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| **SYSTEM REQUIREMENTS**  **SPECIFICATIONS**  **For**  **TRAVEL MANAGEMENT SYSTEM**  **STL**  **At**  **Accra, Ghana**  Document No. PRJ-TMS-SRS-02 Version 1.0 dated 05/09/2024  Supertech new logo  CONFIDENTIAL  Super Tech (STL) Ltd.,  226 Osibisa Close, Airport West,  P.O. Box KIA 30408, Accra, Ghana  Tel: +233-302-782646 / 7  Fax: +233-302-769622 |

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# Terminology

|  |  |
| --- | --- |
| **Acronym** | **Meaning** |
| TMS | Travel Management System |
| OS | Operating System |
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#### 

# Introduction

The purpose of TMS is to manage leave applications, assist users in making travel requests for themselves, for their dependents (family members), and for guests as well. Users are also able to make travel requests as delegates as well. The application also has other features that help to manage (create, view, edit and delete) users, track travel requests, approve or disapprove travel requests, generate reports, and edit travel requests as well.

The application is a build up or upgrade of the original TMS system.

# Document Overview

|  |  |
| --- | --- |
| **SECTION NUMBER** | **DETAILS** |
| **1** | An overview of all the terminologies used in this document |
| **2** | An introduction to the application |
| **3** | A list of customer (user) requirements |
| **4** | Scope of the project |
| **5** | Reference documents listing |
| **6** | An overview of the technical references of the project |
| **7** | Existing system description |
| **8** | Overview of the systems or subsystems of the project |
| **9** | The interface requirements of the project based on external and internal interfaces |
| **10** | Project functional requirements |
| **11** | Non-functional system requirements (software, OS and hardware) |
| **12** | Project’s compliance with standards, conventions and regulations |
| **13** | Addresses the acceptance/validation criteria for the project |
| **14** | Addresses the Change Control Procedure for the project |

# Customer (User) Requirements

The application should…

1. Allow for users to receive notifications on SMS, email and WhatsApp, based on their travel request.
2. Allow users to approve or reject travel requests from notifications. (e.g. approving or rejecting travel requests from the email).
3. Provide settings for notifications
4. Allow admins to choose which users receive notifications at any period
5. Allow users to view the history of travel requests (updates, notifications, etc.)
6. Enable users to edit travel requests even if the requests have reached the final stage of approval
7. Generate reports on how many times a user has made a travel request within the specified date range
8. Generate reports for editing of travel requests
9. Generate approval reports (report on where the approval was done from (system/WhatsApp/SMS/email))
10. Have a customized favicon
11. Have a calendar that fits the give screen, and allow for control on what users see on the calendar.
12. Send approval reminders to users (automatically and manually)
13. Enable users to be able to view their uploaded passport
14. Allow for multiple upload types for passports (e.g. jpeg, PNG, etc.)
15. Allow admin user-types to make travel requests for dependents who are not necessarily under them
16. Allow users to select multiple dependents when making a travel request
17. Encrypt passport information
18. Allow for travel request comments to appear on notifications
19. Create airlines and cities as setups so that they can be added from the ui.
20. Allow users to track number of leave days based on working days.
21. Allow users to see accumulated leave days on travel request.
22. Allow for CFO to view statistics on users accumulated work leave
23. Allow admin user-types to set eligibility levels and family status.
24. Calculate and display the remaining leave days based on the user’s leave balance and working days.
25. Allow managers to see and generate leave and flight balance reports of staff members under them.
26. Enable users to see and generate leave and flight balance reports based on their dependents.
27. Enable admin user-types to see and generate leave and flight balance report of every staff member.
28. Allow users to see their accumulated workdays statistics on their profile.

# Scope

This is a build-up on the original TMS application adding new features and functionalities and accounting for bugs discovered in the original system.

