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Web-Based Geographic Information System for Hopeful Family Program (HFP) and Non HFP in Handil Bakti Village

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ABSTRACT

Handil Bakti Village, Palaran District, Samarinda City is the oldest village in Palaran District, Samarinda City, Handil Bakti Village. The Indonesian government distributes assistance to the lower class community to help ease the burden in daily life. The assistance programs are the Hope Family Program (HFP) and Non HFP. Information and data about the Hope Family Program (HFP) and Non-HFP communities in Handil Bakti Village are very important so that the assistance provided can be right on target and poverty reduction can be achieved. Therefore, it is necessary to have the role of an information system to identify underprivileged communities and poor household data, so that the assistance distributed can be right on the intended target. One of the identification information systems that can be used is the Geographic Information System (GIS). GIS is very efficient in terms of storing, manipulating, analyzing, and displaying geographic data with the help of spatial data and attribute data. From the explanation above, the authors create a system, namely a geographic information system for the Hope Family Program (HFP) and Non HFP data whose purpose is to make it easier for various parties to access information on community data for the Hope Family Program (HFP) and Non HFP anytime anywhere via the internet, because the web can be accessed easily via desktop and mobile devices

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1. INTRODUCTION

Handil Bakti Village, Palaran Subdistrict, Samarinda City Is the oldest village in Palaran District, Samarinda City, Handi Bakti Village has a population of about 7,619 people. It has fertile agricultural land, it has existed since 1940. It was a village that was included in the administrative area of Anggana District, Kutai Regency. Kartanegara, geographically located at latitude: 0.58 and longitude: 117, why do people call the name Handil Bakti because at that time Handil Bakti was inhabited by people who like to do shifting fields which were inhabited by several tribes, namely the Banjar, Kutai tribes. and the Bugis who are chaired by a traditional leader named "Masturi" then they work hand in hand to make waterways that are used for water flow that can be used to drain rice fields for farming, continue to be directed to the river to flow in community service for residential purposes and farming. According to local residents, the river that empties into a bigger, bigger river is called Handil, because the river was made by community service by the local people, the village that was inhabited at that time was named Handil Bakti so that the village was named Kelurahan Handil Bakti in 1978. The village was changed to a Kelurahan which is part of the

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Palaran District of Samarinda City which is now Samarinda City (Kelurahan Handil Bakti 2017). The Indonesian government distributes assistance to the lower class community to help ease the burden in daily life. The assistance programs are the Hope Family Program and Non HFP. One of the identification information systems that can be used is the Geographic Information System. GIS is very efficient in terms of storing, manipulating, analyzing, and displaying geographic data with the help of spatial data and attribute data.

GIS can be expected to be a solution and be used as a means to identify and map areas that have underprivileged communities so that they can be used as a means of distributing aid to be provided by the government and other parties. The purpose of using the web on the GIS will make it easier for various parties to access information on community data for the Hopeful Family Program and Non-Hope Family Program anytime and anywhere via the internet, because the web can be accessed easily via desktop and mobile devices. (Bagye, Haqiqi, and Ashari 2019). Based on the problems and technological developments that have been conveyed, the idea emerged the need to create a web-based geographic information system to store data, display a map of the location on the Hope Family Program (HFP) and Non HFP data, and create an API for supporting applications. The author plans to design a web and API using the Laravel framework.

2. METHOD

2.1. Research Time And Place

The implementation time of this research is 8 (months) months, including proposal preparation activities starting from January 2021 to February 2021, field data collection is carried out in March 2021 to April 2021, system design and design, application creation to thesis writing is carried out in May 2021 to August 2021. This research has been carried out in Handil Bakti Village, Palaran District, Samarinda City as the object to be studied.

