

PROTOTYPES INTEGRATED PARKING SYSTEM BASED QR CODE AND PAYMENT GATEWAY IN DINAS PERHUBUNGAN OF SUKABUMI CITY

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ABSTRACT

This study aims to implement a transaction payment of the cost of parking using the application in non-cash and simplify the UPT Parkir Dinas Perhubungan the city of Sukabumi in monitor report details of transactions parking lot that happens in realtime of each attendant parking official who is under the auspices of UPT Parkir Dinas Perhubungan town of Sukabumi that reporting levy parking also become more transparent . At the study's QR Code is used as a medium of interaction between the two smartphone android as well as the integration of payment gateway Midtrans as a system of payment online . User parking is sufficient to scan the QR Code which has been supplied on the application attendant parking to perform payment fee parking to note the parking should be charged the balance of which is used to carry out the payment . Users parking could do top up the balance through a payment gateway Midtrans with available various methods of payment . Based on the results of the testing , the system that was built successfully carry out the transaction cost of parking in non-cash by utilizing the technology of QR Code and can do top up the balance via the service online payment gateway Midtrans and the UPT Parkir Dinas Perhubungan, the city of Sukabumi can monitor in realtime report details of transactions parking that occurs of each attendant parking official who served. **Keywords** : park, dinas perhubungan, non-cash, qr code, online payment gateway, midtrans, transaction

1. INTRODUCTION

With the rapid development of technology today has had an impact and influence with all convenience in various aspects of daily life, both in the field of education, companies and government. Application of payment of parking fees in non-cash using QR Code technology is expected to be able to meet the needs of the UPT Parkir Dinas Perhubungan in the city of Sukabumi. Parking Unit itself is a business and Supervisory area parking in the city of Sukabumi which , as has been written in the Regulation of the

Mayor of Sukabumi Number 69 Year 2016 About the Unit Implementation of the Technical Center At the Department of Transportation .

The previous problem is that the UPT Parkir Dinas Perhubungan, the city of Sukabumi has not been able to implement the payment of parking fees in non-cash, which on the other hand the Sukabumi city government itself wants to implement all forms of non-cash transactions, one of which is the payment of parking fees which currently still uses cash as payment instrument. Another problem is often the parking attendant on duty can not meet the revenue targets specified in the current parking lot per day for various reasons whether that obstacle weather , deserted visitors or the other . Officials from the UPT Parkir Dinas Perhubungan, the city of Sukabumi town was not always able to monitor directly the income which is obtained from the clerk of parking in per day . Therefore, in the current Information and Communication Technology era, it is possible for smartphone to be integrated with qr code technology to be used as a payment medium for parking fees in the Sukabumi city parking area and integration with online payment gateways as online payments .

In this study QR Code was chosen as a medium of interaction between two smartphones . As in studies before the use of the QR Code as access quick verification of diplomas therein contains an information is important and can be accessed by fast and secure through smartphone by utilizing technology camera when do the scanning [1] . While the research more technology use qr code to be applied to smart Presence are expected d apat provide practicality and can provide solutions that presence goes with good and efficient [2] .

Service payment gateway is already much known in the world online . Its use will be very beneficial for the customer that the next day is very dependent on the internet to buy a product that is desired , so perform the transactions are online [3] . Service payment gateway that exist in Indonesia, one of which is Midtrans , who will try to be integrated in the research of this. In the research before the implementation of the payment gateway Veritrans (

when it Midtrans) as a system of payment online pulse electric , which aims to facilitate consumer that does not come directly to the outlets selling credit - related , and then from the side of a provider that is able to merkapitalasi the data transaction sale of pulses are automatically [4] . Research other system of payment by the payment gateway is based Midtrans on websites selling hosting and domain is expected to make the system of payment that is more convenient , efficient and documented with well [5].

Based on these problems and supported by previous studies, it is necessary to research about PROTOTYPES INTEGRATED PARKING SYSTEM BASED QR CODE AND PAYMENT GATEWAY IN DINAS PERHUBUNGAN OF SUKABUMI CITY.

2. RESEARCH CONTENT

2.1 Literature Review

Here it is a theory that is used as a reference in the study of this.