# Reference Documents / Plans / Schedules

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Document No.** | **Document Name** |
|  | PRJ-TMS-SRS-01 | TMS System Requirements Specifications |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

# Technical Reference

<https://nestjs.com/>

<https://www.postgresql.org>

<https://www.keycloak.org>

<https://www.kafka.org>

<https://socket.io>

[Next.js by Vercel - The React Framework (nextjs.org)](https://nextjs.org/)

# Existing System Description

The main objective of the TMS application (PRJ-TMS-SRS-01) is to manage leave applications, travel schedules as well as gives the user the ease of managing the bridge between the client and the travel agent in a whole. The client has the ability to view each stage of the process. If approved, the client will be notified upon approval. This gives the user the ability to have a clear oversight of applications sent to him or her.

# Systems / Sub-Systems

To create a robust system that allows for autonomous component evolution and uniform scaling and deployment scenarios, the system will be divided into several systems and subsystems.

The following subsystems include the following:

* + User Management
  + Travel Management
  + Notification System

# Interface Requirements

## 10.1 External

* User friendly

## 10.2 Internal

* Keycloak Identity Server
* PostgresSQL Server

# Functional Requirements

*(This section talks of the details of the scope of work given as an overview in Section 5. of this document)*

*(Attributes of the product that indicate the product capabilities that totally fulfil the customer’s functional needs and requirements, and that are the inputs for the program’s final acceptance)*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sl. No. | Contract Ref. No. | Contract / Program Requirements | Processing Narrative | Design Constraints | Supporting Diagrams | Remarks |
|  |  | Home Page  Login/Authentication | 1. After entering the URL for the application in the search bar of a browser, the user will be presented with the Home Page for the application. 2. The home page will display the name and logo of the application. It will also show the Login button which the user will click to undergo the authentication process. 3. Upon clicking the Login button, the user will be redirected to the keycloak login page to provide his Username and Password. 4. Upon successfully providing the Username and Password the user will be given access to the application and will be directed to the Dashboard. |  |  |  |
|  |  | Dashboard | 1. Upon a successful login, the user will be presented with the dashboard. The following features are present: 2. Statistic cards (clickable):   -Draft  -GM Approval  -CFO Approval  -Agency Approval.  (Clicking on these cards will redirect the user to the pages for Drafts, GM Approval, CFO Approval and Agency Approval respectively)   1. Right below the cards,   Calendar (the user will see the approved leave requests on the calendar. The leave requests displayed will be based on the user’s permission (i.e. It is only the leave requests of the users under you that you will see. ))  The calendar will fit the screen size so that the user does not need to scroll to view its contents.   1. Side Navigation Bar; at the left side, the user will see the tabs through which the user can use to navigate to access various parts of the application. The tabs consist of: 2. Dashboard 3. Travel Request 4. Manager Approval 5. General Manager Approval 6. Group Manager Approval 7. CFO Approval 8. All Request 9. Travelling Manager Approval 10. Reports 11. User Management 12. Settings   (The tabs displayed will be based on the user’s role and permissions. For example, not every user will have access the reports and user management pages) |  |  |  |
|  |  | Travel Request Tab  *NB: Travel Requests will have Expiries (e.g. 24 hours), in that if they are not approved within the specified period (24hrs), they will be automatically cancelled, and the user will have to make the travel request again.*  *The type of travel request a user can make (e.g. Self, Dependent, etc.) depends on his or her role in the system* | 1. The travel request page can be accessed when the user clicks on the Travel Request Navigation button. 