Journal of Engineering and Applied Sciences 12 (17): 4325-4329, 2017
ISSN: 1816-949X

Information System Development for Indonesia South-South and Triangular Cooperation

Yova Ruldeviyani, Anisa Fatkhuriani, Hendri Hermawan and Dita Widiarty
Faculty of Computer Science, Universitas Indonesia, Jakarta, Indonesia

Abstract: SSTC (South-South and Triangular Cooperation) Indonesia faces several problems such as uncoordinated cooperation programs and inefficient coordination. An information system is needed to be developed to support activities of the NCT (National Coordinator Team) as part of SSTC (South-South and Triangular Cooperation) Program. This research collected data through focus group discussions and document research. Information systems is developed following waterfall model using PHP programming language with Yii framework and PostgreSQL. Software testing is done internally using black box testing. Results of this research produces information system with several features such as managing demand, managing supply, matching demand with supply, project appraisal and project funding.

Key words: Software, database, information system, SSTC, development

INTRODUCTION

Indonesia is actively involved in several international cooperative frameworks. One of them is South-South Cooperation (SSC). South-South Cooperation (SSC) is an international collaboration between two or more developing countries in the southern hemisphere in the areas of politics, education, culture, health, economic and technical. Indonesia has become part of the SSC since the Asian-African Conference in Bandung in 1955. As time goes by South-South and Triangular Cooperation (SSTC) was formed. SSTC is the same framework with a combination of South-South Cooperation (SSC) and Triangular Cooperation (TC). TC itself is a collaboration between two or more developing countries to developed countries as third party. Through cooperation framework SSTC, Indonesia has become known for its role globally. SSTC Indonesia has several programs. These programs cover issues such as development, good governance and peace establishing and economic issues. But, the Indonesian government has not been too serious to research together in SSTC framework. As time goes by in 2010, Indonesia formed a coordination team named National Coordinator Team (NCT). NCT duty is to raise training requests from other countries and bringing together training providers. NCT is responsible for the entire program of cooperation SSTC in Indonesia and conducted in other countries. Research conducted by Fadhillah (2014) argued that the fact that an inter-ministerial coordination in the NCT less running optimally (Fadhilah, 2014). The information system is one of the ways to facilitate coordination within an organization. Therefore, we need a system that can help NCT information for managing the communication and coordination of cooperation programs. The purpose of this study is to determine what features are needed in developing software and database in information systems SSTC Indonesia. The scope of the research to be conducted is limited to the development of software and databases in the information system SSTC Indonesia. The activities that will be used for developing software modules are capturing demand, capturing supply, matching demand and supply the appraisal and project reporting. Development of this software is limited to the testing system testing by developers due to the limited time of execution.

Information system concept: According to O'Brien, the information system is a combination of people, hardware, software, data and networks. The information system uses human resources, hardware, software, data and networks to perform input, processing, output, storage and control activities that convert the source data into information products. Information system components, consist of:

People: The end user is the person that uses the information system. IS specialist is a person who builds or operates information system.

Hardware: All material or physical device that is used to process information.

Corresponding Author: Yova Ruldeviyani, Faculty of Computer Science, Universitas Indonesia, Jakarta, Indonesia

Software: Consists of programs and procedures. The program is a series of operating instructions for controlling hardware. The procedure is a series of operating instructions are given to the people to run the information system.

Data: The raw material that will be processed to become the information. A database is used to handle data and organizing data.

Network: Component that connect communication in the information system.

MATERIALS AND METHODS

Software development methodology: Software development methodology is a rule and instructions used to build the software. Software development methodology can be divided into two major parts, heavyweight and lightweight (Despa, 2014). Heavyweight methodology is suitable for projects whose needs are not easy to change, need to provide documentation and complex applications that require detailed planning. While, the lightweight methodology is suitable for projects whose needs are changing and requires flexibility. The following are some of the heavyweight and lightweight software development methodology:

Waterfall: A classic model that is both systematic and sequential in software development (Pressman and Maxim, 2015). Waterfall models is linear process which after reaching the final stage of the process the process can not go back to an earlier stage. Waterfall model consists of five processes which are analysis, design, implementation, testing and maintenance (Bassil, 2012).

Prototype model: Client often does not know the details of the software to be made but he/she knows the general description of the software that he/she wants to create. On the other hand, developers do not have the certainty of the efficiency of the algorithm the ability to adjust to the operating system or the form of interaction that must be done between human-machine. In these situations, prototype paradigm is the right approach (Pressman and Maxim, 2015). Prototyping is divided into 5 processes which are communication, quick plan, modeling quick design, construction of prototype, deployment delivery and feedback.

There are plenty of current software development methodologies. Each methodology has certain characteristics that match the characteristics of the project. Developers should be able to determine the methodology in accordance with the development of the project. Factors that can be used to determine development model with characteristics of a development model are presented in Table 1.

