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Parcel Management through Cloud Computing

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ABSTRACT

Parcel companies use various kinds of parcel management softwares to carry out their operations. This project intends to create a model which will make the pickup, delivery and transit more efficient. The pivotal aspect of this project is automation. With less human interventions, it will perform better with less delays and errors. Optimizing the utilization of all resources, parcel security and timely service will be the results. Cloud Computing will serve as a cost-effective solution to deploy this. Global Positioning System (GPS) technology has been the pillar of the system which is responsible for sharing the exact geographical location. This information can improve quality of the service. GPS also leaves a trail of the package and helps the customer get alerts and track it.

Keywords: - Parcel management system, Package, Cloud Computing, Amazon Web Services, Elastic Beanstalk, Automation, EC2

1. INTRODUCTION

The scope for logistics grew with the boom in e-commerce. With the arrival of the COVID-19 Pandemic, the demand for such services grew manifold. With personal movement restrictions and work from homes becoming the norm, many businesses were forced to rely on logistics. The major challenge during the pandemic was supply chain and business continuity disruptions. Parcel companies were not resilient to those, at least on a physical level. It affected various B2B and B2C transactions and slowed down the operations leading to delays and losses [1] [2] [3].

The need of a streamlined parcel management system was here. This project was inspired by the model used in an Austrian delivery service which provided a clue to how the problem can be solved. The application developed was scalable and needed the help of a Cloud service like AWS. The front end was built using PHP and HTML with an SQL database. There are different modes to deploy it. One, the Elastic Beanstalk service and then the Internet Information Services in an EC-2 instance [4] [5] [6]. This application will be wholly hosted in the cloud for this purpose. In the production environments it can be used with a hybrid cloud deployment model, where the public and private deployment models are used in a combination.

2. PROBLEM STATEMENT

The parcel management system is built in a way which makes it work efficiently. The transit model used will be a hub and spoke model. This is the most commonly used logistical model. Ensuring last mile delivery will be done by locating the addressee well before the package arrives at the final point. Unclaimed or undelivered packages if any will be notified to the sender before returning them. Both, the receiver and sender will be get a tracking ID by the system. This will eliminate the lack of co-ordination.

3. EXISTING SYSTEM

The conventional system depends on centralized monolithic database architecture. This has many disadvantages such as, single point of failure, easy manipulation of data etc. They can adversely affect the operations and jeopardize decision making as the right information won't be accessible [7] [3].

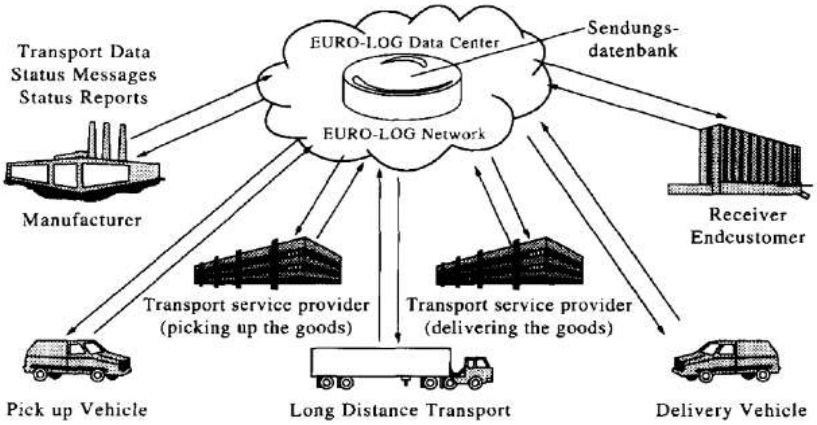

Fig - 1 *Conventional Parcel Management*

The next drawback is the lack of automation. Operations which depend on human interventions can get delayed due various factors

4. PROPOSED SYSTEM

Pragmatic decentralization with centralized authority over transaction will be the addition here. Making a cloud ready application using PHP, HTML and SQL will ensure a good interface for the users [1] [8] [9].

Automation will be used to handle tasks which are monotonous and repetitive thereby reducing human effort and speeding up tasks. The use of that will help the operational costs also to go down.