2. The user will see the Travel Request Page which displays the following: 3. List of travel requests displayed in tabular form. The table will have the following columns: 4. Application Number 5. Applicant Name 6. Type (Request Type) 7. Start Date 8. End Date 9. Date Applied 10. Day/s (Number of Days) 11. Status (Approval Stage) 12. Action   The Action Column will consist of the following buttons:  -View Leave Details Button  -Update Leave Details  -Reminder Button (when the reminder button is clicked, a notification is sent to the manager who is supposed to approve the travel request, so that the manager approves the travel request before it reaches expiry)   1. Search Bar   The Search Bar only takes letters and numbers, and allows the user to search the list of travel request by providing any parameters. (e.g. The name of the applicant, the application number, etc.)   1. Apply Button   The Apply button enable the user to make a travel request for the following:   1. Self 2. Dependent 3. Guest 4. As Delegate 5. Free Dependent (to enable the user to create a travel request for any dependent on the system. The dependent in question does not necessarily need to be tied to the one making the travel request) |  |  |  |
|  |  | Updating of Travel Request  *NB: All updates made on Travel Requests will be recorded and displayed as history on the travel request history page.* | 1. The user will be able to update a travel request that is at each stage of the travel request’s lifecycle. (ie. Whether the travel request is pending, pending General Manager (G.M) Approval, pending Manager (M.A) Approval, or pending Group Manager (GR.M) Approval) 2. Travel requests can also be updated by the Travelling Manager, on behalf of a user 3. The user is able to edit the travel request by clicking on the Update Leave Details button under the Action column of the Travel Request Table.   Clicking the button will redirect the user to the Travel Details Page where the user can edit any field (for example, the departure date).  *Editing the date will take the travel request back to the beginning of the travel request approval cycle* |  |  |  |
|  |  | Travel Request History  *(The purpose of this page is to track the edits that have been made on any given request at any point in time)* | Travel Request History can be accessed when a Travel Request has been made and submitted for approval.   1. It can be accessed from the Travel Request Table when the user clicks on the View Leave Details button. 2. At the Leave Details page, there will be two tabs: 3. Details 4. History 5. Upon clicking the History button, the user will be able to view the history of changes made on the travel request. The list of changes will be displayed in tabular form, and will contain the following columns: 6. Editor Name 7. Edit Type 8. Description/Reason for Edit 9. Edit Details 10. Edit Date   *No actions can be performed on this table* |  |  |  |
|  |  | User Management | 1. Keycloak will be linked to the application so that users will be loaded from the active directory 2. Users can be added from the active directory and even users who are not on the active directory can be created by the admin user who has the permission to create users. 3. The list of existing users will be displayed in a tabular form with the following columns:    1. First Name    2. Last Name    3. Company    4. Actions 4. The Actions column will consist of five (5) buttons that will enable the admin to view, edit the user, edit the user’s profile, delete the user and manage notification settings. 5. At the top of the page there will be a search bar for the admin to search or filter users. 6. At the far-right at the top of the table, there will be an Add User button to enable the admin to create users 7. After clicking the Add User button, the admin will be presented with a modal that has the following features: 8. Search Bar 9. A table with the following columns:    1. Name    2. Username    3. Action 10. An Add Non-LDAP User button |  |  |  |
|  |  | Add Non-LDAP User  (This is to create a user who is not on the Active Directory) | 1. Upon clicking the Add Non-LDAP User button, the user will be redirected to a form with the following fields which are all required: 2. First Name 3. Last Name 4. Username 5. Email 6. Roles (dropdown) 7. Company (dropdown) 8. Client (dropdown) 9. Manager 10. Submit button 11. After providing all the necessary details and clicking on submit, the user will be created and added to the user table |  |  |  |
|  |  | Add user from Active Directory | 1. To add a user from the active directory, the admin searches for the user by typing in the search box 2. As the admin types, the filtered results will be populated on the table from which the admin will click on the Add User button in the action column. 3. Clicking on this button will create and add the user to users table. |  |  |  |