2.1.1 System

There are two groupings approach to the definition of the system (Fanny and Eko), there is a grouping approach on the procedure and grouping approach on the component or element nya [6] .

- a. Grouping system approach to the procedure "The system is a network working on the procedures which each relate to perform an activity in completing an objective particular".
- b. Grouping component system approach "The system is a collection of an element which relates to achieve a purpose specified ".

2.1.2 Parking

Parking is an activity to put or keep the vehicle at a place specified the duration depends on the completion of the purpose of driving it [7].

2.1.3 Parking System

In Indonesia the parking system are categorized into two types, namely the system of parking in the body of the road (on-street parking) and a system of parking in the courtyard of the parking (off-street parking). In the system in the court parking lot is classified again into two types, namely the building of parking (parking building) and parking under ground (basement parking), by setting the position of the vehicle that is parallel, parking upright straight, and parked askew [8].

2.1.4 QR Code

QR Code including technology matrix barcode 2d or also often called code rod. Developed by Denso Wave. Not like a barcode that only one side alone which contains the data, QR Code has two sides that contain the data, and this makes the QR Code is a lot in the loading of information compared with barcode (Denso Wave Inc., 2011) [9].

2.1.5 Payment Gateway

Payment Gateway is an access point to the network of banks nationwide. All transactions are online should be through the Payment Gateway for processing. In theory, payment gateway acts as a bridge between the owner of the website and institutional finance who perform the transaction [4].

3. METHOD AND DISCUSSION

3.1 Data Collection Method

The following methods of collection that used role in the task of ending this are as follows :

- a. Study of literature
Learn about various topics related to research in the form of journals and books.
- b. Field Study
- c. Visit the place to be studied and conduct data collection in person. This includes :
 1. Interview
The data collection technique is done by way of question and answer directly to the informant concerned .
 2. Observation
The data collection technique by direct observation in the field.

3.2 Software Development Methods

Design model were used, namely by using a model prototyping. Model prototyping is a technique to gather information specific about the needs of information users are fast. Focusing on the presentation of aspects of device software that that will be visible to customers or users [10].

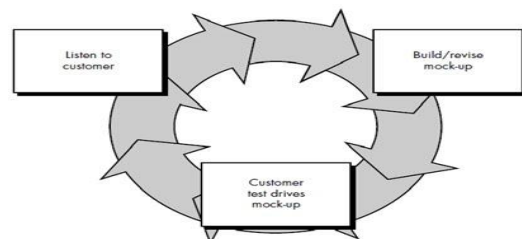


Figure 1 Prototyping model

3.3 Problem Analysis

Based on observations and interviews, the analysis of existing problems includes the following matters :

1. UPT Parkir Dinas Perhubungan the city of Sukabumi has not been able to implement the transaction payment of parking fees in non- cash.
2. Difficulties of UPT Parkir Dinas Perhubungan, the city of Sukabumi in directly monitoring the revenue of the parking operators from each parking officer.

3.4 Proposed New Business Model

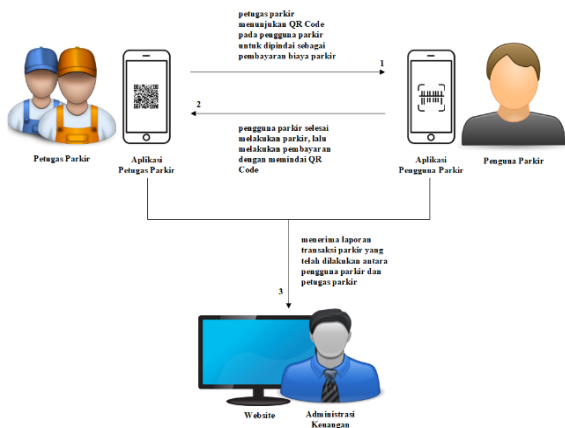


Figure 2 The proposed new business model
The following explanation in Figure 2 above:

1. Officers parking showed qr code that has been in generated in the system after recording the number of police and determine the type of vehicle users park .
2. The parking user scans the qr code provided by the parking attendant and the parking user must have a balance on the application in order to make a payment.
3. Upon the occurrence of a transaction between the attendant parking and the parking, concierge administration of finance UPT Parkir Dinas Perhubungan, the city of Sukabumi receive detailed reports of transactions parking of every officer and area parking particular.