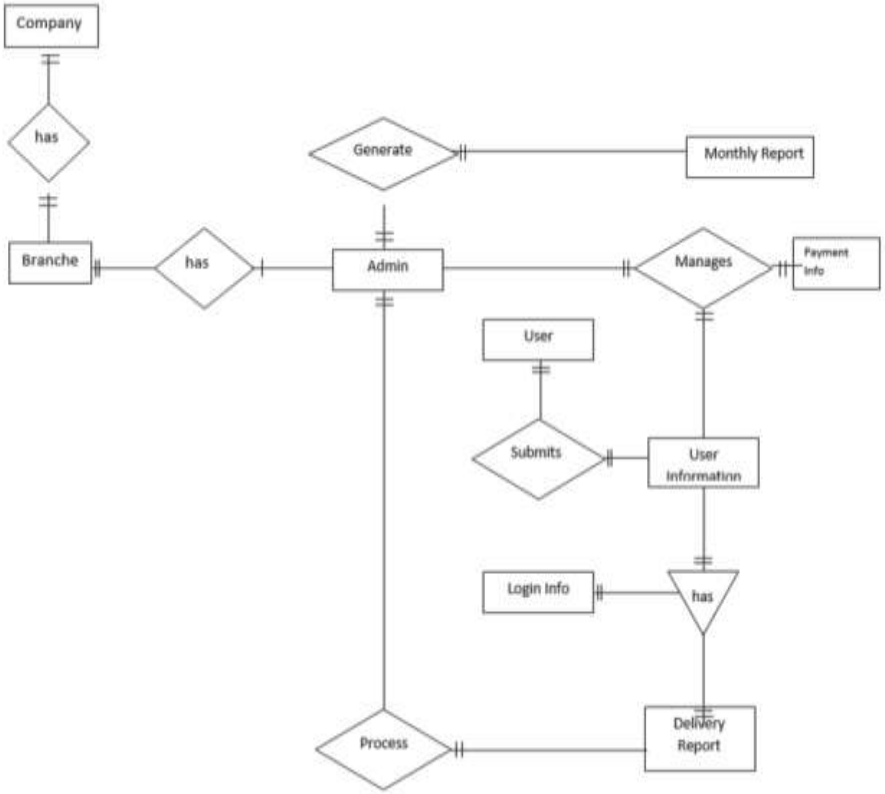

Fig - 2 *Entity Relationship Diagram*

The hierarchy will have atleast 2 levels of authorities to verify the transactions. Use of PHP in this will be helpful for the seamless integration with the SQL backend which houses the database. Also, PHP is a suitable framework for deploying an application into the cloud of AWS [10] [4] [11] [12].

5. DATAFLOW DIAGRAM

The dataflow diagram of the proposed system gives an insight into the main stakeholders. There are three main parties in this transaction:

- Administrators
- Employees
- End users

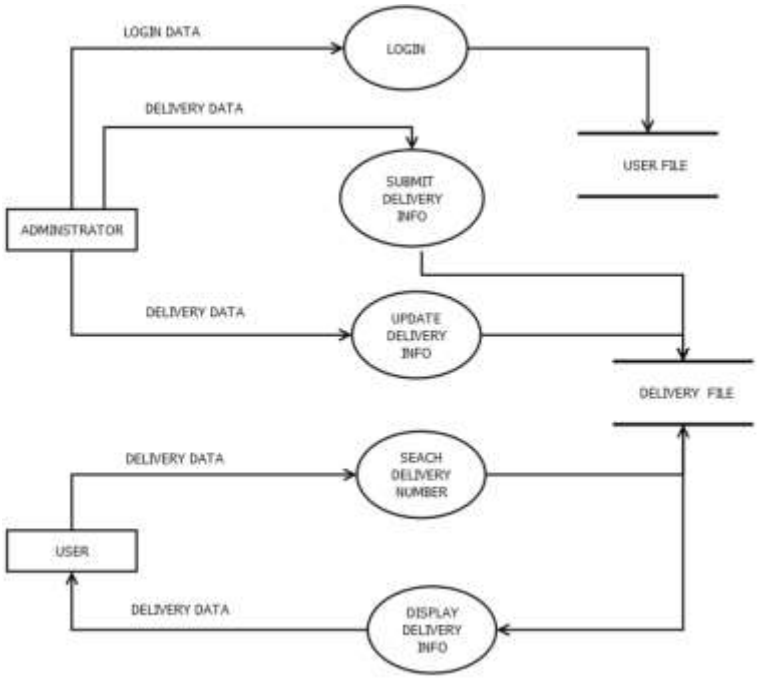

Fig - 3 *Dataflow Diagram*

The authority to book parcels and mark them as delivered rests with the administrator level IDs which do it after due verification. The employees belong to the intermediate levels which carry out other tasks. Their IDs will be restricted to only carry out day to day work. The customer's portal interface is designed to look user friendly and provide adequate information on the parcel. It shows the detailed movement and pricing of the parcels. There would be options to calculate the time and fare of delivery too.

6. SYSTEM ANALYSIS AND DESIGN

The application will be built on PHP and HTML which will serve as its front end while the database of SQL will work at the backend [1] [10]. Deploying it in the cloud will be making it more resilient and Fault tolerant which will be done by using the various services provided. The system architecture focuses on the model of its working. It emphasizes the operations' flow and how the three parties in it interact with each other. The server administrator ensures the working of the whole architecture.

