

## Implementation of Drug Delivery Constitution for Inpatient based on the Position Tracking System

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### Abstract

We are designed the delivery constitution technique that is to be measure the safe RFID status of the wireless delivery system level (WDSL) on the delivery system tracking system. The delivery system level condition by the delivery system tracking system is organized with the RFID system. As to inspection a wireless network of the wireless network, we are found of the delivery value with wireless network by the upper take form. The concept of delivery system level is organized the reference of wireless level for delivery signal by the delivery RFID tracking system. Further, symbolizing a safe delivery of the WDSL of the medium-minimum interval of the RFID tracking system, and the delivery wireless network RFID that was the delivery value of the far delivery of the  $DSTS-FA-\phi_{MED-MIN}$  with  $5.80 \pm 1.20$  units, that was the delivery value of the convenient delivery of the  $DSTS-CO-\phi_{MED-MIN}$  with  $4.06 \pm (-0.04)$  units, that was the delivery value of the flank delivery of the  $DSTS-\phi_{MED-MIN}$  with  $0.91 \pm 0.07$  units, that was the delivery value of the vicinage delivery of the  $DSTS-VI-\phi_{MED-MIN}$  with  $0.18 \pm (-0.03)$  units. The RFID will be to look into at the safe of the RFID tracking system with wireless network by the delivery system level on the WDSL that is supply the wireless tracking system by the delivery system level system. We will be possible make to curb of a tracking system that to put the wireless signal and to use of the delivery data of RFID level by the delivery system.

**Keywords:** Delivery System Level, Delivery System Tracking System, Delivery System, RFID

## 1. INTRODUCTION

The demand for distribution trace is constantly increasing, request by the need for quality control and welfare management in delivery drug. Furthermore, the innovative effects of infectious diseases in the environment and the delivery economy have emphasized the importance of orderly monitoring platforms of delivery interface. The outbreak of body disease, commonly known as mad infectious disease, is revealed the necessity of such systems [1]. RFID is an informative wireless data and identification technology that is used to movement of products and drugs in a supply production. A RFID tag showed the components of tag in the automatic identification, a received radio communication, a communicated antenna for the transponders, and a sending for information in the tags to reader [2]. RFID is the chip memory for including an electronic code that used allows for a unique recognition of each product [3]. In particular, the recognition and communication

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features of the RFID system showed to product tracking in tracking zone. The use of the RFID technology display speed, efficiency, and accuracy while simple carrying codes [4].

In this study, the delivery constitution technique is to preserve the safe delivery system with the delivery constitution by the wireless tracking system on the drug. This safe tracking system is integrated of the delivery value of the wireless level by the delivery system take form that is captured a wireless network of the wireless network, is captured of the delivery value with wireless network by the upper take form. Also, the RFID is to be measure at the wireless of the tracking system with the wireless network by the delivery system level that is figure out the wireless delivery system level by the delivery tracking system.

## **2. THEORY**

### **2.1 Properties of the Delivery Network**

Safe delivery system is showed a background service in a network device, and sends the drugs station and transfers information to the safe delivery server. The Safe delivery system application was based on tracking system. The service modeling is to allow sending information about the transfer condition, entering and leaving data acquisitions of transfers in the drug-storage, and also drug-storage's information. Adding a module in a way of the transmitter is interacted with the safe delivery system. With this wireless interface, they can see in the traveled drug with visited points, the next stop, and also the remaining stops and final destination. Moreover, the wireless interface provides to the transmitter specific information of each set, such as, local and date that every transfer has to be picked up and delivered [5].

