

# Web-Based Application Development using PHP-Native Framework on Agent of Change Integrity Zone Information System

Adidtya Perdana<sup>1)\*</sup>, Nurul Ain Farhana<sup>2)</sup>, Putri Harliana<sup>3)</sup>, Ichwanul Muslim Karo Karo<sup>4)</sup>

<sup>1,3,4)</sup>Computer Science Study Program, Faculty of Mathematics and Natural Science, Universitas Negeri Medan, Indonesia, <sup>2)</sup>Statistic Study Program, Faculty of Mathematics and Natural Science, Universitas Negeri Medan

<sup>1)</sup>[adidtya@unimed.ac.id](mailto:adidtya@unimed.ac.id), <sup>2)</sup>[email@email.com](mailto:email@email.com), <sup>3)</sup>[harliana@unimed.ac.id](mailto:harliana@unimed.ac.id), <sup>4)</sup>[ichwanul@unimed.ac.id](mailto:ichwanul@unimed.ac.id)

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**Abstract:** An Integrity Zone is an activity related to government policies and efforts to create an environment free from corruption, collusion, and nepotism (KKN). The Integrity Zone aims to encourage transparency, accountability, and clean practices in the management of a bureaucracy. To further the success of this Integrity Zone, a Agent of Change was formed who acts as a Role Model for all parties. As a role model, agents of change must be able to provide examples in attitude, behavior, and thinking. In addition, they must be able to provide creative solutions in dealing with problems in their agencies. And must be able to provide creative ideas to improve the performance of all parties. Sometimes, their ideas are not well documented. So a digital-based system is needed that can facilitate the work of these agents of change. For this reason, it is necessary to create a Web-based application for recording, reporting, and implementing change agent performance so that it is more optimal, efficient, and effective. In this study, the development of web-based applications using a framework with PHP-Native technology. Most PHP frameworks that exist today, use MVC and OOP technology but no one has utilized PHP-Native technology as a framework. This aims to facilitate the creation of applications for programmers who have not familiar with MVC or OOP concept.

**Keywords:** Integrity Zone; Agent of Change; Framework; PHP-Native; PHP-Native Framework; MVC; OOP.

## INTRODUCTION

Based on the Regulation of the Minister of Administrative Reform and Bureaucratic Reform (MenPANRB) at Number 10 of 2019 concerning Guidelines for the Development of Integrity Zones towards Corruption Free Areas (WBK) and Clean and Serving Bureaucratic Areas (WBBM), the development of Integrity Zones must be implemented in every government institution (Ifada et al., 2021), This is based on the Decree of the Minister of Education and Culture of the Republic of Indonesia Number 1176 / 2020 concerning Guidelines for the Development of Integrity Zones Towards a Corruption-Free Area / Clean and Serving Bureaucratic Area (Makarim, 2020).

Six leveraging components and two result components make up its application. The leveraging component includes Improving the Quality of Public Services, Increasing Performance Accountability, Developing HR Management Systems, Change Management, and Structuring Management. Additionally, the realization of a government free of corruption and KKN as well as the realization of better public services for the community make up the results component (Gafar et al., 2022). The Leverage Agent is responsible for putting into practice a thorough evaluation of both the result and leverage components. However, without the assistance and participation of all relevant parties, this cannot be completed successfully. lecturers, employees, leaders, pupils, and other relevant stakeholders.

In addition to the parties mentioned above, there is one very important role in the creation of a good Integrity Zone, clean governance, optimal public services, accountable bureaucracy and HR professionalism, namely Agent of Change (Hartanto & Hidayat, 2022). In creating an Integrity Zone, a change agent must at least be able to provide and implement better changes in their respective work environments.

Web-based application development is common today, usually using PHP programming with the help of a framework. Currently, there are many PHP frameworks available such as Laravel, CodeIgniter, Yii2, CakePHP, and so on. However, almost all PHP frameworks available on the internet and open source use the concept of MVC (Model, View, Controller) based on Object Oriented Programming (OOP). In research conducted by (Joshi &

\*name of corresponding author



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Kirti, 2021) states that in the development of a web-based application the use of Framework can support dynamic web development because the current framework already has many convenient features such as MVC, OOP, ORM, Code Generator, CRUD Generator and Template Engine.