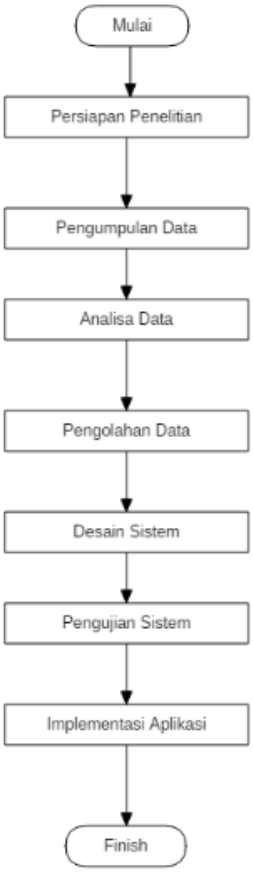
2.2. Tools and Materials

The development of this system uses the following hardware and software specifications tools and materials:

1) Hardware:
   a) Laptop, serves to create data and systems.
   b) Mobile camera, serves to take pictures of the house for data.
   c) Transportation is used to make point picks.
2) Software:
   a) XAMPP
   b) Google Map API
   c) MySql
   d) Microsoft Word
   e) Microsoft Excel
   f) Sublime
   g) Laravel Framework
   h) functions to create HFP and Non HFP Geographic Information Systems.
3) Materials used for research are:
   a) Journal/Literature studies.
   b) HFP and Non HFP data, needed for research and system development.
   c) Stationery, needed to record various information related to research.

2.3. Research Procedure

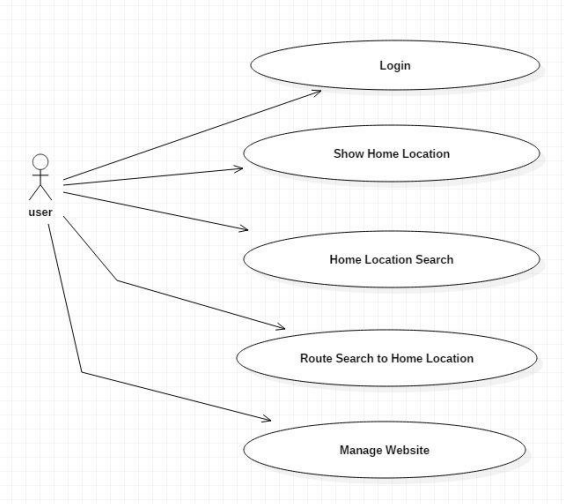
The research flowchart can be seen in Picture 1 below:



Picture 1. Research Procedure

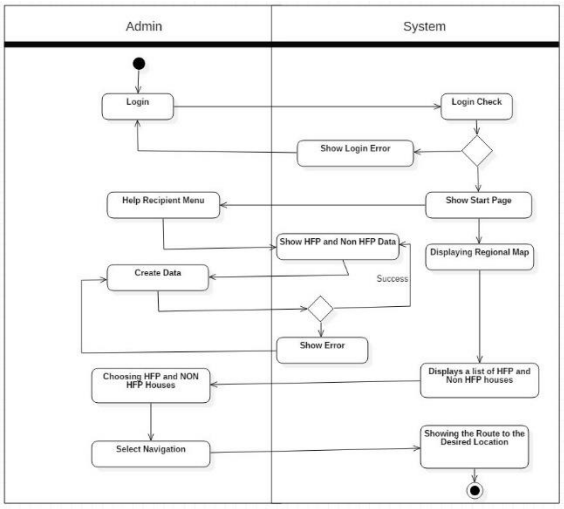
2.4. System Design

UML (Unified Modeling Language) was created to make it easier for system developers to discuss with an easy-to-understand modeling language. The types of UML diagrams used to create a Geographic Information System for the distribution of HFP and Non HFP houses are:



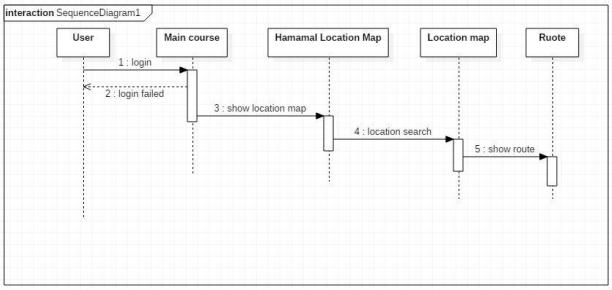
Picture 2. Use Case Diagram

Picture 2 explains this diagram will describe the interaction between users on a system that shows how the system is used.



