Web Application to Monitor Logistics Distribution of Disaster Relief Using the CodeIgniter Framework

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Abstract. Disaster management is the responsibility of the central government and local governments. The principles of disaster management, among others, are quick and precise, priorities, coordination and cohesion, efficient and effective manner. Help that is needed by most societies are logistical assistance, such as the assistance covers people's everyday needs, such as food, instant noodles, fast food, blankets, mattresses etc. Logistical assistance is needed for disaster management, especially in times of disasters. The support of logistical assistance must be timely, to the right location, target, quality, quantity, and needs. The purpose of this study is to make a web application to monitor logistics distribution of disaster relief using CodeIgniter framework. Through this application, the mechanisms of aid delivery will be easily controlled from and heading to the disaster site.

Keywords - Application; Disaster Monitoring; Web; framework; Codeigniter.

1. Introduction
Disaster is an event or series of events that threaten and disrupt the life and livelihood of the community caused either by natural factors and / or non-natural factors as well as human factors resulting in the occurrence of human casualties, environmental damage, property loss, and psychological effects [1]. Disaster management is the responsibility of central and local governments. The principles in disaster management are fast and precise, priority, coordination and integration, efficient and effective. In relation to that matter, to reduce the risk of the disaster impact, disaster management is needed.

Disaster Management is required to prevent and reduce the losses arising from disasters that occurred, either in the form of property or material losses, and ensuring adequate assistance to victims of natural disasters before, during and after the disaster [2]. In a state of emergency disaster, people are in dire need of help from government, community or private organizations. The assistance that most people need are logistical support, the assistance that covers the daily needs of the community, such as food, instant noodles, fast food, blankets, mattresses and others. Logistic assistance is needed for disaster management especially when the disaster occurred. The support of logistical support must be timely, to the right location, target, quality, quantity, and need.

Nurhayati and Lucky Feliciono Waha in their research argue that the modeling of Application modeling can be used to monitor the distribution of aid, by collecting, processing and presenting the location, victims, and the needs of the victims, and can see whether the assistance has been received or not. [3]
Indah Permata Sari in her research argues that in order to smooth and accelerate the collecting information data about disaster victim handling, a special information system that can accommodate all data of disaster victim handling is required[4].

Lucky Feliciano Waha in his research argued that the lack of disaster-related information that occurred cause the process of distributing aid to the community is not on target[5].

Nicky Nia Gustriani in her research argued that the success of government in tackling the disaster that occurs depends on how the implementation of disaster management system information. Because to make the right decision, the government needs fast and accurate data shortly after the disaster occurred.[6]

The hierarchical procedure demands a process that should be able to run quickly but become a bit slow because the upnormal condition. Therefore, the procedures that can be processed quickly, accurately, can be accounted for and ensure that public services relating to the management of mechanisms of aid distribution can be channeled well and well targeted is required. One the ways is to develop a monitoring application of logistics assistance distribution web-based with the concept of framework.

A simple framework can be defined as a collection of functions/procedures and classes for a particular purpose that is ready to be used so as to simplify and speed up a programmer's work, without having to create a function or class from the beginning[7].

One of the concepts adopted by the framework is MVC (Model, View, Controller). MVC separates application development based on major components that develop an application such as data manipulation, user interface, and parts that become application controls.

Based on the description of existing problems, then in this research the researcher will make a Monitoring Application of Disaster Logistics Aid Distribution using codeigniter framework. It is expected that this research will be able to assist the community and also related offices in distributing and monitoring logistic support from and to disaster location more quickly and on target.

2. Research Method

One of the methods used in this research is waterfall model. It is called linear sequential model or software life sequence sequentially or sorted starting from analysis, design, coding, testing, and maintenance[8]. There are 5 stages: needs analysis, system design, programming stage, implementation and evaluation.