The increasing demand for web-based application development leads to the need for high efficiency, reliability, and scalability. Therefore, PHP frameworks have become an essential part of web development. PHP frameworks are designed to make software development easier and are gaining popularity in web-based projects as they can speed up the development process, reduce time, and meet coding standards. PHP frameworks also help create robust and maintainable code, and produce stable and secure web applications. Today, there are many PHP frameworks to choose from, each with unique advantages. However, choosing the best PHP framework requires a good understanding of the differences between them. To help developers choose the most effective PHP framework for web development in the future, this research conducts performance evaluation and testing of three of the most commonly used PHP frameworks in web development (Laaziri et al., 2019).

It is quite common for many software programmers especially those who are still in fledgling stages to find it hard to learn the 'free' frameworks available on the web. That is why working with frameworks is often challenging to these people since they need to know how to describe MVC and OOP among many others. As a result of this complexity, new developers are not able to utilize such frameworks during the development of web applications. Therefore, there is a need for a framework built with PHP-Native concepts, which is simpler. It is hoped that within such a framework, novice programmers will be able to learn how to construct and enhance web based systems without the need of grappling with ideas which they have not fully come to comprehend

As a solution, a web-based E-Reporting System designed according to the needs of the implementation of change agents can facilitate workers such as recording solutions / ideas, reporting on the implementation of solutions / ideas, reporting on the progress of implementation work, collecting / uploading evidence such as photos, videos, and drafting policy documents, and writing final reports. This can help accelerate the implementation of the Integrity Zone by utilizing the PHP-Native Framework.

## LITERATURE REVIEW

### Integrity Zone

Based on PAN-RB Ministerial Regulation number 52 of 2014 which was updated to PAN-RB Ministerial Regulation number 10 of 2019 concerning Guidelines for the Development of Integrity Zones Towards Areas Free from Corruption (WBK) and Clean and Serving Bureaucratic Areas (WBBM) is a strategy in preventing corruption and free from KKN. The main objective of Integrity Zone development is to build a bureaucratic reform program that is able to develop a bureaucratic work culture that is anti-corruption, collusion and nepotism, high-performance, and able to provide quality public services. In addition, the integrity zone within the government must be able to increase improvements in the bureaucracy that can reduce the number of cases of KKN, abuse of authority and weak aspects of supervision (Ifada et al., 2021).

In implementing the Integrity Zone towards WBK and WBBM, there are 6 leverage indicators including (Hartanto & Hidayat, 2022):

1. Change Management
2. Structuring Management
3. Management System Structuring
4. Strengthening Performance Accountability
5. Strengthening Supervision
6. Strengthening the Quality of Public Services

A literature review is a critical, analytical summary and synthesis of the current knowledge of a topic. It should compare and relate different theories/research, findings, and so on, rather than just summarize them individually. It should also have a particular focus or theme to organize the review. In this section, the researcher can describe some of the related previous studies. Researchers can review the gaps in the research, then it can be used as a basis for research to be carried out

### Agent of Change

Based on PAN-RB Ministerial Regulation Number 27 of 2014 concerning Guidelines for the Development of Change Agents in Government agencies is one of the important areas of change closely related to the performance of mindset and work culture. Agents of Change are expected to play a role in driving change in the work environment as well as a role model for other employees in behaving, behaving, and acting in accordance with the basic values of the organization. This also plays a major role in supporting the success of bureaucratic reform (Taslim et al., 2022).

Agents of change are individuals or groups consisting of officials and/or employees who are used as good role models in integrity and high performance. The main task of agents of change is to create institutions of society and government that can be used as a channel for new ideas and social renewal activities. In addition, change agents

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act as catalysts, drivers of change, solution providers, mediators, and liaisons between employees and organizational policy makers (Taslim et al., 2022).

