Transport Company SW

Software Requirements Specification

Team “Number One”

Version 0.2

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1. Introduction

1.1. Purpose

The purpose of this document is to provide a full description of a Transport Management System. A Transportation Management System is a software system which is created to manage transportation operations and ensure better service. Program should decrease transportation time, fuel cost and increase customer satisfaction.

1.2. Document conventions

When writing this SRS, the following terminologies are used:

- **TCP** - The Transmission Control Protocol is one of the main protocols of the Internet protocol suite.
- **FIFO** - an acronym for first in, first out, a method for organizing and manipulating a data buffer, where the oldest (first) entry, or 'head' of the queue, is processed first.
- **GSM** - is a standard developed by the European Telecommunications Standards Institute to describe the protocols for second-generation digital cellular networks used by mobile devices such as mobile phones.
- **NFC** - Near-field communication is a set of communication protocols that enable two electronic devices, one of which is usually a portable device such as a smartphone, to establish communication by bringing them within 4 cm (1.6 in) of each other.
- **GPS** - The Global Positioning System is a space-based radionavigation system owned by the United States government and operated by the United States Air Force.
- **RFID** - Radio-frequency identification uses electromagnetic fields to automatically identify and track tags attached to objects.
- QR code - a machine-readable optical label that contains information about the item to which it is attached.
- **BSON** - BSON /#bi#s#n/ is a computer data interchange format used mainly as a data storage and network transfer format
- **JSON** - an open-standard file format that uses human-readable text to transmit data objects consisting of attribute–value pairs and array data types (or any other serializable value).
- **Socket** - an end-point in a communication across a network or the Internet
- **HTTP** - Hypertext Transfer Protocol is an application protocol for distributed, collaborative, and hypermedia information systems.
- **COM** - name of the serial port interface on IBM PC-compatible computers.

1.3. Contact information/SRS team members

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2. Overall Description

2.1 Product functions

1. Monitor and track parcels lifecycle
2. Monitor and track delivery operation
3. Monitor traffic and critical conditions and provide warning and alternatives
4. Manage criticality and accidents involving delivery
5. Generate activity reports
6. Define operators schedules and turnover
7. Monitor and reporting on stocking areas

2.2 User classes and characteristics

1. International and local manufacturing companies.
2. Legally capable population from 16 to 60+ age with e-wallet.
3. Truck drivers as employees.

2.3 Operating environment

Base: Main Control room with 3 servers, 20 PC based stations with multiple screens. Local High speed bus.

3 Level 2 Control rooms 2 servers 5 PC based stations stations with multiple screens. High speed COMs (Fiber) with Main CR.

500 remote terminal (Android). 4G (up 60%), GSM (up 95%), 50 terminal have parallel Satcom.

2.4 User environment

Web client based on WEB 2.0, Android and Desktop application.

2.5 Design/implementation constraints

The challenges in developing this product consist the most in the limitation of the internet speed on remote terminals. Due to the speed of GSM 115.2Kbit/s and average speed of satlink of 1Mbit/s + latency of 638 ms we need to delimit the information which will be processed on the server and terminal to send less data to the server. It is required to use some protocols over TCP to ensure data security and data safety. Data will be sent as encrypted text, because binary packets are more expensive in requirements of internet. Sometime wireless internet can not be accessible so, information need to be available offline and synced with the server when internet appear, sync must be in FIFO and timestamped.

Because tracking each package manually is too hard, it will be necessary to mark all packages with unique identifier and to track enter and exit of package from the transport or office. There are multiple methods of fast tracking each package, the best will be to have an NFC reader on the terminals and attach RFID to each package. If NFC is not available or too expensive for the company there is a solution to print QR codes and attach them to each package and terminal will have a camera to read.

App must do a lot of action automatically, because there are a lot of packages and personal of the company may not be in time to manually input data for each them.

Each terminal must have GPS, so on the map live all products which have status entered into the transport can be tracked and analytics can create estimation on delivery.