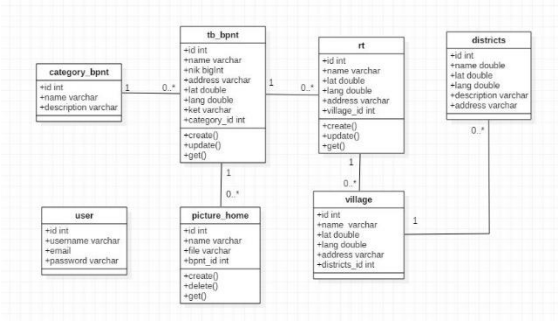
Picture 3. Activity Diagram

Activity diagrams describe how an activity flow in the designed system. The following is an Activity diagram contained in the Geographic Information System for the Hopeful Family Program (HFP) and Non HFP Data. Activity diagram can be seen in Picture 3.



Picture 4. Sequence Diagram

Sequence diagrams describe the behavior of objects in the use case by describing the life time of the object and the messages sent and received between objects. Sequence Diagram can be seen in 4.

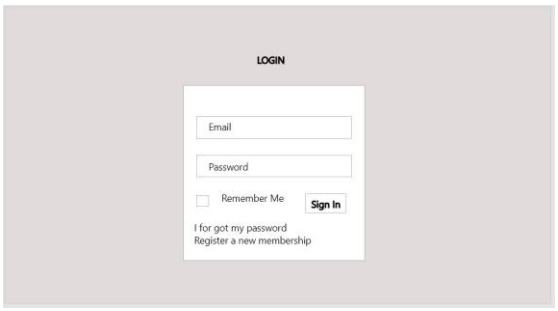


Picture 5. Class Diagram

Class diagrams or class diagrams describe the structure of the system in terms of defining the classes that will be created to build the system. Class Diagram can be seen in Picture 5.

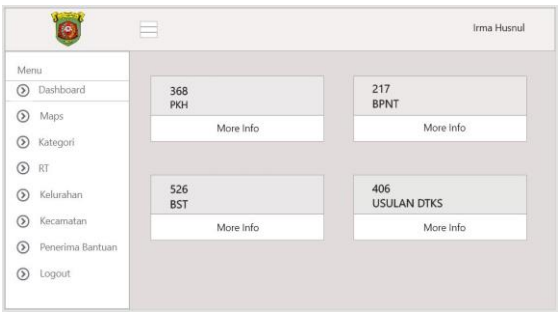
2.5. Interface Design

In making this research the interface design was made including the front page, login, user register, dashboard, and data display for each entity. The following is an overview of the design of each interface that will be created.



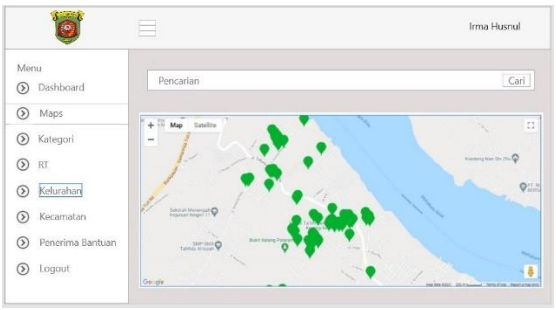
Picture 6. Login Interface Design

Picture 6 is a design for the login page display where there is a textbox for email and a password to login to the dashboard menu.



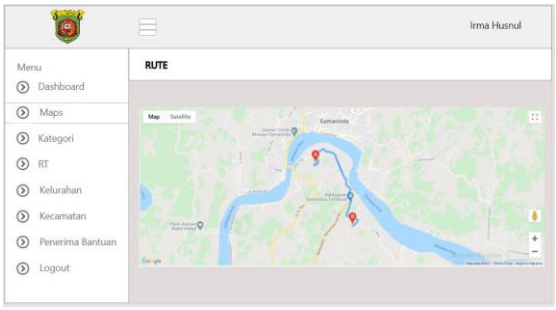
Picture 7. Dashboard Interface Design

Picture 7 is a dashboard page interface design which includes the sidebar menu, and statistical data.



