



Presenting

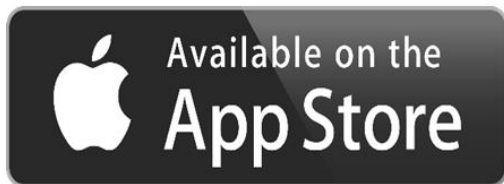
Ababil MobileApp

for Islamic Banks

Overview

Proliferation of IT in the last couple of decades have worked wonders for the modern consumer. We are now savvy and we possess the entire universe at the tip of their hands. How so? Answer is the Mobile Phone and Internet.

Keeping in line with the ever-increasing demands of end-users, Millennium Information Solution has designed, developed and introduced **Ababil MobileApp** in order to support our client Banks cater to the contemporary needs of their clientele with the motto: **Banking in your Pocket.**



Ababil MobileApp “Banking in your Pocket.”

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Ababil MobileApp is a comprehensive solution for Islamic banks with inclusive features of different Shariah based facilities. It built around a state-of-the-art modular architecture featuring multilevel security and authentication measures for secure banking. This service can be integrated with Ababil and also other third-party CBS, thus allowing for a seamless remote service to the end-users.

Key Features

Ababil Mobile Banking Application comes up with a wide range of benefits. With the help of the app, bank's clients can now use banking features from any location, as long as they are connected with the internet.



Architecture & Security

- REST-based Modular Microservices Architecture
- J2EE platform utilising code provided by OWASP and Oracle
- Compatible across Android and iOS platforms
- Compatible with Third-party Core Banking systems
- Multilevel Security: 2 Factor Authentication, Admin Panel.
- Individual Device Registration
- Customizable Transaction Limits
- Periodic Audit Reports
- HTTPS SSL3.0 Protocol to mitigate Man in the Middle attack
- Digital signature with RSA (2048 bits) and SHA-256 for Authenticity
- AES 128 bit data encryption
- PKCS#7 formats for Signatures
- HMAC with SHA-256 for integrity

Payment Options

Ababil MobileApp lets your clients make multifarious payments while sitting at the comfort of their home, office or anywhere they prefer, without ever needing to set their feet at your bank.

Utility Bill Payments

Credit Card Payment

Internet Bill

Mobile Bill

Finance Repayment

Technical & Functional Details

❖ User Management:

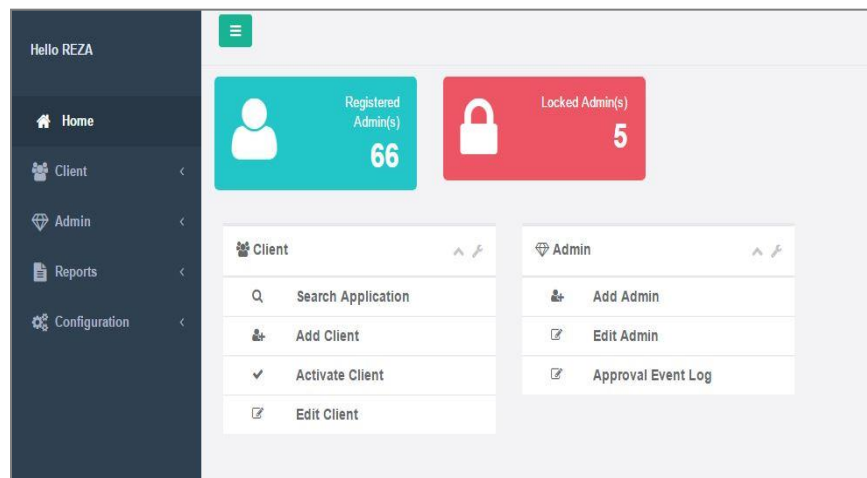
- Authentication

Two factor authentication using following options.

- ✓ User password
 - ✓ USB Token
 - ✓ Smart card
 - ✓ Digital certificate
 - ✓ LDAP
- Our system will use session ID for a specific time.

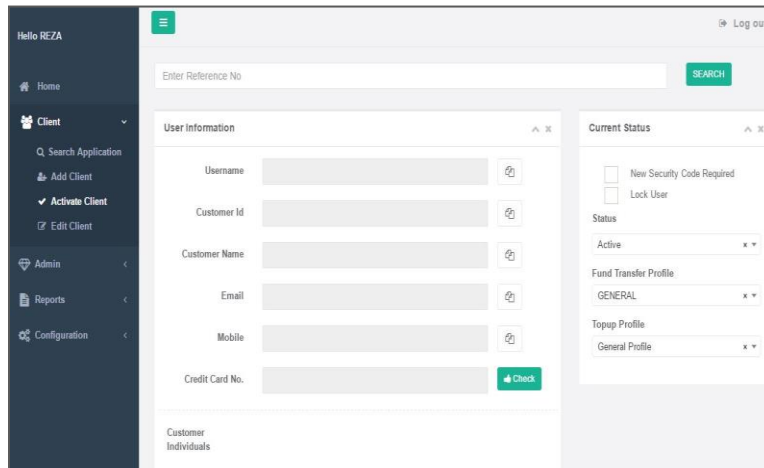
❖ Admin Panel:

After successful login customer will see the dashboard of admin panel. Through admin panel customer can create new admin, can do the approval of event log and add new client, do activate the client also can search the application. Below UI shows the admin control panel:



❖ User Activation:

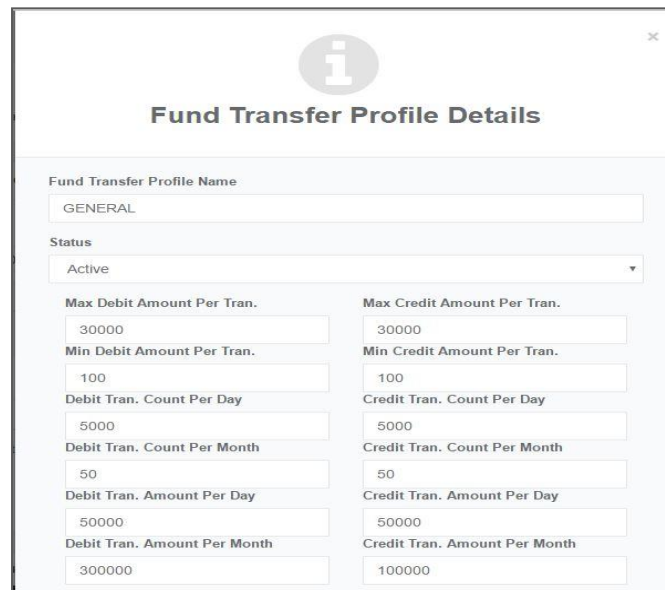
Admin can activate user by putting the reference number received from email. Admin can search application, add client and edit client. Following UI shows the functionalities of Client menu such as activate client.