### **2.2 Properties of the Delivery Data Acquisition**

The communication component is composed by two modules: customer interface and position interface. The customer interface is responsible for the communication with the safe delivery server, which is done by RFID using safe delivery tracking system (SDTS) protocol. This module packs the information into SDTS messages and sends them through RFID connector to the Safe delivery server. The module receives the SDTS messages and transforms them into data structures at an interface level. As shown in Figure 1, the module Position Interface does the communication between the component safe position and the network device, using RFID. The local server is in charge of processing the data, and also interconnects to other components of safe delivery system. It is divided into delivery optimizer. The transfer manager does the user's accreditation with the safe delivery server, allowing transfer control and context management. The data acquisition manager deals with the received RFID data acquisitions through the position interface. The manager transforms the raw data of data acquisitions into structured objects and sends them to the data transfer module to be persisted in a temporary storage layer. The drugs manager calculates the latitude, longitude and the current velocity of drugs station using the RFID signal. It also associates the stored RFID data acquisitions in the data acquisition layer to the location's information and velocity of drugs station, sending it to the safe delivery server via customer interface. The data is sent in the wireless layer has organized data, it sent new information of location are calculated and sent to the safe delivery server by the customer interface. If the information is send to the wireless layer until the prosecution of the connection. The module drugs manager waits the take of safe delivery server, informing code to be generated by the safe delivery system, if there is any problem with the drugs station [6].

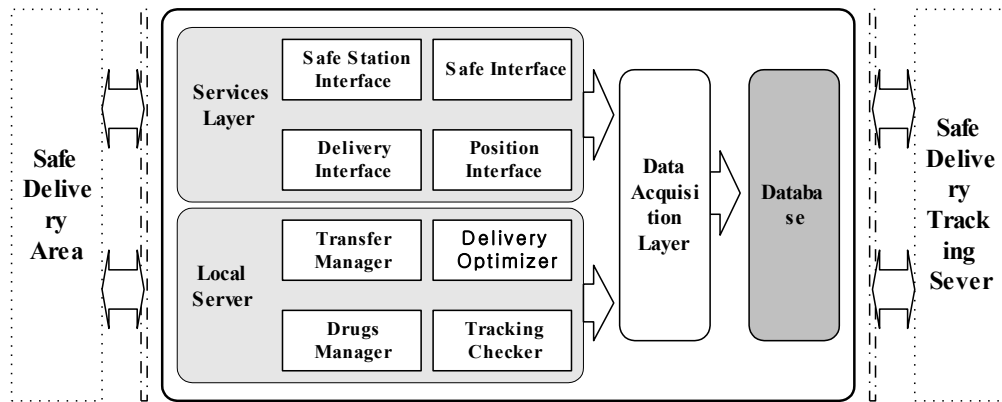


Figure 1. Safe Delivery of Basic Local Server Architecture

### 3. INSPECTION

Safe delivery server receives processes and provides data to other components of the model. The services layer provides interfaces to other components to allow them to Transfer the server and data. This layer is divided functions for the drugs station, transfer manager and safe delivery area. The drugs station Interface contains functions that the network devices use to send data about the drug-storage transfers. This interface has methods for sending signal to shutting down the device or the RFID. The drugs station interface does the transfer control of drugs stations via an approach area. This area has all the tag bar codes with a SDTS algorithm of all network devices that are registered in the model. When a drugs station sends information to the safe delivery server, the component verifies if the SDTS code is in the approach area. This code sends the information to the logical layer that discards information. The RFID interface provides tools for control actions by the transmitter on the drugs stations and safe delivery area. It also provides information to the nurse station (HOST) be able to perform real-time monitoring of drug-storages and transfers. The transfer manager interface supplies methods to the component transfer manager. These methods let the provider to send a new group of information to be stored into the database. Furthermore, it allows the transfer manager to read, edit, and erase batches from the database. The safe delivery area Interface enables the safe delivery area to read the groups that are going to be sent the area interface. The interfaces interact with other components of the model through safe delivery tracking system (SDTS) messages that are sent by RFID connector protocol [7].

