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CONTENTS

ENGINEERING APPLICATION

Design XML Web Services As A Data Integration Method Of Between Unit Health Health Surveillance For Support Health Epidemiology Data Warehousing

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Abstract

Data monitoring disease outbreaks in the region and specific populations (epidemiology) requires the support of a complete and integrated data from each unit surveillance. Integration of data sources between health care units (health centers/"puskesmas", clinics, laboratories, hospitals) as a surveillance unit to be managed effectively so as to facilitate the monitoring, analysis and decision making fast to the outbreak of the disease. It is necessary for the management of data centers in the data warehouse to create an integrated surveillance system (Sistem Surveilans Terpadu/SST). The problem faced is interoperability, or the ability to integrate data from different applications platform between the health care unit. To resolve these problems required a method of XML Web Services, which is a method that can integrate applications and data exchange in XML (Extensible Markup Language). Exchange data in XML format using SOAP technology (Simple Object Access Protocol) and WSDL (Web Services Description Language) and using NuSOAP library. Web Services which will bridge the gap platfor databases and applications in the context of integration into the data center. NuSOAP used to provide class soap and SoapServer Client or as a listener that will receive and respond to requests for access to web services. The results will be obtained in this study is reporting applications clinic surveillance unit and hospital surveillance unit that can be integrated reporting system on the server data center in dinas kesehatan as epidemiological data warehouse.

Keywords : E p i d e m i o l o g i, Interoperabilitas, NuSOAP, XML Web Services

1 INTRODUCTION

Public health indicators related to the epidemiology of cases in a particular region. So that no widespread epidemic ekskalasinya monitoring system is needed to develop a method to systematically analyze the state of a disease in an effort to cope with rapid and integrated. To the Ministry of Health has issued a ministerial decree No. 1479 / Menkes / SK / X / 2003 obout : Guidelines for the Implementation of Surveillance System Integrated Infectious Diseases Epidemiology and Communicable Diseases. In the surveillance guidelines affirm the need for an Integrated Surveillance System (SST) with the support of standard data where the main epidemiological surveillance system covering all health care surveillance units (health centers, Laboratory, Hospital) at the local government level with the model: Reporting Recording System Integrated Health Center (SP2PT) and Hospital Reporting System (SPRS). Operational implementation of SST on local governments were given to local health authorities to be a system of epidemiological information. But in the implementation and operation of an integrated surveillance system (SST) the level districts / cities facing an obstacle in transferring health data to the health department. This constraint is because the source data from surveillance units scattered and obtained from a variety of applications and database management systems (DBMS) are varied (multi-platform). Synchronization of data interoperability and data integration between health department surveillance unit of the local government level the main problem. Setiap unit surveilans memiliki ketidak seragaman platform aplikasi dan database (*heterogen*). The problem is principally related to interoperability or the ability to integrate different applications and data between surveillance units. XML Web Service can be a solution.

XML Web Services is a software system designed to support inter-operation of the machine to machine interactions in a network (Erl,2007). Interaction is done through a specific mechanism or protocol. Thus the ability of web services can increase the ability of the web to communicate and exchange information and data with the pattern of program-to-program. With the design of XML Web Services will be able to integrate systems, programming languages, database and operating system platforms that are different from protocol HTTP (Hyper Text Transfer Protocol), so that different applications between surveillance unit can communicate with the data center with good so as to support the epidemiological data warehouse.

The objective of this study is to perform analysis, design, implementation and integration of data synchronization between the data surveillance unit (health centers/puskesma and hospitals) with the data center (data warehouse epidemiology) in a web-based application model. The benefits of this research is to give an overview of how the steps that must be done and prepared to realize the integration of data between units of surveillance in support of health epidemiological data warehouse.