The screenshot shows the 'Activate Client' form in the Ababil MobileApp admin interface. The form is titled 'User Information' and includes fields for Username, Customer Id, Customer Name, Email, Mobile, and Credit Card No. A 'Check' button is located next to the Credit Card No. field. To the right of the form is a 'Current Status' section with checkboxes for 'New Security Code Required' and 'Lock User', and a 'Status' dropdown menu set to 'Active'. Below the 'Status' dropdown are three more dropdown menus for 'Fund Transfer Profile' (set to 'GENERAL'), 'Topup Profile' (set to 'General Profile'), and another dropdown menu. The left sidebar shows the 'Client' menu with options for 'Add Client', 'Activate Client', and 'Edit Client'. The top right corner has a 'Log out' button.

❖ Limit Profile:

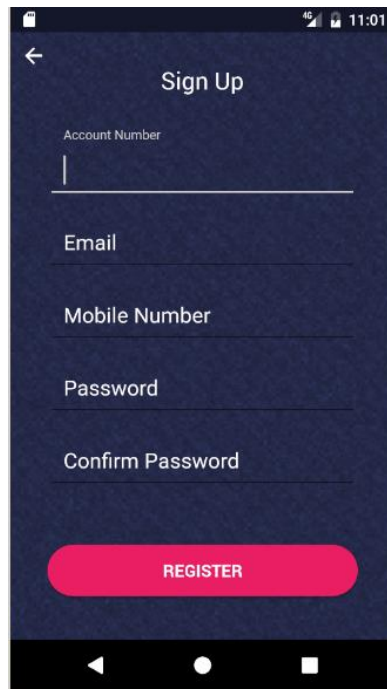
User can configure the limit profile such as max debit amount, max credit amount, debit transaction per day and many more. Below UI shows the fund transfer profile:



The screenshot shows the 'Fund Transfer Profile Details' form in the Ababil MobileApp admin interface. The form is titled 'Fund Transfer Profile Details' and includes a 'Fund Transfer Profile Name' dropdown menu set to 'GENERAL'. Below this is a 'Status' dropdown menu set to 'Active'. The form is divided into two columns of input fields for configuring limits. The left column includes: 'Max Debit Amount Per Tran.' (30000), 'Min Debit Amount Per Tran.' (100), 'Debit Tran. Count Per Day' (5000), 'Debit Tran. Count Per Month' (50), 'Debit Tran. Amount Per Day' (50000), and 'Debit Tran. Amount Per Month' (300000). The right column includes: 'Max Credit Amount Per Tran.' (30000), 'Min Credit Amount Per Tran.' (100), 'Credit Tran. Count Per Day' (5000), 'Credit Tran. Count Per Month' (50), 'Credit Tran. Amount Per Day' (50000), and 'Credit Tran. Amount Per Month' (100000).

❖ Sign Up:

At first customers need to fill up the sign-up form by putting account number, email address, mobile phone number, and set password for secure login and then submit the form to the bank. In admin module which will show all pending registration request and then customer will have to come to the bank to fill out some paper forms and sign the agreement. Customer will need to provide mobile phone's IMEI number; each customer can include almost three mobile devices under his account using which he will be able to access the mobile banking facility. Below UI shows the sign-up screen:



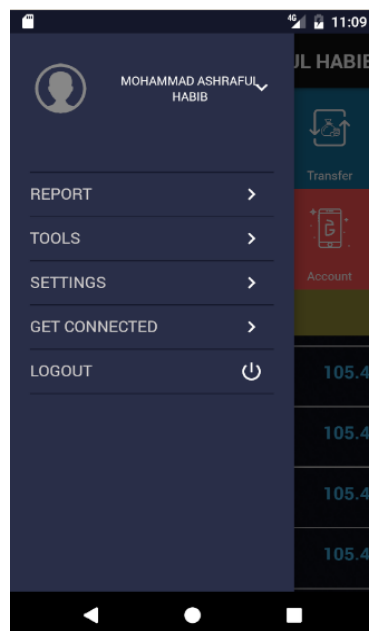
The screenshot shows a mobile application interface for signing up. The background is a dark blue color. At the top left, there is a white back arrow. The title 'Sign Up' is centered at the top in white. Below the title, there are five input fields, each with a white label and a white underline: 'Account Number', 'Email', 'Mobile Number', 'Password', and 'Confirm Password'. At the bottom of the form, there is a prominent red button with the word 'REGISTER' in white capital letters. The bottom of the screen shows the standard Android navigation bar with three icons: a back arrow, a circle, and a square.