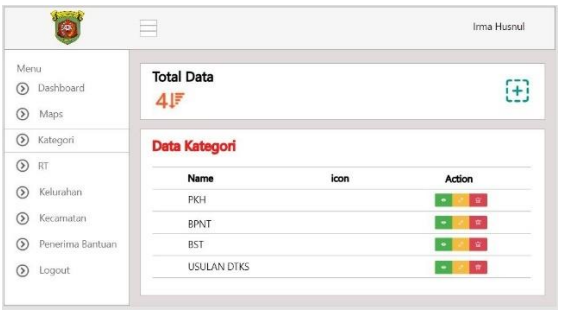
Picture 8. Maps Interface Design

Picture 8 is an interface design for the Maps page which includes several coordinate points for the houses of the beneficiaries.



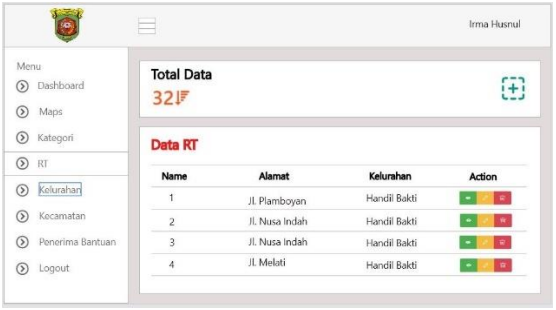
Picture 9. Route Interface Design

Picture 9 is an interface design for the Route page which includes the point of the house you want to go to, and is visible from the point of the user to the destination house.



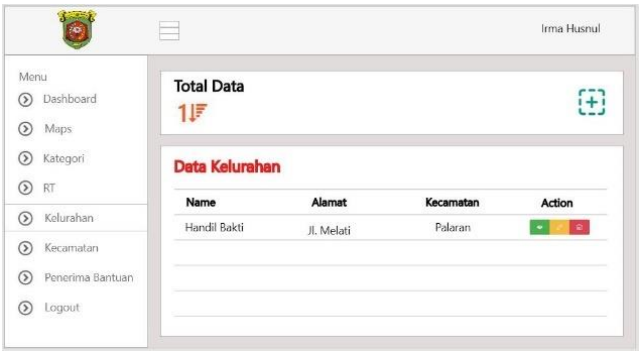
Picture 10. Category Interface Design

Error! Reference source not found.0 is an interface design for the Category page, which includes several categories, namely: HFP, NCFA, CSA and PROPOSED DTKS.



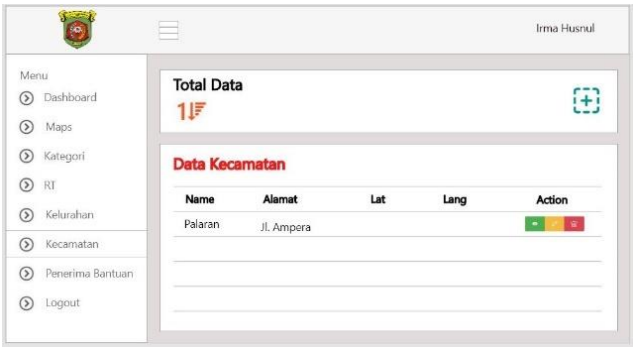
Picture 11. RT Interface Design

Picture 11 is an interface design for the RT page which includes 32 RTs located in the Handil Bakti Village.



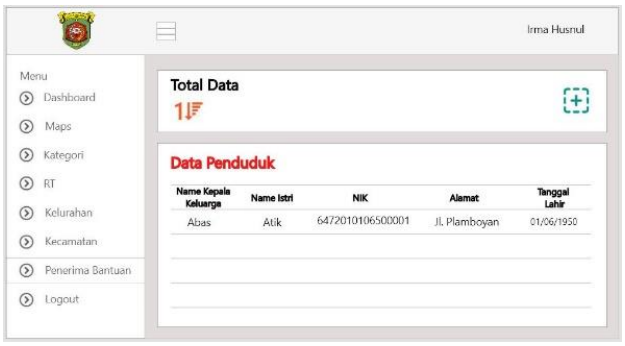
Picture 12. Village Interface Design

Picture 12 is an interface design for the village page including data and addresses for Handil Bakti Village.



Picture 13. District Interface Design

Picture 13 is a sub-district page interface design which includes data and addresses of Palaran sub-district.