2.RESEARCH METHODOLOGY

This research is a case study for integrating epidemiological data two surveillance units (health centers and hospitals) into data center health department epidemiology . Data epidemiological surveillance unit in kunakan at health center level using standard daily epidemiological report LB1, while the rate of hospital epidemiology data using daily epidemiological report data W1. Epidemiological data mengguna health center level DBMS MySQL DBMS while epidemiology at the hospital level PostgreeSQL use traditional DBMS.

a) Analysis Requerement : Studying the database structure epidemiological hospitals and health centers to get the data requirements and data structure epidemiological. Furthermore, in the design of a prototype web service at the health centers and hospitals to manage the epidemiological data that can be integrated with the needs of the data center data base of epidemiology at the health department.

b) Design : The design phase is done by the architectural design of data integration between the surveillance unit with epidemiological data center . Creating test design synchronization of data transmission units towards the data center surveulans health department epidemiology.

c). Implementation : Furthermore, doing web design services to perform data conversion epidemiology of dbms into text form in XML SOAP . With the data in the DMS soap in fregistrasikan to the needs of receipt and delivery of data services. Programs created with PHP and NuSOAP to make fil WSDL.

Simulations carried out by using 3-connected computer, the first computer simulate clinic surveillance, computer b simulate surveilasn house saki and computer c simulate data center health department epidemiology..

d). Testing : Testing is done with the parameter functionality, which is done maker epidemiological surveillance report on computer kompter a and b, then run the web services of data transmission that epidemiological data sent and can be monitored results on the level of health services (computer c) . From this test the function of sending data generated by monitoring the results on the data center epi demiologi.

3 RESULTS AND DISCUSSION

3.1. DESIGN MODEL ARCHITECTURE

In the design for application integration architecture to be built with these services webs are epidemiological data integration unit and hospital clinic surveillance. Where the surveillance unit that uses dbms and different applications (My Sql and PostgreSQL). Access will be built in the inter-application communication occurs in both directions, which through web services each surveillance unit will take a local database riding epidemiological data converted into the format of the document in the form of certain parameters (SOAP Services). Then webservice to send and request access Atar will forward the application to the health department epidemiology database as a data center epidemiological.

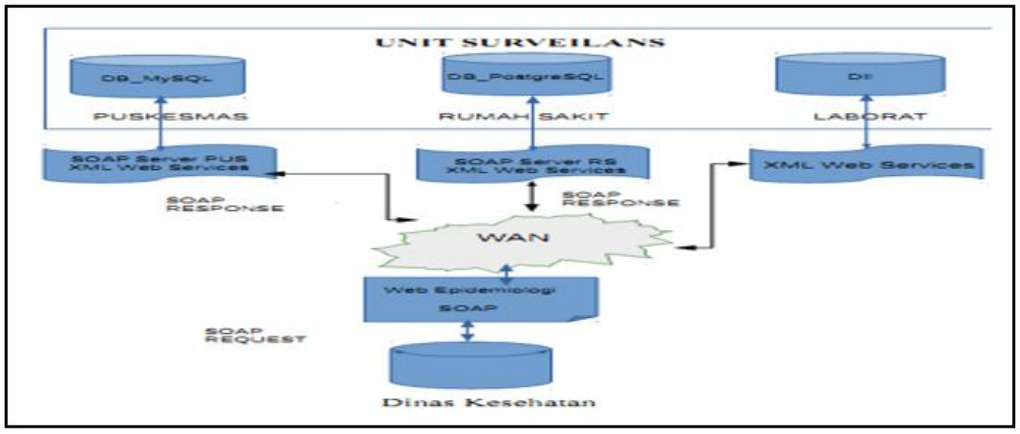

Figure 1. Architecture Integration Data Epidemiologi

3.2. IMPLEMENTASI WEB SERVICES

In this study we created a prototype data center (datawarehouse epidemiology) who obtain epidemiological data sources of health centers and hospitals. The data center will obtain epidemiological data sources in the process of making XML Web Services, there are several services ataau functions that were made to access the database. The services that will be on the call and is used to build the system integration of epidemiological reports of health centers and hospitals to the health department epidemiology data center as a unified data base system integrated survelans (SST).