|  |  | Settings  *(NB: Settings can be accessed by only the Admin user-type)* | The settings page can be accessed by clicking on the Settings tab on the side-navigation bar:   1. The settings page will display the following categories:    1. General Setups    2. Notification Setups |  |  |  |
|  |  | General Setups | The General Setups page will allow the user to add, edit and remove features as well as dropdown options on the system from the UI.  The user will be able to add, edit and remove the following setups:   1. Hotel Options 2. Airline Options 3. Cities Options   The Setups will be displayed as tabs and the existing setups in the system will be listed in tabular form with the following columns:   1. Name 2. Description 3. Action   Therefore, there will be an Airline Table, Hotel Table and City Table.  The Action column for each table will have the following buttons:   * Add * Edit * Delete |  |  |  |
|  |  | Notification Setups | The Notification Setups will allow the Admin to control what medium users will receive notifications from.  The Mediums will be listed in a tabular form with the following columns:   1. Name 2. Description 3. Action   The admin user will not be able to delete a medium of notification, but under the actions tab, the user will be able to perform the following actions:   1. Enable 2. Disable |  |  |  |
|  |  | Roles and Permission | What a user sees or has access to in the application will depend on the permissions the user has.  User roles and permission settings can be managed on the user management page |  |  |  |
|  |  | Eligibility Setup | On the eligibility page, there will be a navigation bar at the top that allows users to easily switch between the following sections: Hotels and Eligibility Settings.   1. The user will be redirected to the Hotels Page when the Hotels Tab is clicked.   The said page will enable admin users to manage hotel information in the system. There will be a button labeled “Add Hotel,” allowing the admin to add a new hotel to the system. Additionally, there will be edit and delete buttons that enable the admin to update and remove existing records, respectively. Hotel information will be displayed in a table format with the following columns   1. Name 2. Description 3. Action 4. The user will be redirected to the Eligibility Settings page when the Eligibility Tab is clicked   Under Eligibility Settings, there will be a button labeled "Add Eligibility Levels." Admin user type can click this button to add new eligibility settings by providing the required information. The eligibility details will also be displayed in a tabular form with these columns:   1. Type, 2. Flights, 3. Working Days, 4. Leave Days, 5. Status 6. The CFO and the admin will have access to view statistics on users accumulated worked days and leave balance on travel request. The statistics can be view by clicking the view button on the travel request page. 7. Additionally, users will be able to view statistics for their leave and flight balances on their profile page.This section will summarize the total accumulated leave days and flight balance for each user 8. Finally, the statistics for flight and leave balance will also be visible to users on travel request application. |  |  |  |
|  |  | Report Generation | This page will enable admin user types to generate reports for their employees or for themselves based on a specified time frame. There will be a button labeled “Generate Report.” When clicked, this button will open a pop-up modal containing the following fields:   1. Report Type 2. Start date 3. End date   The report type will offer two options: "Employees" and "Self." When "Self" is selected, the generated report will include information about the current user. If "Employees" is chosen, the report will contain details about the employees.  The start and end dates will allow the admin or user to specify the interval for which the report should be generated.  The report information will be presented in a table format within a PDF, with the following columns:   1. Username 2. Flight Balance 3. Flight Took 4. Leave Days Outside Ghana 5. Accumulated Flight 6. AverageAccumulatedLeaveDays 7. Accumulated Working Days 8. Leave Balance 9. Arrival 10. Departure 11. Start Date 12. Current Date 13. Maximum Leave Days 14. Maximum Working Days |  |  |  |