The first stage is the analysis of system requirement phase. The requirements are divided into 2 ie functional and non-functional requirements. Functional requirements include user-level sharing and the classification of system capability such as logistics requests and logistics approvals. Non-functional requirements include devices that support the application. The second stage is the system design. System design includes interface design and the design of program workflow. The focus at this stage is the creation of interface design that facilitates users in using the system.

The third stage in this research is the programming stage. At this stage, the process of translation of the system workflow into the PHP programming language into the codeigniter framework is conducted.

The fourth stage in the development of this system is the implementation stage. Here, the implementation stage is at the level of testing according to the needs of existing systems in the monitoring application of distribution of logistics aid for disaster. From this stage, it can be known whether the results shown by the tool is in accordance with the initial plan so that in this stage the researcher can simultaneously run the evaluation phase.

3. Finding and discussion

The system design aims to find the optimal form of the system that will be developed by considering the problems and needs. This application is designed on PHP programming by using codeigniter framework. In testing this application, it runs on localhost with local server XAMPP 1.6.7.

3.1. System Analysis

Disaster management in North Maluku Province can not be carried out by the North Maluku provincial government alone, but other actors are also needed to assist the sustainability of disaster management. The
actors consist of Sub-district Apparatus, Village Apparatus, and Community. Cooperation and coordination between these stakeholders can facilitate the implementation of aid distribution mechanism. Village officials (lurah) coordinate with sub-district and village apparatuses to carry out the mechanism of distribution and take good measures to handle the flood disaster, coordination among stakeholders is considered to fulfill what should be done by the Public Administration Agency. The process of aid distribution based on SOP can be seen in Figure 1 below:

![Figure 1](image)

**Figure 1** Illustration Standard operational Procedure (SOP) running System

### 3.2. Data Flow Diagrams

#### 3.2.1. Data Flow Diagram Level 0

DFD Level 0, describes the system globally, contains only one system process that is connected to two entities which aims to provide an overview to the analyst systems and programmer about the input into a process that finally produce an output. As for DFD level 0 designs the monitoring application of logistics distribution of disaster relief can be seen in figure 2

![Figure 2](image)

**Figure 2** DFD Level 0 Monitoring Application of Logistics Distribution Of Disaster Relief
Figure 2 defines each user who can later use the monitoring application of natural disaster relief distribution, i.e. Social Service, Regional Disaster Management, District Head, Head Of Village, and Administrator.

3.3. Flowchart Design
The flow of flowchart system design is very important in making a computer program. There are several ways to implement a program, one of them is by using flowchart.

![Flowchart System](image)

3.4. Database Design
Database design is a series of specific statements that relate to various data processing, such as data objects that will be processed by the system, the composition of each data object and attributes that describe and how the relationship between each data object [9]

1. Entity relationship Diagram
2. ERD (Entity Relationship Diagram) is a notation used to perform data modeling activities. The attributes of each data object are written on the Entity relationship Diagram. It can be described by using the decryption of data objects

3.5. Menu Structure Design
The menu structure for the admin is described in Figure 5. The admin manages the system user and its permissions with multiple menus. The menu consists of Webadmin (manage the user), MenuManage, News, Village / Subdistrict, District / City, Help, Logistics and Logout
**Figure 4** Entity Relationship Diagram
4. IMPLEMENTATION AND SYSTEM TESTING

4.1. Page for Login User
When a user enters the system, the user is confronted with a display of system index of the login page. On the login page, the user is asked to enter a username and password. This page acts as the verification for the incoming user. This login system also has permissions automation based on the user level who login to the page.

Figure 5 Admin Menu Structure

Figure 6 User Page Login
The page to input the help approval is a page form used to see the approval process for help.
5. Conclusion
Based on the tests that are conducted on the application, it can be concluded that the monitoring application of logistic distribution of disaster relief is designed with CodeIgniter framework that can help the process of disaster data management and the distribution of disaster relief to the destination location can be monitored and managed properly. This system is ready to be implemented in BPBD of North Maluku Province and Social Service of North Maluku Province.

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