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3. External Interface Requirements

3.1 User interfaces

User interfaces in both Desktop and Mobile platforms should follow Material Design Principles introduced by Google (https://material.io/).

3.2 Software interfaces

Software interfaces should be standardized to JSON format. In cases of slow connection it better to use BSON (http://bsonspec.org/) for data compression and GZIP for text compression.

3.3 Communication protocols and interfaces

Communications will be based on HTTP and Socket protocols.

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4. System Features

Role	Description
Software User	All the users of software.
Customer	Uses transport company services to send or receive parcels.
Company operator	Communicates with customers, drivers and company managers. Solves delivery problems.
Company manager	Defines employees' schedule and generates activity reports.
Stock-manager	Controls filling of a warehouse.
Driver	Delivers parcels.

Features:

1. Different types of user should have separate login accounts

Requirement	#1
Actor	Software User
Description	Different types of user should have separate login accounts.
Rationale	When user logs into account, he/she may use functions that are allowed to his /her type of account.
Fit Criterion	Main page asks user to enter his/her login and password. Then on clicking on "Sign In" button, user will be redirected to his account.
Dependencies	Independent

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2. Customers shall be able to monitor their parcels using track code

Requirement	#2
Actor	Customer
Description	Customers will enter track code to monitor their parcels' state.
Rationale	This will enable customers to know where his/her parcel is.
	Customer will enter track number and then system will show him/her state and

Fit Criterion	tracking information.
Dependencies	Independent

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3. Company operator shall be able to monitor customer’s parcel state

Requirement	**#3**
Actor	Company Operator
Description	Company Operator will enter customer’s track number to monitor customer’s parcel state.
Rationale	This will let Company Operator to provide first-hand information to customers.
Fit Criterion	Company Operator will enter customer’s track number and then system will show him/her state and tracking information.
Dependencies	Independent

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4. Driver shall be able to receive weather warnings

Requirement	**#4**
Actor	Driver
Description	Driver will receive weather warnings.
Rationale	This will prepare drivers for weather conditions.
FitCriterion	Driver’s geolocation and internet connection is enabled. If weather changes, warning will be sent.
Dependencies	Independent

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5. Company Operator shall be able to change driver’s route

Requirement	**#5**
Actor	Company Operator
Description	Company Operator will change driver’s route by adding or removing company offices to route.
Rationale	This will enable Company Operator to choose a new convenient route for driver.
Fit Criterion	Operator will click “Add” or “Remove” buttons, then system will send new route to driver.

Dependencies	Independent

6. Company Operator shall be able to monitor road traffic

Requirement	**#6**
Actor	Company Operator
Description	Company Operator will monitor road traffic in the entered city.
Rationale	This will enable Company Operator to warn drivers or give them another way to destination in case of traffic jam.
Fit Criterion	Operator will enter city and click “Traffic” button, then system will show map with traffic jams.
Dependencies	Independent

7. Company Operator shall be able to find the nearest repair center

Requirement	**#7**
Actor	Company Operator
Description	Company Operator will find the nearest repair center in case of accident.
Rationale	This will enable Company Operator to find repair centers that can fastly mend truck so that parcels can reach destination on time.
Fit Criterion	Driver’s geolocation should be enabled. Operator will receive “accident signal”, click “Nearest Repair Centers” button and then system will show all the repair centers that are closest to the driver.
Dependencies	Independent

8. Company Operator shall be able to call repair center

Requirement	**#8**
Actor	Company Operator
Description	Company Operator will call the repair center from the list of the nearest repair centers.
Rationale	This will enable Company Operator to fastly contact repair center that can mend truck so that parcels can reach destination on time.
Fit Criterion	Repair Center should be in the list of the nearest repair centers. Operator will click “Call” button and then system will connect operator with the repair center.
Dependencies	7