3.5 General System Architecture

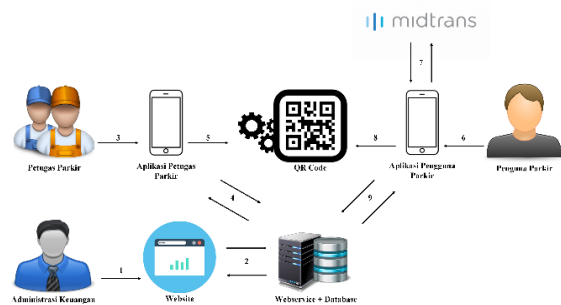


Figure 3 General architecture

The following explanation in Figure 3 above :

1. Financial administration registers the parking attendant to the website to be able to access the parking attendant application.
2. Website saves parking attendant registration data to database.
3. The parking attendant fills in the police number and determines the type of vehicle in the parking attendant application.
4. Applications attendant parking storing the data the number of police and types of vehicles to the database.
5. Applications attendant parking generate QR Code with the data code transactions therein.
6. Parking user doing top up balance and request token then do the payment to the server Midtrans.
7. Midtrans give response and display was a wide variety of payment methods, and the park choose the method of payment and complete the payment.
8. Application users parking meng - scan the QR Code as the payment of costs of parking.
9. The parking user application calls the transaction code from the database that has been generated into a QR Code when a payment scan is performed.

3.5.1 Architecture of the Parking Attendant's Mobile Application System

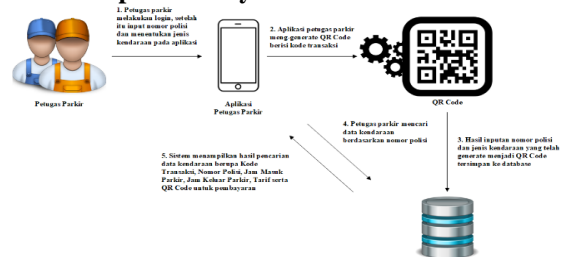


Figure 4 Architecture of a parking attendant's mobile application system

The following explanation in Figure 4 above:

1. Officers parking doing login.
2. Parking officers enter the data of the parking user vehicle in the form of a police number and determine the type of vehicle in the application.
3. System generate a QR Code that contains the code of the transaction.
4. The input of the police number and type of vehicle is stored in the database.
5. Parking attendants look for vehicle data based on police numbers that have been stored previously into the database.
6. The system displays search results in the form of Transaction Code, Police Numbers, Parking Entry Hours, Parking Exit Hours, Rates and QR Code.

3.5.2 Architecture of the Parking User Mobile Application System

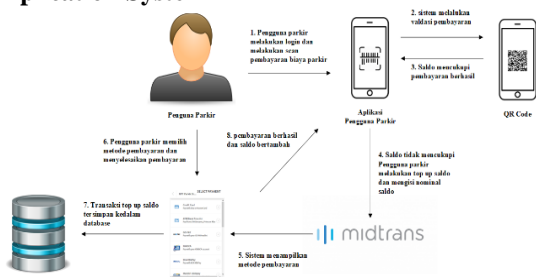


Figure 5 Architecture of the parking user mobile application system

The following explanation in Figure 5 above :

1. Users parking doing login.
2. Users parking open menu scan the QR code and perform a scan payment of fee parking.
3. The system validates payments, if a sufficient balance of transactions is successful.
4. The balance does not meet the parking do top up balance and input the number of nominal balances are needed.
5. The system displays several payment methods.
6. The parking user chooses the payment method and completes the payment.
7. Top up transactions for parking user balances are stored in the database.
8. The system displays a successful payment and the balance increases.

3.6 Analysis of Transaction Codes and QR Codes

Aims to identify the combination of numbers in the transaction code that will be used as well as how the transaction code process is *generated* into a *qr code* which will be used as a transaction media for parking fee payments.

