

Developing *Web Services* for Data Integration and Distribution Presence System for Lecturer, Assistant, and Students using *Agile Unified Process*

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ABSTRACT

Computerized presence system in STMIK AMIKOM Purwokerto has an important role in monitoring attendance and discipline lecturers, students, and assistants in teaching and learning activities. Presence system running currently installed in each of lecture room theory and computer lab where each of learning activity. Presence systems in each classroom lectures are not yet integrated. As a result of the implementation of ongoing presence system at this time, reporting the presence of lecturer, lab assistant, and student monitoring can't be implemented from the presence application. The next problem, the distribution of the data required for the presence of academic information system database to a database presence in each classroom having trouble. The purpose of this research, namely to build web services for data integration presence in each classroom lectures and the distribution of data from database to database of systems academic presence. Web Services systems development method using the Agile Unified Process (AUP). The results of this research, namely web services have 3 methods to perform data integration and 8 method to perform data distribution. Implementation of web services are built on this research in order to resolve the issues that have been described.

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1. INTRODUCTION

Computerized presence system has an important role in monitoring attendance and discipline lecturers, students, and assistants in teaching and learning activities. Computerized presence system in STMIK AMIKOM Purwokerto running currently installed in each of class room and computer lab where each of learning activity. Presence of existing systems in each classroom lectures are not yet integrated. As a result of the implementation of ongoing presence system at this time, reporting the presence of faculty and student monitoring required by the teaching part, can not be implemented from the presence application. Similarly, the reporting of attendance monitoring lab assistant required by the Human Resources Assistant Practicum Forum organization. The next problem, the distribution of the data required for the presence of academic information system database to a database presence in each classroom is having a trouble.

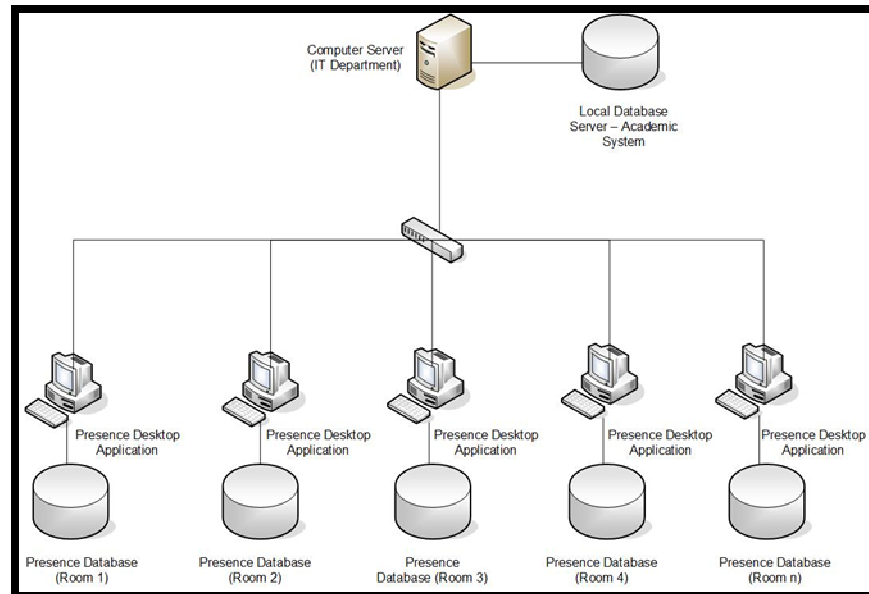


Figure 1. Presence System Scheme

Use of Distributed Computing can be used to solve these problems. Several options on Distributed Computing technologies that can be used to solve these problems, the DCOM (Distributed Component Object Model), CORBA (Common Object Request Broker Architecture), RMI (Remote Method Invocation), and Web Service [1] [2] [3] [4].

In this research is used web services technology to solve the problems in the system presence. Web Services used in this research, because the technology is able to solve problems on DCOM, CORBA, and RMI. DCOM weakness, which is a distributed object infrastructure that was never widely accepted in non-Windows platform, so it is rarely used to provide communication facilities between Windows and non Windows computers [5]. CORBA weakness, which can not be used in most web-based applications due to hit by the enterprise application system's security policy [1]. This resulted in the client to communicate with the server via the Internet faces many potential obstacles in their communication with the server [5]. While the weakness of JAVA RMI, the RMI does not have the concept of service or service [6]. Additionally, JAVA RMI has poor interoperability and communication through the firewall, but RMI is a good choice for small-scale distributed applications [3].

On the development of systems using web services system development methods Agile Unified Process (AUP). AUP has 4 phases of the system development, namely Inception, Elaboration, Construction, and transition [7] [8] [9] [10]. AUP is a system development method that is linear sequences [7]. Difference between the AUP with Waterfall, ie each phase of the development of the system has a number of iterations in the AUP, the Modelling, Implementation, Testing, Deployment, Configuration & Project Management, and Environment Management [7] [9] [10].