### Ereporting System

E-Reporting or E-Report System is an electronic-based system that is tasked with digitally reporting information (Panjaitan & Pakpahan, 2021). E-Reporting is a system that can provide effective and efficient solutions in managing reporting (Harianja & Moloan, 2023). The E-Reporting mechanism itself makes it easy for users to manage, present, and distribute reports quickly and these reports can also be quickly processed by related parties (Balahadia & Mortel, 2020).

The characteristics of the E-Reporting System include (Agarina et al., 2022; Ariani et al., 2021; Mulyono et al., 2021; Shania Alya et al., 2023):

1. Electronic Access
2. Interactive and Dynamic
3. Process Automation
4. Information Security
5. Convenience and Integration
6. Real-time Monitoring
7. Reporting flexibility
8. Ease of Audit
9. Performance tracking

The E-Reporting System model includes the structure and key components designed to manage the electronic reporting process in an organization. Here are some common components that are often found in E-Reporting System models (Harianja & Moloan, 2023; Mulyono et al., 2021; Panjaitan & Pakpahan, 2021):

1. User Interface: use of interactive Dashboard and Navigation
2. User Management and Access Rights: easy management of user accounts and authorization system
3. Data Management: providing good data sources, data cleaning and transformation, and data quality monitoring.
4. Reporting Process: report preparation, validation and verification, reporting process automation
5. Document Management: easy storage, search and retrieval of documents.
6. Integration: able to integrate with external systems
7. Maintenance and Support: system updates and online documentation/help.

### PHP-Native

PHP-Native is a term that describes the web application development in PHP language without the use of an external framework like Laravel, Code Igniter or Symfony. In PHP-Native, the developer codes everything himself and handles all components of the application from the file structure, database connections, business logic management, etc (Agus Supriatmaja et al., 2022; Ariyanto et al., 2024; Habib et al., 2023).

### PHP Framework

A PHP framework is a collection of modules and resources made to make web application development with the PHP programming language easier and faster. Imagine it as the framework of a completed structure, all this have to do is add the finishing touches to make it a home. This can avoid starting from scratch when creating a web application by using a framework (Chavan & Pawar, 2021; Joshi & Kirti, 2021; Laaziri et al., 2019).

Some examples of PHP Frameworks that are popular and widely available as open source on the internet include:

1. Laravel
2. CodeIgniter
3. Symfony
4. Yii
5. Zend Framework
6. CakePHP

In general, the PHP Framework works by providing an MVC (Model-View-Controller) architecture that separates the logic of control, display, and data. In addition, the routing mechanism that connects the URL with the appropriate function or controller is well packaged so as to create a Pretty-URL. For databases, some frameworks such as Laravel provide the use of stand-alone databases such as SQLite (Ariyanto et al., 2024).

Some frameworks provide templating engines to make it easier to write or generate code so that users don't have to bother writing code. Authentication in the framework has been provided which can make it easier for users. As well as Session management and Caching have been made easier with various features provided by the Framework developer (Sinlae et al., 2024).

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PHP Framework itself is very suitable for use when developing a complex project that requires large features and scalability. besides that, the development time using the framework becomes shorter because many features have been provided. And this framework is very suitable for use if working with a team, especially with a large development team (Chavan & Pawar, 2021).

**METHOD**

**Application Overview**

An overview of the application is made based on entity information and application input/output using a context diagram, as follows:

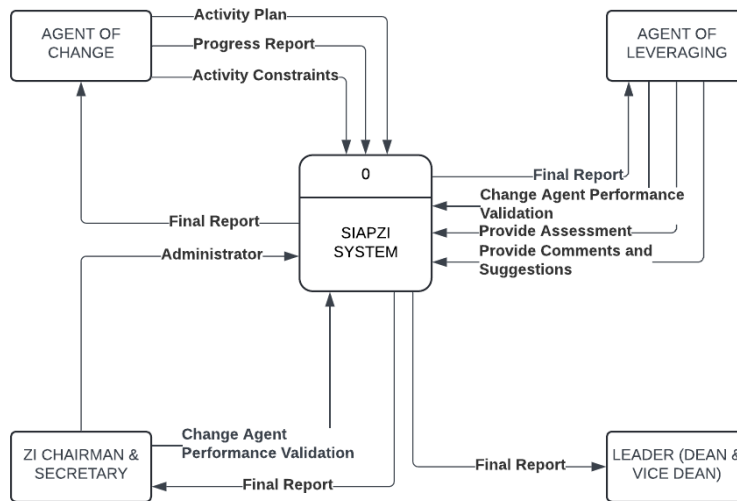


Fig. 1 Application Overview Diagrams

Based on the context diagram above, it can be concluded that the web-based Zone of Integrity (ZI) Change Agent E-Reporting Application is designed to manage data and reports related to change agents. This SIAPZI system allows various entities such as Change Agents, Leveraging Agents, ZI Chairpersons & Secretaries, Leaders, and Administrators to interact with the system in inputting, validating, and receiving data and activity reports. Each entity has a specific role, from inputting activity plans to providing assessment and feedback, all of which are coordinated to ensure the smoothness and accuracy of the reporting process.

With the Administrator's central role in validating data, the application ensures that all information is managed in accordance with applicable procedures and standards. The main output in the form of a final report and performance evaluation of change agents provides transparency and accountability in the implementation of Integrity Zone activities. The application supports improved reporting quality and efficiency, and facilitates constructive feedback for continuous improvement.

**Design Database**

The first stage in developing a web-based system is database design. The following is a database design for the Integrity Zone Agent of Change Information System. Basically, this system is made as a form of e-reporting application for Agent of Chage. Database is named siapzi.

\*name of corresponding author



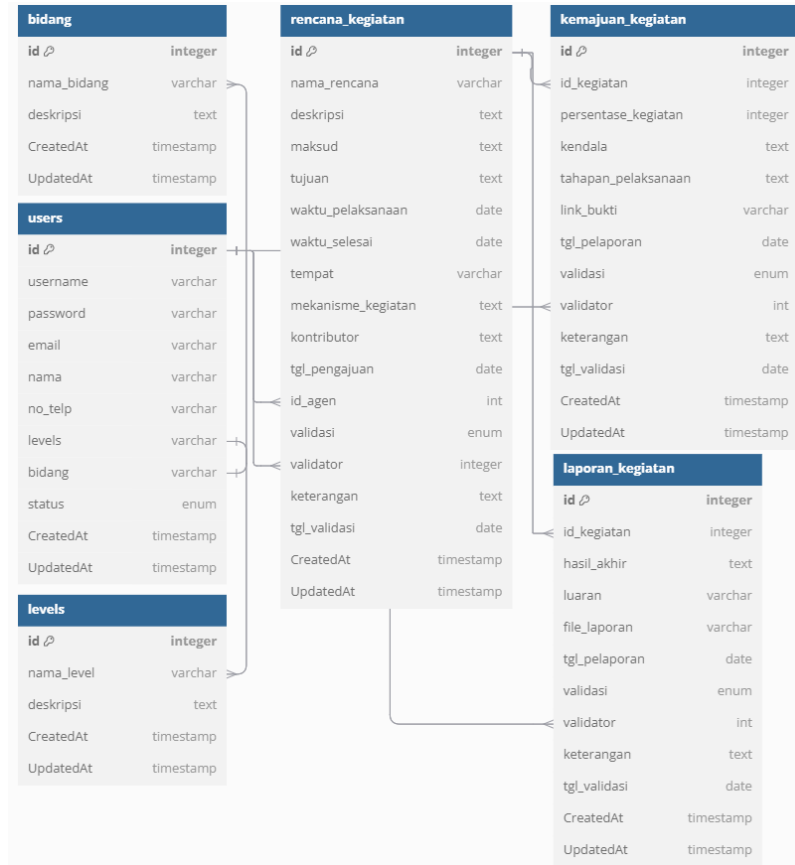


Fig. 2 Design Database System

### Directory Structures

In developing this application, using the PHP-Native Framework, organizing the directory structure is very important. so that application development becomes easier. The following is the directory structures of the application:

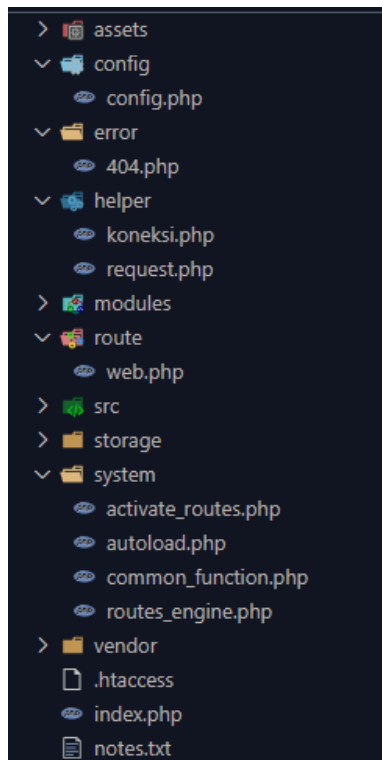


Fig. 3 Directory Structures the Applications

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The explanation of each folder and file is as follows:

1. Assets directory: serves to store assets such as templates, CSS, javascript, images, fonts, etc.
2. Config directory: serves to store configurations such as root, application name, version, database server, database user, database password, and database name used, folder configurations related to application development such as helper folders, modules, storage, routes, sessions, and redirect paths. config.php file in this directory is one of the main files forming this framework.
3. Helper directory: serves to store functions that are defined by the user.
4. Modules directory: serves to store the main program codes related to display and CRUD.
5. Route directory: serves to store routing code or addressing files in the modules directory.
6. Src directory: serves as a place to store sources almost similar to assets, this directory may not be used.
7. Storage directory: serves as a place to store files if the application created is related to uploading files.
8. System directory: is the main directory that forms this framework. There are 4 main files in this directory, namely active\_routes.php which functions as a regulator of routes that will be related to sessions and urls. autoload.php file which functions as an automatic load of files in the helper directory. common\_function.php file which functions as the formation of several main functions such as getConfig, getSession, setMessage, and getMessage. and routes\_engine.php file which functions as a place to add and call routes from the route directory which is connected to files in the modules directory.
9. Vendor directory: works if using NPM (Node Package Manager) or Composer. When using NPM or composer, the library installation results are placed in this directory.
10. .htaccess file: as a configuration file used for web servers to control server settings and behavior in certain directories.
11. index.php file: as the main file that holds all files including configuration, display, CRUD, etc.

### File config.php

In the config.php file there are several configurations related to the placement of root variables, application name, version, database (server, user, password, database name), directory placement (helper, modules, storage, route), session, and redirect path.

```
<?php
defined('SIAPZI_APP') or exit('Forbidden...!');

$config['APP_ROOT'] = '/siapzi';
$config['APP_NAME'] = 'SIAPZI';
$config['VERSI'] = '1.0';
$config['DB_SERVER'] = 'localhost';
$config['DB_USER'] = 'root';
$config['DB_PASSWORD'] = '';
$config['DB_NAME'] = 'siapzi';
$config['HELPER_DIR'] = './helper';
$config['MODULES_DIR'] = './modules';
$config['STORAGE_DIR'] = './storage';
$config['ROUTE_DIR'] = './route';
$config['SESSION_NAME'] = 'APLIKASI_SIAPZI';
$config['REDIRECT_PATH'] = '/login';
$config['HELPER'] = ['koneksi.php', 'request.php'];
?>
```

### File active\_route.php

In this file there are several functions related to routing which will make URL writing neater (Pretty-URL).

```
<?php
defined('SIAPZI_APP') or exit('Forbidden...!');

if (!isset($ROUTES[$request_uri])) {
    include './error/404.php';
} else {
    $need_session = $ROUTES[$request_uri]["need_session"];
    $module = $ROUTES[$request_uri]["module"];
}
```

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```
if(substr($module, 0, 1) != '/'){
    $module = '/' . $module;
}

if ($need_session) {
    session_start();
    if (!isset($_SESSION[$config['SESSION_NAME']])) {
        redirect($config['REDIRECT_PATH']);
    }
}

ob_start();
include $config['MODULES_DIR'] . $module;
$content = ob_get_contents();
ob_end_clean();
echo $content;
}
?>
```

### File route\_engine.php