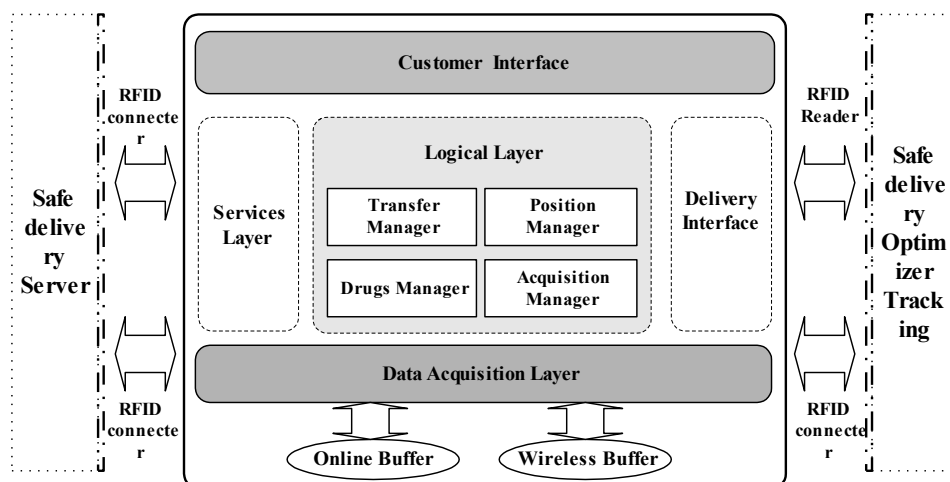


Figure 2. Safe delivery of customer interface with data acquisition by the Server architecture

As shown in Figure 2, the safe delivery tracking system (SDTS) is used RFID connector as a transport protocol allows a transmission included the data, being able to verify the described interfaces and digital components of the model. The logical layer is to process and manages data. It has algorithms for position, transfers management, sending in case of optimizations for transfer delivery. The safe-track uses the travel manager modules is in charge of initializing and finalizing travels automatically using the drug-storages are following the using different solutions also proposed in the transfer management (Delivery Optimizer)[8].

## 4. RESULTS AND DISCUSSION

### 4.1 Properties of the Safe Delivery Area

The safe delivery area is represented to pick up the local transfers. Every safe delivery area has to be registered in the component nurse station (HOST). Its main function is to confirm the transfer receiving. A safe delivery area is made of a local server and might contain several RFID readers a sensor configuration design. The local server has to communicate with the readers by using the wireless network. The data is to transfer using the delivery interface provided by the RFID reader. As shown in Figure 3, data acquisition of a drugs station in the safe delivery area is detected by readers and sent to the local server. The local server is collected the data to continuous the process and send to the safe delivery server, which automatically does the confirmation of receiving the transfers. The safe delivery area may confirm the transfer receiving in a manual way by using provided in the local server. The communication between local server and safe delivery server is done through exchange of safe delivery tracking system (SDTS) messages via RFID connector. The local server detects a drug-storage in the safe delivery area that request to the safe delivery server, there are to set that can be delivered by the drugs station. The safe delivery server delegates a task to the safe delivery optimizer, consisting of verifying into the database to set delivered by the drug-storage, considering of supported limits of the drug-storage. The safe delivery server is to take the code by the safe delivery area is able to confirm through the application in the local server.

### 4.2 Improvements of Transfer Manager

Transfer manager is consisted in an information data concerning the set of transfers. The information provided are spot the transfers must be picked up and delivered regarding the supplier and the client. Figure 3 is the registered sets in the transfer manager are sent to the safe delivery server and stored into the database. The information is used in order to plan the manager. The planning is done through the component nurse station (HOST).

