

# FNB Next Gen ATM

## Phase 1: Software Requirements Specification

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# **1 Introduction**

## **1.1 Purpose**

FNB is one of the four leading banks in South Africa, and with the widespread growth of technology in this country, FNB is moving towards the future. Towards the integration of mobile devices and their self-service devices (ATM).

This Software Requirements Specification (SRS) aims to provide a detailed overview of the software product to be developed and delivered, as well as the parameters and goals of the project.

## **1.2 Scope**

A new software application will be developed to integrated mobile devices and ATM's. The ATM's will be redesigned to incorporate modern technology. The mobile application will allow users to perform most of the functions provided at an ATM, but on their mobile device. This will then allow the user to simply use the ATM and NFC software to make withdrawals, deposits, and print a mini-statement/account balance. The goal of this new software solution is to reduce the amount of time users spend at an ATM, prevent problems such as the machine not returning the users card, reduce the cost of installation and maintenance of the ATM's, and increase the safety and security of the user. This will ultimately enhance the users experience and enable FNB to move towards a more technologically advanced user experience.

## **1.3 Definitions, Acronyms, and Abbreviations**

ATM - Automated Teller Machine

FNB - First National Bank

NFC - Near-Field Communication (tap-and-go)

PIN - Personal Identification Number

SRS - Software Requirements Specification

SSD - Self-Service Device

## **1.4 Overview**

This document contains all of the software requirements and specifications, as well as an overview of the software product and its functions. User characteristics, constraints, assumptions, and specific requirements will also be outlined in this document.

## 2 User Characteristics

There are three main types of users for the next generation ATM; the users that own a smart mobile device that supports NFC with the ATM app installed on the device, users that own a smart mobile device with the app installed but the device does not support NFC, and users that do not currently have access to their mobile device but has access to a web browser.

The new system should provide users with the ability to withdraw/deposit money, as well as print their mini-statement at the ATM. They will also be able to check their balances on the application itself.

Users that are unable to use their mobile device but are able to access a web browser are required to be internet literate.

The users of this new system will mainly be someone who is up-to-date with the current technology trends and they have a smart-phone. People who are not able to access the application because they do not have a smart-phone, or other reasons, will still be able to use the older ATM's.

The users do not need to have a high educational level or technical skill as the application will easily take the users through each required step. This will enable FNB to reach a wider user base because the application will have an interactive user interface that will be easily understandable and easy to use.

Other intended users includes the software engineers who will ensure that the system runs smoothly, as well as take note and fix any problems that may occur. They will require a high educational level and good technical skills in software engineering in order to interact with the system at the lowest level to ensure that it is functioning as require.

There will also be an Admin using the system. They are required to have the technical ability to add or remove a user to the new system. They should also be able to issue new NFC cards when needed.

The consultants that will be using the new system are required to have good communication skills so that they are able to supply information and give help when a user runs into a problem.

Lastly, vendors will be using the system to receive payment from a user using the tap-and-go functionality. These vendors do not requires a high educational level nor advanced technical skills. They will need to provide the means for users to pay using a different NFC enabled device and have the knowledge on how to use these devices.

## **3 Product Perspective**

### **3.1 System Interfaces**

The system will interface with a card machine when a mobile device is directly used to make payments. This may occur in shops and other establishments that make use of a card machine with an NFC chip. All other requirements are met through the use of software and hardware within the system.

### **3.2 User Interfaces**

The system will consist of three user interfaces. The application/website user interface, the ATM user interface and the admin user interface. The application/website user interface consists of security checks and a way to select the transaction to perform, and the amount of money involved. This will involve a GUI. The ATM user interface consists of a keypad, small screen, NFC chip scanner, money slot, and a printer. The admin user interface will use a command line in order to perform general maintenance on the system.

### **3.3 Hardware Interfaces**

The specific hardware that will be used, is the ATM and the NFC chip. The ATM will interface with the user and the server. It will accept information about the transaction from the user and provide a response. It will send security checks, transaction validation checks and eventually updates to the server. The NFC chip will be used to send data to the ATM from a mobile device.

### **3.4 Software Interfaces**

No software requirements where specified.

