

Functional Specification Document

Trade Analytics Application

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**Table of Contents**

1. Introduction 3

1.1 Purpose of the document 3

1.2 Project Scope 3

1.3 Scope of the document 3

1.3 Related documents 3

1.5 Terms/Acronyms and Definitions 3

1.6 Risks and Assumptions 3

2. System/ Solution Overview 4

2.1 Context Diagram 4

2.2 System Actors 5

2.3 Dependencies and Change Impacts 5

3. Functional Specifications (Functional and Non-Functional) 5

3.1 Purpose/Description 9

3.2 Use Case 9

3.3 The Use Case Model 10

3.4 Use Case Description 10

4. Form Business Rules and Dependencies 11

5. Buttons, Links, and Icons 11

6. System Configuration 11

Interfaces 12

Appendix 15

1. **Introduction**

There is a need to create a Trade Analytics application for the Bank which can display stock analytics from the day before. The current problem is that analysts and employees in the related field are manually logging in stock information, which is both time-consuming and an inefficient method of generating analytics from data. Hence, an application has been designed to resolve this problem. It will need to have certain information which has been mandated from the FCA.

* 1. Purpose of the document

The Functional Specification Document is a document that provides a guideline and continuing reference point as developers write the code for a product or application. It describes the intended features and capabilities for a product in detail so that it can be programmed accordingly. This document is intended to be used by the stakeholders involved in the process of developing this application and will be a key document for use by the software development team that will be involved in this project. Included in this document will be the detailed functional requirements including functional and non-functional, process flows, diagrams, and mock ups.

* 1. Project Scope

1. The main goal for this project is to develop a new Trade Analytics application that will provide analytics about the previous day's equity trading activity for equity traders at the Bank. The project scope will address the current problem as it will enable trade analysts, portfolio managers, and other staff who use trade analytics to be able to see already generated visualisations on an application that has already communicated with the database. This will resolve them having to interact with the relational database after it has been processed through the trading engine. This will be very useful for these stakeholders as it will allow them more time to view analytics, dashboards and reports and process information and make comparisons easily through the applications outputs.

1.3 Related Documents

|  |  |  |
| --- | --- | --- |
| **Component** | **Name** | **Description** |
| Brief | Assessment Brief | The Assessment Brief related to this project can be found in the Appendix. |

1.4 Terms and Definitions

|  |  |  |
| --- | --- | --- |
| **Term/Acronym** | **Definition** | **Description** |
| FCA | Financial Conduct Authority | The FCA regulates the financial services sector in the UK. Its role is to protect customers, encourage healthy competition and preserve stability in the industry. |

1.5 Risks and Assumptions

Constraints of the application include constraints given by the FCA in relation to what the dashboard should include. An identified assumption is that users will have access to a stable internet connect. For this, the application should provide offline functionalities where possible so that users do not need to rely on an internet connection. A possible risk is a potential complex user interface which could lead to difficulty in navigating the application. To mitigate this, user feedback sessions can be conducted to ensure users are happy with the design of the interface. Another risk is that there may be changed in FCA regulations which could affect the T-1 requirements or changes to the compliance standards. To mitigate this, it is important to regularly monitor regulatory updates and ensure the application is flexible in adapting to comply with changes. Finally, to combat the risk of security breaches, the application will include encryption and user authentication.

1. **System/Solution Overview**

The Trade Analytic Application is being developed to meet the requirements requested by the Global Head of Compliance at the Bank, in compliance with the FCA. The primary purpose of the application is to provide comprehensive analytics on the previous day’s equity trading activity. This will benefit the bank and ensure that they avoid regulatory penalties. The application is to be desk-top based, but it will also be compatible on smartphones, and it is designed to offer insights into various aspects of the trading data. The overview provided by the application will enable the Global Head of Compliance to monitor and oversee trading activities effectively and easily identify any potential issues. Another solution the application will provide is time efficiency. The application aims to streamline the process of gathering and displaying trading data. This will benefit the trading team and analysts as it reduces their time and effort in compiling and analysing equity trading information, allowing stakeholders to focus more time on strategic decision-making.

2.1 Context Diagram

A diagram of a trade analytics application

Description automatically generated

2.2 The Context Model

Goal Statement: The goal of this project is to achieve a fully functioning, well developed application that will enable analysts at the Bank to be able to export visualisations to Excel and obtain analytical information related to stock information T-1. The application aims to offer two user login options, which allow one set of users to view the dashboard only, whilst the second set will have enabled permission to read and export the dashboards and visuals.