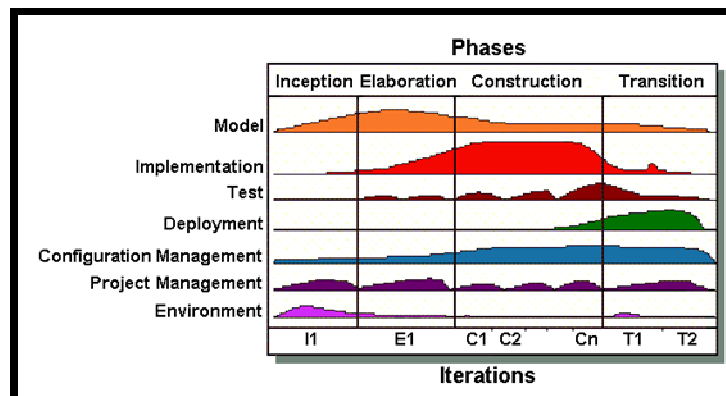


Figure 2. The Agile Unified Process (AUP) lifecycle [10]

Previous research on the development of educational administration and teaching remote management systems with system development methods AUP [8], explaining that the project took 13 weeks, which is divided into 25 iterations, and each iteration took 2 weeks. The conclusion that can be drawn from these studies, that they can make the software development process Easier to implement, as well as more theoretical and more systematic. Also they can shorten the development cycle, improve the quality of the software, and reduce the risk of software projects. Research system development method has also been conducted on the project AUP Integrated Desktop (ID) [9] in one of the big banks in Greece. The project's main objective was to host private-banking applications with single sign-on capability, thus automating daily tasks via a global customer handling, Exploiting the enterprise service bus framework architecture, and managing multiple and concurrent customer sessions. Modifying the existing functionality or creating new functionality in the existing back-end systems was beyond the project's scope. Total execution time was 20 weeks project with the details, the inception phase took 19 days, the elaboration phase lasted 23 days, the construction phase took 75 days, and the transition phase lasted another 23 days.

From the background above, we draw differences of previous study and this study. We focus in AUP system development methods that is used to build web services for integration and distribution of data in case of presence systems for Lecturer, Assistant, And Students.

2. RESEARCH METHOD

Based on AUP systems development methods, there are 4 phases are carried out to build a web service, namely:

- a. *Inception*
The team identifies the project's initial scope, a potential architecture, and obtains initial funding and stakeholder acceptance.
- b. *Elaboration*
The team establishes the system's feasibility and proposed architecture.
- c. *Construction*
The team builds working software on a regular, incremental basis that meets the project stakeholders' highest-priority needs.
- d. *Transition*
The team validates and deploys the system in the production environment.

3. RESULTS AND ANALYSIS

3.1. Project Information Summary

Software development team worked following 4 phases of AUP development software. Projects were built include creating web service for integration and distribution data, application and desktop monitoring student attendance teacher for teaching part, desktop application monitoring presence lab assistant to the human resources assistant Forums, and desktop applications for the IT department doing data distribution from the local database to database server academic presence in each classroom lecture. Table 1 present's summary information on the project was done.

Table 1. Project Information Summary

Project Name	Web Service for Presence System
Project Owner	STMIK AMIKOM Purwokerto
Institution units involved in the project	IT Department
Team Size	Three Developers, two technicians (operational and administrative support), three tester, four users, and two head of division (see steering committee)
Steering committee	IT development manager and head of division (head of human resources Forum Asisten and head of teaching division)
Project Duration	4 Months
Project Size	11 Use cases

3.2. Project Life Cycle Based on AUP

3.2.1. Inception Phase

This phase was the most important phase of the entire software development process. The goal of this stage was investigating, researching, discussing, and making decisions of crucial events. Inception Phase take up to 14 days. Team at this phases identified the functional and non functional requirements web service users. The results of the investigation found 3 types of users. Firstly IT staff who conducted the distribution of data, Teaching staff who conducted the monitoring and reporting of student attendance and teacher attendance and the last from the human resources staff of Assistant forum who monitoring and reporting of lab assistant Presence.

From the discussion, the team of developers at this phases was decided there are two stages to complete the project, the first phase was to build a web service for integration and distribution of data, and the second phase was to build desktop applications who utilized the the monitoring and reporting web service.

At this phase also discussed how to describe the operation of the process flow in the form of a flowchart, and conducted user modeling functional requirements in the form of use case diagrams.