### **3.5 Communication Interfaces**

The application/website and the ATM will make use of the TCP/IP protocol to communicate with the server. This connection will be encrypted for security. The NFC will make use of the NFC communication protocol.

### **3.6 Memory**

In terms of the memory requirements of the users' mobile device, it will depend on the memory of the actual device. In terms of the software application itself, it will require somewhere between 60 MB - 90 MB of storage (this is an estimate). The user's mobile device will therefore need to be able to accommodate this requirement.

The only other consideration to make in terms of the memory, is the amount of space the software system will require on the actual server. This is, however, a hardware/software requirement that is specific to the system that FNB has put in place.

### **3.7 Site Adaptation Requirements**

The old ATM systems will need to be adapted to cater for the new system. An NFC scanner will need to be available as well as the traditional input keyboard for the user's PIN. The software of these old systems will need to be updated to cater for the functionality of the new system.

The new ATM will only physically required 2/3 the amount of space that the older ATM currently requires, because the new ATM will only have a small screen, a keypad to enter the PIN, an NFC scanner, and the slots to deposit/withdraw money and print the mini-statement.

## 4 Constraints

One of the main constraints that the new system faces is the possibility of users who have a NFC enabled mobile device but do not have a NFC card. If their mobile device is lost or stolen, the user will then have no way of using the new ATM system. The user will be required to go to the nearest FNB branch to acquire a temporary NFC card to use with the web version of the application on some other device. This may be time consuming and an annoyance for the user.

Another constraint concerns those individuals who are not able or who would not like to use the new ATM system. These users will still need to use the older ATM's which means that the old ATM systems cannot be completely abolished and will still need to be in service..

When users do not have network access or data, it becomes a problem as they will not be able to use the new ATM system to check their balances, nor withdraw/deposit money. This user will also not be able to print their mini-statement.

Users will not be able to use the new ATM system if the mobile device that they are using runs out of battery power. This is another reason as to why the old ATM systems need to stay in service.

## 5 Functional Requirements

### 5.1 Overview

The system shall provide the following functionality: Withdrawing money (R1 and R2), depositing money (R3 and R4), printing bank statement (R5, R6 and R7) and transferring money (R8), ATM offline (R9), adding user (R10), removing user (R11), ATM no funds (R12), Login (R13). All requirements below are based on the assumption that the user is logged into the system.

#### R1. Placing Withdraw Request

- R1.1. The system will provide an option to withdrawal money.
- R1.2. The system will provide an option to select an account
- R1.3. The system will query the client for the amount to be withdrawn.
- R1.4. The system will validate that the amount is available.
  - R1.4.1. The system will provide a message if there are insufficient funds.
- R1.5. The system will query the client to confirm the withdrawal.
- R1.6. The system will put the amount on hold.
- R1.7. The system will compile a data file.
- R1.8. The user will be prompted to tap the device on the ATM  
NFC chip.

#### R2. Withdrawing Money

- R2.1. The system will send the data file from mobile device to ATM.
- R2.2. The system will query the user for the PIN.
- R2.3. The system will process the transaction.
- R2.4. The system will verify that there are sufficient funds in the  
machine.
- R2.5. The system will issue the on-hold amount.
- R2.6. The system will deduct the on-hold amount from the account.
- R2.7. The system will release the on-hold amount.
- R2.8. The system will notify the client the transaction has been  
successful.

### **R3. Placing Deposit Request**

- R3.1. The system will provide an option to deposit money.
- R3.2. The system will provide an option to select an account.
- R3.3. The system will query the client to confirm.
- R3.4. The system will compile a data file.
- R3.5. The system will prompt the user to tap the device on the ATM NFC chip.

### **R4. Depositing Money**

- R4.1. The system will send the data file from mobile device to ATM.
- R4.2. The system will query the user for the PIN.
- R4.3. The system will process the transaction.
- R4.4. The system will verify the amount of space available.
  - R4.4.1 The system will notify the user of space available in the ATM.
- R4.5. The system will wait for the amount to be inserted.
- R4.6 The system will count the amount inserted.
- R4.7. The system will add the amount to the account.
- R4.8. The system will notify the client the transaction has been successful.

### **R5 Querying Bank Statement**

- R5.1. The system will provide an option to view a bank statement.
- R5.2. The system will provide an option to select an account.
- R5.3. The system will generate the bank statement.