3.6.1 Analysis Transaction Codes

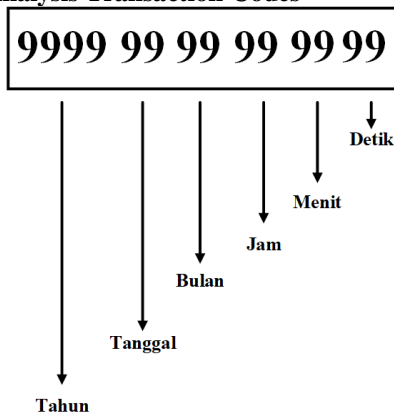


Figure 6 Transaction code to be built

1. The transaction code to be developed is in the form of Year , Month, Hour, Minute and Second.
2. The transaction code is generated by the web service during the process of storing the parking transaction data to the database , which later the transaction code is generated into a qr code.
3. The use of a combination of numbers codes deal with Hours, Minutes and Seconds is to be always

different when done generation at the time specified . While the use of Year , Month and Date is also to find out when the transaction took place when it is stored in the database.

3.6.2 Analysis QR Code

A. Generation (Generate) QR Code On System

The step how the transaction code is generated into a qr code. Generation qr code This occurs when the attendant parking doing activities on applications that will generate the code transactions that have been raised on a web service.

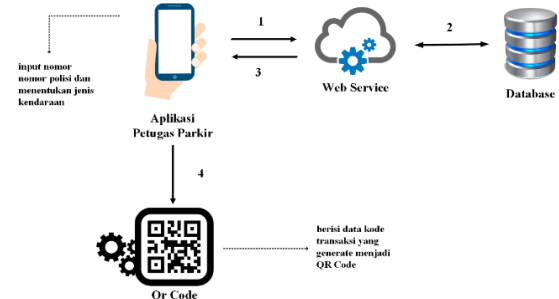


Figure 7 Qr code generation on the system to be built

The following is an explanation in Figure 7 above :

1. In the application attendant parking , concierge input up to advance a number of police and determine the type of vehicle and me request to the web service for the storage of data of vehicles into the database.
2. Web services perform the generation of code transactions and stored into the database.
3. After successfully stored , the parking attendant application will get the transaction code from the web service.
4. The transaction code is obtained and then generated into a QR code.

B. Scanning (Scan) QR Code On System

In the process of scanning qr code is done at the application users park to read the data code transactions are contained in qr code.

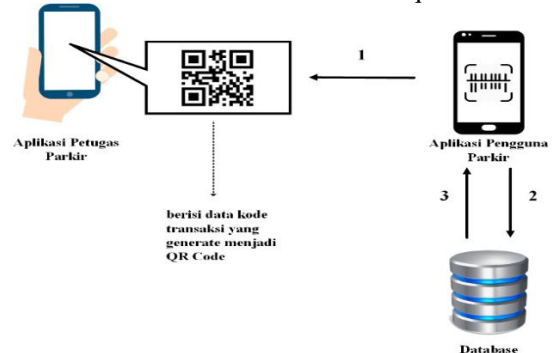


Figure 8 Qr code scanning on the system to be built

The following explanation in Figure 8 above :

1. Users parking perform a scan on a qr code that has been provided on the application attendant parking and contains the code of transactions that have been raised previously.

2. Call the transaction code data along with the parking transaction details.
3. The transaction code is obtained , the parking user has finished making the payment.

3.7 Payment Gateway Analysis

Analysis Payment Gateway is intended to identify the Payment Gateway that will be integrated, which will be used for the transaction payment online top up the balance of the car park. Payment Gateway that is used in the system is that Midtrans

3.7.1 Midtrans Integration

So that the system can perform payments through payment gateway Midtrans required several requirements that must be met include :

1. List of Accounts MAP (Merchant Administration Portal) Midtrans, need to know accounts MAP Midtrans divided into two parts, namely modes Sandbox and Production.
 - a. Sandbox , is a development / testing period and no actual transactions will occur.
 - b. Production , Used when a merchant has been doing the process of integration and is ready to go live so happen transactions that actually. Integration of payment gateway Midtrans to be used that mode Sandbox which is a mode t esting or not the actual transaction.
2. Getting Client Key and Server Key obtained after the account signup MAP (Merchant Administration Portal) Midtrans.