```
<?php
defined('SIAPZI_APP') or exit('Forbidden...!');

$request_uri = $_SERVER['PHP_SELF'];

if (strcmp($request_uri, $config['APP_ROOT'], strlen($config['APP_ROOT'])) === -1) {
    die('Perbaiki konfigurasi APP_ROOT "' . $config['APP_ROOT'] . '"');
}

$request_uri = substr($request_uri, strlen($config['APP_ROOT']));

if (strcmp(strtolower($request_uri), '/index.php/', strlen('/index.php/')) === 0) {
    $request_uri = substr($request_uri, strlen('/index.php/'));
} else if (strtolower($request_uri) == '/index.php') {
    $request_uri = '/';
}

$ROUTES = [];

function addRoute($path, $module, $need_session = false)
{
    global $ROUTES;
    if (substr($path, 0, 1) != '/') {
        $ROUTES[strtolower('/') . $path] = ["module" => $module, "need_session" => $need_session];
    } else {
        $ROUTES[strtolower($path)] = ["module" => $module, "need_session" => $need_session];
    }
}
```

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```
function redirect($path)
{
    global $config;
    if (substr($path, 0, 1) != '/') {
        header('Location: ' . $config['APP_ROOT'] . '/' . $path);
    } else {
        header('Location: ' . $config['APP_ROOT'] . $path);
    }
    exit();
}

function getRoute($path)
{
    global $config;
    if (substr($path, 0, 1) != "/") {
        return $config['APP_ROOT'] . '/' . $path;
    } else {
        return $config['APP_ROOT'] . $path;
    }
}

function isRequestURI($href)
{
    global $request_uri;
    if ($href == $request_uri) {
        return true;
    }
    return false;
}
?>
```

### File index.php

As the main file, this file contains several calls to the files that make up this framework such as config.php, common\_function.php, autoload.php, routes\_engine.php, web.php, and activate\_routes.php.

```
<?php
define('SIAPZI_APP', 'SIAPZI APP');
date_default_timezone_set('Asia/Jakarta');

require './config/config.php';
require './system/common_function.php';
require './system/autoload.php';
require './system/routes_engine.php';
require './route/web.php';
require './system/activate_routes.php';
?>
```

## RESULT

### Concept

In developing an application using PHP-Native Framework for the Integrity Zone Change Agent Information System (e-reporting application), it provides the desired results. The purpose of creating this application is to facilitate reporting the performance of change agents in the integrity zone of an institution or agency. Starting from submitting activities, activity progress reports, to final activity reporting, everything went well. The validation process is carried out by the Leverage Agent and monitored by the Chairperson and Secretary of ZI and the Leadership. All primary and supporting evidence can be stored and documented properly through this system.

In developing this system, appropriate hardware and software are required. For hardware, a computer or laptop with any operating system is required, either Windows, Linux, or MacOS (OSX). The software used is a web server, in this case using Laragon, which is integrated with DBMS MariaDB (MySQL), Composer, Browser (in this case using Chrome), and Text Editor (in this case using Visual Studio Code).

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**Design**

Now, it is certainly a fact that the design phase one of the most crucial phases in the development of an application is web-based or other frameworks. This is the stage where all of these prerequisites are brought in together from architectural systems to styles, displays and materials. The idea behind this design is to make the system more convenient to final users, not only usable but also made with out of the box solutions.

How is this created in practice: — In the design phase, a visual design for each component of an application regarding its appearance and function is prepared. UI includes the placement of important screen elements (Icons, help text and pointers) so that users can easily understand them and navigate around in a manner for good understanding. A well planned navigation structure lets users browse the different features of a linked app smoothly, without being interrupted.

Apart from just visual design, this stage also includes functional design — specifying how each app feature/module actually works. Each and every scenario for using the application is thought out by how it can have a reach. A good design is one way for developers to guarantee that every user stays with the same experience when interacting with an application. However the results of this stage are going to be the main guidance of next development steps like coding and implementation so the design stage is actually playing an important role in full scale application development.