❖ **Login:**

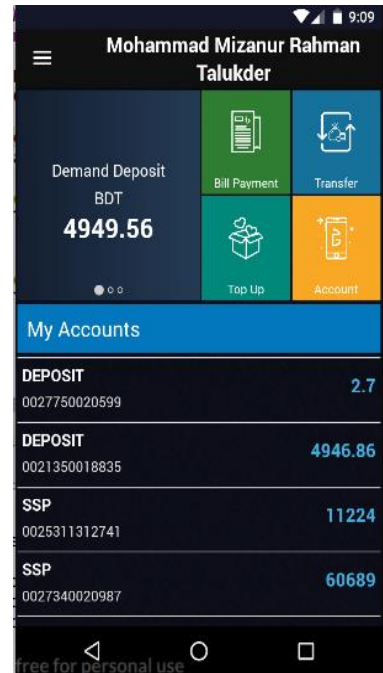
After finishing the signup process customer will get the access to use the features of mobile banking by putting valid username and password. Below UI shows the login screen:



❖ **Side menu:** Customer will get the feature of side menu such as report, tools, settings option, logout option etc. Below UI shows the side menu screen:



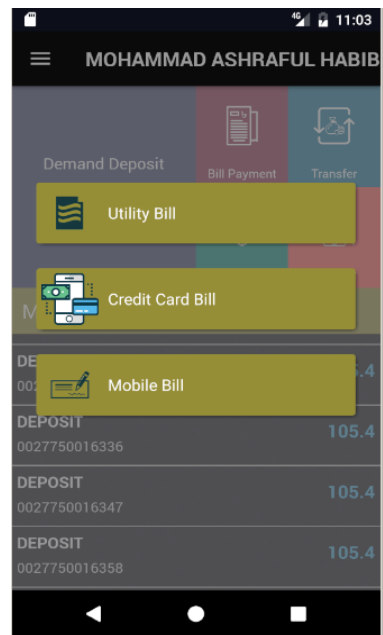
❖ **Dashboard:** After successful login, Customer can view the information on dashboard such as balance information, account details as well as Bill payment menu, Transfer menu, Top Up and Account menu. Below UI shows the dashboard screen:

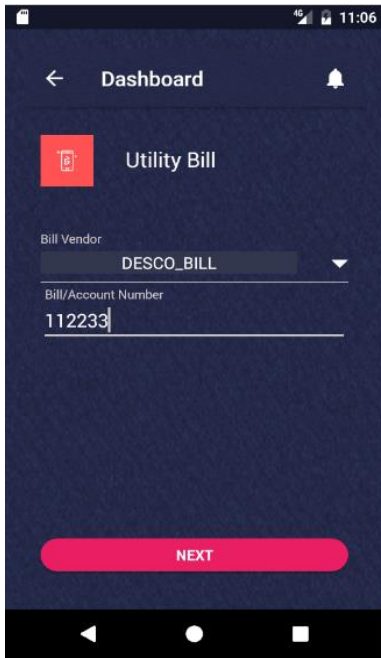


❖ **Bill Payment:**

After clicking the “Bill Payment” menu customer will be able to view his Bill payment menu details such as Utility Bill, Credit Card Bill, Mobile Bill etc. Customer will get the functionality of all the bill payment menus (Utility, credit card, mobile).

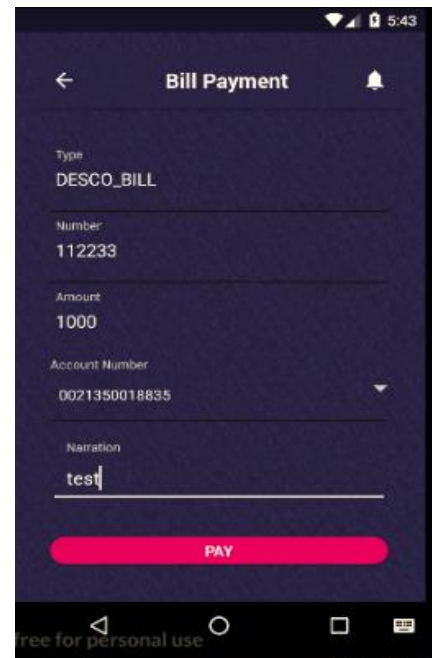
Following UI shows the bill payment menu details:





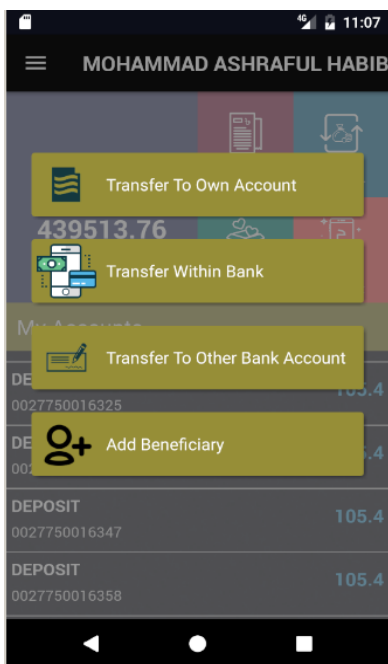
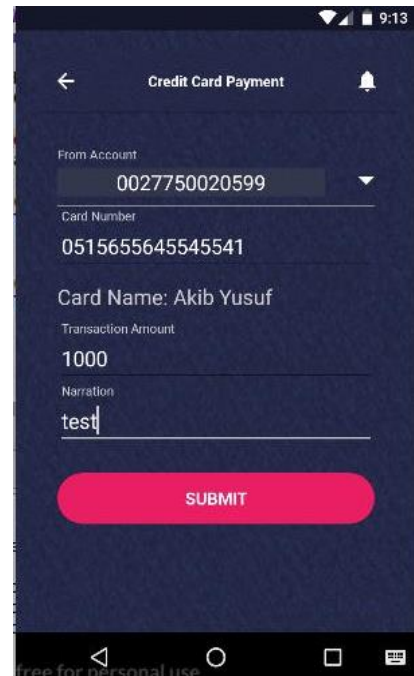
❖ Utility Bill:

When customer will click the Utility bill then following UI will show where customer will need to select the bill account number, vendor name, and bill year and bill month to transfer the bill payment. After click the “next” button then second UI will appear with the information below such as bill type, number, amount, account number and narration