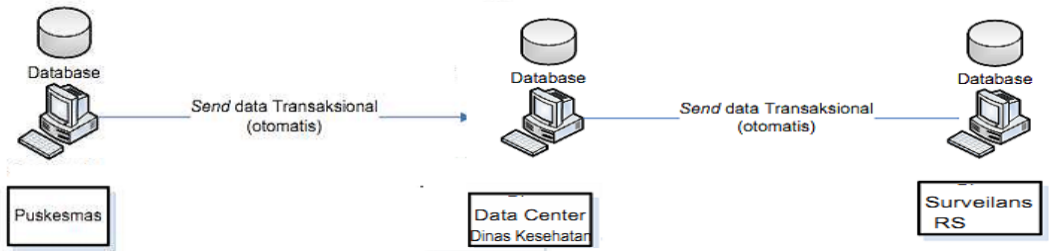

Figure 2. Design of Delivery Function Data Between Surveillance Unit

The first integration process is to integrate epidemic report LB1 (“Puskesmas” daily epidemiology format) from a “puskesmas” to the health department epidemiology data center. Delivery LB 1 has been done manually, so that the data center to work extra to enter data for the subsequent conduct of epidemiological data processing. he process of data transmission is done on a daily. By creating services that can integrate epidemiological data automatically into data center health department would have an impact of efficiency in processing and analyzing epidemiological data as well as integrated with other surveilasn units.

Algorithm making of services WSDL for epidemiological data from surveillance unit can be seen as shown below.

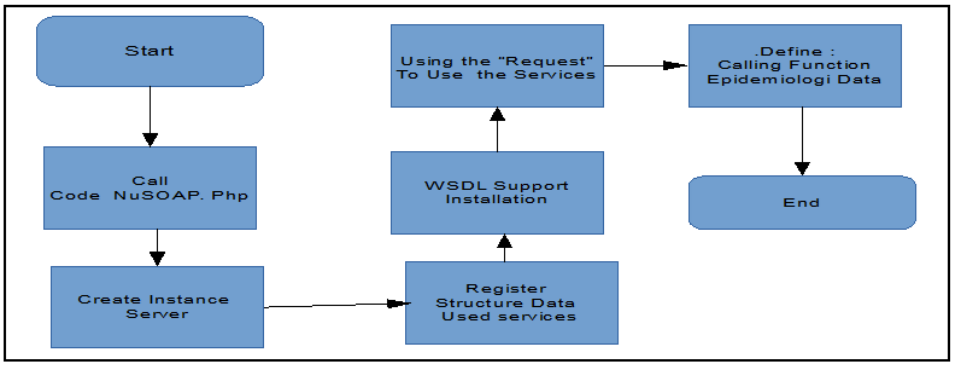

Figure 3. WSDL Services Getting Data Surveilans Algorithms

Step algorithm of making such services are:

1. The first step in pemrogaram WSDL is calling NuSOAP code which is a PHP class to send and receive SOAP messages over HTTP using needs (nusoap.php).
2. Next create a server instance: $ server = new soap_server ();.
3. Do initialization WSDL Support: $ server -> configurWSDL ('AServer', 'urn: Aserver).
4. The next step is to register epidemiological data structures used by these services (Services: $ services-> wsdl-> addComplexType) in the format of LB1 and W1 into an array (registers ('surveaailans', array ('param', tns: typeDataInput), array ('return' -> xsd: string ').
5. The final step is to define a function call epidemiological data from surveillance unit and use the request for service memeinta services: $ server -> services ($ HTTP_RAW_POST_DATA).

3.3. RESULT OF INTEGRATION OF XML WEB SERVICE

Prototype integration of data center that was developed at the health department is the integration of the two units of surveillance that health centers and hospitals. To design XML Web Services data from two surveillance units can be unified into a system that terintagrasi although originating from different applications and dbms (multi-platform). Figure below shows the number of data reports epidemiological information sourced from health centers and hospitals.