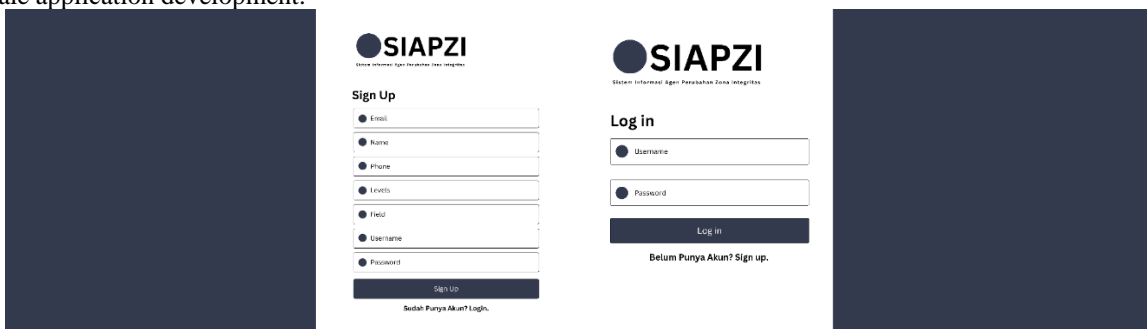


Fig. 3 Design UI System for Sign Up and Log In

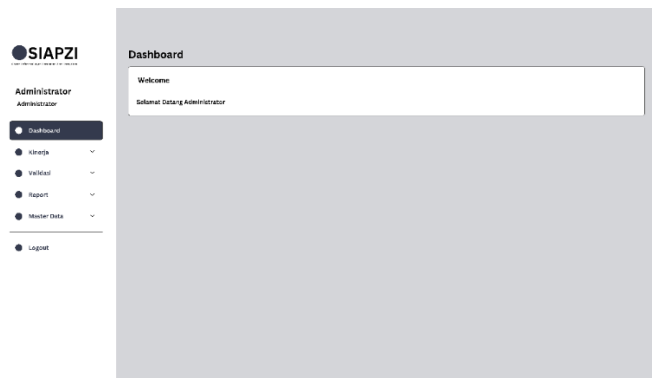


Fig. 4 Design UI System for Dashboard

**Implementation**

At this stage, the system has been completed and can be run. All materials and materials have been collected and integrated into the application. At this stage, the development team works together to create and produce a functional and interactive application.

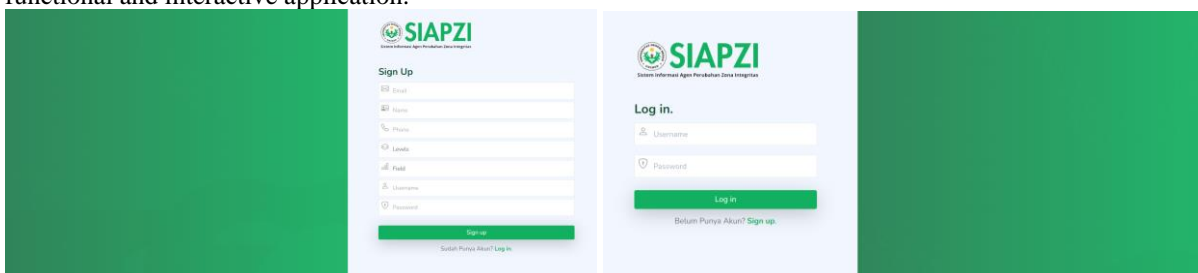


Fig. 5 System Sign up and Log in Display

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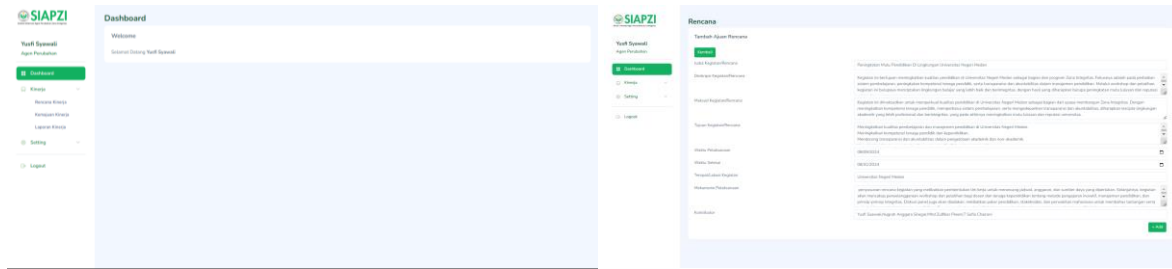