### **R6. Requesting Bank Statement**

- R6.1. The system will provide an option to print a bank statement.
- R6.2. The system will provide an option to select an account.
- R6.3. The system will query the client to confirm.
- R6.4. The system will compile a data file.
- R6.5. The system will prompt the user to tap the device on the ATM NFC chip.



## **R7. Printing Bank Statement**

- R7.1. The system will send the data file from mobile device to ATM.
- R7.2. The system will query the user for the PIN.
- R7.3. The system will process the transaction.
- R7.4. The system will print the statement.

## **R8. Transferring Money**

- R8.1. The system will provide an option to transfer money.
- R8.2. The system will provide an option to select an account to transfer from.
- R8.3. The system will provide an option to select a method to transfer to.
- R8.4. The system will query the user for the amount to be transferred.
- R8.5. The system will validate that the amount is available.
- R8.6. The system will query the client to confirm.
- R8.7. The system will notify the user.
  - R8.7.1. The system will notify the user to tap the smartphone with the recipient's smartphone if NFC was chosen.
  - R8.7.2. The system will notify the transaction is complete.
- R8.8. The system will notify the recipient.
  - R8.8.1. The system will notify the recipient to tap the smartphone with the user's smartphone if NFC was chosen.
  - R8.8.2. The system will notify the recipient the transaction is complete.

## **R9. ATM Offline**

- R9.1. The system will check availability of ATM functionality.
- R9.2. The system will notify parties.
  - R9.2.1. The system will notify FNB that the ATM needs attention.
  - R9.2.2. The system will notify users on transaction system is down.

**R10. Adding User**

R10.1. The system will allow new users to be added.

R10.2. The system will notify the new user.

**R11. Removing user**

R11.1. The system will allow users to be removed.

R11.2. The system will notify the user that they was removed.

**R12 ATM No Funds**

R12.1. The system will notify parties.

R12.1.1 The system will notify FNB the ATM needs funds.

R12.1.2. The system will notify the user when transaction  
there is insufficient funds.

