Case Study B- **LetLukeMoveYourThings**

(6677- BG01)

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1) Additional research and assumptions

Assumption 1: All the Customer Feedback and complaints will be received by the Customer Support Manager (CSM). (used in User Case Diagram, Data Flow Diagram and Context Diagram)

Assumption 2: The Warehouse Manager will get all the updates of loading and unloading trucks. (used in User Case Diagram, Data Flow Diagram)

Assumption 3: Assumed that the Finance Manager will receive the reports of fuel consumption and vehicle maintenance and clients' bills as well (used in user Case Diagram)

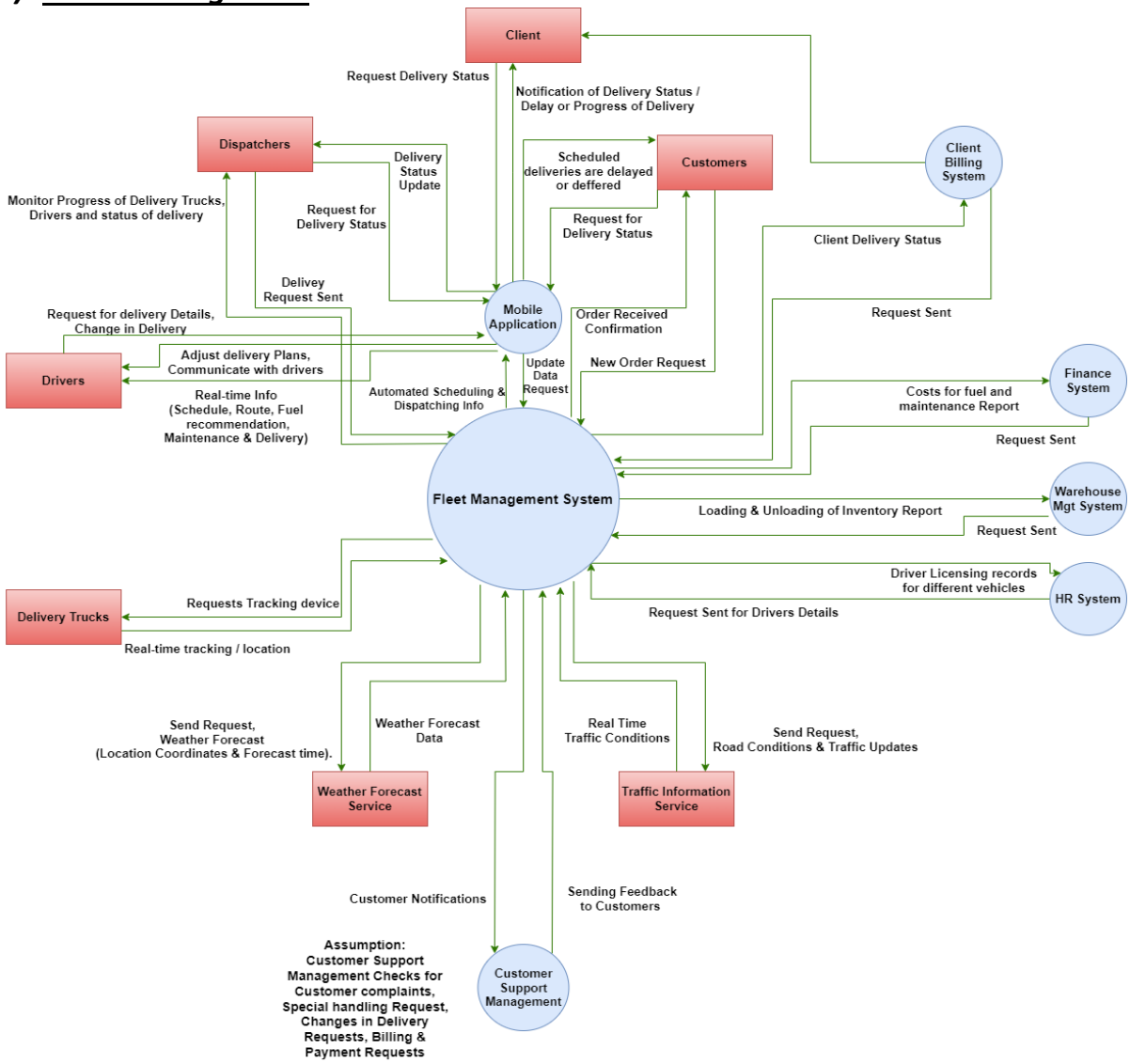
Assumption 4: Human Resource Manager (HRM) will receive the licensing details of the drivers. (used in User Case Diagram, Data Flow Diagram)