Table 1: Software development selection factors

Factors	Waterfall	Prototyping
Requirement	Complete	Not complete
Change frequency	Low	High
Documentation	Complete	Not complete
User involvement	No	Yes
Delivery time	Late	Early
Risk	Low	Medium

SSTC Indonesia profile: NCT (National Coordinator Team) or Timkornas (National Coordination Team) is an inter-departmental coordination team whose job is to manage and coordinate SSTC Indonesia. Purpose of establishing the NCT is to focus on the work mechanism of the container and to avoid the separation of the SSTC activities on various technical ministries. Duties and roles of NCT are as follows:

- To coordinate programs of the ministry
- To connect and formulate cooperation with development partners
- To monitor the implementation of the SSTC program
- Being the gate of SSTC Indonesia
- To act as a focal point for the prospective development partner and south
- Ensure that the activities of the SSTC Indonesia in accordance with the priorities and policies of the Indonesian state

There are two layers of existing coordination structures in the NCT. The first layer is the steering committee. The steering committee is composed of the deputy minister or director general level officials. The next tier is the technical team. Technical team is divided into three researching groups they are:

- Working Group 1 (WG1) for handling capturing demands
- Working Group 2 (WG2) for handling programs and funding
- Working Group 3 (WG3) for monitoring and evaluation, public relations and knowledge management

Research methodology: Research conducted through several stages. There are 7 steps done is formulating problems and objectives, stages of data collection and processing, stage of analysis, stage of design, results and discussion, internal testing stage and the stage of the conclusions and suggestions. This study follows the

waterfall system development methodology. The stages are done in building the software is as follows, analysis, design, implementation and testing. Based on the explanation factor requirement, change frequency, documentation, user participation, delivery time and risk, suitable methodology for developing software is a waterfall. However, based on other factors such as the size of the development team and the type of communication methodologies more suited to light weight. In addition, the development of the system will need to include the prototype in order that the user has picture of system that will be created on the stage of requirements gathering. Model development of the research follows the waterfall model does not rule out the possibility that the development model in some cases can be combined (Zahia and Jaluta, 2014). Method of testing used on this development is black box method conducted internally. In this study, the data collected is derived from focus group discussions and document study. The data collected in this study is qualitative data.

Focus group discussion is a method of collecting data by conducting a systematic discussion and focus on an issue or problem. Focus group discussion is essentially an in-depth interview conducted by a group of people at the same time on a meeting. Collecting data using FGD was conducted to determine the needs of software development and database information system. In addition the FGD is also used to validate operational procedures and design software that has been created. FGD had been done 6 times. The parties involved in FGD of this research are Working Group 1, Working Group 2, Working Group 3, NCT secretariat and CADEP (Capacity Development Project).

While, document study is done by collecting documents related documents to support the development of the system. The documents used in document study are document of SOP (Standard Operating Procedure) SSTC application form, supply center of excellence form, supply expert form, supply funding form, appraisal form, study report of information system requirement specification NCT-SSTC 2014.

The raw data obtained research is written in the form of field note reports. The field notes reports are given mark on the words or arguments that are relevant to the purpose of research. Furthermore, the marked words or arguments are presented in the form of information that is neatly arranged.

RESULTS AND DISCUSSION

Focus group discussion analysis: One of ways to collect data for analysis needs this system is focus group discussion. Focus group discussion was done 6 times.The first focus group discussion discussed the previous research and what is done in the present study.

Table 2: System features lists

Features	Description
Login/logout	Features for user to login to/logout from the system
Account management	Features for admin to manage systems such as add, delete and update accounts
Management form	Features for customizing questions that appear in demand form
Management of demand	Features to manage demand such as add, delete and update
Management of supply centers of excellence	Features to manage center of excellence such as add, delete and update
Management of supply expert	Features to manage expert such as add, delete and update
Management of supply facility	Features to manage facility such as add, delete and update
Matching demand and supply	Features to match demand with supply with demand driven rules
Management of potential projects	Features to manage potential project such as update and view project
Project appraisal	Features to give scores on the potential project include the relevance, effectiveness, efficiency, sustainability, and impact
Project funding	Features to add budget based on the potential project
Set the project	Features to change status of potential project to ready for implementation as the project
Monitoring and evaluation of projects	Features to monitoring and evaluation including upload the project document and change the progress status of project

In this focus group discussion, project manager SSTC group said demand is filtered by priority projects while supply is based on funding needs. The first focus group discussion also mentioned that there is need for a mechanism demand data management and data supply. The second focus group discussion discussed the definition of projects and programs that exist in the SSTC. The third focus group discussion discussed the workflow of researching Group 2. The fourth focus group discussion discussed the workflow of the researching Group 1. The fifth focus Group discussion discussed the workflow of the researching Group 3.

The sixth focus group discussion discussed the workflow of all researching group and verification SOP and prototype. The use of supply-driven rule was canceled because SSTC does not have the form of supply for supply-driven case. The mechanism to match demand continue to use demand-driven, a demand is find the source of supply.

Functional requirements: Based on the analysis of focus group discussions and POB documents, system requirements can be divided into capturing demand, capturing supply (consisting of a center of excellence, expertise and facilities) matching demand with supply, appraisal and project design and reporting project. Table 2 contains the features lists of the system that can support requirements. From these features use case diagram will be made.

