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BRITEHOUSE DOCUMENTATION

SCHOOL OF INFORMATION TECHNOLOGY | IT DEVELOPMENT



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1. **Introduction**

Britehouse delivery management system was developed following system development and database designs stages for smooth running and management of Britehouse deliveries. Furthermore, following from the specification provided from the functional workshop that was held between the company’s IT manager, delivery manager, delivery planner, representatives from both the customers and the drivers, enabled system analyst to recognize and define problems in the current manual system. We also can conclude that there is a need for a computerized management system. The database system should at least support create, read, update, and delete operations. This system will indeed help the delivery management and the esteemed staff members to manage and steer the company’s functionality and transactions to realize its maximum potential in addition to its competence in the delivery business field.

1. **Vision**

After successful implementation of web-based application together with its database, I foresee myself working on a similar project as the delivery management project.

1. **Mission**

A web-based application should be provided to Britehouse Inc. with reliable and satisfactory database that generate accurate, relevant, consistent, and timely reports, of which they are critical in decision-making in a company.

1. **Project Timeline**
2. **System Analysis Aspects**
   1. ***Problem Definition***

Britehouse specializes in delivering items. They deliver:

* Consignments
* Packages
* Envelopes containing products shipped to its customers
* Documentations and invoices,
* and payments, gifts and other items.

They have trucks, minivans, and smaller three wheeled delivery vehicles. They have different load capacities and not all the vehicles can carry all the types of packages we must deliver. They have different costs to operate, and different ranges from the depot they can cover.

Although the company have every resources for their deliveries, the company is not realizing its maximum potential due to delay of activities and undesirable situations caused by the current redundant manual system. Due to huge losses suffered by the delivery company from frequent errors in the current system, Britehouse delivery management need a computerized system, which would:

* Be friendlier to customers and Britehouse staff.
* Improve customer services.
* Increase delivery performance.
* Reduce the operational costs of deliveries.
  1. ***The Current Manual System***

The current manual system is paper-based and uses direct human language communication by mouth to manage the deliveries. This delays information transmission in deliveries. Delivery request is done through phone calls and customers need to phone the delivery people in the days leading up to the delivery to confirm, and they’re not always available. Even when customers do confirm the delivery schedule, it often doesn’t happen the way they planned.

* 1. ***Problems in the Manual System***
* Human and computational costs.
* Poorly generated records.
* Complaints from customers.
* Poor communication.
* Difficulty in data analysis.
  1. ***Overview of Proposed System***
     1. **Objectives of the Proposed System**
* To enable online placing of deliveries via internet.
* To enable automated data entry methods.
* Ensure efficient and reliable communication within drivers, customers, and delivery planner and delivery manager.
* Avoid data entry errors.
* Enable easy authorization modification of data.
* Enable fast and easy retrieval of delivery records and data for fast reference activities.
  + 1. **Scope of the System**

To help the system smoothly carry out its intended purpose to meet the Britehouse delivery management needs, at least the following tables will be needed:

* CUSTOMER table
* DELIVERY table
* ADDRESS table
* COMPANY table
* TRUCK table
* DRIVER table
  + 1. **The Advantages of the System**
* The system provides better data management facilities.
* Easy update of delivery records.
* Greatly reduce paper use at the company.
* Improves collaboration.

1. **System Design Aspects**
2. **Database Initial Study**
   1. ***The Nature of the Company and its Mission***

Britehouse Inc. is a company that specializes in delivering of items. Their deliveries include the following:-

* Consignments
* Packages
* Envelopes containing products shipped to its customers
* Documentations and invoices,
* and payments, gifts and other items.

The company also owns trucks, minivans and three wheeled vehicles that performs their day-to-day deliveries from 8:00 to 17:00 and 08:00 to 13:00 on Saturdays.

The Britehouse Inc., from the specification given, it seems to be expanding and dynamic in its requirements. Although, the company it is immature in terms of their system environment and database environment. This can be concluded from the fact that, some of the company’s day-to-day operations are not being attended to in an efficient and effective way. The communication between the customer, delivery manager, delivery planner and drivers is not efficient as they current experiencing problems with deliveries.

Although, the delivery planner plans the delivery schedules but their planning is not effective. Many factors that comes into play are left out. It can be concluded that the company is still based on traditional paper-based systems succeeding from specification given after the meeting was held between company’s representatives. Traditional paper-based system has so many disadvantages such as supply costs, poor environmental credentials, limited collaboration, editing problems etc.