3.2.2. Elaboration Phase

This phase requires 3 iterative. The main task of this stage was to implement the decisions made in the inception stage correctly and effectively. Elaboration phase took up to 28 days. At this phase made detailed use case modeling to describe functional requirements fully, made modeling of Activity Diagram to describe business processes, and modeling sequence diagram to realize business processes that have been made. The purposes of making the diagrams were to describe the system of web service architecture and the desktop application that will be built.

At this stage, also designing the user interface on the desktop application the monitoring presence and desktop applications for distribution of data. The design of the user interface included design input and reports generated by the system. The first two weeks of this phase was used by the team to build the architecture, system design, and user interface design. three and fourth week of this phase is used to make improvements architecture, system design, and user interface after the presentation to the stakeholders at the beginning of three week and fourth week.

3.2.3. Construction Phase

This phase developed the system so that it was ready for testing. Previous phases identified most requirements and created a baseline for the system's architecture. Emphasis then shifted to prioritizing and understanding the requirements, brainstorming a solution, and coding and testing the software. Construction was the project's largest phase. Construction phase takes up to 56 days. This phases occurs at 6 iterations. Early stages of this phase was making the web service with testing that takes up to 28 days. The next stage was manufacture and testing of desktop applications who take up to 28 days.

Testing of the desktop application using the User Acceptance Testing (UAT) method. Testing of the teacher and student attendance monitoring application done by the teaching staff, testing of lab assistant attendance monitoring applications done by human resources staff of Assistant forum, while the testing of desktop applications for distribution of data done by IT staff.

3.2.4. Transition Phase

At this stage the application of web service applications and desktop applications on a real environment performed. Additionally, in this phase also performed performance testing on web service and desktop applications in terms of performance Local Area Network (LAN). Last step, conducted training of on the user desktop application. Time required for Transition Phase were 14 days.

Figure 3 describes the scheme Presence system that has been integrated with the web service.

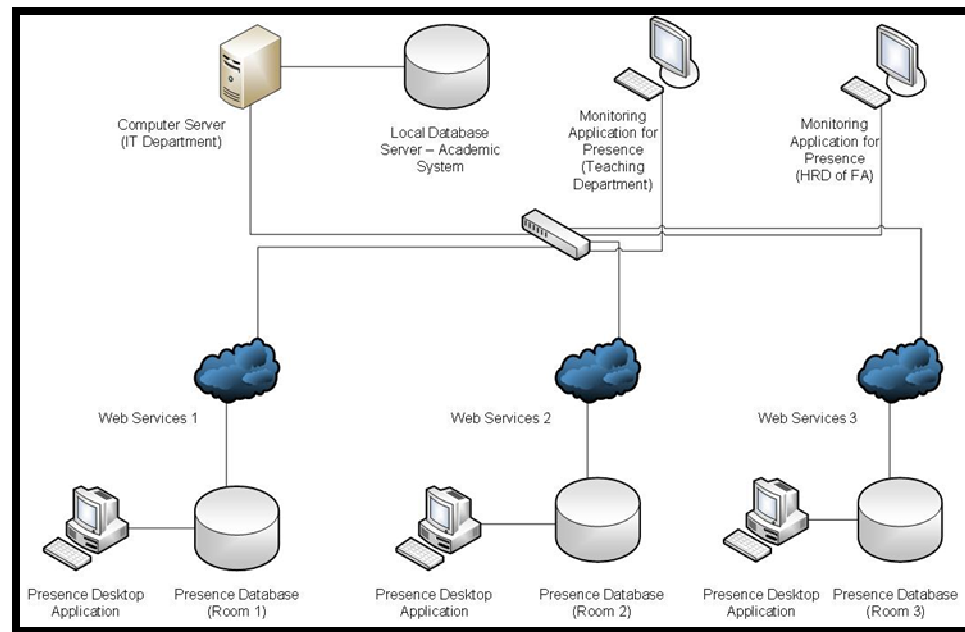


Figure 3. Scheme of Integrated Presence System with Web Service

Based on Figure 3, can be explained that each system now has a web presence services. Functions of the web services, monitoring attendance Presence faculty, students, and lab assistant. Additionally, with web services, the process of data distribution Presence of local server database into the system database Presence can performed, and vice versa

4. CONCLUSION

By AUP Methods, we can make the web services development process easier to implement, as well as more theoretical and more systematic. Also we can shorten the development cycle, and improve the quality of the software. Implementation of web services are built on this research is able to give service to provide monitoring reports of the presence of the required faculty and student teaching part, capable of providing service to provide attendance monitoring reports required by the lab assistant human resources assistant Forums, and capable of providing services for the data distribution from local database server to database of presence academic system. This research development plan, which will be additional function or method on web services to give services required by the presence Data other than the teaching and human resources, such as the finance department of STMIK AMIKOM Purwokerto.

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