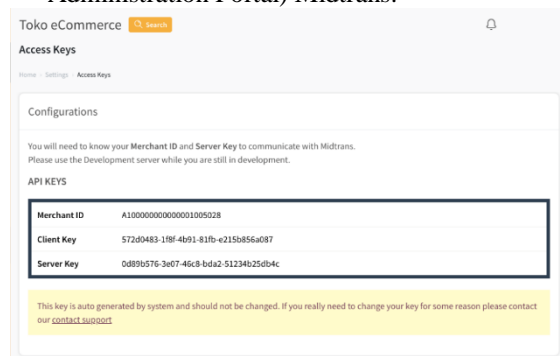


Figure 9 Examples of *client* and *server key* midtrans

3. Midtrans SNAP integration
SNAP Midtrans is a payment portal that allows merchants to use the Midtrans payment system by bringing up the Midtrans payment page directly on the user's application payment page. For the process of integrating SNAP Midtrans with the application, through several stages, namely :

- a. Get a Snap Token
On stage is at least there are 3 information that is needed to get Snap Token namely Server Key, ID Transaction and Nominal Transactions.

```
<?php
require_once(dirname(__FILE__) . 'Veritrans.php');

//Set Your server key
Veritrans_Config::$serverKey = "<Set your ServerKey here>";

// Uncomment for production environment
// Veritrans_Config::$isProduction = true;

Veritrans_Config::$isSanitized = true;
Veritrans_Config::$is3ds = true;

$transaction = array(
    'transaction_details' => array(
        'order_id' => "<your order_id>",
        'gross_amount' => 10000 // no decimal allowed
    )
);

$snapToken = Veritrans_Snap::getSnapToken($transaction);
?>
```

Figure 10 Example of a PHP source code for getting a snap token

- b. Displays the Snap Payment Page
On stage is carried out to display the page payment snap Midtrans and it takes at least 3 information that Client Key, Snap.js and Snap Token.

```
<html>
<head>
<script type="text/javascript"
src="https://app.sandbox.midtrans.com/snap/snap.js"
data-client-key="<Set Your Client Key Here>"></script>
</head>
<body>
<button id="pay-button">Pay!</button>
<script type="text/javascript">
var payButton = document.getElementById('pay-button');
payButton.addEventListener('click', function () {
    snap.pay('<?php echo $snapToken; ?>'); // store your snap token here
});
</script>
</body>
</html>
```

Figure 11 Example of PHP source code showing payment page

Referring to the steps above, the results will display a payment page with various payment methods as shown below.

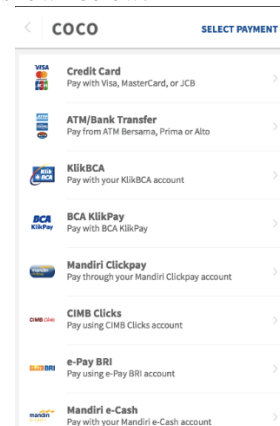


Figure 12 Example of a midtrans snap payment page

- c. Transaction Status
To find out the status of a transaction that occurs is done by way of accessing your account MAP Midtrans, merchants can check the status of the transaction through a payment on account MAP Midtrans. Here's an example of the status of the transaction which is carried out as in the image below.

PAYMENT TYPE	DATE & TIME	ORDER ID	CUSTOMER EMAIL	AMOUNT	STATUS
Bank Transfer	22/04/2019 14:29	order-va-bca	noreply@example.com	Rp. 41,000	FAILURE
Credit Card	16/01/2019 12:29	CC-01	noreply@example.com	Rp. 10,000	SUCCESS