Fig. 6. Dashboard and Planning Display

### DISCUSSIONS

From the results of the testing and analysis that have been done, there are still many things that need to be fixed and improved from this application. In developing web-based applications using the PHP-Native Framework, there are several advantages and disadvantages. During the implementation process of creating a system, the use of this framework is fairly easy to apply for both beginner, intermediate, and advanced programmers. Because of the use of PHP-Native, beginner to intermediate programmers are quite familiar with using it. As an example case, when developing this system, using several beginner programmers, namely students together with several intermediate and advanced programmers, namely team members and authors. The students had no difficulty in developing this system using this PHP-Native Framework. The author explained the flow of the work process a little and the students were able to implement it immediately. In addition, this Framework has implemented Pretty-URL so that the Browser URL is neater, no longer displaying the .php file extension in the URL. And the location or address of the .php file in the module can be saved, so that it only displays the address specified by the developer (via the web.php file in the route directory). By implementing the setRoute() function, writing the .php file address can be hidden.

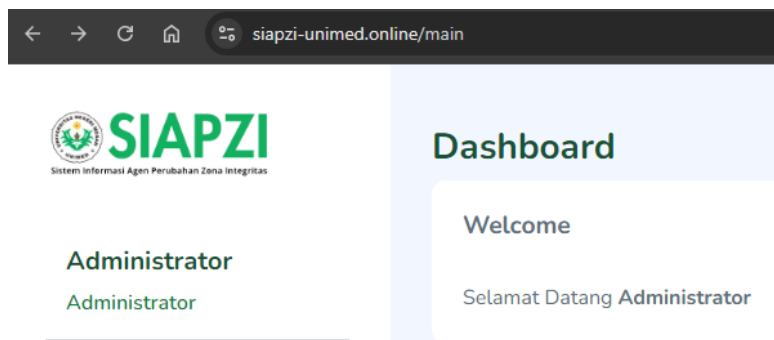


Fig. 7 Pretty-URL in Application

However, there are still some shortcomings of this Framework compared to the MVC Framework that is freely available and open source on the internet, namely this Framework has not utilized the MVC concept so that the Model, View, and Control are still mixed together and have not been separated. In addition, unlike MVC Frameworks such as Laravel, CodeIgniter, etc., this Framework does not yet have a template engine, command-line tools (such as artisan on Laravel and spark on CodeIgniter), and good Security.

There is a quite interesting difference between the PHP-Native Framework and the MVC Framework such as Laravel, CodeIgniter, etc. The PHP-Native Framework is strong enough to develop small to medium applications. While the MVC Framework is very suitable for use in developing large applications. Although technically the PHP-Native Framework is also capable of developing large applications, it can experience problems loading large data. Because this Framework is not equipped with N + 1 Problem Handling technology.

### CONCLUSION

From the research conducted, it can be concluded that the development of a web-based application for the Integrity Zone Change Agent Information System (SIAPZI) is able to provide good results when using the PHP-Native Framework. Although there are still some shortcomings, the implementation can still run as desired. This system is fully designed, developed, and implemented using the PHP-Native Framework. In the future, further development is needed for this Framework so that it can compete with the MVC Frameworks that are freely available and open source on the internet. Some things that need to be developed for this Framework are adding a mechanism between Query Logic (Model or CRUD process - Create, Read, Update, Delete), Display, and Control, Database Seeder, Handling N + 1 Problems for larger projects, and Command Line Tools so that

\*name of corresponding author



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\*name of corresponding author



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