1. **Problems and Constraints**
   1. ***Delivery Planner’s Perspective***

* Some deliveries are not on Britehouse’s daily routes hence they often using external delivery company.
* The company have problems with tracking their fuel costs against deliveries.
* Fuelling costs cannot be easily correlated with daily delivery schedule.
* The company regularly receive traffic fines but hard to track which drivers and deliveries each fine related to.
* The company cannot always figure out why the trucks are at certain location at the time of the fine.
* Hard to track when and why certain trucks deviated from original route.
* Hard to make effective changes to the schedule because the company does not know where the trucks are at, at the certain time and they reach their clients.
  1. ***Delivery Planner’s Perspective***
* They does not exactly know when the products will be packaged and ready for delivery.
* Customer’s complain about late deliveries as well as early deliveries.
* Sometimes there can be confusion about addresses where the delivery should be delivered.
* Sometimes the delivery addresses are incorrectly captured, not verified and found to be wrong.

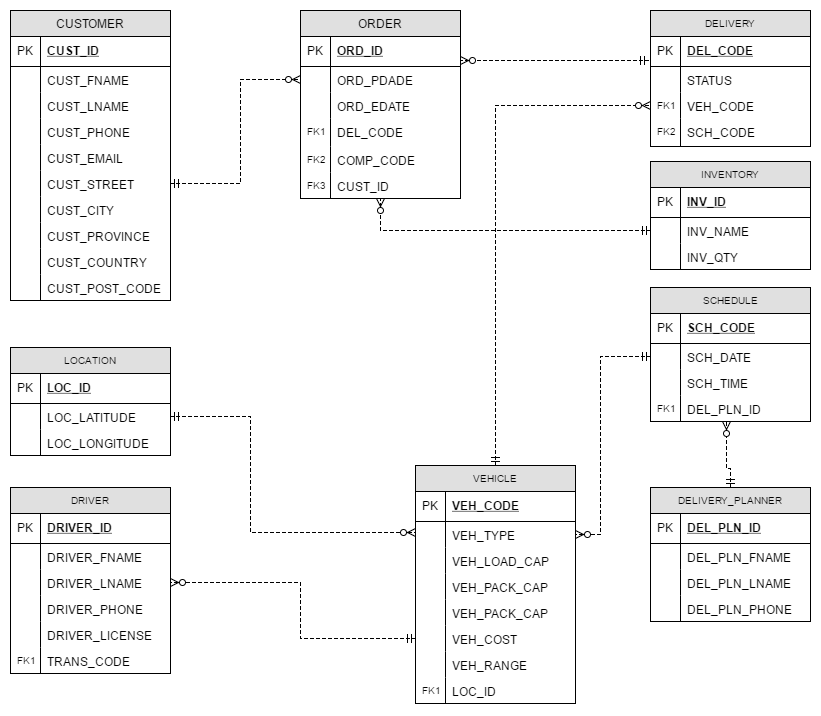
1. **Define Objectives**

* Ensure all database servers are backed up in a way that meets the business’s Recovery Point Objectives (RPO).
* Test backups to ensure we can meet the business’s Recovery Time Objectives (RTO).
* Provide timely reports on the company’s database data.
* Ensure processing of data takes place.
* Provide database that will capture data, do lookups, remove data and update information as necessary to the company.
* Document the company’s database environment.

1. **Define Scope and Boundaries**

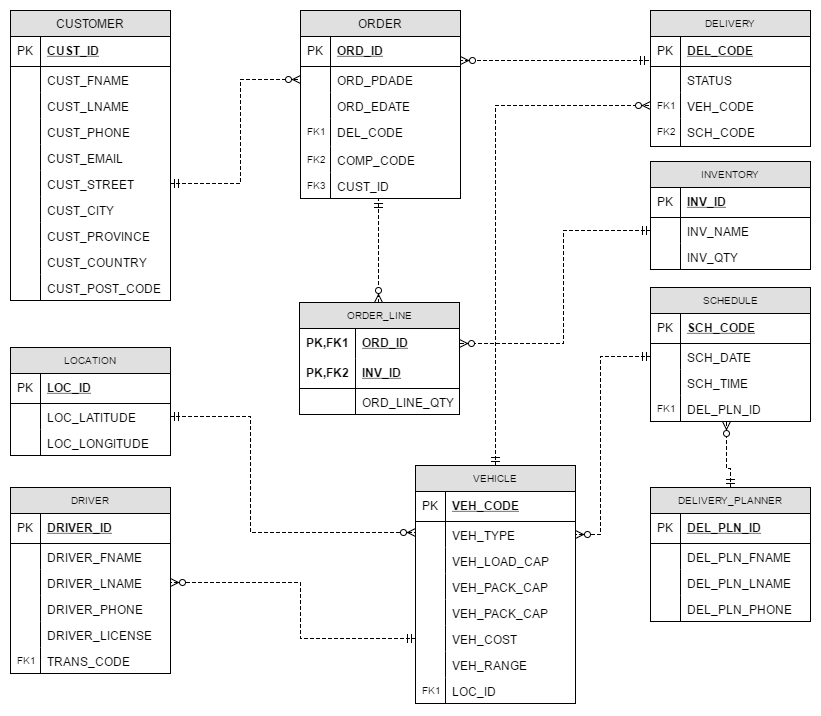
* The Britehouse delivery company need to be provided with a centralized delivery management database system. The database system will enable end-users to share information and also promote integration among themselves within the company practices. This system will help end-users to input, read, update and delete information as necessary. The system data will only be accessed by authorized personnel for improved security and privacy to company’s information.
* The database system will also accommodate the daily operations of the company such as creating profiles for the deliveries that are available, create new customer delivery requests as well as capturing driver details with their associated truck and all other necessary information needed to be captured.
* The database system will also address the following transactions:-
  + Provide a list of drivers for the company.
  + Customers whom have requested a delivery for their respective preferable times.
  + List of available trucks prior to selected date.
  + List of deliveries on a specific day.
  + Provide customer information etc.
* The database system will also be able to generate some reports for the company e.g. financial statement for financial managers, and graphically representation of the financial trend of the company.