Picture 14. Population Data Interface Design

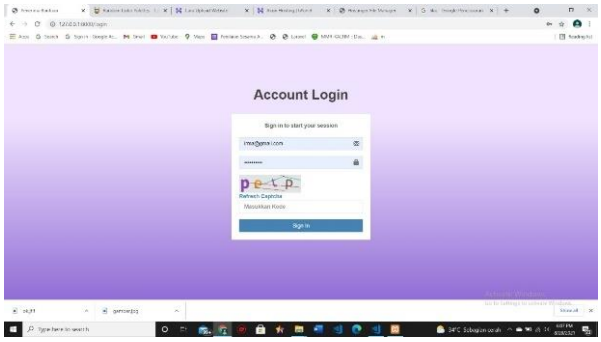
Picture 14 is an interface design for the Population Data page which includes data on beneficiaries who are in the Handil Bakti Village.

3. RESULT AND DISCUSSION

3.1. Implementation Interface

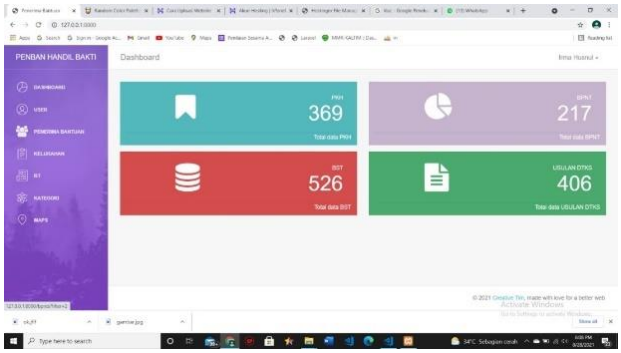
The following is a display of the results of the web development of the Geographic Information System for the Hopeful Family Program (HFP) and Non HFP Data. This web is made in such a way to support

everything that is needed by the web to run smoothly. HFP and Non HFP Web Displays.



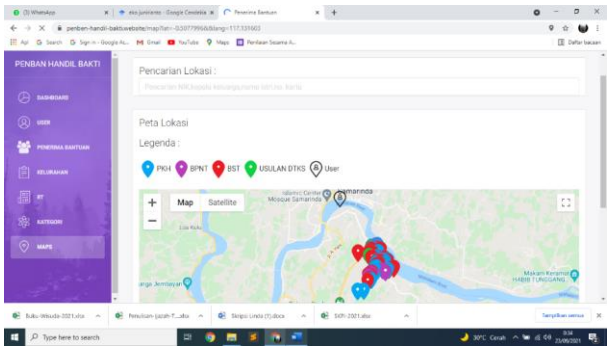
Picture 15. HFP and Non HFP Web Login Pages

Error! Reference source not found.5 is a display of the HFP and Non HFP web admin login pages where the admin on duty and has been registered, logs in by inputting email, password, and captcha before entering the HFP and Non HFP admin dashboard page.



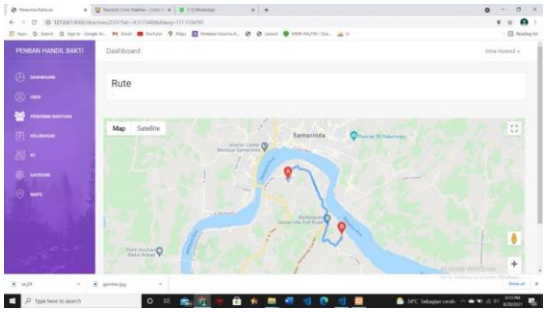
Picture 16. HFP and Non HFP Web Login Pages

Error! Reference source not found.16 is a dashboard page display where this page contains a shortcut to see the number of beneficiaries. Which is directly related to the beneficiary page according to the beneficiary category.



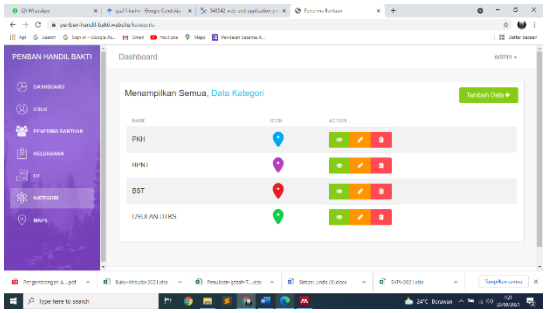
Picture 17. Map Page View

Error! Reference source not found.17 is a map page where there is a search for locations, user coordinate points, beneficiary points, and there is a legend that displays several beneficiary icons, and it appears that there are several different icons that indicate the existence of beneficiaries in different categories.