Figure 13 Example of the status of a failed and successful transaction on Midtrans MAP

d. Handling Notifications

Following is the sample code to accept HTTP (POST) and JSON objects using the Veritrans PHP library. This file is a PHP file that will be in execution when the URL endpoint notifications.

```
<?php
require_once('Veritrans.php');
Veritrans_Config::$isProduction = false;
Veritrans_Config::$serverKey = '<your serverkey>';
$notif = new Veritrans_Notification();

$transaction = $notif->transaction_status;
$type = $notif->payment_type;
$order_id = $notif->order_id;
$fraud = $notif->fraud_status;

if ($transaction == 'capture') {
    // For credit card transaction, we need to check whether transaction is
    // challenge by FDS or not
    if ($type == 'credit_card') {
        if ($fraud == 'challenge') {
            // TODO set payment status in merchant's database to 'Challenge by FDS'
            // TODO merchant should decide whether this transaction is authorized or not
            in MAP
            echo "Transaction order_id: " . $order_id . " is challenged by FDS";
        }
        else {
            // TODO set payment status in merchant's database to 'Success'
            echo "Transaction order_id: " . $order_id . " successfully captured using " .
            $type;
        }
    }
}
else if ($transaction == 'settlement') {
    // TODO set payment status in merchant's database to 'Settlement'
    echo "Transaction order_id: " . $order_id . " successfully transferred using " .
    $type;
}
else if ($transaction == 'pending') {
    // TODO set payment status in merchant's database to 'Pending'
    echo "Waiting customer to finish transaction order_id: " . $order_id . " using " .
    $type;
}
else if ($transaction == 'deny') {
    // TODO set payment status in merchant's database to 'Denied'
    echo "Payment using " . $type . " for transaction order_id: " . $order_id . " is
    denied.";
}
else if ($transaction == 'expire') {
    // TODO set payment status in merchant's database to 'expire'
    echo "Payment using " . $type . " for transaction order_id: " . $order_id . " is
    expired.";
}
else if ($transaction == 'cancel') {
    // TODO set payment status in merchant's database to 'Denied'
    echo "Payment using " . $type . " for transaction order_id: " . $order_id . " is
    canceled.";
}
}>
```

Figure 14 Example of source code accepting http (post) and json objects

e. Get Status Process

At this stage is the process of taking information from a transaction that has occurred. Use this get status process if the http(s) notification sent by Midtrans is received late by the merchant, the following is an example source code for the get status process by using the Veritrans PHP library.

```
<?php
include_once(dirname(__FILE__) . '/veritrans/Veritrans.php'); //include PHP library
Veritrans_Config::$serverKey = <Your Server Key>;
Veritrans_Config::$isProduction = <true / false>; // false = sandbox
$order_status_obj = Veritrans_Transaction::status($order);
$status = $order_status_obj->transaction_status;
}>
```

Figure 15 Example of source code get transaction status

Following is the successful response to the get status process.

```
{
  "status_code": "200",
  "status_message": "Success, transaction found",
  "transaction_id": "249fc620-6017-4540-af7c-5a1c25788f46",
  "masked_card": "481111-1114",
  "order_id": "example-1424936368",
  "payment_type": "credit_card",
  "transaction_time": "2015-02-26 14:39:33",
  "transaction_status": "capture",
  "fraud_status": "accept",
  "approval_code": "1424936374393",
  "signature_key":
  "2802a264cb978fbc59f631c68d120cbda8dc853f5dfdc52301c615cf4f1e7a0b09aa...",
  "bank": "bni",
  "gross_amount": "30000.00"
}
```

Figure 16 Response successfully get transaction status

Here is the response failed to get the status.

```
{
  "status_code": "404",
  "status_message": "The requested resource is not found"
}
```

Figure 17 Response successfully get transaction status

1. RESULT AND TESTING

4.1 QR Code Testing

4.1.1 Generating a QR Code

- At this stage the parking attendant fills in the Police Number "D3957RX" and the type of vehicle "Motor" with an automatic rate of Rp. 1,000.



Figure 18 The process of generating qr code and transaction code (1)

- Once saved, in this process the qr code and transaction code are generated, after which the vehicle data details can be displayed along with the qr code.