While the organizational managers take care of the day to day work and the tasks which affect the organization like:

- Adding a new employee's details
- Updating or deleting an existing employee's details
- Adding new branch offices
- Updating or deleting new branches
- Introducing new schemes
- Adding or removing assets

In the case of the normal day to day operations the system administrator does not need to keep a watch on every operation which goes on. The managers look after the following functions for smooth running:

- Pickup a parcel
- Transit and trail
- Returned or undelivered packages
- Delivery

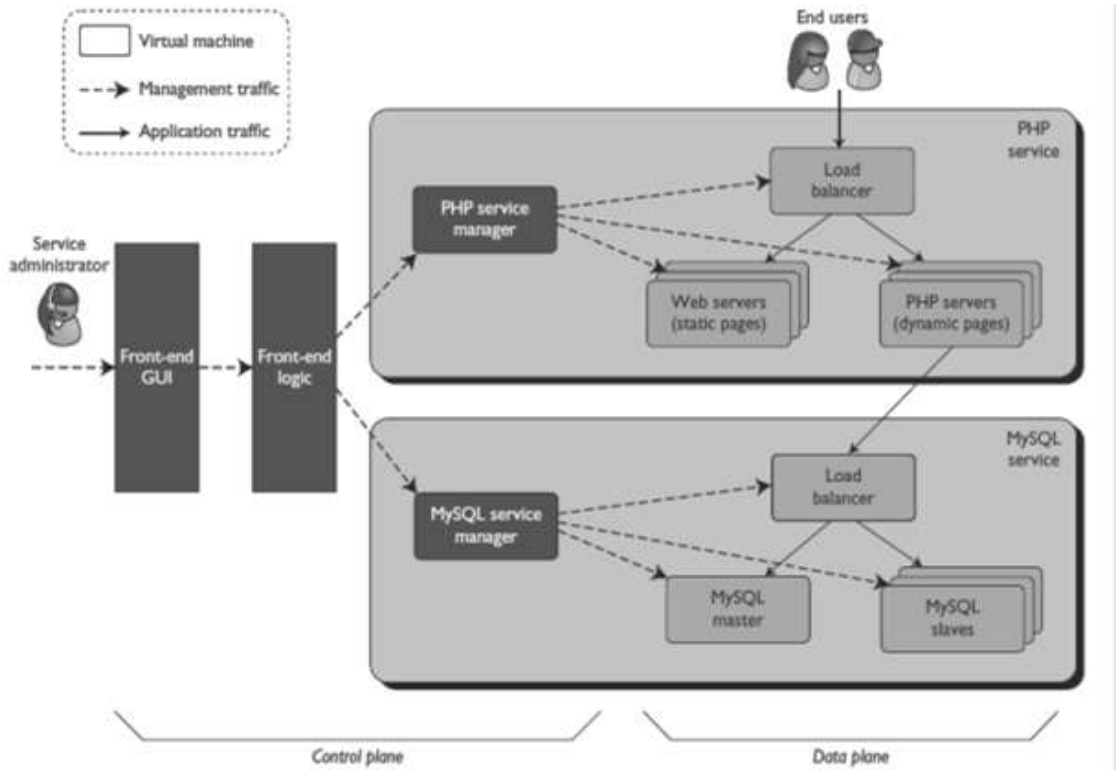

Fig - 4 *System Architecture*

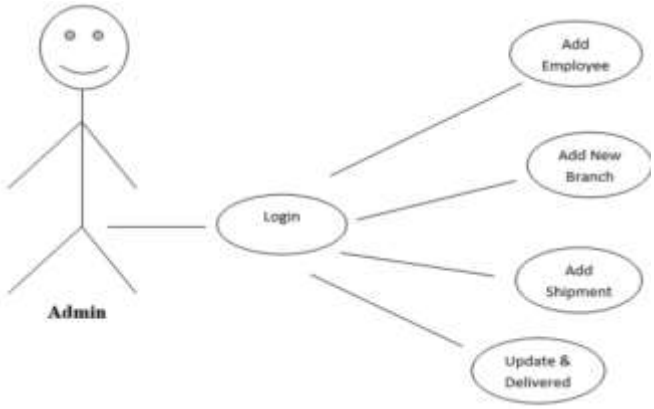

Fig - 5 *Administrator Roles*

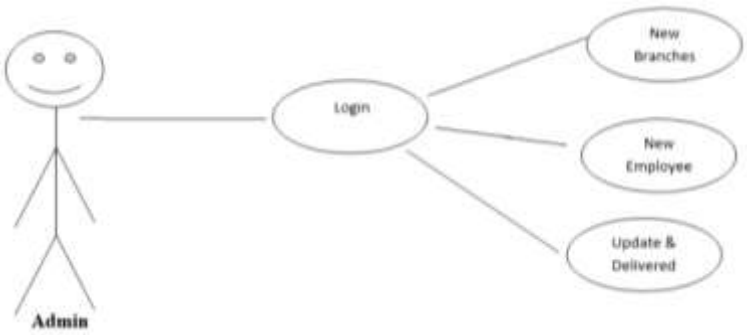

Fig - 6 *Administrator Roles*

7. CONCLUSION AND FUTURE SCOPE

The project has intended to solve the issues faced by conventional parcel management systems by using the help of automation and pragmatic centralization.
Taking advantage of the cloud services provided by Amazon Web Services, it will be deployed to its full potential with the help of scalability and load balancing [13] [14] [15].