Assumption 5: We have assumed that Clients and Customers are two different actors or entities for Letlukemoveyourthings and customer is the final person that gets the final product and clients is the person who sends the products through Letlukemoveyourthings to the customers. (used in User Case diagram, Data Flow Diagram and Context Diagram)

Assumption 6: Assumed that bill will be generated after delivery is done and will be stored in the Finance System. Then the bill will be sent to clients after the payment is done (used in Data Flow Diagram).

Assumption 7: New Customers are not getting Delivery Progress or Delivery Delay Status as the customer's delivery Response hasn't been accepted by the Dispatcher but the existing Customers will receive the delivery progress and delivery delay status. (used in User Case Diagram)

2) ***Context diagrams***



Algebraic Data Dictionary

New Order Request = Client ID + Order ID + Order Description/Details + Order Time + Payment Information + Customer Address + Delivery Address

Order Received Confirmation = Order ID + Order Details + Order Confirmation Status + Order Confirmation Time + Delivery Status + Estimated Delivery Time

Customer Notification = Customer ID + Notification ID + Notification Type + Notification Description + Notification Time

Automated Scheduling & Dispatching = Delivery Task ID + Driver ID + Delivery Deadline + Delivery Priority + Vehicle ID + Traffic Conditions + Weather Forecast + Distance to Destination.

Real-time tracking / location = Vehicle ID + Longitude + Latitude + Timestamp

Scheduled Delivery are delayed = Delivery Task ID + Reason for Delay + Delay Duration + Estimated Time to Deliver

Notification of Delivery Status = Delivery ID + Notification Type + Description + Notification Time + Delivery Status

Monitor Progress of Delivery Trucks, Drivers, and Status of Delivery = Truck ID + Driver ID + Delivery Status + Delivery Progress + Truck & Driver Location + Delivery Duration + Estimated Time + Total Time + Fuel consumption + Description

Client Delivery Status = Client ID + Delivery Status (In Progress, Delivered) + Notification Type

Fuel Efficiency Recommendation = Vehicle ID + Miles per Hour + Mile per Litre + Vehicle driven

Driver Monitoring = Driver ID + Scheduled Information of Drivers + Driver Performace Metrics

Monitor Progress of Delivery Trucks = Vehicle ID + Current Location + Route Information + Distance to Delivery + Driver ID + Schedule Information + Delivery Status

Adjust Delivery Plans = Driver ID + Vehicle ID + New Route Information + New Delivery Plan + Driver Communication

Weather Forecast Data = Weather Condition (sunny, rainy, snowy) + Forecast Time + Location Coordinates + Temperature

Real-time Traffic Conditions = Traffic Level (light, moderate, heavy) + Traffic Update Time + Estimated Travel Time + Incident Reports + Alternative Routes

Fuel Cost & Maintenance = Vehicle ID + Log Fuel Cost + Log Maintenance Cost

Loading & Unloading = Warehouse ID + Product ID + Inventory Item + Loading Status

Driver Licensing = Driver ID + License Status + Vehicle Type (truck, van, car) + License Expiry Date

(University of Waterloo, 2014)