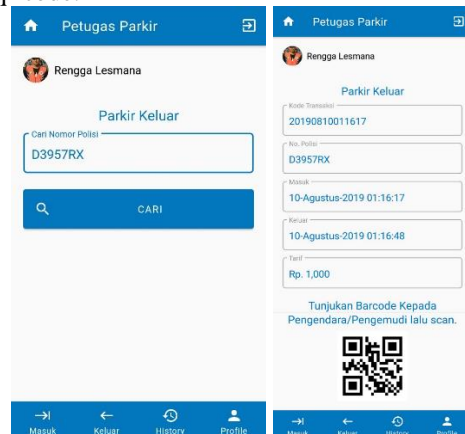


Figure 19 The process of generating qr code and transaction code (2)

4.1.2 Scan the QR Code

1. At this stage the parking attendant shows details of the parking transaction along with the qr code to be scanned by the parking user.

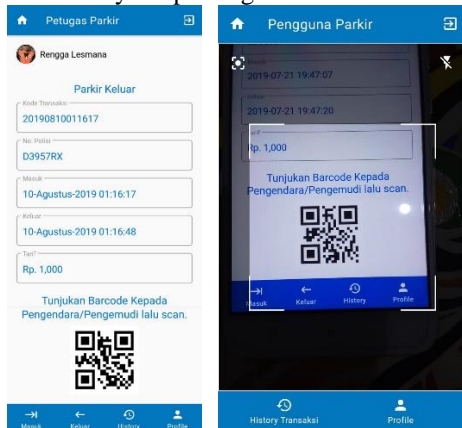


Figure 20 The qr code scanning process for paying parking fees

2. After done scanning qr code as the payment of costs of parking by the parking lot, then the application of the parking will display the notification "Berhasil". In application parking attendant displays the status of the parking "Parkir Selesai" once done scanning the previously "Parkir Belum Selesai".

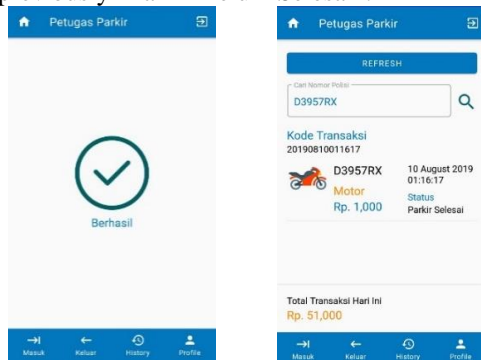


Figure 21 After the qr code scanning process

3. Status parking on the website was changed once made the process of scanning qr code into a "Parkir Selesai" which previously was "Parkir Bekum Selesai".

Data Transaksi Parkir

Menampilkan Transaksi Parkir

Cetak Laporan

Display 10 records

No	Kode Transaksi	Petugas	No. Polisi	Jenis Kendaraan	Masuk Area Parkir	Keluar Area Parkir	Area Parkir	Status Parkir	Tarif
1	20190810011617	Rengga Lesmana	D3957RX	Motor	10 August 2019 01:16:17	10 August 2019 01:48:34	jalan Ahmad Yani	Parkir Selesai	Rp. 1,000

Showing 1 to 1 of 1 entries

Figure 22 Status parking after done scanning qr code (website)

Data Transaksi Parkir

Menampilkan Transaksi Parkir

Cetak Laporan

Display 10 records

No	Kode Transaksi	Petugas	No. Polisi	Jenis Kendaraan	Masuk Area Parkir	Keluar Area Parkir	Area Parkir	Status Parkir	Tarif
1	20190810011617	Rengga Lesmana	D3957RX	Motor	10 August 2019 01:16:17	Parkir Belum Selesai	jalan Ahmad Yani	Parkir Belum Selesai	Rp. 1,000

Showing 1 to 1 of 1 entries

Figure 23 Status parking before done scanning qr code (website)

4.2 Payment Gateway Testing

1. In the parking user application, the user goes to the Top Up menu to replenish the balance and fill in the required amount.

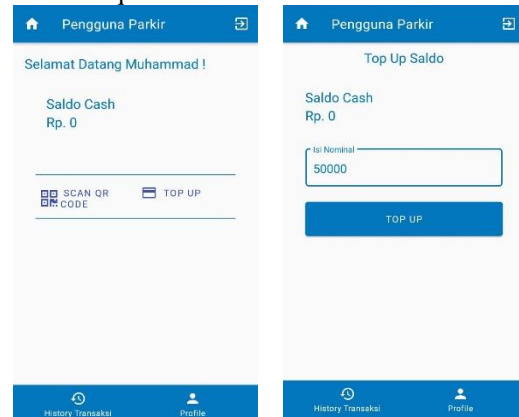


Figure 24 Page top up user parking application balances

2. After pressing the button top up, the application will download direct to the browser and then press the button "Pay" it will lead page payment with various kinds of methods of payment.