2.3 System Actors

2.3.1 User Roles and Responsibilities

|  |  |  |  |
| --- | --- | --- | --- |
| **User/Role** | **Frequency of Use** | **Security/Access, Features Used** | **Additional Notes** |
| *Global Head of Compliance* | *Daily* | T-1 View Dashboard | *Has read and export access for a comprehensive oversight* |
| *Compliance Manager* | *Daily* | T-1 Analytics | *Will generate compliance reports and a detailed analysis* |
| *IT Administrator* | *As needed* | User Access Management | *Will manage user accounts and permissions* |
| *Read only user* | *Daily* | View T-1 Analytics | *Will have restricted access for viewing purposes only* |

2.4 Dependencies

2.4.1 System Dependencies

Firstly, one mandatory dependency is that the application cannot proceed to development until it has the approval of the Head of Compliance who will be funding the project. Secondly, without the funding the project cannot proceed either. Thirdly, an internal dependency includes the Quality Assurance team who will not be able to test the application until the development team have finished the development process. Another dependency the application incurs is that the user will not be able to log in until they create an account. Thirdly, the application relies on compatibility with specific operating systems. To mitigate this, the application will be designed to be compatible with all its target devices including desktop and mobile phones and the application will be tested on the different environments.

1. **Functional Specifications**

**Functional Requirements**

|  |  |  |
| --- | --- | --- |
| **Requirement ID** | **Requirement Statement** | **Comments** |
| Technical requirements | | |
| FR01 | The application shall be dynamic, which is compatible on desktop and smart phones. | Display should be able to accommodate portrait and landscape mode on a smartphone. |
| User authentication into the system | | |
| FR02 | Upon the first launch of the application, the user will be presented with a series of screens which highlight the main purpose of the app and how they will be able to navigate through it. |  |
| FR03 | The user may select ‘skip’ if they do not wish to read the information presented at the first launch of the application. |  |
| Login and registration | | |
| FR04 | The user should be able to log in with their credentials or sign up for a new account. |  |
| FR05 | There should be an option to reset your password by clicking on ‘forgot password?’ under the sign in option. |  |
| FRO6 | For the password reset process:  a. The user enters their e-mail address.  b. An e-mail is sent with a reset password link.  c. A link is prepared to be handled by the application, after the opening link, the application is opened on the screen for setting up the new password.  d. After setting up a new password, the user stays logged in. |  |
| FRO7 | There should be two user log ins: read-only and read and export. The read and export user can sign up by toggling the read and export option to the right. |  |
| FR08 | The user should be asked whether they want to set up two-step verification as a safety measure to maintain the security of their account. There should be a skip option available should they decide to decline the message. |  |
| FR09 | The system should send an email confirmation once an account has been created. |  |
| User Interface | | |
| FR10 | The application must provide visual representations like charts and graphs for better comprehension. |  |
| FR11 | The application must be available for two users   1. Read-only 2. Read and Export |  |
| FR12 | Users must be able to search for the following features in more detail at the search bar for the previous day and see them displayed on the dashboard:  1. The application must display the total number of orders for each stock from the previous day’s trading activity.  2. The application must identify and present information about the largest order placed for each stock  3. The application must calculate and show the ratio of buy orders to sell orders for each stock  4. In the event an order is split, the application must provide information about the spread of each split order  5. The application must track and display the count of orders that were filled during the opening auction for each stock  6. The application must also track and display the count of orders that were filled during the closing auction for each stock | These features have been specified by the FCA and must be displayed on the application. |
| FR13 | The application must allow Read & Export users to export the generated analytics into a downloadable format on Excel. |  |
|  | Once user has exported a file onto their system, display message on screen: “Export successful”. |  |
| Other features and regulations | | |
| FR14 | The application should provide a user-friendly interface which can be accessed by all users that displays the analytics for each stock, allowing users to easily interpret the information. | The text colour and background colour should be contrasting and easy to read. |
| FR15 | The application should implement algorithms to process trading data efficiently and calculate metrics such as number of orders, largest order, buy/sell ratio, and others in real time to ensure that T-1 displays are accurate and up to date. |  |
| FR16 | The application must have a secure user authentication system, and access should be restricted to Bank users only. | Users must sign up with a work email address to ensure they work at the Bank. |
| FR17 | The system should collect and process equity trading data. |  |
|  | There should be an option the user can select at the left on the menu bar should they need help navigating the application or need assistance. | This should be labelled as ‘’Need help?” on the menu bar. |