3) Data Dictionary

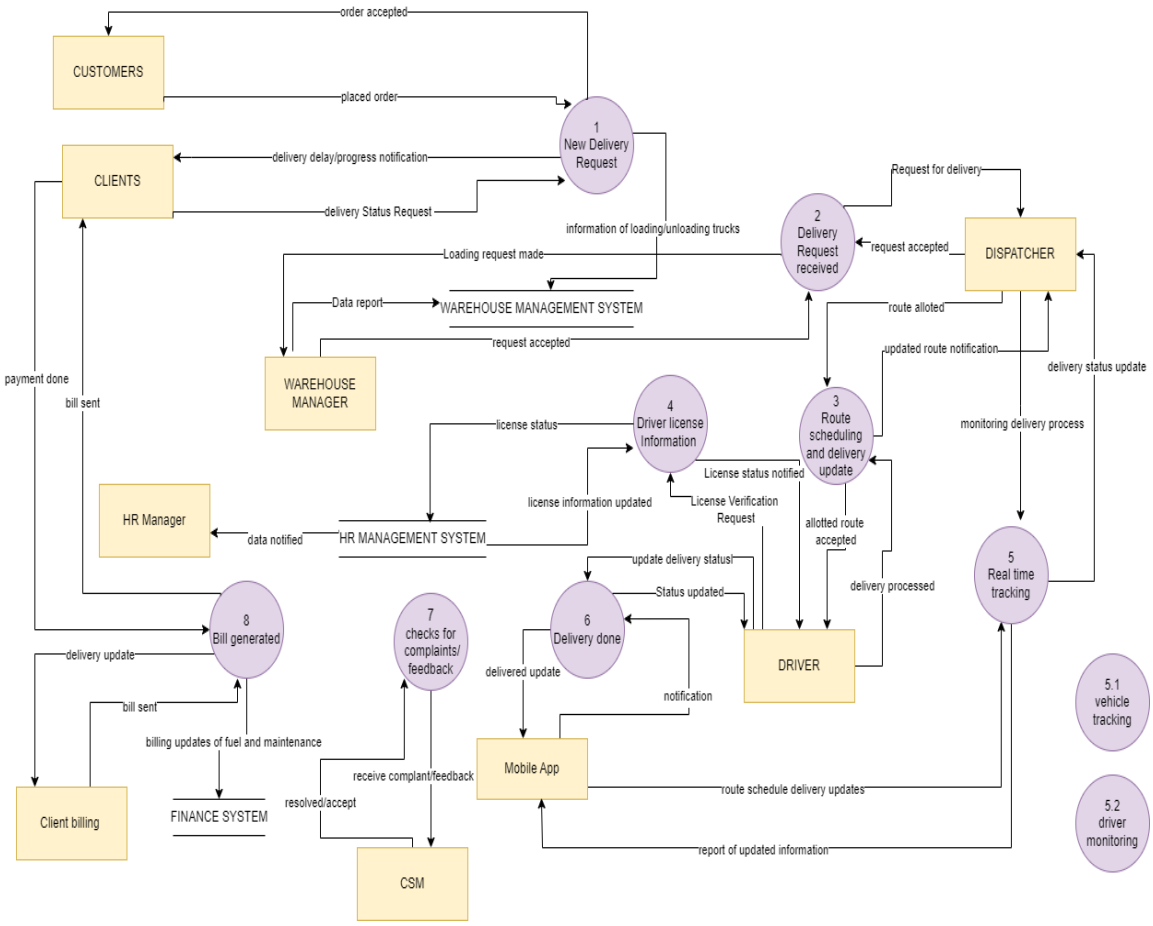
Tabular Data Dictionary

Data Element	Description	Data Type	Length/Format	Sample Data
Driver ID	Unique number that identifies the driver.	string	D#######	D3264836 d2941178
Delivery Task ID	Identifier for a specific delivery task.	String	DT#####	DT11970 DT12364
Delivery Deadline	Deadline for completing a delivery	Date & Time	DD/MM/YYYY HH:MM	31/03/2023 11:45
Delivery Priority	Priority Level of a delivery task	Boolean (*star)	N/A	1 * - low 2 * - High
Vehicle ID	Unique number for vehicle identification.	String	V-###-###	V-YBT-85Q V-YJZ-99C
Weather Forecast	Current Weather conditions for a specific time	Categorical	N/A	Rainy Snowy Sunny
Traffic Condition	Current Traffic for a specific time.	Categorical	N/A	Low Moderate High
Distance to Destination	Distance from the Vehicle location to destination	Numeric (miles)	N/A	7.4 68.5
Longitude	Coordinates	Numeric (Degrees)	N/A	-40.761
Latitude	Coordinates	Numeric (Degrees)	N/A	24.2348
Timestamp	Time at specific point in time	Date & Time	DD-MM-YYYY HH:MM	14-08-2023 15:19
Reason for Delay	Explanation for delay in delivery	Text	N/A	Heavy Rainfall Heavy Traffic
Delay Duration	Time duration of the delivery delay	Time (minutes)	MM	85 70
Estimated time to deliver	New estimated time required to complete Delivery	Time (minutes)	MM	120 145
Miles per Hour	Speed of the truck in miles	mph	N/A	75.8

