
Data synchronization between academic information systems with webservice technology

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ABSTRACT (10 PT)

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XML,
Web Service,
Information Systems,
University

With the increasingly complex and complex applications, data management and integration become critical. XML Web Service allows an application to "communicate" with other applications. As the name implies, XML Web Services stores data in XML format which makes it multi-platform in terms of accessibility. With this web service system, it is hoped that it will increase collaboration between programmers and between business organizations, which allows a function in the web service to be used by other applications without needing to know the details of the secure programmer contained in it. XM Web Service suitable for solving problems in the old concept business system into an integrated business system, so that with one business concept model it can be accessed and used by a variety of device applications. The university is a collection of many faculties, departments, and other supporting departments. The wide scope of the university, therefore, really needs an integrated information system with one another. The implementation of a centralized information system will burden the central server. Meanwhile, if the information system is handled by distributing it to each faculty or even department, there will be a lot of information systems with various platforms, both from information systems and programming languages, with the advantages and disadvantages of each. Therefor there will be problems when integrating data and its functions on different platforms. Besides that, there is now a trend in the use of information systems using a variety of devices. So that the design of the university information system will be increasingly complex

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1. INTRODUCTION

The university is a collection of many faculties, departments, and other supporting departments. The wide scope of the university, therefore, really needs an integrated information system with one another. The implementation of a centralized information system will burden the central server. Meanwhile, if the information system is handled by distributing it to each faculty or even department, there will be a lot of information systems with various platforms, both from information systems and programming languages, with the advantages and disadvantages of each. Therefor there will be problems when integrating data and its functions on different platforms. Besides that, there is now a trend in the use of information systems using a variety of devices. So that the design of the university information system will be more complex [1] With the increasingly complex and complex applications, data management and integration become critical. XML Web Service allows an application to "communicate" with other applications. As the name implies, *XML Web Services* stores data in XML format which makes it *multi-platform* in terms of accessibility. With this *web service* system, it is hoped that it will increase collaboration between programmers and between business organizations, which allows a function in the *web service* to be used by other applications without

the need to know the detailed programming contained in it. *XML Web Services* is suitable for solving problems in old concept business systems to integrated business systems, so that with one business concept model it can be accessed and used by various device applications [2]

2. METHOD

Web service is a software component which is a *self-containing, self-describing* modular application that can be published, allocated, and implemented on the web [3] *Web service* is a technology that changes the ability of the internet by adding *transactional web* capabilities, namely the ability for webs to communicate with each other in a *program-to-program* (P2P) pattern. The focus of the web has been dominated by *program-to-user* communication with *business-to-consumer* (B2C) interactions, while the *transactional web* will be dominated by *program-to-program* with *business-to-business* interactions [4] Figure 1 is the building block of a *web service* which provides long-distance communication facilities between two applications, which are the *web service* architecture layer [5]

- a. Layer 1: The standard internet protocols used as a means of transport are HTTP and TCP / IP.
- b. Layer 2: *Simple Object Access Protocol* (SOAP) based on XML and used to exchange information between groups of services.
- c. Layer 3: *Web service Definition Language* (WSDL) is used to describe service attributes
- d. Layer 4: *Universal Description, Discovery and Integration*, which is the central directory for service descriptions.

Service Publication And Discovery (UDDI)

Service Description (WSDL)

XML Based Messaging (SOAP)

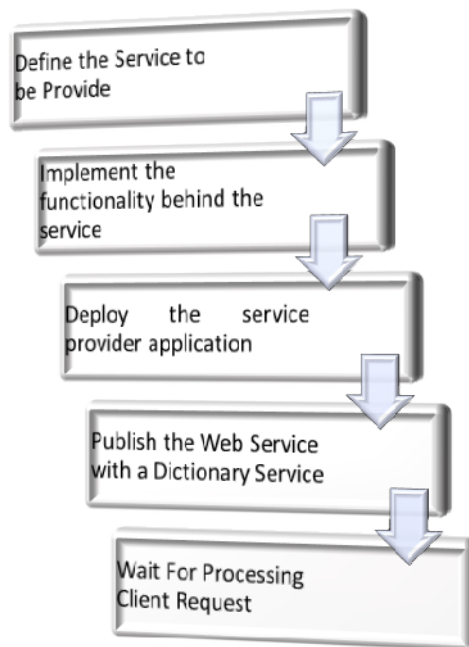
Command Internet Protocol (HTTP, TCP/IP)

Figure 1. Building Blocks of a *Web service*

Source: [6]

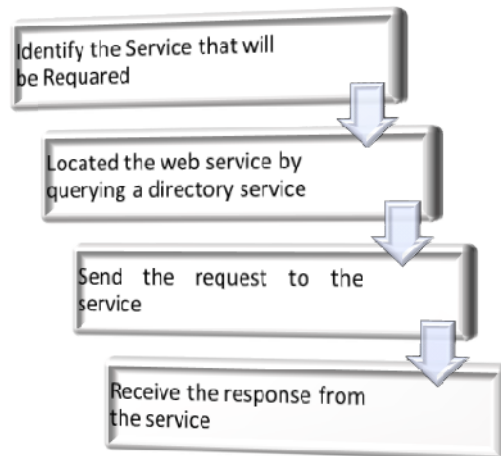
The steps to develop *XML Web Services* -based applications are divided into 2 parts, namely: on the *service* provider side and from the *service* user side [7] The development steps are shown in Figure 2.

