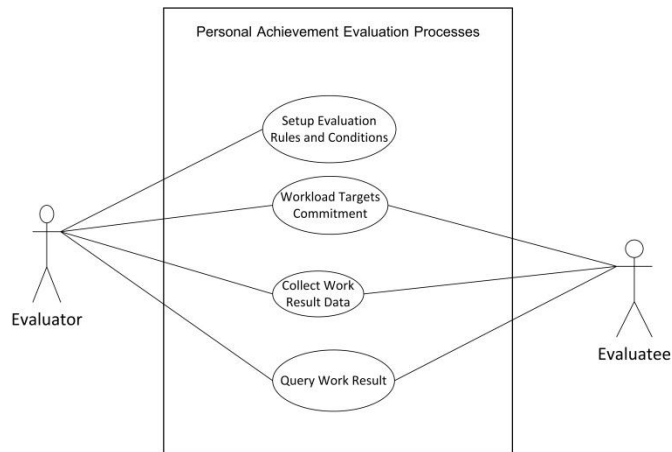
Enterprise Content Management

Enterprise Content Management (ECM) is the strategies, methods and tools used to capture, manage, store, preserve, and deliver content as well as documents related to enterprise's processes (Tyrväinen *et al.*, 2003). It is a combination of different technologies that include: document management systems, record management systems, collaboration technologies, portal technologies, workflow systems as well as search, and retrieval capabilities. ECM tools and strategies can produce high return on investment that is a valuable asset of the enterprise (McNay, 2002). In an university domain, business documents among organization and users are exchanged, revised, approved, committed, and rejected. To deal with the series of workflow steps, ECM technology is needed.

B. Alfresco

Alfresco Community Edition is an open source application platform for enterprise-level content management, which provides many kinds of digital document management such as .doc, .xls, .pdf, image file, or streaming file. Data indexed and hierarchically stored in the Java Content Repository (JSR 170) and CMIS standard platform repository, which makes good performance for retrieval process. Alfresco platform also control users role-based access, providing a complete security model and management of access control and user profiles. Besides, Alfresco platform is highly built supporting Java API Standard which is extensible for integration with other solutions (Shariff *et al.*, 2009).

C. Business Intelligence

Business Intelligence (BI) is processes, techniques, or tools to define useful and relevant operational data and then change it into intelligent knowledge which supports faster and better decision making, and efficiency of the cost and the responsiveness to an enterprise (Shaoling and Yan, 2008; Kleesuwan *et al.*, 2009; Li *et al.*, 2009). For the evaluator in personal achievement

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evaluation process, BI technology can provide useful knowledge or decision support reports that are generated from masses of evaluated result data on the demand .The drill-down reports also assist to trace and compare work results with achievement target for each evaluatees.

D. Jaspersoft Business Intelligence Suite

The Jaspersoft Business Intelligence Suite is a comprehensive BI suite that provides robust reporting, report server, data analysis, and data integration for organizations that want to make faster, better business decisions. It is available in three editions: Professional Edition, Enterprise Edition, and Community projects. In this study is using Community project - an open source which allows organizations to have the flexibility to iterate and evolve and discrete business problems one after another, building knowledge and delivering value along the way (Jaspersoft Corporation, 2012). The benefits of using Jaspersoft BI are the public Java APIs and Web services which are also flexible to integrate with another solution. There is interactive and parameterized report function that can support many kinds of academic reports. It also provides data exploration capabilities: drill-down, roll-up, 'slice-and-dice', pivot, and filter which help evaluatees and evaluators track down evaluated results.

3.   AN ARCHITECTURE FOR PERSONAL ACHIEVEMENT EVALUATION SYSTEM IN AN UNIVERSITY BY APPLYING OPEN SOURCE ECM AND BI SOFTWARE

In this section, we outline our architecture design to implement the personal achievement evaluation system in an university by applying open source ECM and BI software.   Fig. 2 shows six steps involved in implementing our prototype. The specific steps in implementing are detailed as follows:

A. Import Data

The purpose of this step is to gather basis data from main database application which produces the whole transaction data in an university into evaluation database of each academic department. To identify the imported data, we design structure of personal achievement evaluation data as entity relational diagrams (ERD). In this study, we select data which is related to evaluation process such as courses, positions, teachers, students, teaching schedules, publication documents, and etc. Fig. 3 shows that selected data are from different data sources. This step is executed only one time when the system is started.