9. Company Operator shall be able to call replacement truck

Requirement	#9
Actor	Company Operator
Description	Company Operator will call replacement truck in case of accident.
Rationale	This will enable Company Operator to replace damaged truck so that company can deliver parcels on time.
Fit Criterion	Operator will click “Call Free Driver” and system will contact operator with the nearest free truck driver.
Dependencies	Independent

10. Driver shall be able to receive the shortest way to destination

Requirement	#10
Actor	Driver
Description	Driver will receive the shortest way to destination.
Rationale	This will enable driver to deliver parcels on time. Fit
Fit Criterion	When driver moves out, he should click “Get the Way” button and then system will show him the way to destination.
Dependencies	Independent

11. Company Manager shall be able to create reports

Requirement	#11
Actor	Company Manager
Description	Company Manager will generate activity report.
Rationale	This will enable Company Manager to store full documentation about employees and company activities.
Fit Criterion	Company Manager will press “Create Report” button, system will show him/her report forms. After filling them manager will press ”Create” button and then report will be generated.
Dependencies	Independent

12. Company Manager shall be able to create employee’s schedule

Requirement	#12

Actor	Company Manager
Description	Company Manager will create employee’s schedule.
Rationale	This will enable Company Manager to manage the time each employee works.
Fit Criterion	Company Manager will press “Create Schedule” button, system will show him /her schedule tables. After filling them manager will press ”Create” button and then schedule will be generated.
Dependencies	Independent

13. Stock Manager shall be able to monitor stocking areas

Requirement	**#13**
Actor	Stock Manager
Description	Stock Manager will check stocking areas on space availability.
Rationale	This will enable Stock Manager to manage space in the warehouse.
Fit Criterion	Stock Manager will request information about parcels in the warehouse by clicking button and then system will provide this information in the form of a table.
Dependencies	Independent

14. Stock Manager shall be able to change the state of parcels in the stock

Requirement	**#14**
Actor	Stock Manager
Description	Stock Manager will change the state of parcels in the stock.
Rationale	This will enable Stock Manager to
Fit Criterion	Stock Manager will change state by clicking “Change state” button and choosing right state, then system will change parcel’s state and notify Stock Manager.
Dependencies	Independent

15. Company Operator shall be able to add new parcel into the system

Requirement	**#15**
Actor	Company Operator
Description	Company Operator will add new parcel into the system.
Rationale	This will be the starting point of a parcel through the system

Fit Criterion	Company Operator will add a new parcel into the system with destination point and receiver information.
Dependencies	Independent

16. Company Operator will select a route for parcel shipping

Requirement	**#16**
Actor	Company Operator
Description	Company Operator will select most convinent route for parcel.
Rationale	Based on delivery requirements system will generate valid routes and operator will select
Fit Criterion	Company Operator will select a route and the route will be available into parcel information.
Dependencies	Parcel Management

17. Company Operator will view in real time expected time of delivery

Requirement	**#17**
Actor	Company Operator
Description	Company Operator will have possibility to analyze expected time of delivery.
Rationale	Based on location system will give a prediction on remaining time to deliver
Fit Criterion	Company Operator will have valid information based on prediction of delivery.
Dependencies	Parcel

18. Company Operator will view in real weather forecast and prediction

Requirement	**#18**
Actor	Company Operator
Description	Company Operator will have possibility to check weather forecast on every point on the map.
Rationale	Based on location system will give a prediction of forecast in the region at the predicted time of parcel location
Fit Criterion	Company Operator will have weather forecast to all location where system should work .
Dependencies	Weather Module

19. Company Operator will see in real time traffic congestion

Requirement	#19
Actor	Company Operator
Description	Company Operator will have possibility to view traffic on the map and drivers positions.
Rationale	Based on custom services system will show traffic on the map and drivers positions to change route to make delivery faster
Fit Criterion	Company Operator will have a map with traffic in all available regions .
Dependencies	Map