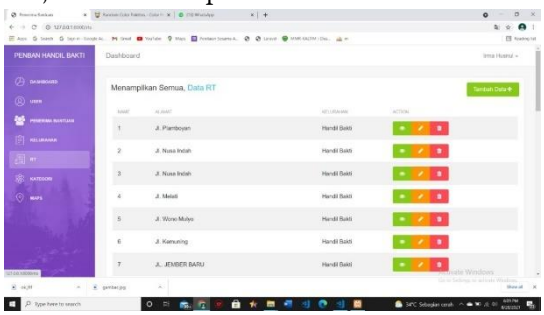
Picture 18. Route Page View

Picture 18 is a map page which contains the route to the beneficiary's house in the “handil Bakti” village.



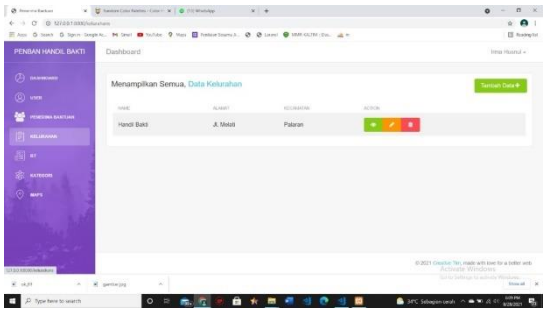
Picture 19. Category Page View

Picture 19 is a category page consisting of marker icons that are useful for distinguishing each point or marker that appears on the maps page such as the HFP, NCFA, CSA and Proposed DTKS.



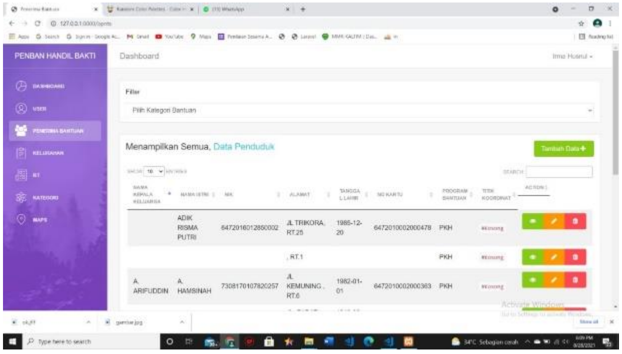
Picture 20. RT Page View

Picture 20 is a RT page where there is a table that displays all RT data in the Handil bakti sub-district.



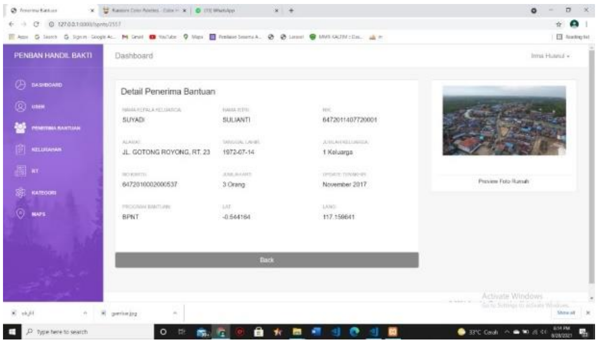
Picture 21. Village Page View

Picture 21 is a village page like the other menus that display Village data.



Picture 22. Help Beneficiary Page View

Picture 22 is the beneficiary page where there is a table that displays all data on the people who received assistance in the “Handil Bakti” village.



Picture 23. Data Detail Page

Picture 23 is a data detail page, which shows complete community data and a photo of the beneficiary's house.

3.2. API Aplication “HFP and Non-HFP”

1. HFP and Non HFP Web API

The following is a snippet of the HTTP request test results for the HFP and Non HFP Web APIs using Postman and the response results from HTTP requests in the form of json data.