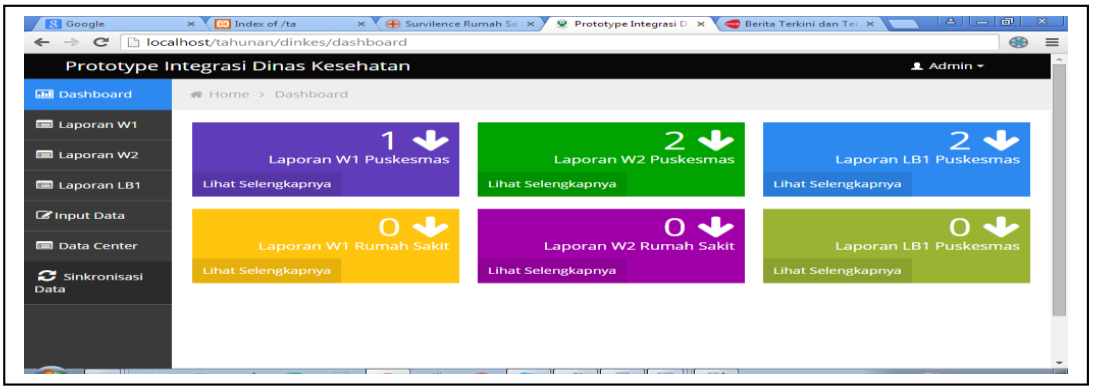

Figure 4. Pages on Information Epidemiology Data Center Dinkes.

To monitor the epidemiological data transmission from the surveillance unit shipment data synchronization can be performed on each unit of surveillance every day or per date. With this daily monitoring system will

be able to ensure the surveillance unit anywhere that does not perform epidemiological data transmission so that it can be done a certain action, It is very important to monitor epidemic especially for epidemics and infectious diseases.

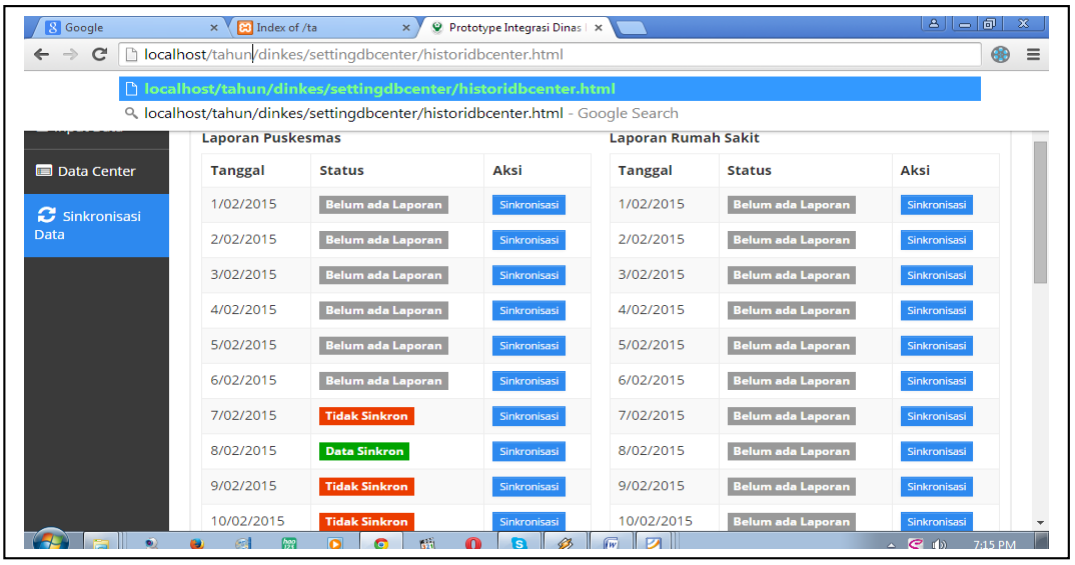

Figure 5. Page Data Center Monitoring Data Reporting Epidemiology

4 CONCLUSION

In this study has been conducted servives web design development with XML and has conducted testing of prototype data center epidemiological dinkes which epidemiology data sources derived from epidemiological data reporting daily health centers (LB1) and daily epidemiological data reporting hospitals (W1). From the test results of the prototype data center epidemiology, web design service successfully integrated reporting system of units surveilas although epidemiological data sources come from different applications and dbms (MySQL and PostgreSQL). This shows the communication protocol middleware web service that is capable of performing as a messege epidemiological data exchange by using the HTTP protocol, with a computer network between web-based and database apikasi anatar surveillance unit with database data center health department epidemiology. Integration between surveillance units with web services technology in computer networks also shows communication between providers and services requester sevices can be used for monitoring the delivery of data in real time, so it can be designed application monitoringdan effectively synchronize data transmission.

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