Service Provider



Source:[8]

Service User



Source: [9]

Figure 2. Development steps and synchronization of XML web service base systems

Source: [10]

3. RESULT AND ANALYSIS

This paper is the result of a literature review which includes a conceptual review of *web services* between information systems. Examples of implementing *web services* as interoperability solutions are presented to provide a real picture in real practice. Based on conceptual studies are then analyzed and described the service needs of *web service* inter-system information in the *e-Gov* to use a case study on the system infomasi university in environments Panca Budi.

3.1 Variety of Information Systems at Universitas Pembangunan Panva Budi

Universitas Pembangunan Panca Budi until the end of 2017 has developed 4 information systems (3 improvements) which are operated *intranet* and used for internal data processing services (Table1) and 1 *website* to display information to the public (Table 2). All *website* applications are still in the preparation stage, because they do not yet provide interactive, integrated services. Information provided to the public in the *website* application includes news, profiles, main tasks, service procedures, related *links*, and contacts.

Table 1: Availability of information system applications in the UNPAB environment

No.	Made	Application Name
1.	2008	Academic Information System
2.	2010	Library Information System
3.	2011	EL SIS Information System (e- learning)

Source: UPSI UNPAB

Table 2: Availability of *website* applications in the environment

No.	Made	Website / subdomain
1	2012	http://pancabudi.ac.id

Source: UPSI UNPAB

3.2 Web Service Needs in eGov at Universitas Pembangunan Panca Budi

The service needs a *web service* in a university in Panca Budi one of them can be identified based upon common data objects (entities) and similarity the relationship between object data that is processed in the system. The similarity of data objects (entities) indicates the need for data exchange between information systems to synchronize data between systems. Based on the results of the analysis of the needs of each information system owned by UNPAB (Table 1), in the existing system there are applications that require *web services* to synchronize data between applications. The main requirement of the webservice is to synchronize the resident master data so that the transaction process will refer to the same resident *master* data, so that the processed item values are consistent among existing systems. In this *web service*, one system will act as a *requester* and the other system as a *provider*. The target users of the *Web Services* functions are application developers, not end-users. Therefore, what must be provided by the *Web Services* provider are the functions required by application developers in the provided domain. The functions provided by a *Web Service* provider do not have to be complete, because other *Web Services* providers can provide other functions that ultimately form a complete system. That way collaboration (mutual cooperation) between application developers can take place well. The development of *web services* -based applications in this study uses the concept of growth and development. On a university scale, the application to be developed in this research is academic services first. Then library and E -Learning services will be developed as well as university websites that also take advantage of academic services. This development concept is shown in Figure 3.

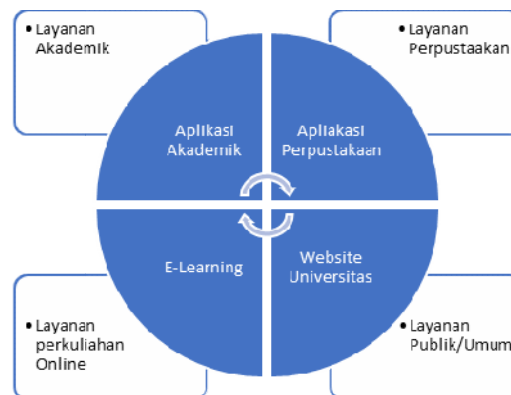


Figure 3. University Information System Development Concept

In designing a system based on *XML Web Services* for university information systems, the following steps are presented:

1. Defining the functions that will be used in the university information system
2. Categorization of these functions
3. *Web Service* coding.
4. Function testing.
5. Making the *Web Service* access application.
6. Testing applications.

What needs to be done first is to create all the functions (in the form of *Web methods*) that can be used to access and process data. *The functionality of the web methods* is tested, whether it is as desired. The next step is to create a *client* application that can later access the *Web Service*.

The facilities or functions that are often needed by application developers are as follows:

1. Functions of adding, deleting, and editing data
2. Functions to display data based on certain criteria.
3. Functions for data processing.
4. Functions for searching data based on certain criteria.

4. CONCLUSION

The *web service* model is a form of implementation of the concept of interoperability which can be an alternative solution for the data exchange process between information systems. With the ability to process data exchange between information systems, it is possible to synchronize data between information systems, including the University Information System. *Web services* are developed by involving three main components, namely *providers* as information service providers, *agents / brokers* as providers of *web service* applications for the registration process (*registry*) and discovery (*discovery*) to facilitate management and service search, and *requester* that can use service functions. from the *provider*. The results of the analysis of the need for *web services* for various information systems at Pembangunan Panca Budi University have been successfully revealed in this paper based on the similarity of data objects (entities) and the closeness of the relationship between data objects processed in the information system. Database of students, lecturers and employees is the type of data most needed by other information systems, so that the accuracy and completeness of the *database* of students, lecturers, and employees needs to be more focused.

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