20. Company Operator will activate order dispatch

Requirement	#20
Actor	Company Operator
Description	Company Operator will activate order dispatch.
Rationale	Order should be activated only when it is acknowledged by the delivery operators
Fit Criterion	Company Operator will have a button to activate order into the system .
Dependencies	Map

21. Customer will have possibility to see expected delivery date

Requirement	#21
Actor	Customer
Description	Customer will have ability to see expected delivery date.
Rationale	Customers are interested to see delivery date to wait for the parcel
Fit Criterion	On tracking page will be a field which will show expected time to deliver.
Dependencies	Parcel

22. Customer will have possibility to select custom delivery time and date

Requirement	#22
Actor	Customer

Description	Customer will select the most convinent time for delivery.
Rationale	For home delivery customer should select time when he will be available to receive it
Fit Criterion	User will input on the personal page of the delivery time and date of delivery.
Dependencies	Parcel

23. Company Operator should add and change custom delivery time and date

Requirement	**#23**
Actor	Company Operator
Description	Company Operator have a form to enter custom dates and time to deliver.
Rationale	For home delivery Company Operator should be able to change delivery time and date if customer ask for it
Fit Criterion	On delivery page Company Operator will change time and date, driver will receive a notification with new information .
Dependencies	Parcel

24. Company Operator should add and change custom delivery time and date

Requirement	**#24**
Actor	Company Operator
Description	Company Operator have a form to enter custom dates and time to deliver.
Rationale	For home delivery Company Operator should be able to change delivery time and date if customer ask for it
Fit Criterion	On delivery page Company Operator will change time and date, driver will receive a notification with new information .
Dependencies	Parcel

25. Company Operator will close the order only when the confirmation from the client will be received

Requirement	**#25**
Actor	Company Operator
	Company Operator will complete order when driver will give the confirmation

Description	document from customer.
Rationale	To avoid lost parcels and unsatisfied clients parcel should be marked as delivered only when customer signs the document of delivery
Fit Criterion	Company Operator should manually confirm order when document is received
Dependencies	Parcel

26. Company Operator shall be able to change the state of parcels along the route

Requirement	**#26**
Actor	Company Operator
Description	Company Operator will change the state of parcels along the route.
Rationale	This will enable customers to track state of parcels along the route
Fit Criterion	Company Operator will change state by clicking “Change state” button and choosing right state, then system will change parcel’s state, notify Company Operator and send appropriate message to the customer.
Dependencies	Independent

27. Company Operator shall be able to check the timeliness at the planned points along the route

Requirement	**#27**
Actor	Company Operator
Description	Company Operator will check the timeliness at the planned points along the route.
Rationale	This will enable Company Operator to understand that something has happened, take timely measures and warn the customer about possible delays.
Fit Criterion	Company Operator will request information about location of delivery operator in time when he/she should be at the planned points.
Dependencies	Independent

28. Company Operator shall be able to contact delivery operator

Requirement	**#28**
Actor	Company Operator
Description	Company Operator will contact delivery operator.

Rationale	This will enable Company Operator to provide delivery operator real time support.
Fit Criterion	Company Operator will contact delivery operator by clicking “Contact” button and then system will connect them.
Dependencies	Independent

29. Company Operator shall be able to generate a special attention message in case of delays

Requirement	**#29**
Actor	Company Operator
Description	Company Operator will generate a special attention message in case of delays.
Rationale	This will let customers to receive first-hand information about their parcels and not to worry about delays.
Fit Criterion	If there is delay in delivery, Company Operator will click “Create Attention Message”, write message and the send by clicking “Send” button. System will send this message to the customers.
Dependencies	Dependent on requirement 27

30. Customer shall able be create a plan for delivery

Requirement	**#30**
Actor	Customer
Description	Customer will plan delivery of parcels.
Rationale	This will allow customer create a plan for delivery.
Fit Criterion	Customer create path through company’s offices. Could be chosen by maps or typing addresses of offices.
Dependencies	Independent