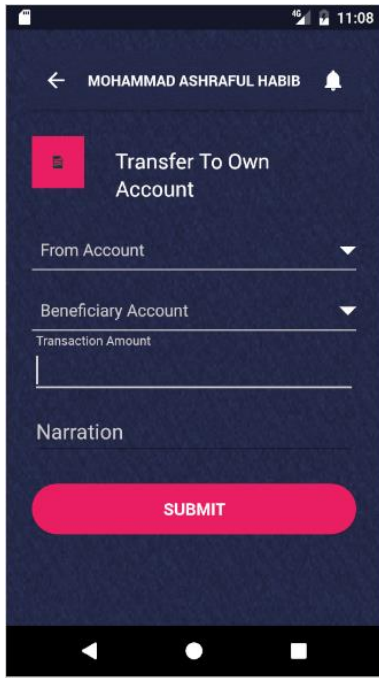
❖ Credit Card Payment:

Customer can do the payment through the credit card by putting from account number, credit card number, transaction amount and put narration if necessary. Below UI shows the credit card payment screen:



❖ Fund Transfer:

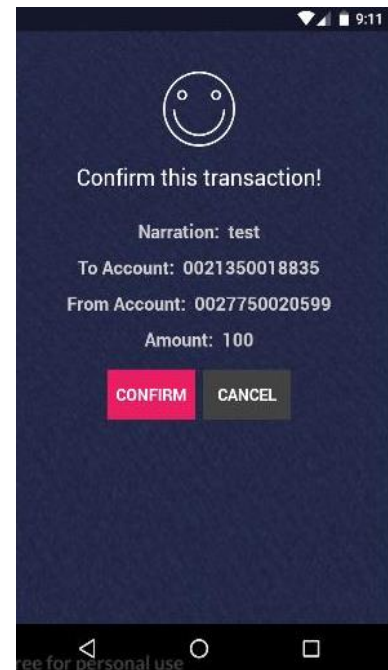
When customer will click Transfer menu following UI will open with the list of menu details such as Transfer to own account, Transfer within Bank, Transfer to Other Bank Account and Add beneficiary.



❖ Fund Transfer to Own Account:

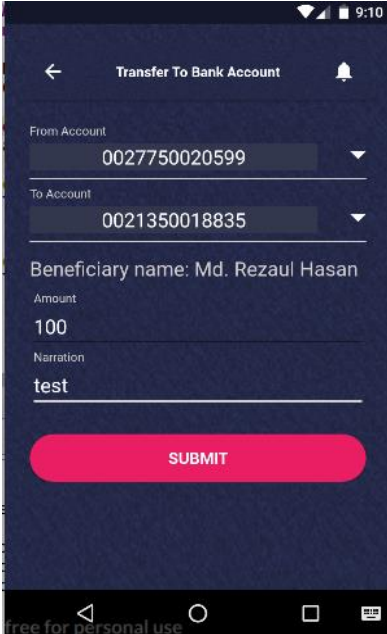
This feature will allow customers to transfer the fund to own account. Following UI shows the related information to transfer fund to own account with the following information such as, “from account” from which account customer will transfer fund, “beneficiary account” to which account fund will transfer and write narration if necessary.

After putting all related information then, click the submit button a following confirmation UI will appear:



❖ Fund Transfer to Same Bank A/c:

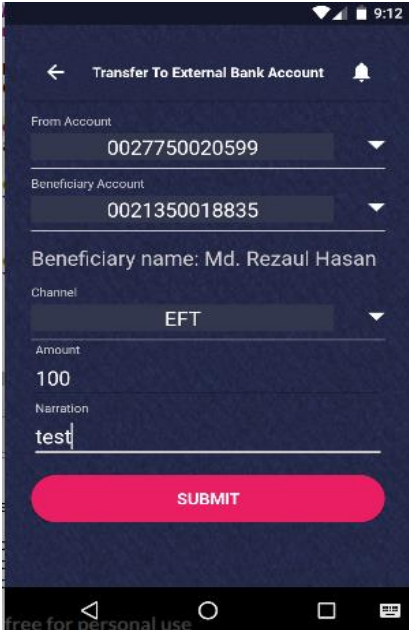
This feature will allow customers to transfer fund to another account holder of the same bank. Following UI shows the related information to transfer fund to bank account with the following information such as, “From account” from which account customer will transfer fund, “To Account” to which account fund will transfer, write the transfer amount and write narration if necessary. Below UI shows the fund transfer to bank account:



The screenshot shows a mobile application interface for transferring funds to a bank account. The title is "Transfer To Bank Account". The form includes the following fields: "From Account" with the value "0027750020599", "To Account" with the value "0021350018835", "Beneficiary name: Md. Rezaul Hasan", "Amount" set to "100", and "Narration" set to "test". A prominent pink "SUBMIT" button is located at the bottom of the form. The status bar at the top shows the time as 9:10. At the bottom, there is a small text "free for personal use".

❖ Fund Transfer to Another bank A/c:

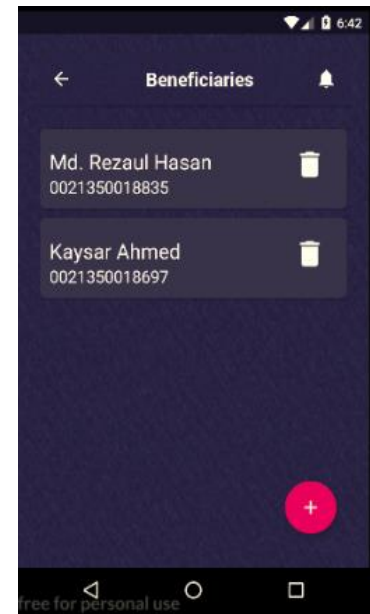
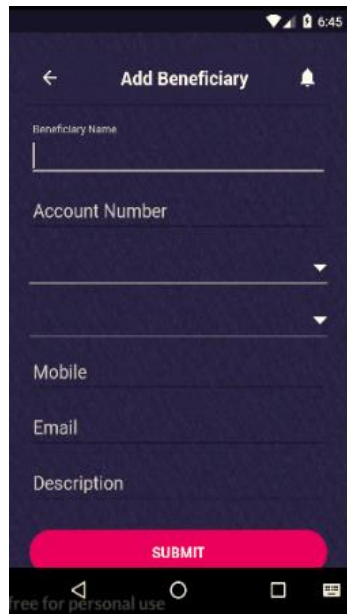
This feature will allow customers to transfer the fund to other bank account. Following UI shows the related information to transfer fund to other bank account with the following information such as, “From account” from which account customer will transfer fund, “beneficiary account” to which beneficiary account fund will transfer, and select the delivery channel such as EFT, RTGS, NPSB, write the transfer amount and write narration if necessary. Below UI shows the fund transfer to other bank account:



The screenshot shows a mobile application interface for transferring funds to an external bank account. The title is "Transfer To External Bank Account". The form includes the following fields: "From Account" with the value "0027750020599", "Beneficiary Account" with the value "0021350018835", "Beneficiary name: Md. Rezaul Hasan", "Channel" set to "EFT", "Amount" set to "100", and "Narration" set to "test". A prominent pink "SUBMIT" button is located at the bottom of the form. The status bar at the top shows the time as 9:12. At the bottom, there is a small text "free for personal use".

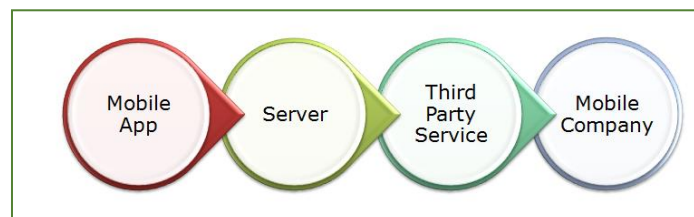
❖ Add Beneficiary:

Customer can add beneficiary by putting name, account number, mobile number, email address and description of beneficiary & can also view the beneficiary name. Following UI shows the add beneficiary & view beneficiaries screen:

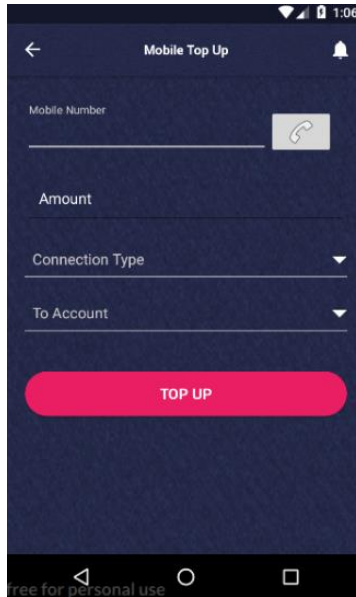


❖ Mobile Top-up:

We use third party service to process mobile top up and customers can use any valid local mobile number to recharge their mobile phone using our service. Following figure shows how mobile app uses third party service.



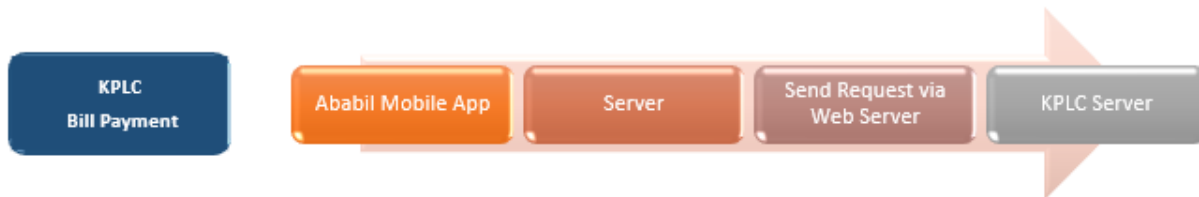
Using the following UI customer can do the mobile top up at any time by putting the related information.



❖ Utility Payment (Govt. Semi Govt. Private etc.)

KPLC Bill: Shadow database is available in our end. All transactions and changes happen in our end database and at day end, they fetch data from this shadow database and update their original database. Then, later on, we collect unpaid bill information from their database and keep that info in shadow database to execute these unpaid bills next day.

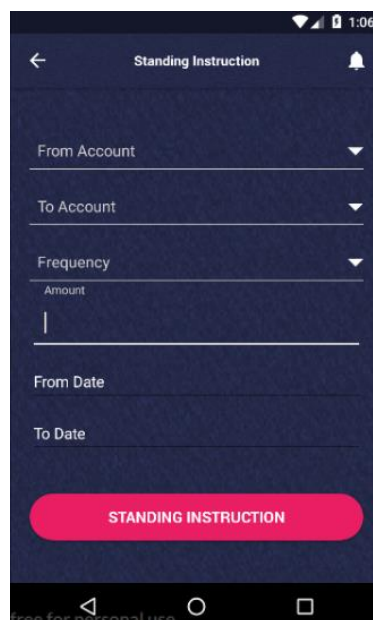
Following figure shows how Utility Bill Payment is processed by using Mobile app:



Nairobi City Water and Sewerage Company Bill: Nairobi City Water and Sewerage Company provides web service in their server which is available to call by Ababil Mobile app. Ababil get data from client using forms and call appropriate web service to execute that transaction. Web service executes that transaction in WASA database and informs us the result and then, we inform client about the result of the transaction.

❖ **Standing Instruction:**

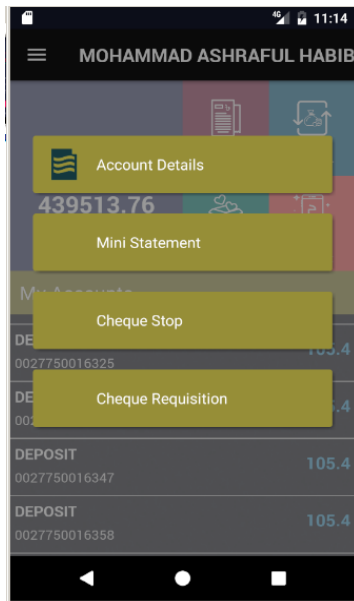
Customer can run the process of standing instruction by using our mobile apps. He can specify which of his account will be used to debit and which payee account will be used as credit account, can select the start and end date of the standing instruction for execution and also can select the recurring period for transfer fund i.e. set the frequency whether it is monthly, weekly or yearly. Following UI shows the standing instruction:



❖ **Account Management:**

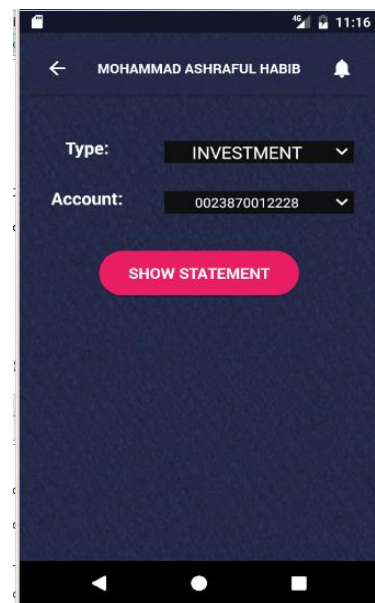
Customer can enable all his accounts to mobile banking or choose some of those. So, user will be able to add and delete accounts usable in mobile banking. User can view account details information, view mini statement and can stop the cheque. When customer will click the menu

“Account” a following UI will appear with the information such as Account details, mini statement, Cheque stop and requisition:



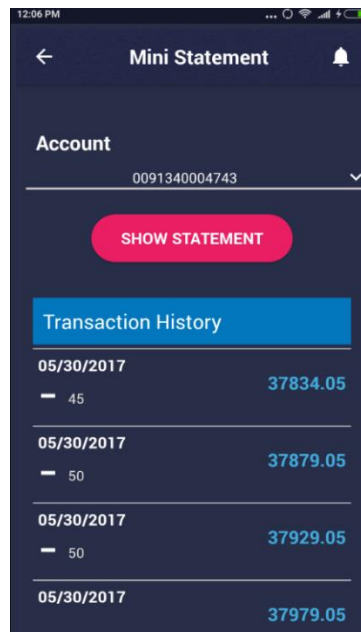
❖ Account Details:

Customer can view the account details, at first customers need to select account type such as SSP or investment account, and then select the account number of that account click show statement button to see the account details and to view account details a following UI will appear:



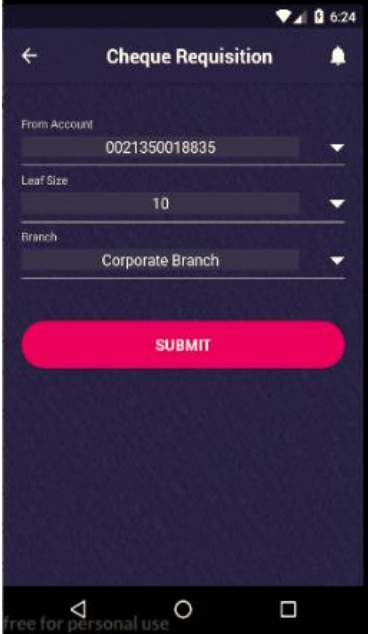
❖ Mini Statement:

Customer can view the statement details and to view the statement customer needs to select account number and then click the show statement button, to view mini statement a following UI will appear with the related information:



❖ Cheque Requisition:

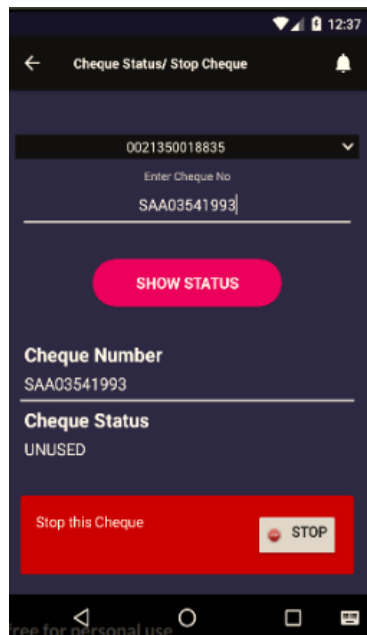
Customer can easily complete the cheque requisition by putting his from account number, put the leaf number and also from which branch customer can do cheque requisition, for cheque requisition following UI will appear:



The screenshot displays the 'Cheque Requisition' form in a mobile application. The form includes three dropdown menus: 'From Account' (0021350018835), 'Leaf Size' (10), and 'Branch' (Corporate Branch). A prominent red 'SUBMIT' button is positioned below the form fields. The interface is dark-themed with white text. The top status bar shows the time as 6:24. The bottom of the screen features the Android navigation bar and the text 'free for personal use'.

❖ Cheque Status / Stop:

Customer can easily view the status of cheque by putting his cheque number, also can stop that cheque immediately by clicking the stop button. For cheque status or stop following UI will appear:



❖ **Finance/Investment Request:**

Customer can easily view the different shariah based financing/investment options are facilitated by the concerned Islamic Bank and can initiate the finance/ investment request as per customer's need. The amount and number of requests is subject to Banks policy and Ababil Mobile app can configure accordingly.



❖ **Zakat/Waqf/Sadaqa Service:**

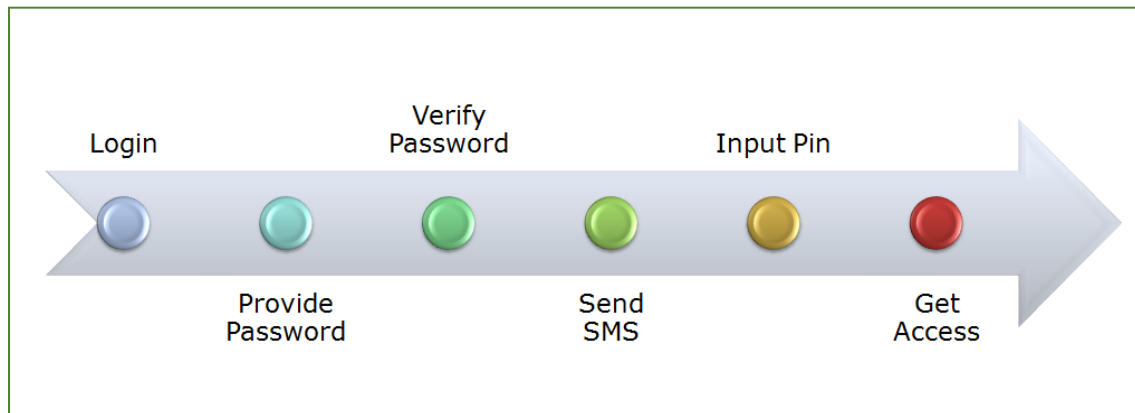
Ababil Mobile App is an integrated Platform, it facilitates the hassle-free and high-quality services of channeling Zakat/Waqf/Sadaqa fund to donors, people in need and members of all segments of society.

