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Software Requirement Specification

V 0.2

DUPay

A local payment solution with popular MFS/DFS

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# Introduction

DUPay is an online Payment Gateway System in Bangladesh, that allows both individuals and businesses to accept secured payments over internet for selling services or products. Using DUPay web portal, registered merchant can accept secured online payments, manage e-wallet, make payout to bank account, manage customer subscriptions/products/services, view reports/settlements, and other features. On the other side, registered/unregistered customer(s) can make secured online payments, configure payments options, mange e-wallet, view reports etc. It is not necessary for a customer to have an DUPay account for payments service; They can also pay with their wallet services (bkash, rocket, surecash) only.

## Purpose

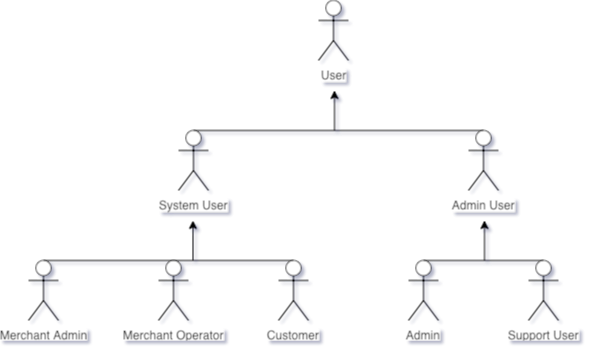
The purpose of this document is to present the describe the features of the payment gateway for both, the users and the developers. The first version should contain the details of the system and the corresponding users along with the components needed to be built. This document is intended for the audience seeking a detail idea of the project. The purpose of this document will be changed over time depending on the completeness business & technical specifications of the entire project.

## Scope

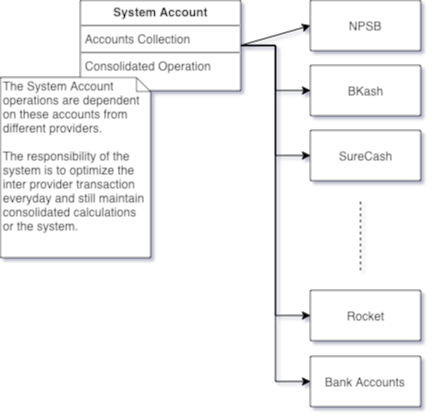
The intended software system will provide web/mobile-App interfaces with the popular digital wallet systems in Bangladesh. There are a few MFS or DFS solution available in the market and the users should be facilitated with the bill payments, online purchases different prepaid or post-paid utilities. DUPay is designed to be a consolidated payment platform, where the customer will pay with or without his/her account in the system, using at least one digital wallet system and the system will take care of the rest. The Merchants will have the benefit to have a collection system which is dynamic in nature and s/he will never need to be worried about transferring the bills/amount to the corresponding business wallet. This will save the time and money for the Merchants.

## Definitions, Acronyms & Abbreviation

Users: Merchant Admin (UMA), Merchant Operator (UMO), Customer (UC), Admin (UA), Support Operator (USO).



Accounts: Merchant (AM), Customer (AC), System (AS)



## Overview of the Document

Overview of the Document – *<PENDING>*

# Overall Description

## Systems Summary

The proposed software systems will have a central payment engine. The merchants/billers will be able to register and manage different bill entity and will be able to download sample code or JS snippet for integrating payment buttons. In addition to these features, the registered billers will be able to see the reports about the transactions. The system should offer the interfaces depending on the type of the biller. On the other hand, the wallet source (bkash, rocket, surecash) should be integrated depending on the corresponding manual for integration.