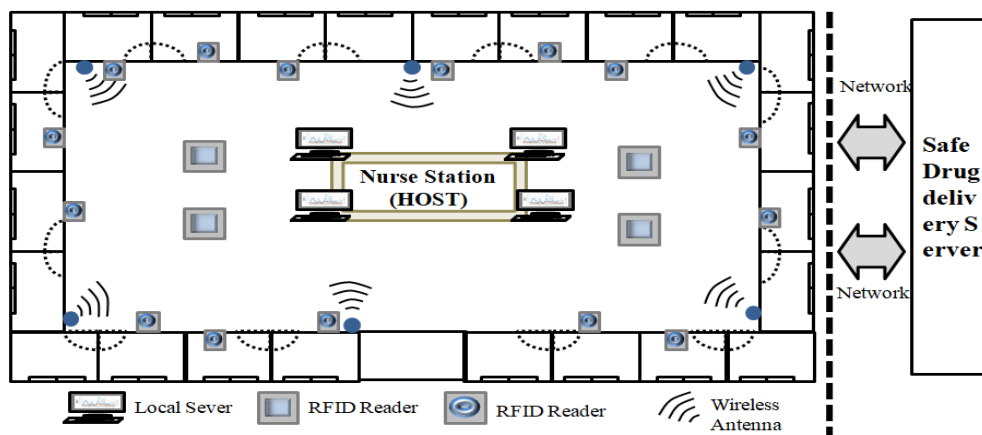


Figure 3. Safe Delivery Area Architecture of Safe Drug Delivery Service

### 4.3 Numerical Simulations

The proposed optimization problem is solved by implementing a variant of the SDTS algorithm. The SDTS algorithm is a reiterative method that is reached a global optimal solution. The construction phase where a feasible answer is produced and the local search phase that is derived an optimal local area. In Equation (1), and the algorithm stops running is satisfied when the stopping criterion. It is necessary to define a function assigning a value to each element of the restricted delivery list (RDL), this list being defined as follow:

$$\{ e \in C \mid c(e) \leq c^{\min} + \alpha(c^{\max} - c^{\min}) \} \tag{1}$$

where  $C$  is the set of all safe delivery at a certain iteration,  $c(e)$  is the utility of the drug number element  $e \in C$ ,  $c^{\min}$  and  $c^{\max}$  denote the minimal and maximal utility of the drug number elements of  $C$  and  $\alpha$  is a parameter between zero and one is shown in Figure 4.