Security and Architecture

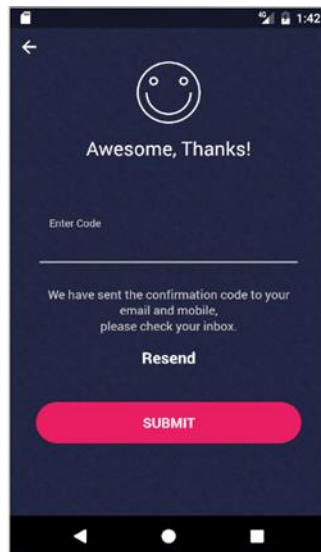
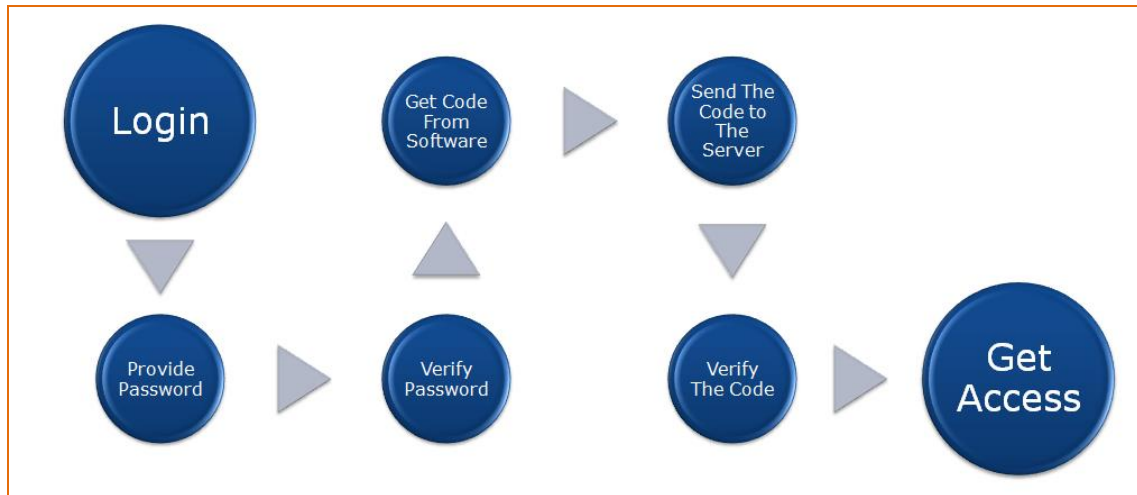
Security Issues of Mobile Banking Through Mobile App:

We will use Two Factor Authentication in case of password lost by customers. Customers will have to provide more than their password to access our mobile banking. Once they successfully provide password, a SMS (or email, configurable) will be sent with one time pin number. They will have to get that pin number from their device (or email account) and provide to our system to get access. We will also use IMEI (International Mobile Station Equipment Identity) Number, which is unique for each device and each customer can register maximum of three devices from where he wants to access the services. We will also give option to use software as second factor along with password where the software will generate unique pin number for each device and help to verify transaction. The software will be installed in the mobile device prior to use it in transaction or login verification.

Two (2) - Factor Authentication for (SMS):



Two (2) - Factor Authentication for (Software):



General Features:

❖ Programming Language:

- Java to develop server-side coding
- Deploy solution in any platform
- Client Bank can choose platform with highly secured system

❖ Memory Management:

- Java has garbage collection mechanism to free unused memory
- Helps to mitigate buffer overflow
- Secure java code provided by [OWASP](#) and [Oracle](#)
- Helps to mitigate input validation related vulnerabilities like Denial of Service and (SQL/XPath) Injection

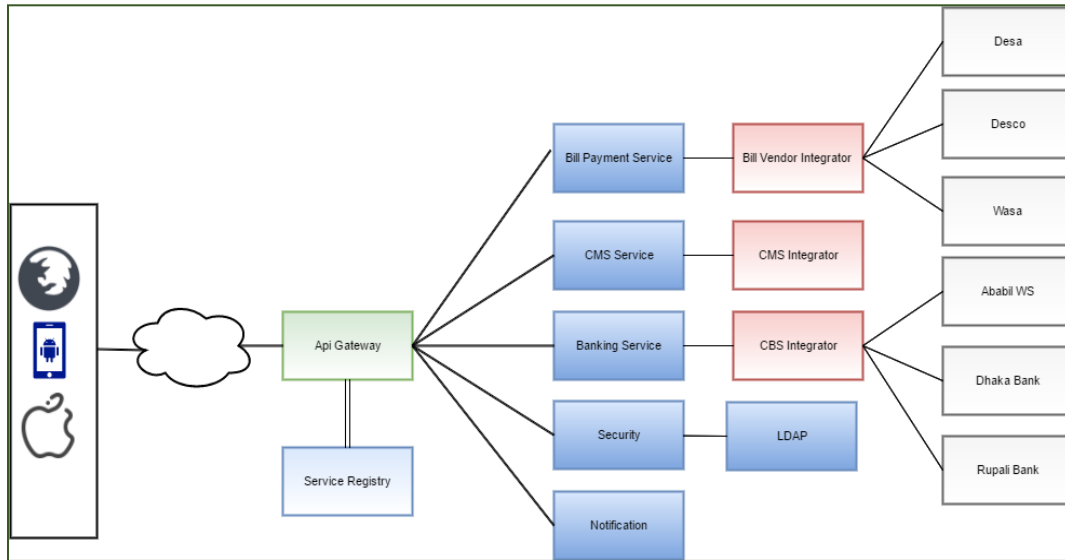
❖ Platform:

- J2EE platform to develop service level development.
- Application server will run under JBoss.
- Ensure standard authentication including certificate-based authentication

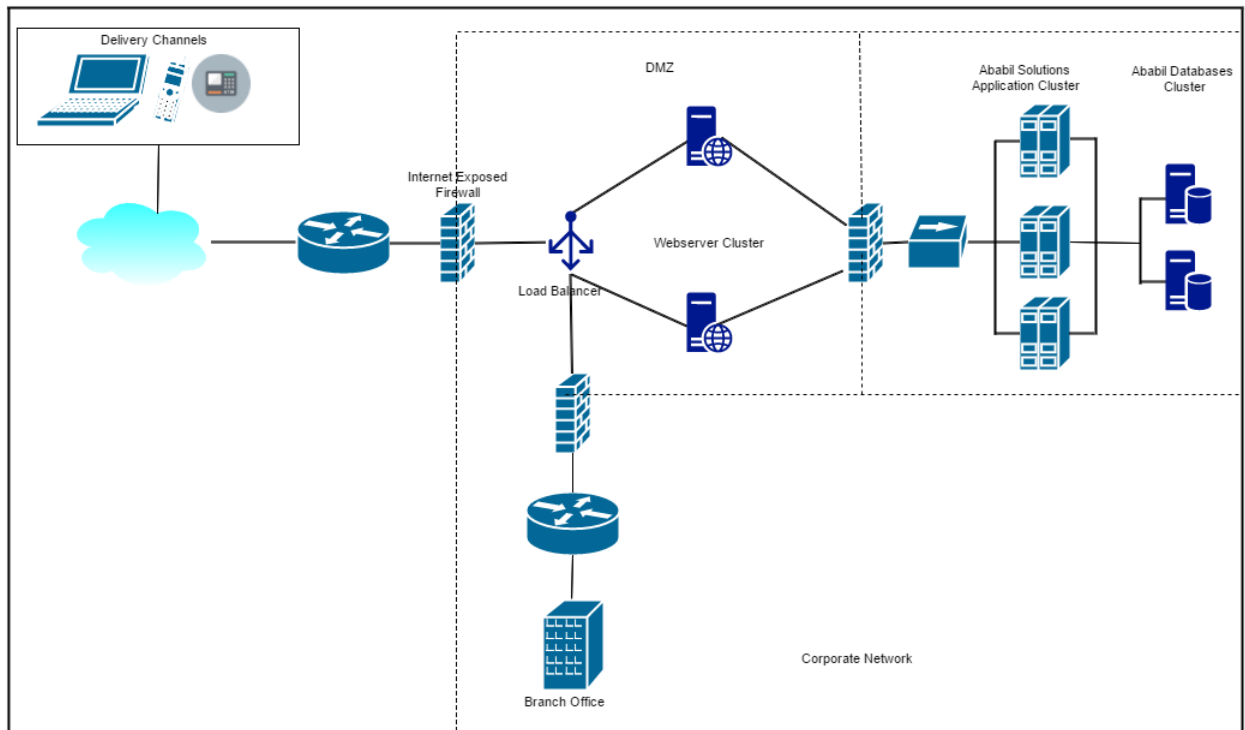
❖ Architectural System:

- System is SOA and REST based architecture
- Helps to integrate with other systems with very few changes
- Allows further development on tab-based application

❖ **Architectural Diagram:**



❖ **Typical Deployment Diagram**



❖ Security:

- **Https**
 - SSL 3.0 to mitigate Man in the Middle attack
- **Certificate Selector**
 - Support any certificate authority (CA)
- Supported certificate formats will be
 - Token (USB Token, Smart card)
 - .pfx (PKCS # 12)
 - .cer (Certificate format)
 - .der (DER encoded bytes)
- Browser applet will select a certificate from local location or from Token.
- User can select certificate from Hard Disk Driver (HDD), USB token, and smart card with secure element.

❖ Authenticity:

- Digital signature with RSA (2048 bits) and SHA-256
- During transaction, a certificate selector window will open and user will select the certificate.
- Browser applet will use private key to create digital signature.
- Signature will pass to server using PKCS#7 formats.
- Server will get this format and verify that

❖ Confidentiality:

- AES 128 bits for data encryption
- User will select certificate using certificate selector.
- Browser applet will generate a secret key and hence encrypt data and then prepare PKCS#7 to send sensitive transactional data.

❖ Integrity:

- HMAC with SHA-256 for digesting
- Prepare PKCS#7 using browser applet to send to server

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...As part of the expansion of technology-based services, the bank introduced its own mobile app so that the clients can avail regular banking services from the comfort of their homes... SIBL will become a top-ranking bank in the country over the next few years.

- Kazi Osman Ali, MD & CEO, Social Islami Bank Limited

We are a Global Software solution provider with over two decades of experience in designing, developing, deploying and marketing software suites for enhancing your business process and efficiency. Millennium has established itself as a consistent and reliable software company through its commitment and dedication towards quality, innovation and customer satisfaction. The company positions itself globally through software development, consultancy services and three flagship products.

- Ababil of Millennium is now certified by ISRA Consultancy for being Shariah Compliant with AAOIFI, AAFA, MWL, IFSB, BNM standards.
- Ranked as one of the top ten Global Islamic Banking Solution provider by Gartner Inc., USA since 2011
- Global Finance Magazine ranked Ababil of Millennium to be one of the award winners under “The Innovators 2016 – Islamic Finance” category.
- Millennium has been awarded IFFSA Award in 2017 (Silver) and 2018 (GOLD) and considered as the best solution provider in region.



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