## Functional Requirements Specification

### Merchant Use Cases

#### Registration

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Merchant will be able to register himself/ herself |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The Merchant will create an account entity using his email and mobile number 2. After mobile number verification the Merchant will have to upload necessary documents (e.g. Trade License of the business, national ID of the owner) 3. The submission of the form will be at the PENDING state and after manual verification by the admin, the account will be created. |
| Xref: |
|  |

#### Login

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The merchant will be able to login in the system for checking the account status & transaction reports |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The merchant will brose the portal and provide the username & password 2. Upon successful verification of the credentials, the merchant will be able to login to the system. |
| Xref: |
|  |

#### Configuration

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Merchant can configure its properties for taking payment |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The Merchant can choose its type from a predefined set of options 2. Either choose to enable the default payment process or can configure the payment enquiry parameters and payment parameters. 3. S/he can configure JS SDK options. |
| Xref: |
|  |

#### SDK Download

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Merchant can download the JS SDK for website/shopping cart |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The Merchant will be able to download the JS SDK, once configured properly. 2. Otherwise, the Merchant will be redirected to the configuration page. |
| Xref: |
|  |

#### Transaction Query

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Merchant can enter the Customer mobile number or the Transaction number |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The Merchant submits the transaction number and gets the details of transaction if the transaction belongs to the Merchant. 2. In case of the Customer Mobile, the Merchant will be able to see the transactions for the Merchant Customer combination. |
| Xref: |
|  |

#### Reverse Request

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Merchant can request for reversing any transaction |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The merchant will submit a request for reversing the transaction 2. The reverse request must be followed by a submission of the password of the Merchant Account |
| Xref: |
|  |

#### Transfer Request

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Merchant can submit a request for transferring the money to the corresponding account |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The merchant will submit a request for transferring a certain amount of money to the bank account or to the MFS/DFS wallet. 2. The transfer request must be followed by a submission of the password of the Merchant Account. |
| Xref: |
|  |

#### Reports

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Merchant can view/download certain reports necessary for running the business |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The Merchant will enter some options and duration for reports. 2. The system will provide the paginated list. 3. The system will also offer the downloadable excel file as reports. |
| Xref: |
|  |

### Customer Use Cases

#### Payment Enquiry

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| Customer can ask for the status of the intended payment |
| Channel: |
| Web, Mobile App |
| Initial Step by Step Description: |
| 1. The Customer can input the transaction id, reference mobile number and date of payment. 2. The Customer can check the status of the payment. |
| Xref: |
|  |

#### Payment from SDK

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| From Web portal, the JS SDK will load secured iframe based payment interface for MFS/DFS payment. |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The Customer will checkout using the DUPay systems 2. The DUPay SDK will return with the token and hash for the confirmation screen. 3. The Customer will pay using the preferred MFS/DFS systems and submit the Transaction ID and reference mobile number in the confirmation screen. 4. An additional OTP step may be added. |
| Xref: |
|  |

#### Payment Submission

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Customer will use this option for Biller payment like (DESCO, DPDC, TITAS etc) |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The Customer will execute the transaction in his preferred MFS/DFS network 2. Initiate the bill payment in the DUPay system and submit the payment details. 3. The OTP verification must take place. |
| Xref: |
|  |

#### Registration

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Customer may register in the system for profiles service |
| Channel: |
| Web, Mobile App |
| Initial Step by Step Description: |
| 1. The Customer can register in the system using the mobile number. 2. The Customer mobile number will be verified by the OTP. 3. The system will register the Customer to the system. |
| Xref: |
|  |

#### Login

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Registered Customer will be able to login to the system. |
| Channel: |
| Web, Mobile App |
| Initial Step by Step Description: |
| 1. The customer will provide the user mobile and password for logging in to the system |
| Xref: |
|  |

#### Transaction History

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Registered Customer will be able to check the Transaction history |
| Channel: |
| Web, Mobile App |
| Initial Step by Step Description: |
| 1. The customer will login to the system 2. Choose date range for viewing the transaction list. |
| Xref: |
|  |

