

# IMPLEMENTATION OF WATERFALL METHOD IN DEVELOPING TIARA BUNDA CLINIC INFORMATION SYSTEM BASED ON WB SERVICE

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**Abstract** — Tiara Bunda Clinic is a clinic located at Jln. Surya Kencana, No. 17, Cibadak-Sukabumi. In the service process, this clinic still uses a manual system that is considered to inhibit the assessment process for spending considerable time. Sometimes the process of recording data is often wrongly done by the data recorder. Therefore, the authors conducted a research to design a system that would automate the process of service at Tiara Bunda Clinic. In designing this clinic service information system, the authors use the waterfall method. By using this model, the process will be sorted from the data analysis until the final process. By waterfall method, each process will be done one by one, so it will be very focused on the process being done. This research described the design of Tiara Bunda clinic service system. The method used in the design of clinical information service system is a waterfall model that has coherent and sequential stages.

**Keyword** — System Implementation, waterfall, clinical service system

## I. INTRODUCTION

### 1.1. Background

Nowadays, the need for effectiveness and efficiency of health service time is increasing, and it seems to be the thing that must be designed and applied by health service provider. As service at Tiara Bunda Clinic still using manual method resulted in slow service process to the visiting patient, especially if there is a technical error from the employee resulting in inhibition of health service process

Tiara Bunda Clinic is a health service agency especially mothers and children, which the number of patients is quite a lot. The problem that is being faced by Tiara Bunda Clinic is the absence of a computerized system that regulates all information services such as registration, patient data, medical record, drug prescription, acceptance report and drug expenditure, all done manually and

uncomputerized. So that, it is difficult to keep the archive properly, because its storage still unstructured and piling up and if instantaneous data is needed it takes a long time to search for patient data.

Thus the authors compiled this research with the title "*IMPLEMENTATION OF WATERFALL METHOD IN DEVELOPING TIARA BUNDA CLINIC INFORMATION SYSTEM BASED ON WB SERVICE*". By applying this model, all services in this clinic would be more effective and efficient. And if it is computerized, it can allow users of the system to be faster in clinical services.

### 1.2. Identification of problems.

Based on the above background, it can be concluded the formulation of the problem as follows:

1. How to obtain patient data needed?
2. How to design health information system at Tiara Bunda clinic by using waterfall method?

### 1.3. Purpose and objectives

Designing information system health services at Tiara Bunda clinic and automate the service process to facilitate the service system located at Tiara Bunda clinic, so that the service at the clinic would more effective and efficient.

## II. LITERATURE REVIEW

### 2.1. Information System

Information Systems (IS) is a combination of information technology and the activities of people who use technology to support operations and management. In a very broad sense, this information system is often used to refer to interactions between people, algorithmic processes, data, and technology. In this explanation, the term used to refer not only to the use of information and communication technology (ICT) organizations, but also to people interacting with technology in support of business processes.

Broadly Information Systems can be described as a system within an organization that is a mixing of multiple people, technology, facilities, media procedures & controls aimed at obtaining critical communication channels, performing routine transaction types, signals to a management of events external and internal and provide an information that will be used as a decision making.

According to O'Brien (2005, p.5), "The information system is an organized combination of people, hardware, software, computer networks and data communications, and databases data) that collects, transforms, and disseminates information within an organization". According to Lani Sidharta (1995: 11), "An information system is a man-made system that contains an integrated set of manual components and computerized components aimed at collecting data, processing data, and generating information for users."

## 2.2. System planning

The design of information systems is a new system development of existing old systems, where the problems that occur in the old system is expected to be resolved in the new system.

Conceptually the development cycle of an information system is as follows:

1. *System Analysis*: analyze and define problems and possible solutions for information systems and organizational processes.
2. *System Design*: designing outputs, inputs, file structures, programs, procedures, hardware and software needed to support the information system;
3. *Development and Testing System*: build the necessary software to support the system and perform accurate testing. Install and test hardware and operate software;
4. *System Implementation*: switch from old system to new system, conduct training and guide as necessary.
5. *Operation and Maintenance*: support the operation of information systems and make changes or additional facilities.
6. *System Evaluation*: evaluate how well the system has been built and how well the system has operated.

The cycle runs repeatedly. The above cycle is a classic model of information system development. New models, such as

prototyping, spiral, 4GT, and combinations developed from the above classic model.

## 2.2. Waterfall Method

According to Pressman (2010: 39) waterfall is a classical model that is systematic, sequential in building software. Here are two descriptions of the waterfall model. Phases in waterfall model according to Pressman reference:

### 1. Communication

This step is an analysis of the needs of the software, and the stage to conduct data collection by meeting with customers, or collecting additional data either in journals, articles, or from the internet.

### 2. Planning

Planning process is a continuation of communication process (analysis requirement). This stage will generate user requirement documents or can be said as data related to user desire in making software, including plans to be done.

### 3. Modeling

This modeling process will translate the requirement ke sebuah design software that can be estimated before the coding. This process focuses on the design of data structures, software architectures, interface representations, and procedural (algorithmic) details. This stage will produce a document called software requirement.