**Fig-2.** An Architecture for Personal Achievement Evaluation System.
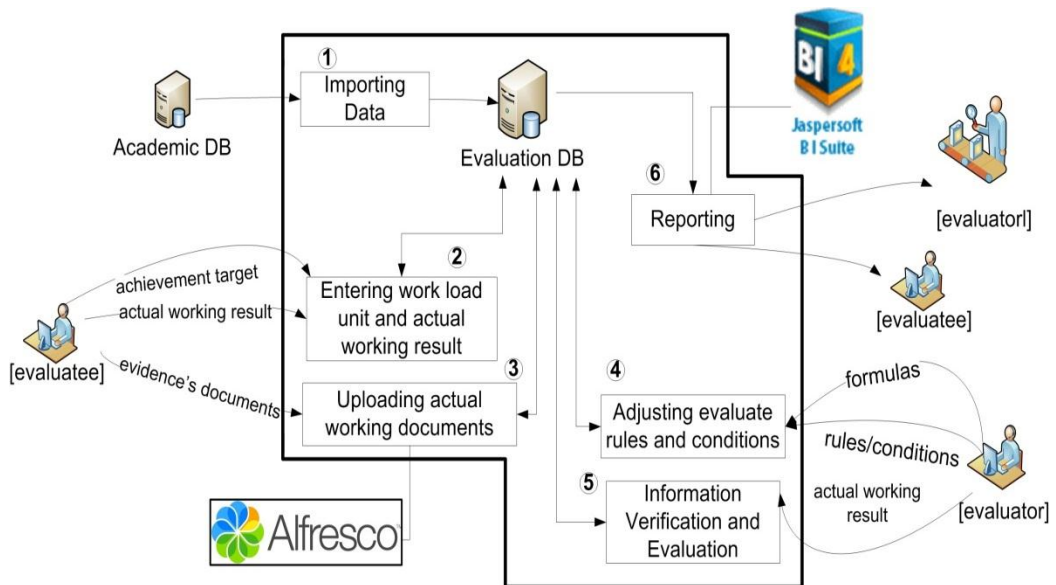
B. Enter Workload Unit and Actual Work Result

When a period of evaluation process has been started, evaluatees entered two kinds of data. First is their own workload target which evaluators had already agreed with, and second is their own actual work result. Data that is entered have to satisfy with rules and conditions of evaluation.

C. Upload Actual Work Documents

There are many kinds of actual work documents of each evaluatee that would be uploaded such as letters, internal or external official organization's paper, acknowledgement documents, and etc. All these documents are used along with actual work results to analyze personal achievement evaluation process. ECM open source software tool - Alfresco Community Edition is used. Document management (DM) is an important solution for creating, converting, managing, and sharing electronic documents. Alfresco also provides version management and full-texts search capabilities. The document management administrator provides interface to define repository, security and user management through the definition of users, groups, and roles which ensure that all users in personal achievement evaluation system can work together (Shariff *et al.*, 2009).

Fig-3. Import basis data
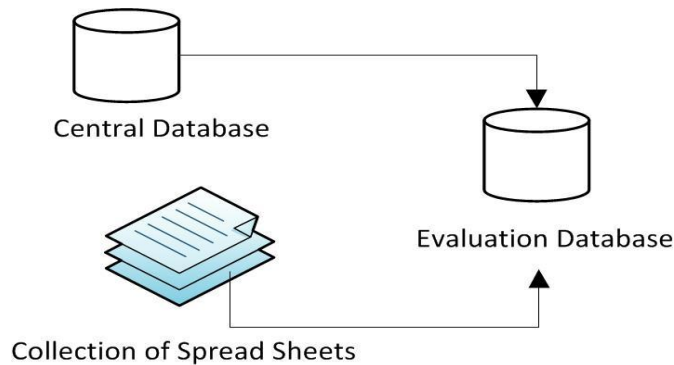
D. Adjust Evaluate Rules and Conditions

