

# IoT Based Secured Parcel Delivery System using MQTT Protocol

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**Abstract** — Online shopping has become current trending approach to buy or sell products. Many traditional vendors are converting their business to online. Also offering several opportunities for the customers to attract them towards online market. In spite of all these, around 70% of the people across India are still looking at the safety and security aspect of the online delivery. In this connection, the proposed work is trying to develop a unique IoT based container to secure and ensure the safety of the product. MQTT protocol is involved to ease the controlling of both client and server through database.

**Keywords**—MQTT Protocol, Parcel Delivery, Internet of Things.

## I. INTRODUCTION

The Internet of Things (IoT) is a network of objectives that are integrated with software, sensors, and other technologies in order to gain increased moral and service by interchanging data with the producer, promoter, or other connected devices. Every object is identified by its embedded computing system, however it may be explained using existing Internet infrastructure. The Internet of Things own its technological origins to a long-standing attempt to advice and control the physical environment in which people work and enjoy. Security has become a major problem in any online delivery system. There may be a possibility of burglary or misuse of the ordered item. The main objective of our proposed system is to deliver goods through a smart and secure channel without disrupting the product while reaching the targeted customer. For this to happen, the proposed project uses a secure and secure container with a digital locking device.

SMART lock is a new delivery method available to customers who are interested in online shopping which not only grows but also meets the growing need for travel. It is an easy solution for customers who do not want to wait for the messenger to speak, they can order their daily plan without considering the route and their plan. Locks are available at any access point, so the package can be picked up at any time for a few days. It is a delivery solution to the messenger system to protect the product ordered by the customer. The customer can have confidence in the system and the product in line with its quality and use. you do not have to return to the address many times

to be able to deliver if at first contact the customer is not available at the address or if they request delivery outside the courier work schedule.

## II. EXISTING SYSTEM

### A. MQTT Protocol

MQTT protocol provides a lightweight application publishing or registration model for messaging. Article [1] introduces a few of the most generally used MQTT system vendors and customer libraries. Mosquitto is an EPL licensed open source software or EDL, developed by the Eclipse Foundation. It supports 3.1, 3.1.1.1, and 5.0 versions of the MQTT protocol.

MQTT communication generally include two types of agents: the MQTT client and the MQTT server. Data sent by MQTT is transmitted via app message. The device that is connected to a network and then changes the program message via MQTT is called the MQTT client. The MQTT client can be a publisher or subscriber. A Publisher publishes application message and subscriber appeal for application message. MQTT server is a device that connect to MQTT client. Receive and transfer app message between many clients connected to it [2].

HiveMQ is based on MQTT, a licensed marketing platform built on 3.X specifications and 5.O versions of the MQTT protocol. Rewritten in Java, develop by HiveMQ GmbH. HiveMQ is a MQTT client application [3].

## III. ARCHITECTURE

Figure 1 shows the various components of the proposed system. The working of the IoT container includes 3 phases as below