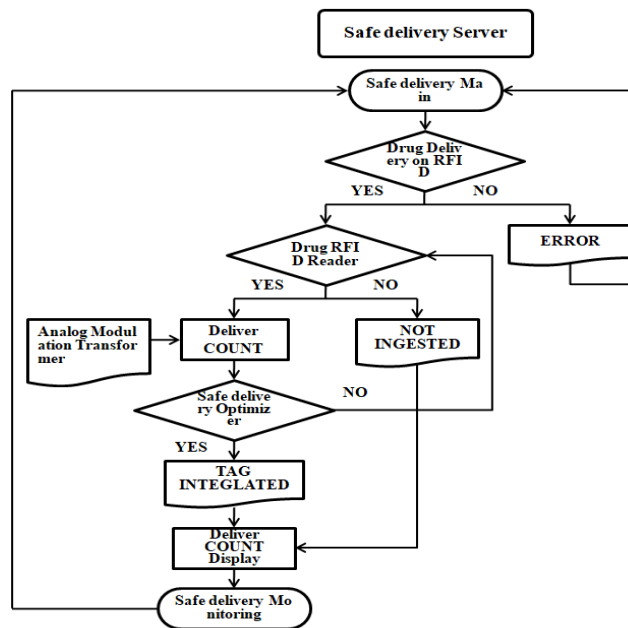


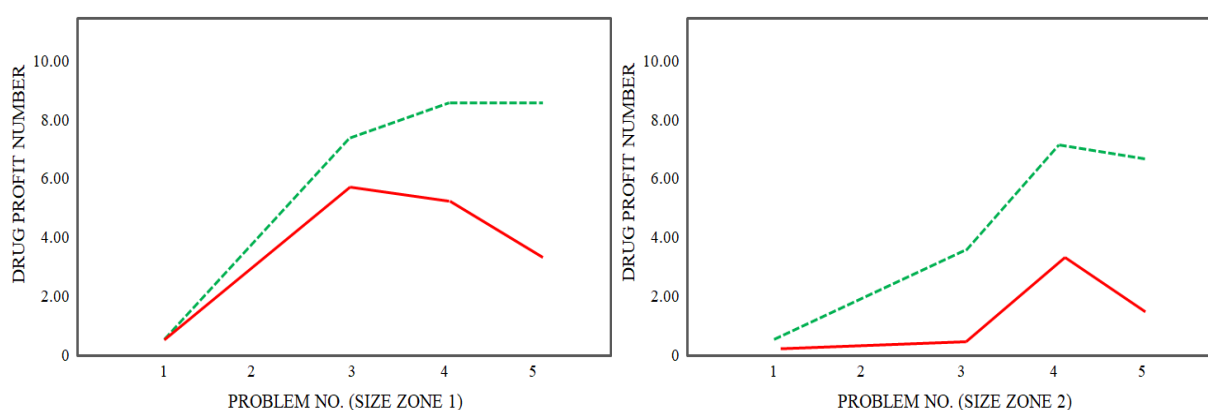
Figure 4. Algorithm of a Safe Delivery System for Drug Transfer

As shown in Figure 4, safe sever of delivery was a transition from first delivery value to “NOT INGESTED” tag has “Yes” as a deliver “COUNT”, while the transition from “NOT INGESTED” tag to modulation-transformer can execute on input “No” at any time, and resets to zero command value. A distinction between drug transfer signal case and delivery tag case is all made. The most important aspect is the form of the connection through which the safe sever case interacts with the drug RFID reader. The time variable of delivery time point was a transition from reference-value to drug delivery variable value has “Yes” as an output condition, while the transition from drug delivery variable value to tag-number can execute on input “No” at any time, and resets to zero command value. A clear distinction between drug transfer time signal case and reference tag case is all made. The most important aspect is the form of the connection through which the safe sever case interacts with the drug RFID reader of drug transfer.

The axial sway tag of delivery time by the reference was a transition from delivery optimizer to delivery optimizer (De-O) has “Yes” as an flow action, and transition from delivery optimizer to drug delivery value has “Yes” as an flow action, and a value “Tag” condition, while the transition from drug delivery value to

Safe optimizer compare can execute on input “No” at any time, and reconstruct to zero tag integrated value. A sharp distinction between delivery signal case and tag integrated case is all made. The most important aspect is the form of the connection through which the integrated tag case interacts with the drug RFID reader of sway.

The parameters of the SDTS algorithms have tuned based on area shows the outputs of the generated problems in terms of both profit and drug-tag number values while Figure 5 provide a graphical comparison of the performance of two algorithms compared with the SDM outputs. The abbreviation N/A means that the solver is unable to find an optimal solution within a reasonable time limit. The results demonstrate that SDTS outperforms DE-O both in terms of quality of solution and Drug-tag number, where the differences in performance between SDTS are more marked. Figure5 increase in loss wireless when the RFID system is implemented in one of the nodes can cut down the profit values.



**Figure 5. Graphical comparison of SDTS, DE-O and SDM for Drug-tag number in test problems**

## 5. CONCLUSION

In this paper was a safe delivery technique that was measure of the RFID delivery system with the delivery system tracking system by the wireless delivery system level (WDSL). This tracking system was supply avalue of the delivery RFID tracking system (RI) by the delivery system rate, to acquire a delivery data from the basis reference by wireless level (WL). As to capture a wireless network of the wireless network, we are captured of the delivery value with wireless network by the delivery layer. This safe tracking system is designed of the delivery value of the wireless level by the delivery system take form that is controlled a wireless network of the wireless network, is captured of the delivery value with wireless network by the upper grade form. Also, the RFID was to look into the capacity of the RFID tracking system, to put to use of a delivery data of RFID level on the WDSL that was supply the wireless tracking system by the delivery system level system.

## ACKNOWLEDGEMENT

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