In personal achievement evaluation process, there are rules or conditions that are used for considering with actual work results. In this study, there are a lot of rules such as unit for each workload types, minimum or maximum values for each work load, work duration limitation, period of evaluation, and etc. These rules have to be defined or adjusted before evaluation process has been started. Then these rules are used to consider or analyze actual work results of each evaluate. Example of rules and conditions are shown in Table I.

Evaluators manage the rules and procedures of the evaluation by creating document files using XML standard every evaluation period. The features of XML document files help system adjusting to the changing needs of the managers.

Table-1. Examples of Rules and Conditions in the Evaluation Process

Name	Rules and Conditions	
	Attribute	Description
Period	Year	Evaluate year
	Sequence	Evaluate sequence in period year
Workload	Work load code	Work load identity
Workload unit	Unit	Unit of each workload

E. Information Verification and Evaluation

Evaluators feed rules, conditions, and other evaluation information; such as workload unit, actual work results, and all working evidences which already recorded in evaluation database – to verify and evaluate the personal achievement data by considering from achievement target of each evaluatees.

Fig-4. ER diagrams of personal achievement evaluation database.
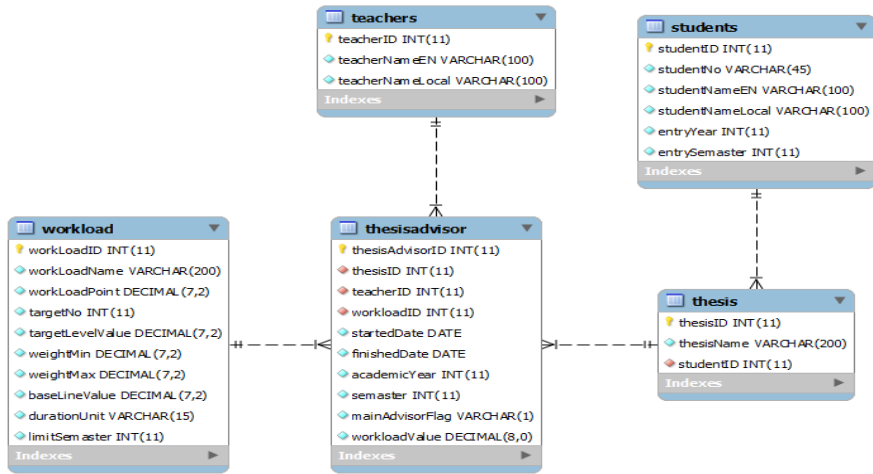

Fig-5. An example of OLAP view from JasperSoft BI.

Therefore, information should be consistent with rules and conditions of each evaluation period. Evaluators may modify the considering information by themselves. If there are incorrect or incomplete information, the system will report the cautions for the users to amend.

F. Reporting

This research applies JasperSoft BI tool to view or export information from personal achievement evaluation database. Fig. 4 shows an example of Entity-Relationships diagram which has been designed. Fig. 5 shows the in-depth and multiple dimensions data, so evaluators can drill down into related information. Information can be browsed by evaluatees and evaluators.

4. CONCLUSION

This research presents an architecture design of personal achievement evaluation system in an university by using two parts of open source softwares. The first one is ECM which manages content of documents for an organization by using Alfresco Community Edition that its DM function helps managing workload evidences. The second part, technology of business intelligence or BI Software, which helps issuance workload and actual work result reports,

retrieval documents for issuance reports which related to working evidences for information verification.

Also, there are rules, conditions, and procedures modification for adjusting along with evaluation plans or policies by using XML schema.

Next step we are developing a web application for personal achievement evaluation by JAVA language and use personal data from many departments to test the application.

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