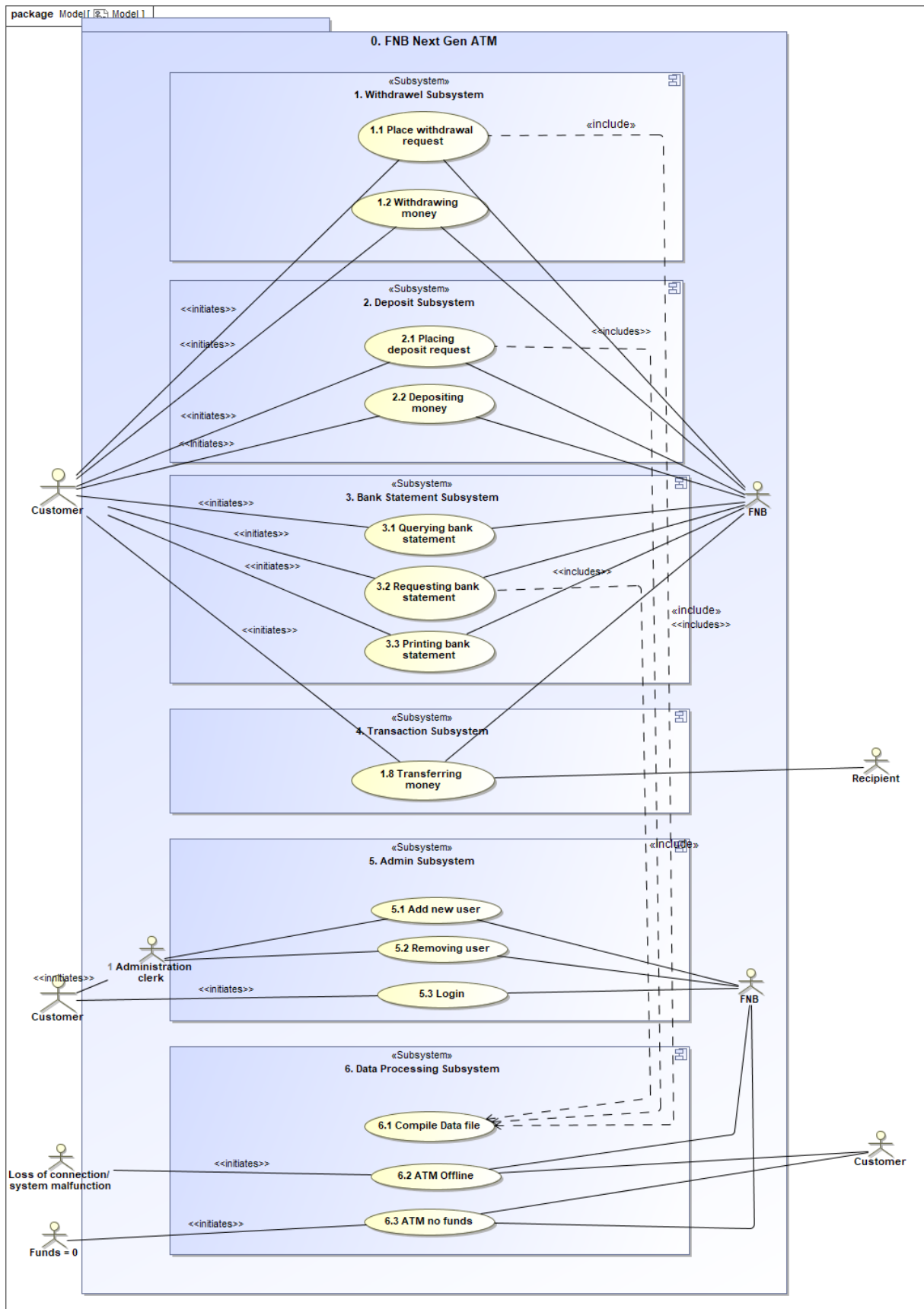
**R13 Login**

R13.1. The system will provide an option to login.

R13.2. The system will authenticate login details.

R13.2.1. The system will notify the user if login successful or not.

## 5.2 Use Case Diagram



## 6 Quality Requirements

This section provides a definition of the quality for the FNB Next Gen ATM. The definition is provided using quality factors and their associated quality metrics. The most important quality factors to the client are efficiency, security and reliability.

### 6.1 Quality Factors

#### 6.1.1 ATM Factors

- Maintainability - the ease by which the ATM can be restocked, repaired or replaced.
- Reliability - the probability that the ATM will successfully perform its functions.
- Security - how secure the ATM is to outside interference.
- Monitorability - the ease by which the server is alerted to a faulty ATM.
- Cost - the cost of installing or upgrading the ATM.
- Usability - the ease by which the client can use the ATM.
- Efficiency - the time it take for a client to interact with the ATM.

#### 6.1.2 Server Factors

- Maintainability - the ease by which to fix any issues in the server.
- Reliability - the probability that the server will successfully perform its functions.
- Scalability - the ease by which the server can expand to be able to handle more ATM's and users.
- Security - how secure the server is to outside interference.
- Cost - the cost to maintain the server.
- Performance - the speed at which the server manages functions.

#### 6.1.3 User Interface Factors

- Reliability - the probability that the user interface will successfully perform its functions.
- Security - how secure the user interface is to outside interference.
- Usability - the ease by which the client can use the user interface.
- Performance - the speed at which the user interface manages functions.

## 6.2 Quality Metrics

### 6.2.1 ATM Metrics

- Maintainability:
  - Measurement Method: The maintainability is measured in average cost to repair, or the average time from first getting the alert to completing the repair.
  - Frequency: Monthly.
  - Target Cost: Lower than R10 000.
  - Target Time: Within a day.
- Reliability:
  - Measurement Method: The failed cases and the attempted cases, where cases are the attempt to perform a function of the ATM.
  - Frequency: Weekly.
  - Target Reliability: Less than 1%.
- Security:
  - Measurement Method: The number of standard security check failures.
  - Frequency: Weekly.
  - Target Security: 0.
- Monitorability:
  - Measurement Method: All the failures to alert the system, as well as all the attempts to alert the server.
  - Frequency: Weekly.
  - Target Monitorability: Less than 1%.
- Cost:
  - Measurement Method: The initial cost to install the new ATM vs the initial cost the install the old ATM.
  - Frequency: Weekly.
  - Target Cost: Less than 50%.
- Usability:
  - Measurement Method: Monitored through the use of a survey.
  - Frequency: Monthly.
  - Target Usability: Good reports from all the users.
- Efficiency:
  - Measurement Method: The time to perform a function using the new ATM vs the time to perform a function using the old ATM.
  - Frequency: Weekly.
  - Target Efficiency: Less than 50%.