### Admin Use Cases

#### Merchant Activation

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Admin user can check the pending Merchants and approve them |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The Admin user can see the list of pending Merchants in the corresponding dashboard. 2. Check the details of the Merchant 3. Activate or Deny the Merchant. |
| Xref: |
|  |

#### User (Merchant/Customer) Management

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
|  |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The Admin user can change the status of the Merchant. 2. Should be able to change other configuration parameters as well |
| Xref: |
|  |

#### Account Posting (Merchant Transfer)

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Admin user will process the transfer request |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The Admin user will be able to see the transfer request from the merchant in the dashboard. 2. He’ll transfer the amount manually (EFT, NPSB or transfer) from the Master Account to the corresponding bank account of the merchant. 3. He’ll enter the corresponding posting with the corresponding transaction reference. |
| Xref: |
|  |

#### Reverse Request Processing

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Admin user will process the reverse request |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The Admin user will be able to see the reversal request in the dashboard. 2. Depending on the external systems, the Admin may approve or reject the request. |
| Xref: |
|  |

#### Custom Notification

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Admin user may create notification entry and send it to specific Merchants/Customers |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The admin user will be able to create custom notification object (Email, SMS) 2. He’ll create a target group 3. Send notification |
| Xref: |
|  |

#### Reports

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Admin user has the access to the reports |
| Channel: |
| Web |
| Initial Step by Step Description:   1. The Admin user will choose the search criteria 2. The system will show the result |
|  |
| Xref: |
|  |

### Support User Use Cases

#### Transaction Search

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Support User will be able search for reported transaction |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The Support User submits the transaction number and gets the details of transaction. 2. In case of the Customer Mobile, the Support User will be able to see the transactions. |
| Xref: |
|  |

#### Ticket Management

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Support user can take queries from the customers and create a support ticket |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The Support user can create, update and close the ticket |
| Xref: |
|  |

### Payment System Use Cases

#### Integration APIs

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| Integration of biller will be automated |
| Channel: |
| Web/REST API |
| Initial Step by Step Description: |
| 1. There will be a generic implementation for integrating any biller 2. The Admin user will be able to configure the specific integration contract 3. The system developer will extend the default implementation to integrate the biller |
| Xref: |
|  |

#### Accounts Management

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The Account of the System comprises of the different master accounts/wallets at different systems |
| Channel: |
| Web, Manual |
| Initial Step by Step Description: |
| 1. The system expects to have integration with the wallet systems, so that the transactions can be stored in the system and can be used for different operations. 2. The accounts system will sum up the different collection accounts and show the consolidated amount. 3. Posting of merchant transaction will be manual |
| Xref: |
|  |

#### JS SDK for web

|  |
| --- |
| Diagram: |
|  |
| Brief Description: |
| The JS SDK is the component for ecommerce payment integration |
| Channel: |
| Web |
| Initial Step by Step Description: |
| 1. The customer wants to checkout 2. The ecommerce system will generate a reference ID and send it to the DUPay systems (along with the total bill amount) for generating security token. 3. The SDK will prompt the user to complete the transaction and then submit the transaction related information. 4. The system will cross check the security token and the payment details in its corresponding account/wallet for confirmation. |
| Xref: |
|  |

## External Dependencies

### Biller Server

The biller server is the external system where the billing information will be available for querying and updating information. Most likely, these servers are from the utility services or fixed amount for billable items (DESCO, TITAS, DPDC etc). The biller server may expose REST API for enquiry of the bill amount against bill number or userId-month combination or any custom combination. The biller system may also expect real time update of the billing information.

### Merchant Website

The Merchant Website is actually the ecommerce platform or online payment collection portal. The website developer will use the JS SDK for processing the payment. The tough part of communicating with the customer and maintaining security token will be handled by the provided JS SDK.

### Hosted Bill Collection System

This is a server system, which is more like the biller server in functionality. But, the server is not supposed to be managed by the biller/merchant themselves; rather, they’ll prepare a forms based enrollment system that will generate the billIDs dynamically. Most cases, the short-term payment items (e.g. admission fees) work in this model.