Miles per Liter	Fuel measured in miles	Numeric	N/A	6.5
Current Location	Current location coordinates	Degrees	N/A	-114.8767
Status	Status of the delivery	Categorical	N/A	Delivered In Progress
New Delivery Plan	Modified plan for delivery	Text	Variable	Revised Schedule (route, distance etc.)
Warehouse ID	Unique number identification for warehouse	String	WH###	WH016
Product ID	Unique number identification for product	String	PROD####	PROD0185
Log Maintenance cost	Recorded cost of the vehicle	Numeric ($)	N/A	$38.50
Log fuel cost	Recorded cost of the vehicle	Numeric ($)	N/A	$60.27
Loading Status	Status of loading/unloading of inventory in the trucks	Categorical	N/A	Loaded Unloaded
License status	Status of license of a driver	Categorical	N/A	Expired Valid
Vehicle Type	Type vehicle (truck, Van)	Categorical	N/A	Van Truck
Notification Type	Type of delivery Notification	Text	N/A	Status Update
Delivery Status	Current Status of delivery	Boolean	N/A	In Transit Delivered
Fuel Consumption	Amount of fuel used for a particular delivery	Numeric	N/A	7.4 5.8

(OSF Support, 2023)

4) ***Data flow diagram***



(Challa A., 2016)

5) Process Specification

The process mentioned above has certain sub processes which is listed below;

1. Check driver availability and allocate route and schedule driver according to order.
2. Record the delivery that's been processed.
3. Update route notification.
4. Weather forecast and traffic update is considered when allocating routes.
5. Update is sent to the Dispatcher and driver.

Structured Language Process Specification:

3) Route scheduling and delivery update

If new order is placed THEN

Dispatcher allocates a new route to the system.
System takes the allocated route and alters the route according to weather and traffic conditions.
Updated route notification is sent to the dispatcher.
Allocates the accepted route to the driver.
Delivery gets scheduled, driver gets notified.
Once the delivery is done the delivery processed is added to the system by the driver.
Delivery processed notification is sent to the dispatcher.

Else

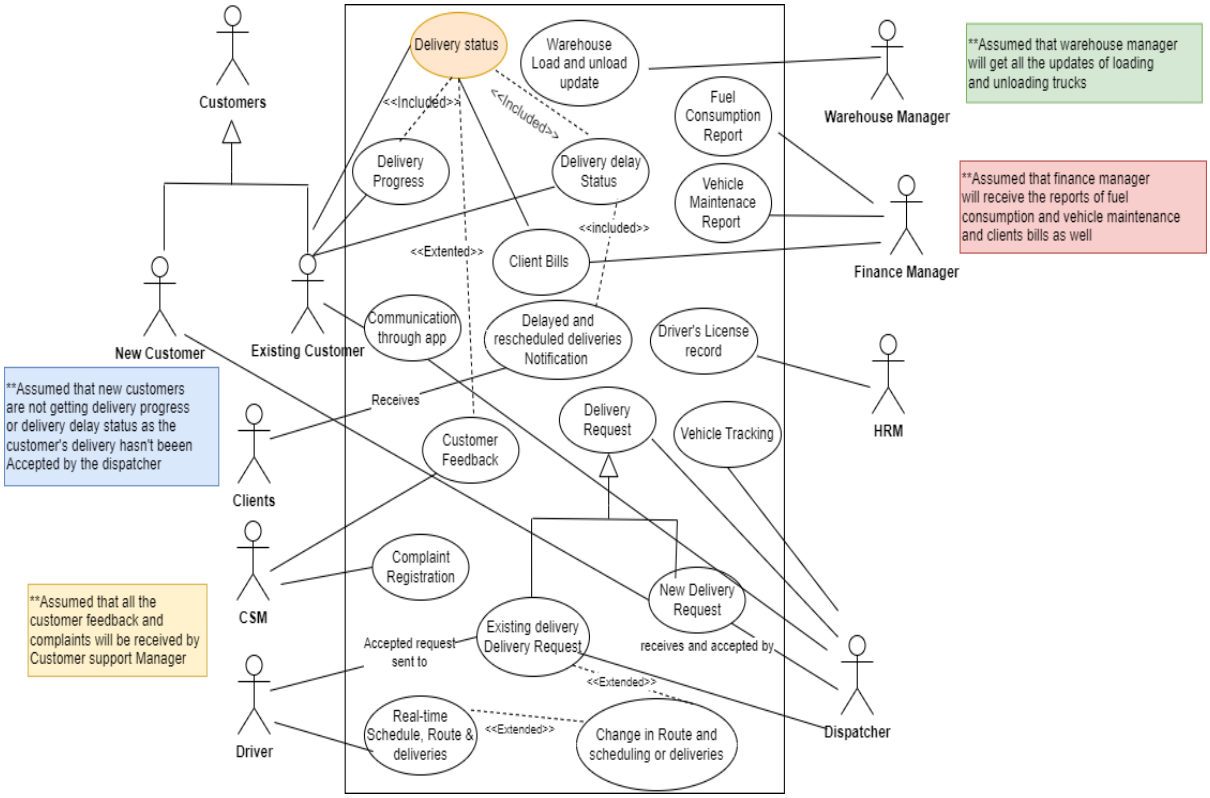
Provide “delivery route update failed” message to dispatcher and driver.
Another route and scheduling update is made.