### 6.2.2 Server Metrics

- Maintainability:
  - Measurement Method: Average cost to repair and average time from first getting an alert to completing the repair.
  - Frequency: Monthly.
  - Target Cost: Lower than R10 000.
  - Target Time: Within a day.
- Reliability:
  - Measurement Method: The failed cases and the attempted cases, where cases are the attempt to perform a function of the Server.
  - Frequency: Weekly.
  - Target Reliability: Less than 1%.
- Scalability:
  - Measurement Method: Average cost to add an ATM or user to the server vs the average time to add an ATM or user to the server.
  - Frequency: Weekly.
  - Target Cost: Nothing.
  - Target Time: Within a day.
- Security:
  - Measurement Method: The number of standard security check failures.
  - Frequency: Weekly.
  - Target Security: 0.
- Cost:
  - Measurement Method: The cost of the required hardware and the cost to run the hardware.
  - Frequency: Weekly.
  - Target Cost: Use the current infrastructure available.
- Usability:
  - Measurement Method: Monitored through the use of a survey.
  - Frequency: Monthly.
  - Target Usability: Good reports from all users.
- Efficiency:
  - Measurement Method: The time to perform a function using the new Server or the time to perform a function using the old server.
  - Frequency: Weekly.
  - Target Efficiency: Less than 100%.

### 6.2.3 User Interface Metrics

- Reliability:
  - Measurement Method: The failed cases and the attempted cases, where cases are the attempt to perform a function of the User Interface.
  - Frequency: Weekly.
  - Target Reliability: Less than 1%.
- Security:
  - Measurement Method: The number of standard security check failures.
  - Frequency: Weekly.
  - Target Security: 0.
- Usability:
  - Measurement Method: Monitored through the use of a survey.
  - Frequency: Monthly.
  - Target Usability: Good reports from all users.
- Efficiency:
  - Measurement Method: The time to perform a function using the user interface or the time to perform a function using the old ATM.
  - Frequency: Monthly.
  - Target Efficiency: Less than 50%.

## 7 Trace-ability Matrix

	Withdrawal Subsystem	Deposit Subsystem	Transaction Subsystem	Bank Statement Subsystem	Data Processing Subsystem	Admin Subsystem
R1.1	x					
R1.2	x					
R1.3	x					
R1.4						
R1.4.1					x	
R1.5	x					
R1.6					x	
R1.7					x	
R1.8	x					
R2.1					x	
R2.2	x					
R2.3					x	x
R2.4					x	
R2.5	x					
R2.6	x					
R2.7	x					
R2.8	x					
R3.1		x				
R3.2		x				
R3.3		x				
R3.4					x	
R3.5		x				
R4.1					x	
R4.2		x				
R4.3					x	
R4.4						
R4.4.1		x			x	x
R4.5		x				
R4.6		x			x	
R4.7		x			x	
R4.8		x				
R5.1				x		
R5.2				x		
R5.3				x	x	
R6.1				x		
R6.2				x		
R6.3				x		
R6.4					x	
R6.5				x		
R7.1					x	
R7.2				x		
R7.3				x	x	
R7.4				x		



R8.1			x			
R8.2			x			
R8.3			x			
R8.4			x			
R8.5					x	
R8.6			x			
R8.7						
R8.7.1			x			
R8.7.2			x			
R8.8						
R8.8.1			x			
R8.8.2			x			
R9.1					x	
R9.2						
R9.2.1						x
R9.2.2	x	x		x		
R10.1						x
R10.2						x
R11.1						x
R11.2						x
R12.1						
R12.1.1						x
R12.1.2	x	x		x		
R13.1	x	x	x	x		x
R13.2					x	
R13.2.1	x	x	x	x		x