### Local Wallets (MFS/DFS)

The main source of digital wallet for this payment system is basically the available MFS(bkash, rocket, surecash) or DFS(iPay, Dmoney) wallets. Different banks has their own mobile payment solutions(UPay, OkWallet etc) as well.

### National Payment Switch (NPSB)

Bangladesh Bank has already introduced a real time transfer switch for all banks and MFS wallets. Though, only a few banks are connected to this network right now, most of the financial organization will be a part of this within a couple of years.

## Non-Functional Requirements

The system depends on the integration with the payment system and banks. If the actual application cannot have the API connection with the actual payment partner or wallet partner, the corresponding system could be solved by building simple simulator resembling the payment partners. This is similar for billers/merchants. If any practical biller API could not be integrated, the billers will be simulated.

# APPENDIX A

## Requirements of Payment Gateway (for Bangladesh):

With the rise of Mobile Financial Services in Bangladesh, it has become evident that the payment solutions for different public and private services must include these local wallets or services. There are 2 ways to serve the digital payment solutions: either build a wallet system and pay from the digital money of that wallet or execute a debit operation at the Customer account/wallet and credit from the corresponding merchant account/wallet. In real life, the Banks are reluctant to provide APIs for automated transactions, rather they still prefer to operate the accounts through manual updates. Here we’ll go through a short description for building a payment gateway service.

### Major Entities of Payment Gateway:

1. Wallet/Accounts
   1. Merchant
   2. Bank
   3. Customer
2. Payment Channel
   1. Web
   2. Mobile App
   3. USSD
3. Payment Service Engine
   1. Integration with Biller/Merchant
   2. Integration with Wallet Systems (bkash, rocket, surecash, ipay)
   3. Transaction Management
   4. Reports
   5. Dispute Resolution

### Basic Steps for Payment Gateway Operations for a Shopping Cart:

1. The Customer visits a shopping cart and wants to pay the invoice amount.
2. The Customer will choose his/her wallet of choice
   1. The Customer may choose to complete the payment manually
      1. The Customer pays to the Payment Gateway Account
      2. The Customer should provide the transaction number and the invoice number as a proof of transaction
      3. The system should make a query to the corresponding wallet/account system before confirming the payment
   2. The Customer provides the wallet/account details and the payment gateway starts communicating with the wallet system
      1. The payment gateway service most likely opens up an interface for the Customer for submitting the OTP (bkash) or the Customer mobile receives a push notification for the PIN (surecash).
      2. The other option could be a hosted session from the wallet partner, which is securely integrated in the payment service systems, so that the payment gateway cannot read the PIN or any other confidential account/wallet information from the interface/system.
3. Once the payment is confirmed, the payment service provider will call the Merchant system with the payment confirmation information with respect to the invoice number.
   1. The confirmation process may be a direct transfer to the Merchant’s bank account from the payment gateway account or just a wallet to wallet transfer using some MFS/DFS wallet system.
   2. The confirmation process may not actually transfer the real money, rather the corresponding merchant will be confirmed about the payment and the settlement will be processed later.
4. The customer receives a final payment confirmation message.

For different billers like DPDC, DESCO etc the invoice number will be replaced with bill number. For other systems, where the bill number does not exist(Titas gas) the invoice number will be replaced by account id.

### Major Components to build:

1. Payment Gateway Service
   1. Transaction Management Module
   2. Merchant Integration Module
   3. Notification (sms, email) Module
2. Web SDK which will be integrated to the Merchant Site/ecommerce site.
3. Web Application for Bill payment for different services.
4. Mobile App & SDK for payments

### Technology of Choice:

1. Java & Spring Framework (Spring Boot)
2. PostgreSQL/MySQL
3. Android development (preferred: Flutter, easier: Java)

Let’s give a title for this payment gateway “DUPay”