2. HFP and Non HFP Web Login API

HFP and Non HFP login API are admin authentication APIs for managing beneficiary data with JWT security. For API requests, login using postman with the POST method and the URL https://penben-handil-bakti.website/api/login and fill in the body form-urlencoded in the email key and password. Here's the input process in postman.

```
POST /api/login
Host:penben-handil-bakti.website
Conten-Type: application/x-wwww-form-urlencoded
Accept: application/json
email=admin@gmail.com&password=handilbakti
```

Picture 24. Login API

Then the result in the form of a response in the form of a json where the 2nd line is the token that is obtained if successfully logged in and the 5th to 11th lines are the admin who manages the recipient's data manager based on the email and password entered.

```
1  {
2      "access_token": "eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzI1NiJ9.
       eyJpc3MiOiJodHRwczpcL1wvcGVuYmVuLWhhbmRpbC1iYWt0aS53ZWJzaXR1XC9hcGlcL2xvZ2luIiwiaWF0IjoxNjMyNzA5NTA1LCJleHAiOjE2MzI3MTMxMDUsIm5iZiI6MTY
       zMjcwOTUwNSwianRpIjoiMFRyWjhkN0VOdUtCZ0k2byIsInN1YiI6MiwicHJ2IjoiODd1MGFmMWVmOWZkMTU4MTJmZGVjOTcxNTNhMTR1MGIwNDc1NDZhYSJ9.
       ZpyPky-s7iL0pVZHgGDD9RYYJ6t2Wt-8vyBdhsNhKDo",
3      "token_type": "bearer",
4      "expires_in": 21600,
5      "user": {
6          "id": 2,
7          "name": "admin",
8          "email": "admin@gmail.com",
9          "email_verified_at": null,
10         "created_at": "2020-08-13T17:54:33.000000Z",
11         "updated_at": "2021-08-18T05:47:51.000000Z",
12         "deleted_at": null
13     }
```

Picture 25. Result API Login

3. Help Recipient Data API

The data transaction API with the GET method is an API that displays beneficiary data. To request API data the beneficiary uses the postman with the GET method and the URL https://penben-handil-bakti.website/api/bpnts and fills in the Header in the Authorizaton, Accept and Content-Type keys where the value of the Authorization key is a token bearer which we get after logging in. Here's the input process in postman.

```
GET /api/bpnts
Host: penben-handil-bakti.website
Authorization: BearereyJ0eXAiOiJKV1QiLCJhbGciOiJIUzI1NiJ9.
    eyJpc3MiOiJodHRwczpcL1wvcGVuYmVuLWhhbmRpbC1iYWt0aS53ZWJzaXR1XC9hcGlcL2xvZ2luIiwiaWF0IjoxNjMwMjM4ODE4LC
    JleHAiOjE2MzAyNDI0MTgsIm5iZiI6MTYzMDIzODgxOCwianRpIjoiVkc2YmJERGZnU1h2YzNqSSIsInN1YiI6MiwicHJ2IjoiODdl
    MGFmMWVmOWZkMTU4MTJmZGVjOTcxNTNhMTR1MGIwNDc1NDZhYSJ9.18cQSixQ4mCDzzAj1G8FOTnwTUtb59v0p7cTO0IOF4Q
Accept:application/json
Conten-Type:application/json
```

Picture 26. Help Recipient Data API

4. Category Data API

Category Data API with GET method is an API that displays the current beneficiary category. For category data API requests, use postman with the GET method and the URL https://penben-handil-bakti.website/api/getKategori and fill in the Header in the Authorization, Accept and Content-Type keys. The input process in Postman is as follows.

```
GET /api/getKategori
Host: penben-handil-bakti.website
Authorization: Bearer eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzI1NiJ9.
    eyJpc3MiOiJodHRwczpcL1wvcGVuYmVuLWhhbmRpbC1iYWt0aS53ZWJzaXR1XC9hcGlcL2xvZ2luIiwiaWF0IjoxNjMwMjM4ODE4LC
    JleHAiOjE2MzAyNDI0MTgsIm5iZiI6MTYzMDIzODgxOCwianRpIjoiVkc2YmJERGZnU1h2YzNqSSIsInN1YiI6MiwicHJ2IjoiODdl
    MGFmMWVmOWZkMTU4MTJmZGVjOTcxNTNhMTR1MGIwNDc1NDZhYSJ9.18cQSixQ4mCDzzAj1G8FOTnwTUtb59v0p7cTO0IOF4
Accept: application/json
Content-Type: application/json
```