31. Company operator shall able to check correctness of input data

Requirement	**#31**
Actor	Company Operator
Description	Company operator will check for correctness the data from user’s plan.
Rationale	This will allow company operator accept or reject delivery plan.
	Company operator will receive orders from users and check its correctness by

Fit Criterion	clicking on buttons “Approve” and “Reject”. The owner of order will be notified about operator’s decision by notification.
Dependencies	Independent

32. Company operator shall able to change state of orders

Requirement	**#32**
Actor	Company Operator
Description	Company operator will change state of the order after checking for correctness.
Rationale	This will allow company operator change state of order.
Fit Criterion	Company operator will be able to change state of order by clicking “Change state” and choosing a state from the drop-down box.
Dependencies	Independent

33. Customer shall able to assess the delivery

Requirement	**#33**
Actor	Customer
Description	Customer can assess the delivery process at the end.
Rationale	This will allow a customer to give a grade/feedback for delivery process.
Fit Criterion	Customer can leave feedback after receiving the parcel by clicking on “Leave Rating” and leave a message and grade.
Dependencies	Independent

34. Customer shall able to choose one of the delivery time options

Requirement	**#34**
Actor	Customer
Description	Customer will choose the delivery time options.
Rationale	This will allow a customer to choose how long the parcel will be delivered.
Fit Criterion	Customer can choose delivery time by clicking on the drop-down box and choose on of the predefined options.
Dependencies	Independent

35. Company operator shall able to choose one of the type of transport vector.

Requirement	#35
Actor	Company Operator
Description	Company operator will choose the type of transport vector.
Rationale	This will allow a Company operator to choose the certain type of transport vector.
Fit Criterion	Company operator can choose type of transport vector by clicking on the drop-down box and choose on of the predefined options.
Dependencies	Independent

36. Company operator shall able to choose possible route for delivery.

Requirement	#36
Actor	Company Operator
Description	Company operator will choose the route.
Rationale	This will allow a Company operator to choose the certain route for delivery.
Fit Criterion	Company operator can choose route for delivery by marking points on the map or inputting addresses of points.
Dependencies	Map API

37. Customer shall be able to confirm parcel receiving.

Requirement	#37
Actor	Customer
Description	Company operator will choose the route.
Rationale	This will allow company operator to receive confirmation in seconds, no need to wait until courier brings signed paper.
Fit Criterion	When customer receives parcel, he should click “Confirm Receipt” button. When system will notify company operator.
Dependencies	Independent

38. Company operator shall able to generate “Parcel Delivered” message.

Requirement	#38
Actor	Company operator
Description	Company operator will generate “Parcel Delivered” message.
Rationale	This will allow a Company operator to monitor shipment phase and keep information up to date.
Fit Criterion	Company Operator will be notified when parcel is received by customer, after that he/she should generate “Parcel Delivered” message by clicking “Parcel Delivered” button.
Dependencies	Independent

39. Control Supervisor shall be able to see customers feedback.

Requirement	#39
Actor	Control Supervisor
Description	Control Supervisor will request feedback from customer.
Rationale	This will allow a Control Supervisor to assess customer satisfaction.
Fit Criterion	Control supervisor chooses some order and there is a field with customers assessment or if it’s not there send customer an offer to leave feedback.
Dependencies	Independent

40. Customer shall be able to leave feedback.

Requirement	#40
Actor	Customer
Description	Customer will leave feedback.
Rationale	This will enable Control Supervisor to assess customer satisfaction.
Fit Criterion	Customer have a special window to feedback, which he can fill any time and send it pressing the button”send feedback”.
Dependencies	Independent

41. Control Supervisor shall be able to observe general trend of orders.

Requirement	#41
Actor	Control Supervisor
Description	Control Supervisor will observe general trend of orders.