In case of a small project, the requirement specifications may be presented as one continuous document. In larger programs comprising of several components, all requirements may be combined into logical groups of requirements. The above mentioned columns may be detailed individually for each component.

# Non-Functional Requirements:

The User Interface of the application will be very friendly and easy to use to accommodate all user categories.

## Software

N/A

## OS

Windows / Mac OS or Android OS.

## Hardware

|  |  |  |
| --- | --- | --- |
| **Sl No** | **Component** | **Specifications** |
|  |  |  |
|  |  |  |

## Design Requirements

N/A

## Performance

Based on the hardware requirements provided in Section 12.3, the application is projected to handle the following performance constraints:

Time taken between HTTP requests (Request/Response cycle): 90sec

## Training Requirements

Users of the system shall be taken through a rigorous training session to get acquainted with the usage of the system.

## Maintenance / Product Support

There shall be provision for periodic maintenance to achieve the aim of ensuring the system is always abreast with current trending technology to improve the system and also make it easier for users to undertake transactions and also make it possible to fix any bugs that may be identified after the application is deployed.

## Safety and Reliability

The application shall not pose any danger to life and property. The systems and sub systems shall be developed to be highly available to improve user experience and provide fast response for critical information.

## Security and Privacy

All information entered into the application shall be treated as private and with a high level of security. Only authenticated and authorized users can access the information. Also the application shall be developed in accordance with industry recommended security guidelines to ensure the privacy and security of critical user information. To be precise the application shall guard the following OWASP top 10 web application security risks:

1. Injection (SQL Injection): Injection flaws, such as SQL, NoSQL, OS, and LDAP injection, occur when untrusted data is sent to an interpreter as part of a command or query. The attacker’s hostile data can trick the interpreter into executing unintended commands or accessing data without proper authorization
2. Broken authentication: Application functions related to authentication and session management are often implemented incorrectly, allowing attackers to compromise passwords, keys, or session tokens, or to exploit other implementation flaws to assume other users’ identities temporarily or permanently.
3. Sensitive data exposure: Many web applications and APIs do not properly protect sensitive data, such as financial, healthcare, and PII. Attackers may steal or modify such weakly protected data to conduct credit card fraud, identity theft, or other crimes. Sensitive data may be compromised without extra protection, such as encryption at rest or in transit, and requires special precautions when exchanged with the browser.
4. XML external entities: Many older or poorly configured XML processors evaluate external entity references within XML documents. External entities can be used to disclose internal files using the file URI handler, internal file shares, internal port scanning, remote code execution, and denial of service attacks
5. Broken access control: Restrictions on what authenticated users are allowed to do are often not properly enforced. Attackers can exploit these flaws to access unauthorized functionality and/or data, such as access other users’ accounts, view sensitive files, modify other users’ data, change access rights, etc.
6. Security misconfiguration: Security misconfiguration is the most commonly seen issue. This is commonly a result of insecure default configurations, incomplete or ad hoc configurations, open cloud storage, misconfigured HTTP headers, and verbose error messages containing sensitive information. Not only must all operating systems, frameworks, libraries, and applications be securely configured, but they must be patched/upgraded in a timely fashion
7. Cross Site Scripting: XSS flaws occur whenever an application includes untrusted data in a new web page without proper validation or escaping, or updates an existing web page with user-supplied data using a browser API that can create HTML or JavaScript. XSS allows attackers to execute scripts in the victim’s browser which can hijack user sessions, deface web sites, or redirect the user to malicious sites.
8. Insecure deserialization: Insecure deserialization often leads to remote code execution. Even if deserialization flaws do not result in remote code execution, they can be used to perform attacks, including replay attacks, injection attacks, and privilege escalation attacks.
9. Components/libraries/frameworks with known vulnerabilities: Components, such as libraries, frameworks, and other software modules, run with the same privileges as the application. If a vulnerable component is exploited, such an attack can facilitate serious data loss or server takeover. Applications and APIs using components with known vulnerabilities may undermine application defenses and enable various attacks and impacts
10. Insufficient logging and monitoring: Insufficient logging and monitoring, coupled with missing or ineffective integration with incident response, allows attackers to further attack systems, maintain persistence, pivot to more systems, and tamper, extract, or destroy data. Most breach studies show time to detect a breach is over 200 days, typically detected by external parties rather than internal processes or monitoring.
11. Kiosk Mode: The application will be in Android Kiosk Mode which will lock the Android Devices to the application. Users will not be able to use the application for any other function except the application. The application will also not allow the system to be turned off or be formatted and factory reset. This is a form of defense mechanism against theft and also regulation of the usage of the device to limit it to the application which was developed for it.

## Physical Characteristics and Power Requirements

The device to run the application comes with an 8.00-inch display with a resolution of 800 x 1280pixels powered by 2.0 GHz processors. It comes with 2GB of RAM. It runs Android10.0 and is powered by 5100mAh non-removable battery. There will be 50 pieces in all.

## Operating Environmental Conditions

The device that will run this application can used in ambient temperature of 0 degrees Celsius to 35 degrees Celsius. The device can be stored at an ambient temperature of -20 degrees Celsius to 50 degrees Celsius. Using and storing the device outside the recommended temperature may damage the device or reduce the battery lifespan

## Statutory Requirements

N/A

# Compliance with Standards, Conventions and Regulations

This software shall comply with the JavaScript language coding standards presented in ISO process in Supertech. It shall also follow the ISO 9001 standards for software development process of Supertech

# Acceptance / Validation Criteria

This will be provided in the accompanying ATP.

# Change Control Procedure

The customer is required to complete a change request document if he wishes for any changed to be effected after this SRS is approved.