**Non-Functional Requirements**

|  |  |  |
| --- | --- | --- |
| **Requirement ID** | **Requirement Statement** | **Comments** |
| Security requirements | | |
| FR18 | The application must encrypt sensitive information and implement secure data. |  |
| FR19 | The application must ensure security and compliance with FCA regulations transmission |  |
| FR20 | The application should implement robust security measures to protect against unauthorised access and data breaches. |  |
| FR21 | The application should ensure there are strong security measures to protect sensitive trading data, with the use of encryption, access controls and the secure transmission of data. |  |
| FR22 | The application must offer regular backup procedures and a robust data recovery implementation to safeguard users against data losses or system failures. |  |
| Performance and scalability | | |
| FR23 | The application should be able to handle a high volume of users at once and data processing to ensure performance under peak trading hours. |  |
| FR24 | The application must result a minimum of 80% when tested for performance and accessibility on Google Lighthouse. |  |
| FR25 | The system should be developed to accommodation at least 6-8 users at once but be able to scale easily as the volume of trading data and users increases. | The number of users is stated to be 6-8 within the bank but this may grow as the bank grows. The Compliance Manager also stated that they are looking to expand internationally. |
| FR26 | The application should be able to scale internationally as its users expand out of the UK. |  |
| Interface | | |
| FR27 | The application should display the T-1 view analytics in a clear and understandable format, with a font size of at least 15. |  |
| FR28 | The user interface must be dynamic and adaptable and be able to be resized according to different smartphone dimensions |  |
| FR29 | The user interface must be user-friendly and simple to understand so that trading managers can quickly and efficiently access the data information. |  |
| Development | | |
| FR30 | The application must be ready for development within 3 months. |  |
| FR31 | The application response time for data retrieval and analytics presentation should be within 30 seconds. |  |
| Other features | | |
| FR32 | The application must comply with regulatory standards and data protection regulations |  |
| FR33 | The application must ensure integration with external market data sources to improve trading information and enhance the accuracy of analytics |  |
| FR34 | The application should maintain an audit trail that logs user actions, system events, and other changed to the data for compliance and accountability purposes. |  |
| FR35 | The application should ensure that trading data is available to users all day. |  |
| FR36 | The application should allow users to obtain historical trading data and analytics. |  |

3.1 Purpose/Description

The purpose of the specifications is to aid software developers in the development of this application. It will ensure that there is no confusion in the next stage of development which involves writing the programming code for the application. It will ensure that the Global Head of Compliance receives the result they are looking for and will prevent any unwanted design or direction changes through the process.

3.2 Use Case

|  |  |
| --- | --- |
| **UC-1** | **Details** |
| **Primary Actor(s)** | *Finance Executive* |
| **Stakeholders and Interest** | *Global Head of Compliance (Auditing and Reporting)* |
| **Trigger** | *Finance Executive starts the process of exporting the T-1 Analytics data to Excel.* |
| **Pre-conditions** | *The Trade Analytics Application is installed and accessible for the Finance Executive.* |
| **Post-conditions** | *The Analytics data is successfully exported to an Excel file* |
| **Main Success Scenario** | 1. *Finance Executive logs into Trade Analytics Application* 2. *Scrolls to view the T-1 Analytics Report* 3. *Selects the desired stock/s and views analytics* 4. *Selects the export option to download analytics locally* 5. System generates an Excel file containing the Analytics data from T-1 6. Executive reviews the Excel file downloaded on computer |
| **Extensions** | If the selected stocks do not have any analytical data, notify the user and abort the export option.  If the user faces issues during the export process, display an error message and request user try again later or seek assistance. |
| **Priority** | *Medium* |
| **Special Requirements** | *The exported file should be compatible with Microsoft Excel 2016 or later.* |

3.3 The Use Case Model

**System Use Case Diagram**

A diagram of a diagram

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3.4 Use Case Description

The Bank would like the business analyst team to design a new application for Trade Analytics application that will provide analytics about the previous day's equity trading activities. The FCA has mandated that the bank has a T-1 view of specific categories which are to be displayed on the application screen for all users. There are two sign-in options available for users: Read only and Read & Export, which will depend on the role of the user at the Bank. A user case has been written up that includes the following situations:

* A user logs in and views the dashboard with graphs and visualisations of the previous day’s equity trading activities
* A user (Read & Export) downloads a copy of the dashboard onto Excel
* A user searches for the previous day’s largest order placed for a certain stock

4. Form Business Rules and Dependencies

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Field Name | Validation/Business Rules | Error Message | Data Dependencies | Additional Info/Notes |
| Email address | Email provided should be a valid email address. | For incorrect/invalid email display on screen “Please enter a valid email address” | None | Access prohibited to users at the Bank with a valid work email address. |
| Export permissions | Read and Export users have permission to export reports. | “Read Only User. You do not have permission to export data.” | Depends on user permissions and which user they are. | This ensures that only authorized users can export data to Excel. |