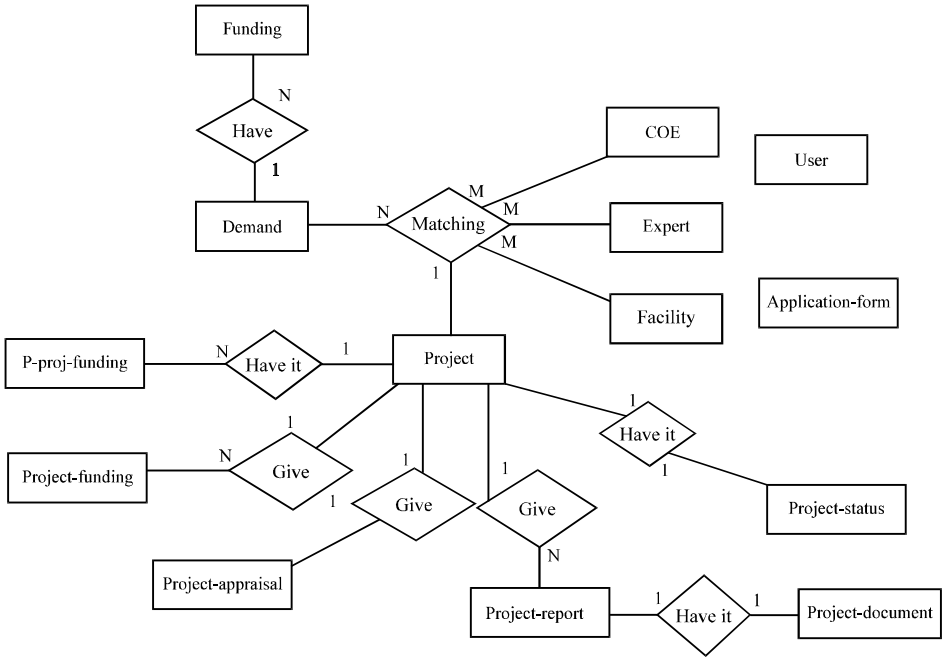

Fig. 1: Database conseptual design

Conceptual database design: From the analysis of the functional requirements, conceptual database design as in Fig. 1 can be obtained.

CONCLUSION

Based on the formulation of the problem, the conclusions that can be drawn from this study is the author can identify that there are 32 requirements of use cases that can be divided into 13 features. Not all features may be used by any user. Managing demand made by WG 1. Managing supply carried out by WG2. Matching demand and supply is done by WG1 and WG 2. Appraisal feature is conducted by WG1, WG2 and the Ministry. Funding feature is made by WG2. Project reporting feature carried by WG3. In addition there are supporting features which are management of user accounts which is managed by the admin and question of demand configuration which is administered by NCT. Some recommended suggestions for the development of further research are:

- On the further development, SSTC Indonesia information systems should be integrated with other applications in SSTC Indonesia
- Researcher expects that further development can develop a project reporting features with clearly specified project reporting form
- Further development can identify the needs of other components such as hardware and network to complete the current information system

IMPLEMENTATIONS

Implementation or coding stages is a stage where the needs will be written into the lines of code programming language to create software that can be run. Coding is done by looking at the results of the design of the system. SSTC Indonesia information system Software built using the PHP programming language with Yii framework 2.2. postgre SQL database is used in this information system. Selection of the programming language is matched to the SSTC's servers. Other reason is that previous SSTC have had ssc-indonesia.org web portal that use the PHP programming language. So, it becomes the reason for the uniformity of the programming language. This information system has five menus which are:

Home: A menu that contains the main page of the information system. Home page contains general information about the amount of demand, the number of projects and the number of supply centers of excellence currently.

Demand: A menu that contains a page for managing demand. This page also has a button to match demand and supply.

Supply: A menu that contains a page for managing supply consisting of a center of excellence, expert and facility.

Potential project: A menu that contains a list of potential projects. On this page, there is a button to make the appraisal, add fund and make changes from the potential projects into the ready projects.

Project: A menu contains a list of projects. In the menu, there is a sub menu for change the status of the project and project report menu.

REFERENCES

Bassil, Y., 2012. A simulation model for the waterfall software development life cycle. Intl. J. Eng. Technol., 2: 1-7.

Despa, M.L., 2014. Comparative study on software development methodologies. Database Syst. J., 5: 37-56.

Fadhilah, A.T., 2014. Requirement specifications for integrated information systems to support SSTC (South-South and Triangular Cooperation) program: Case study at National Coordination Team on SSTC O'Brien, J.A., 1997. Introduction to Information Systems. 8th Edn., McGraw-Hill, New York, USA.

Pressman, R.S. and B.R. Maxim, 2015. Software Engineering: A Practicioner's Approach. McGraw-Hill, New York, USA.

Zahia, M.A.B. and I. Jaluta, 2014. Criteria for selecting software development models. Proceedings of the Global Conference on Computer and Information Technology (GSCIT), June 14-16, 2014, IEEE, Tripoli, Libya is BN:978-1-4799-5626-5, pp: 1-6.