Picture 27. Category API

Then the results in the form of a response in the form of json data where in the 3rd to 34th lines contain category data based on the beneficiary where in the 7th line is an icon and the 6th line is the name of the beneficiary by category.


```
{
    "success": true,
    "data": [
        {
            "id": 1,
            "name": "PKH",
            "icon": "storage/icon/PKH_1.png",
            "created_at": "2020-08-01T12:41:22.000000Z",
            "updated_at": "2021-08-15T00:24:14.000000Z",
            "deleted_at": null
        },
        {
            "id": 2,
            "name": "BPNT",
            "icon": "storage/icon/BPNT_2.png",
            "created_at": null,
            "updated_at": "2021-08-15T00:17:43.000000Z",
            "deleted_at": null
        },
        {
```


Picture 28. Category API Result

3.3. HFP and Non HFP Web UI/UX Testing

UI/UX testing for HFP and Non HFP websites was conducted using the SUS (System Usability Scale) questionnaire. The following data on the results of the SUS calculation are shown in **Error! Reference source not found.**.

Tabel 1. Data from the calculation of SUS web HFP and Non HFP

Respondents	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	sum	score sus
R1	3	3	3	2	3	3	3	3	3	3	29	72.5
R2	3	3	3	1	3	3	3	3	3	1	26	65
R3	3	3	3	3	3	3	3	3	3	1	28	70
R4	4	1	4	1	3	1	4	1	3	1	23	57.5
R5	4	4	4	3	4	3	3	3	4	4	36	90
R6	4	3	4	0	3	3	3	4	4	1	29	72.5
R7	3	3	3	4	3	2	3	3	4	4	32	80
R8	3	1	3	4	2	2	3	2	3	4	27	67.5
R9	4	4	4	3	3	3	4	3	4	3	35	87.5
R10	3	4	3	3	3	2	3	4	3	3	31	77.5
R11	4	3	3	3	3	3	3	3	3	1	29	72.5
R12	4	0	4	0	4	0	4	0	4	4	24	60
R13	4	3	4	1	3	1	3	2	3	1	25	62.5
R14	4	3	4	2	4	3	4	3	4	1	32	80
R15	4	1	4	1	4	1	4	1	4	1	25	62.5
R16	3	3	3	1	3	3	3	3	3	1	26	65
R17	3	3	3	3	3	3	3	3	3	3	30	75
R18	4	3	4	3	4	3	4	3	1	4	33	82.5
R19	3	3	3	3	3	3	3	3	3	3	30	75
R20	4	3	4	4	4	4	4	4	4	1	36	90
R21	3	3	3	3	3	3	3	3	3	3	30	75
R22	3	1	3	1	3	1	3	1	3	1	20	50
R23	3	1	3	1	3	1	3	1	3	1	20	50
R24	0	3	2	1	4	3	0	1	4	4	22	55
R25	3	2	4	4	4	2	4	3	4	4	34	85
Average Score												72

After calculating the respondent's data, to calculate the value of the SUS score, the average value of the SUS score was calculated as 72. This proves that the test from the Penben web can be accepted because the value obtained is above the average and gets a grade C grade. as shown in Figure 9 and get a good rating (good).

4. CONCLUSIONS

From the results of testing and analysis of the HFP and Non HFP Web and API, it can be concluded that the HFP and Non HFP webs have been successfully created with the Laravel framework where the system is managed by the admin and which makes it easier to search for beneficiary data according to the aid category and can find the location of the beneficiary's house. Each data collection can be recorded and stored in the database and can be viewed on the beneficiary's web page. The HFP and Non HFP web login APIs have been successfully created with JWT security where the authentication process for API logins uses an email and password. The beneficiary data API succeeded in displaying data based on data that received assistance in the "handil Bakti" village along with the details of the recorded data and the category data API succeeded in displaying beneficiary data according to the existing categories.

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