5. Buttons, Links, and Icons

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Button, Link, Icon Label | On Click Event | Other Event | Visible | Enabled/Disabled | Navigate to | Validation | Dependencies |
| Log in | Verify if email and password are correct. If yes, log the user into the system. | If incorrect, display the message: “Please provide your correct email address and password” | Yes, always | Disabled, by default. Enabled, after first key entered in either email address or password field. | User Dashboard page | Verify if email address and password match with registry data. | Disable the New user functionality on subsequent pages if user logs onto application through this button. |
| Export to Excel | Trigger Excel export functionality | None | Read and Export users | Depends on user profile | Dashboard | None | Requires user to be Read and Export profile |
| Search largest order | Initiate search feature | Display search results | All users | None | Results screen | None |  |

6. System Configuration

a) The steps required to configure an application begin with the Business Requirements and Functional Specification documents. Following this, the documents can be passed onto the development team who can begin building and coding the application given the mandatory and desired features, actions, and interfaces. The export option should be compatible with Excel 2016 or more. To maintain security, users are requested to set up 2-step verification as part of the authentication method. The application should create an activity log of when the user signed in and whenever there is an export of data on the system. Backup should be implemented every 2 days in case of system failure or other risks.

b) System Externals

The Banks database will be a relational database as the stock information is all related. The application will use an API that will communicate and access the data stored in the database, which will then be transferred to the middleware, and translated into the User Interface as a graph or visualisation for the end-user.

**Interfaces**

Here is a proposed interface of the application, offering a proposed view of the desktop version and mobile phone display. There are a series of interfaces from when the end-user opens the application till, they reach the dashboard homepage. On the left there is a menu tool, which when selected will give the user options. These include navigating to view all the stocks, viewing reports, selecting the search bar, user profile and for those with a Read & Export profile there will also be an export reports option visible.

A blue rectangles on a white surface

Description automatically generated

In colour psychology, dark blue conveys safety and reliability which is why it has been chosen as the prototype colour. One of the aims the application would like to convey is that the Trade Analytics provided are reliable. Secondly, it is important that the users feel safe using the application and reassured that their data and privacy are secure, hence the choice of blue may be a possible colour for the interface.

A screenshot of a computer

Description automatically generated

The interface for the desktop will differ from the mobile application as the screen will be smaller. Therefore, for the smart phone application the menu bar will remain on the left and closed. When it is selected its opens are reflected on the screen for the user. Given the decreased amount of space, the user can switch from portrait to a landscape mode allowing the visualisations to be spread wider when the phone is rotated. Below there is a mock-up of the smart phone interface. The background has been kept as while and the text colour as black to ensure there is not confusion when and the contrast in colours allows users to be able to understand the application clearly. The mock up shows the two possible homepage screens depending on the user. If the user is using a Read Only profile, then the export option will be disabled and not displayed on the screen.

A screenshot of a cell phone

Description automatically generated

**Appendix**

Appendix 1: Functional flow chart of the applicationA diagram of a computer flowchart

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Appendix 2: Stakeholder Meeting Questions

1. Q. What is the problem you are trying to solve? Or is this an opportunity and what value will it bring?
2. Currently stock orders are logged manually and so there is a need for a new application that can communicate directly with the database and display analytical visualisations for users.
3. Who are the end users? Or potential users?
4. This application is for internal use and about 6-8 users that deal with the trading information and order management systems within the Bank.
5. What do you expect that the application should be able to do? Are there any specific features that you want included in the application?
6. The FCA has mandated that the Bank need to have a T-1 view (per stock) of:  
   • The number of orders  
   • The Largest Order  
   • The ratio of buy to sell orders  
   • The Price Spread of each order (if split)  
   • The number of Orders filled in the Opening auction  
   • The number of Orders filled in the closing auction
7. How would you like the dashboard to be structured? Is there any priority as to what information is placed at the top or any requirements related to information positioning and the interface?
8. No preferences
9. How many users will the application have?
10. It should be able to accommodate 6-8 users.
11. Follow-up question: Do you see potential for growth in the future or expect that the number of users and data information could grow?
12. We are planning to grow in the future as the bank expands and hope to expand internationally so the application should be able to accommodate this.
13. Are there any budget limitations or restrictions regarding funding I should know about?
14. No budget limitations, we are happy to invest given that the application is well prepared and looks promising.
15. Do you have any requirements on the design of the software that will communicate with the database system?
16. No requirement, this can be discussed further with the development team instead.
17. Do you have any questions for me, any concerns regarding the Functional Specification document?
18. What if the application crashes or has a failure?

Response. I have accounted for this by ensuring that the application has a regular backup procedure as part of the specifications and a strong data recovery implementation. This will ensure that valuable analytical information is preserved, and users feel at ease when engaging with the application.

A close-up of a document

Description automatically generatedAppendix 3: Project Assessment Brief