Rationale	This will enable Control Supervisor to predict new orders.
Fit Criterion	Control supervisor will press a button “observe general trend” then system will show the statistics of orders through graphs or diagrams.
Dependencies	Independent

42. Control Supervisor shall be able to report of the day activity.

Requirement	**#42**
Actor	Control Supervisor
Description	Control Supervisor will report of the day activity including status of the quality indicators, observation general trend and so on.
Rationale	This will enable company to have all information in archive.
Fit Criterion	Control Supervisor will have special form to fill with day activity report.
Dependencies	Independent

43. Control Supervisor shall be able to request statistical placement to the shipment.

Requirement	**#43**
Actor	Control Supervisor
Description	Control Supervisor will request statistical placement to the shipment.
Rationale	This will enable Control Supervisor to assess shipment.
Fit Criterion	Control supervisor will choose some order and press button ”Statistical placement” and then the graph with the shipment compared to the others will be shown.
Dependencies	41

44. Customer shall be able to get support in real time.

Requirement	**#44**
Actor	Customer
Description	Customer can get support in real time.
Rationale	This will allow Customer to get support instantly (in real time) without a long wait.
Fit Criterion	Customer will open support form by clicking “Get support” and ask support (ask questions) by clicking “Send” button, system will send message to Company

	Operator.
Dependencies	Independent

45. Company Operator shall be able to support customers in real time.

Requirement	#45
Actor	Company Operator
Description	Company Operator will support customers in real time.
Rationale	This will allow a Company operator to give support instantly (in real time).
Fit Criterion	Company Operator will get message from Customer and send answer for appropriate Customer by clicking “Reply” button.
Dependencies	44

46. Customer will have possibility to receive updates if delivery is delayed

Requirement	#46
Actor	Customer
Description	Customer will have ability to receive notifications if delivery was delayed .
Rationale	To avoid dissatisfied customers system should notify in case of emergency
Fit Criterion	User will receive an email or sms with new delivery time.
Dependencies	Parcel

5. Other Non-Functional Requirements

NFR-01

Type	Security
Description	No one will have an access to any user’s account information without a permission except the user itself

NFR-02

Type	Security
	Only users with correct login-password or track number will be given access to the

Description	system

NFR-03

Type	Performance
Description	Users should receive tracking information about parcels in less than 30 seconds after request

NFR-04

Type	Usability
Description	All users should be satisfied with use of the system

NFR-05

Type	Portability
Description	Drivers should be able to use the system on different Android devices

NFR-06

Type	Safety
Description	Software should show only valid ways for drivers

NFR-07

Type	Performance
Description	Software should generate routes in less than a minute

NFR-08

Type	Safety
Description	Software should alert driver in case emergency weather conditions

NFR-09

Type	Safety
Description	Every change on state of the parcel should be saved in parcel log

NFR-10

Type	Usability
Description	Drivers app should work in offline to allow driver to see route and cached information

NFR-11

Type	Usability
Description	The product shall be self#explanatory and intuitive such that a customer will get all information by himself

NFR-12

Type	Reusability
Description	The wather forecast should be collected from public services

NFR-13

Type	Availability
Description	Unless the system is non#operational, the system shall present a user with notification informing them that the system is unavailable

NFR-14

Type	Survivability
Description	If a transactions fails before it was saved, the system shall be able to recover all changes and notify user.

NFR-15

Type	Availability
Description	The system shall prevent access to failed functions while providing access to all currently operational functions.

NFR-16

Type	Maintainability
Description	The system shall not be shut down for maintenance more than once in a 24#hour period

NFR-17

Type	Maintainability
Description	The software users should be notified in case of a bigger maintenance to the system.

NFR-18

Type	Portability
Description	The time zone shall be obvious to the user whenever a time element is displayed.

NFR-19

Type	Usability
Description	The parcel state should be shown in the timezone of the requested person

NFR-20

Type	Usability
Description	System registration process should be less than 10 seconds

NFR-21

Type	Usability
Description	System should allow e-mail or phone based registration

NFR-22

Type	Availability

Description	Users should have an access to the system and all resources all the time