### 4. Construction

Construction is the process of coding. Coding or encoding is a design translation in a language that the computer can recognize. The programmer will translate the requested transactions by the user. This stage is a real step in working on a software, meaning that the use of computers will be maximized in this stage. After the coding is completed, it will be testing the system that has been made earlier. The purpose of testing is to find errors on the system for later repair.

### 5. Deployment

This stage can be said final in the making of a software or system. After performing the analysis, design and coding then the ready-made system will be used by the user. Then the software that has been made must be done periodically maintenance

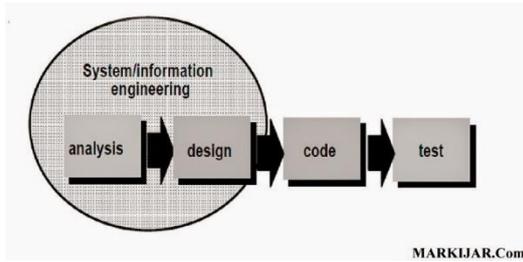


Figure 1: waterfall pressman model  
Source: <http://www.markijar.com>

**Advantages of Waterfall Method**

- a) The quality of the resulting system will be good. This is due to the gradual execution. So it is not focused on a particular stage.
- b) Document development system is very organized, because each phase must be completed completely before stepping into the next phase. So each phase or stage will have a specific document.
- c) This method is still better to use even though it is classified as archaic, rather than using an arbitrary approach. In addition, this method also still makes sense if the need is well known.

**4.1. Web Based Application**

WWW is a network of Mother-Akomputer that is categorized into two, namely Client and server by using special software to form a network called client-server network.

HTTP (hypertext Transfer Protocol) is a protocol that specifies the rules that the web must follow in requesting or retrieving something documents and by the web server in providing the requested web browser documents.

**1.1. Supporting Software**

According to Arief (2011: 152) "MySQL is one type of database server that is very popular and widely used to build web applications that use the database as a source and data processing.

**4.1. Literature Review**

Title	Discussion	Method	Result
1. Design of an outpatient information system at the clinic waluya	Explain the process of design use case diagrams, design class	Waterfall	The system can store patient data, and patient data processing

..	diagrams, interface design, coding and testing.		g can be faster, precise and accurate, and in the form of payment can give detailed results.
2. Design of Academic Information System using Waterfall Method in Madrasah Aliyah Al Mansyuriyah Kanza Mekar Jaya Tanggerang.	Discussing about the design of online website system aims to facilitate the school, teachers and students in conveying information for more updates.	Waterfall	The system works according to the design and runs well, using waterfall method is simplify the information notification easily, quickly and accurately up to date sera against students and teachers.
3. Web-Based Sales Information System on CV. Permata	Discusses the making of sales applications online, and aims to provide ease of sales transactions to customers. Using the RUP method and the PHP programming language,	RUP (Rational Unified Process) is a hardware approach that is done repeatedly.	The result of this research is that the system can be utilized by the customer in doing the transaction but there must be maintenance system so that the system can keep

	My SQL.		running and provide comfort.
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### III. RESEARCH METHODOLOGY

#### 1.1. Method of Collecting Data

In conducting the research, data related to the research title "Design of Clinical Information System Tiara Bunda with Php Based Analysis Method". In the collection we do:

##### a. Literature Review

Library Studies conducted by searching for some books related to research, journals, articles, both contained in libraries and those contained from the internet, then used as a reference in the preparation of this study.

##### b. Field Studies

###### • Interview

In this interview method, the authors who interviewed was Ibu Nawang Putri Martiningsih as Supervisor and Mr. Moch. Roem as the head of the administration, along with other staff to obtain the data needed by the author in the application design at Tiara Bunda Clinic.

###### • Observation

This method was done by directly dive to see the system that is running in Tiara Bunda Clinic to collect data and information. Observations were made on:  
Venue :

Tiara Bunda Clinic Kec.Nagrak – Sukabumi

Time :

January 2017-June 2017

#### 1.2. Systems Approach Method

The system approach is a set of steps aimed at solving a problem and ensuring that the problem is understood. The method of system approach used is the method of system approach in detail, as for the tools used are: flow chart (Flowmap), context diagram, data flow diagrams, data dictionary, and entity relational diagram (ERD).

### IV. DISCUSSION

#### 1.1. Analysis of Current System

The system that is currently running in Tiara Bunda Clinic is the manual system as follows:

1. The proposed procedure on the registration of new patients:

- a. Patient submits the file
- b. In the form of KTP (Identity Number) for general patient category, and additional ASKES / BPJS card (*Healthy insurance*) for patient category of ASKES / BPJS member.
- c. Admintrator in the registration will receive patient data and input patient data into the

database of clinical service information system.

- d. Admin prints the patient card.
  - e. Admin calls the patient data previously entered into the registration form visit and fill the sequence number of the patient queue.
  - f. Admin prints the queue number.
  - g. Admin hand over patient card and queue number along with file previously requested by admin to patient.
  - h. Admin prints reports of patient visits per day to be filed.
2. The proposed process of registration of old patients, Treatment, taking drugs, etc.
- a. Reports on drug receipts, drug expenditure reports, and payment reports into the database.