This project can be made into an android mobile application to enable remote working and decentralization. The mobile application needs 3 types of deployments –

- Customers
- Administrators
- Employees

The apps can be developed using AWS Honey code and the APIs will be separate for each application.

The other modifications which can be made are address change and cancellation while on transit. This can be done real time. Data visualization can be used to set and measure targets and benchmarks. This is to give the administration a bird's eye view of the situation.

8. REFERENCES

[1] POWELL, C LOEBBECKE AND P, "Competitive Advantage from IT in Logistics: The Integrated Transport Tracking System," lnternationaI Journal of lnformation Management, 1998.
[2] Ross, Jeanne, "UNITED PARCEL SERVICE:Delivering Packages and E-Commerce Solutions," Center for Information Systems Research, Massachusetts Institute of Technology,
[3] [Ramzan, Javed, "DHL Courier Service as an E-Courier Service," Computer Engineering and Intelligent Systems, 2019.
[4] Ifrah, Shimon, Deploy Containers on AWS, Kwang-Roh Park, Woo Lee, Sang-Ha Kim, "A Proposed Platform & Performance Estimation of Digital-Home Service Delivery Management Systems,"
[5] Rochkind, Marc, Expert PHP and MySQL: Application Design and Development,
[6] Ibrahim Inuwa, Dr. Oye N.D., "Courier Service Tracking System: NIPOST Adamawa State Nigeria
[7] Stratan, Guillaume Pierre and Corina, ConPaaS: A Platform for Hosting Elastic Cloud Applications, View from the Cloud, 2012.
[8] Deni Connor, Patrick H. Corrigan and James E. Bagley, Cloud Storage: Adoption, Practice and Deployment.
[9] Anirban Bhattacharjee, Yogesh Barve, Aniruddha Gokhale, Takayuki Kuroda, "CloudCAMP: Automating the Deployment and Management of Cloud Services," IEEE International Conference on Services Computing.
[10] Rajeev, BV, Baliga, Vinod and kumar, Arun, "A Comparative Study of Amazon Web Service and Windows Azure," International Journal of Advanced Computer Research, vol. 3, no. 3, 2013.
[11] Tobias Binz, Uwe Breitenbücher, Oliver Kopp and Frank Leymann, "Portable Automated Deployment and Management of Cloud Applications," TOSCA: Portable Automated Deployment,
[12] A. Mohd., R. A. Rashid, A. H. F. Abdul Hamid, M. A. Sarijari, M. R. A. Rahim, H. Sayuti,, "Development of android-based apps for courier service management," Indonesian Journal of Electrical Engineering and Computer Science, 2019.
[13] Choi, Mohan Krishna Varma and Eunmi, "COMPARATIVE STUDY OF VARIOUS PLATFORM AS A SERVICE FRAMEWORKS," International Journal on Cloud Computing: Services and Architecture (IJCCSA), vol. 6, no. 1, February 2016.
[14] Atletiko, Faizal Johan, "Development of Android Application for Courier Monitoring System," Information Systems International Conference 2017, 2017.
[15] Jurg Vliet, Flavia Paganelli, Steven van Wel, Dara Dowd, Elastic Beanstalk, 2011.
[16] Michael Wasner, G.unther Z.apfel, "An integrated multi-depot hub-location vehicle routing model for network planning of parcel service," Int. J. Production Economics, vol. 90, pp. 403–419, 2004.
[17] Aspin, Adam, High Impact Data Visualization with Power View, Power Map, and Power BI,
[18] Syed Mohd Ali, Noopur Gupta, Gopal Krishna Nayak, Rakesh Kumar Lenka, "Big Data Visualization: Tools and Challenges," 2nd International Conference on Contemporary Computing and Informatics, 2016.
[19] Judith Hurwitz, Marcia Kaufman, Dr. Fern Halper, Daniel Kirsch, Hybrid Cloud Computing for Dummies, s.l.: John Wiley & Sons, Inc.
[20] Okemiri Henry A, Nweso Emmanuel Nwogbaga, Francis N. Nwebonyi, "Critical Review Of Courier Service Management System With Empasis To Its Relevance If Adopted In Nigeria," Journal of Multidisciplinary Engineering Science and Technology (JMEST), 2017.