- Pre-delivery Phase
- Delivery Phase
- Post-delivery Phase

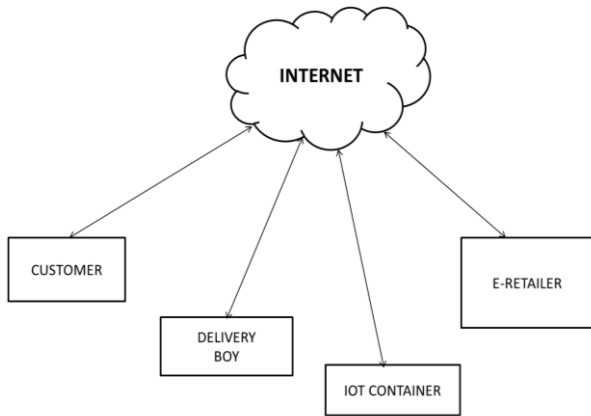


Fig. 1: Architecture of proposed system

**1. Pre-delivery Phase:**

Figure 2 indicate the sequence diagram for pre-delivery of the product. A customer places the order on the E-Retailer website. Once the order get confirm by the E-Retailer will send the package information including the relevant package details to the customer. The customer is able to feed this information through the cloud. Once fed in the cloud, a customer will be able to accept his package safely even if it is anywhere in the world. The E-Retailer will place the parcel in the IoT container and set the PIN number for both E-Retailer and customer and feed it in the cloud and verify the PIN number from the cloud and send the customer PIN number to respective customer. After placing the parcel the E-Retailer locks both the IoT container with the respective PIN number. The container is locked by the E-Retailer so that no outsider can have access to the parcel unless the IoT container is opened by the customer by entering the PIN number given by E-Retailer.

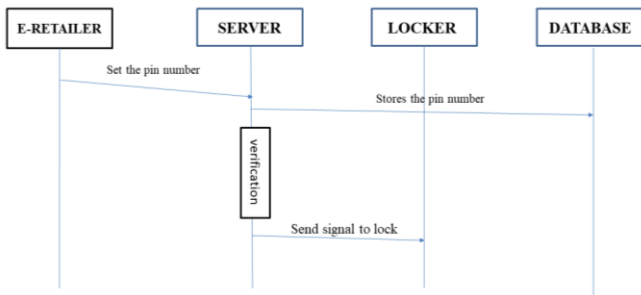


Fig. 2: Sequence diagram for pre-delivery of the product

**2. Delivery Phase:**

The delivery boy walks in with the parcel for delivery. The boy has to carry the IoT container for delivering it. After the parcel is delivered, the delivery boy logs in and verify the details and sends an acknowledgement message to the E-Retailer about the delivery status and logout.

**3. Post-delivery Phase:**

Figure 3 shows the sequence diagram of post-delivery of the product. In Post-delivery phase, the E-Retailer unlocks the container after receiving the delivery status from the delivery boy. Then the customer enters the PIN number received from the E-retailer where he/she can unlock the container and receive the respective parcel and confirm it. From this final step of conformation the E-Retailer can eventually conclude

that the parcel has been delivered to the customer safely and securely. finally customer returns the IoT container to E-Retailer.

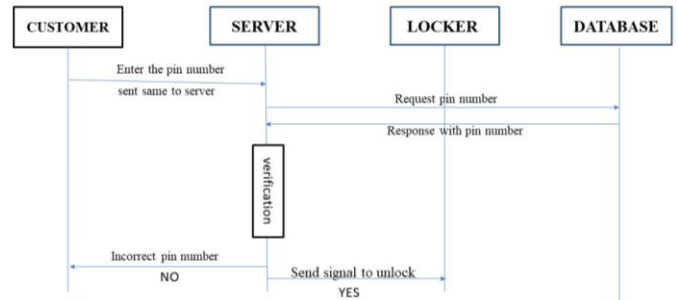


Fig. 3: Sequence diagram for post delivery of the product

**IV. RESULT**

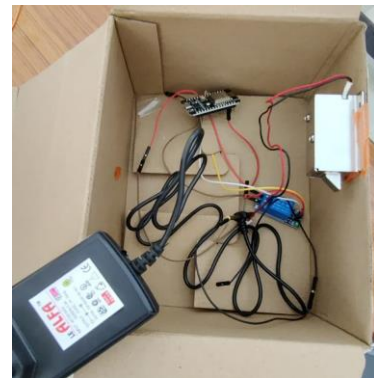


Fig. 4: Container setup including solenoid locker

Figure 4 shows the prototype of the IOT container used to dispatch the ordered products with safety and security to the customers. The setup includes the solenoid lock enabled through NodeMCU Microcontroller. The NodeMCU can access internet through its WiFi module. MQTT protocol can access and control both client and server through the database.

**v. CONCLUSION**

The proposed work has tried to introduce a protocol based locking system using Internet of Things. This can be utilized for shipping the products from e-retailer to the customer with 100% security and safety assurance. Availability of the internet is the only limitation for the successful execution of the proposed work. This implementation certainly encourages anyone to buy even costly products by online.

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