#### 1.2. System Overview Proposed

The Clinical Services Information System designed is a system designed based on the analysis. This system enables users to perform computerized work activities in order to process patient service more quickly and accurately including patient registration process, patient medical record, drug service, payment, up to financial reporting process, daily visit reporting, drugs acceptance reporting and drug expenditure process.

#### 1.3. Proposed Design Procedures

The proposed procedure design will the author pour in several charts such as flowmap, DFD, context diagram, and data dictionary. But, to be more clear again first the author will describe the proposed procedure design in writing as follows:

1. The proposed procedure on the registration of new patients:
  - a. Patient submits files in the form of ID cards for general patient category, and additional ASKES / BPJS card for ASKES / BPJS member category.
  - b. Admin in the registration will receive patient data and input patient data into the database of clinical service information system.
  - c. Admin prints the patient card.
  - d. Admin calls the patient data previously entered into the registration form visit and fill the sequence number of the patient queue.
  - e. Admin prints the queue number.
  - f. Admin hand over patient card and queue number along with file previously requested by admin to patient.

- g. Admin prints reports of patient visits per day to be filed.
- 2. Proposed process of registration of old patients:
  - a. Patient submits the patient card to the registration admin.
  - b. Admin calls the patient data listed on the patient's card and entered into the registration form visit and admin fill the sequence number of the patient queue.

- c. Admin prints the queue number.
- d. Admin hand over patient card and queue number along with file previously requested by admin to patient.
- e. Admin prints reports of patient visits per day to be filed.

#### 4.4. Proposed System Context Diagram

#### 4.5. Interface Implementation

##### 1. Patient Registration

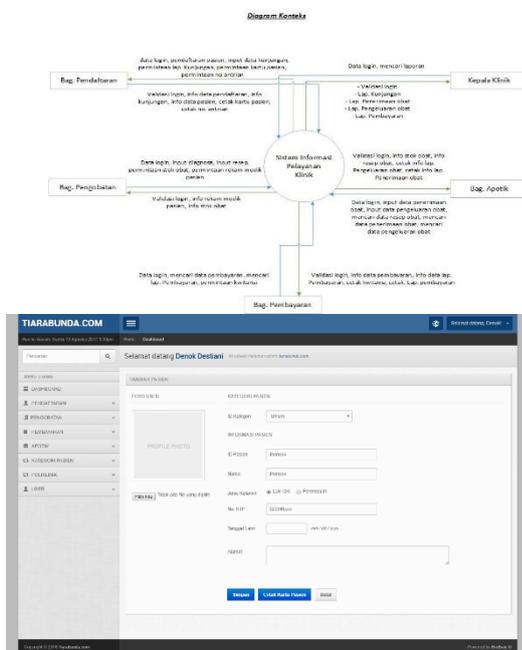


Figure 6 : Patient Registration

#### 4.6. Testing

Testing is one important part in the process of clinical information system information in Tiara Bunda Clinic. This test is intended to know the extent of quality and also know the weakness of the software that the author created this. Testing of this application aims to clinical information system can run well in accordance with the needs of Tiara Bunda clinic, as much as possible to avoid mistakes in the course of this clinic service information system, and allows for the development of the system in the future.

In testing Tiara Bunda clinic service information system is the author uses black box testing, so we do not need to find out what really happens in the system or software, which tested the input and output. The following is the system input / output testing plan

#### 4.2. Networking Topology

The network topology designed for this system is the star topology where each client computer connects to a server computer via a hub / switch. This topology is used because it is considered more effective in the settlement if there is damage to one lane then only need to fix one path only without disturbing the other lane.

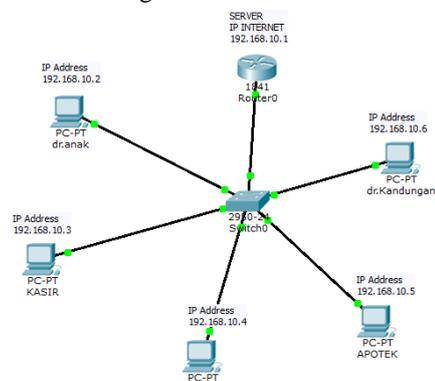


Figure 24: Star network topology

#### V. CONCLUSIONS AND SUGGESTIONS

Based on the analysis and the results of the discussion that has been described in the design of information systems of clinical services tiara mother, the authors conclude:

1. The design of information systems clinical service is made because it is based on the background.
2. The design of this information system can be used in accordance with the business flow of Tiara Bunda Clinic with offline method.

Any system design undoubtedly has deficiencies that need to be fixed. On that basis, the researcher express the following suggestions:

1. The design of Tiara Bunda clinic service information system has not yet arrived at its implementation, testing and maintenance, therefore for further research it is necessary to make the implementation, testing and maintenance.
2. The design of clinic information service system is web offline. It would be better if in the next study

made an online version for the range of services to be more widespread.

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