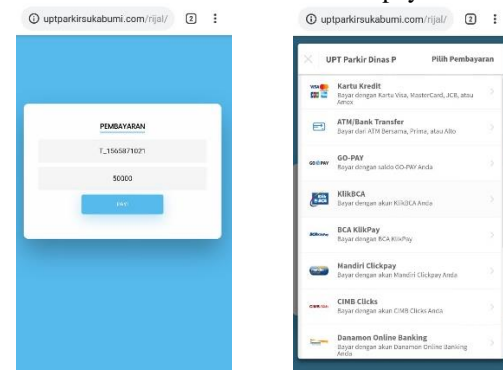


Figure 25 Midtrans payment method page

3. On the pages of this method of payment that is chosen as an example that a payment by using a card credit.

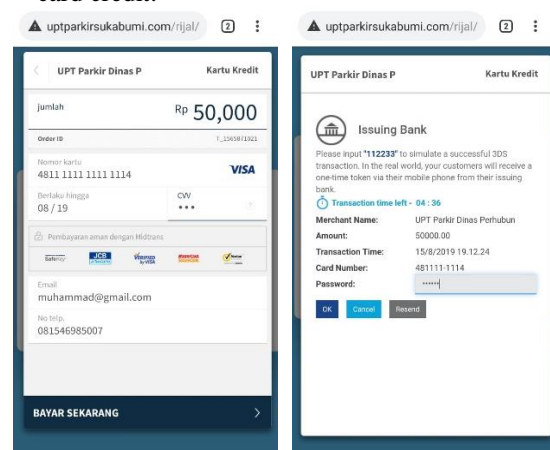


Figure 26 The VISA credit card payment method page

4. After all the steps are done Midtrans displays notification of the successful transaction and the balance increase.

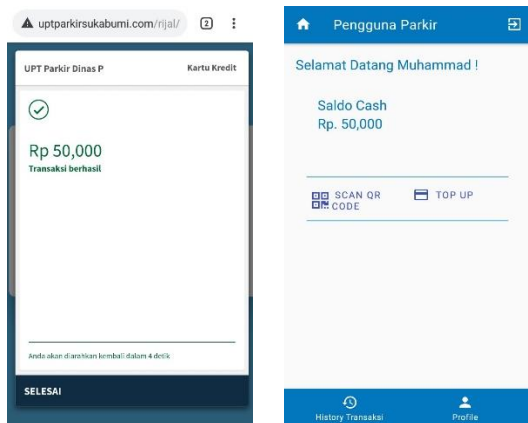


Figure 27 Successful top up balance transaction

It should be noted that the implementation of the Midtrans payment gateway above uses Sandbox (testing) mode, so the transaction is not a real transaction, but a dummy transaction.

4.3 Testing the QR Code Scan Distance

Table 1 Testing the distance of qr code scanning by the camera

Jarak	Hasil
5 cm	Terbaca
10 cm	Terbaca
15 cm	Terbaca
20 cm	Terbaca
25 cm	Terbaca
30 cm	Tidak Terbaca

Based on the results of testing at the tables within the scanning qr code by the camera shows that the distance scanning qr code from within the most close is ± 5 cm and the distance of the most distant is ± 30 cm. Acquired right that the maximum distance until qr code can be scanned is 25 cm, and for a distance of 30 cm and so on qr code not be readable.

5. CLOSING

5.1 Conclusion

At the end of this study, it can be concluded that the prototype of the parking system application successfully implemented a non-cash transaction utilizing qr code technology as a payment media for parking fees with a scan distance of 5 cm to 25 cm, besides that this application can also facilitate the UPT Parkir Dinas Perhubungan Sukabumi city in directly monitoring the revenue or parking transactions that occur in realtime from each parking officer. Applications can also top up balances with Midtrans payment gateway as an online payment even though the transaction is not an actual transaction.

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