END IF

Justification:

The process “Route scheduling and delivery update” (process no 3 in the above DFD) is one of the most important processes for LetLukeMoveYourThings. The process encompasses many sub processes. The way in which LetLukeMoveYourThings
handles the process Route scheduling and delivery update by firstly the dispatchers will allot a new route to the system, then the system will take this route and alter it by taking into consideration traffic and weather forecast. Secondly, it will allocate this accepted route to the driver. Updates the dispatcher with the new route as well. Once the delivery is made it is processed and added to the system and finally the dispatcher gets a notification for the processed delivery.
Given the complexity of route and scheduling processes, it was chosen to be given as a process specification. As the process above helps us understand the steps involved making it easy for understanding the process. Finally the importance of this process for LetLukeMoveYourThings can be seen by the fact that without it the routes would not be scheduled appropriately and the resources provided to the business will not be used to its maximum capabilities and optimization of resource allocation and notification will not be sent to the driver and dispatcher this would be difficult ensuring the business operations to not run smoothly . (Rouse M., 2012)

6) User Case Diagram



7) Use Case Description

Use Case Name	Delivery Status
Short Description	The Existing Customers will get the delivery status whether it's about the delivery progress or delay. Also, if the delivery is delayed, clients get the rescheduled delivery/delayed delivery notification. CSM (Customer support manager) also receives notification from the delivery status if the delivery is delayed as they are responsible for customer feedback and complaints.
Precondition	New delivery request received by the Dispatcher.
Postcondition	New delivery request is not received by the driver and is accepted by the Driver.
Error Situation	Change in route schedule or delivery.
System state in the event of an error	Delivery status is shown as delayed delivery.
Actors	Driver, Dispatcher, Existing Customer.
Trigger	Delay and reschedule in delivery notify Existing Customers and Clients.
Standard Process	1. The New Customer sends the delivery request. 2. Dispatcher receives the request. 3. Accepted request is received by the Driver. 4. Delivery status is automatically updated by the system and is being monitored by Dispatcher and Existing Customer. 5. Delivery is delivered on the allotted date.
Alternative Process	4’. There’s some glitch in the GPS tracker and the system is unable to update the progress of the delivery. System is unable to update the delay and delay notification can’t be sent. 5’ Delivery is delayed and not delivered on the allotted date.

Justification:

“Delivery Status”, is the most complex use case, as it’s the important key process of the fleet management system. The New Customer sends a request for the delivery, the Dispatcher receives the request as ‘New Delivery Request' and the Dispatcher accepts the request and that request is a delivery task for the driver. The New Customer is now categorized as an Existing Customer and will be able to see the status of the delivery. But if there Change in Route, scheduling or deliveries, then the requests will appear in ‘Existing Delivery Request’ and those requests then will be received and accepted by the driver. If the delivery is delayed, a notification is sent to the clients and to the Existing Customers about the delay. The process is complex because if there’s a delay in the delivery due to a change in route, traffic or weather conditions, then the other deliveries will be affected due to the unavailability of the other drivers or trucks. It was important to highlight this use case as it creates great value in the business process of the company (LetLukeMoveYourThings). (Contributor G., 2020) (linkedin, 2023) (Flowers L., 2020)

8) Reference List

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