1. **Conceptual ER Diagrams**

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## *Figure 10.1: Entity Relationship Model (Conceptual) diagram*

1. **Logical ER Diagrams**

**** *Figure 10.1: Entity Relationship Model (logical) diagram*

1. **DBMS Software Selection**
   1. ***Advantages***

MySQL is selected as the DBMS for this project because, MySQL is the world’s most popular database with plenty advantages, disadvantages and many other features that contribute to its popularity. It comes with new versions that are updates of the original software and new features that are being implemented in the existing ones. MySQL is the best software for our system because of the following advantages that it contains:-

* It is very easy to install in a computer or laptop and it is also an easy database to work with.
* Support is readily available whenever necessary.
* It’s open source.
* It’s incredibly inexpensive–it is less expensive than most other database options on the market.
* It is standard for the industry and it is still extremely popular.
* It is compatible with every operating system (virtually).
* Reliable.
* Improved data integrity–use of triggers and stored procedures.
* Reduced network traffic (reliable and it increases performance).
* The stored procedure in MySQL-stored procedures enables better tuning for performance.
  1. ***Disadvantages***

Although MySQL supports large data, data type supports numbers and characters. Given that it also provides the data to support object-oriented database storage and has the ability to manage multiple databases using a two-phase commit protocol it also contains some disadvantages. The following are its disadvantages as compared to its competitors (Ask.com):-

* Stability Issues (references, transitions, and Auditing) – MySQL tends to be somewhat less reliable than peers.
* It Suffers From Relatively Poor Performance Scaling.
* Functionality tends to be heavily dependent on Add-ons.
* Developers may find some limitations to be frustrating – MySQL database is not fully SQL compliant and limited in areas including data warehousing.
  1. ***System Requirements***

**Our System Software Requirements include:**

* Operating system (windows 7, 8 or 10).
* Microsoft.NET Framework 4.5.
* Microsoft visual C++ 2015 Redistributable package.
* 2015 with MySQL workbench 6.3.9.
* Database server.
* Access control.
  1. ***Hardware Requirements***

**Hardware requirements of our system includes:**

* Size: 700MB.
* Size on disk: 755MB.
* Processor: Intel Core i3.
* RAM: 2GB @ 1.83GHz (4GB recommended).

1. **Implementation and Loading**

Implementation is a phase where theory is turned into practice. The implementation stage is where the database management system is installed on the required hardware, optimization of this DBMS should take place to run at its optimal level, and create the database and its necessary tables. The initial data will be captured from the manual system that is currently taking place. In this stage, the database security and granting user privileges to various users identified to access the application should also take place. Lastly, the backup plans have to be initiated in this phase. The following are steps in implementation phase:

1. Install the DBMS.
2. Fine-tuning of variables for setup according to hardware, software platform, and usage conditions.
3. Create a database with its tables.
4. Load the data.
5. Set up users and security.
6. Implement backup plans.
   1. ***Install the DBMS***

This stage comprises of the installation of the database management system on a new server. Virtualization will be used to support the creation of logical representations of computing resources that are independent in the underlying physical computing resources (Carlos Coronel, Steven Morris: 12ed).

* 1. ***Fine-tuning Variable***
  2. ***Create a Database and its Tables***

The MySQL database will be used to store the company’s data. The MySQL database is a modern relational database that requires the creation of special storage-related constructs to go use the end user tables. The construct usually include the storage group, the table spaces and a table can contain more than one table space. The storage group of the delivery management system consists of:

* People; categorized as the administrative staff, drivers and clients.
* Vehicles; have different delivery stations as well as different items to deliver. They also cover a certain distance from the depot.
* Schedule; list all possible times for which every vehicle should leave the depot.
* Tables are used to help organize the data into groups.
  1. ***Load the Data***

To load the company’s data into the new database we will import it from the existing file manual system. In case data formats does not support direct importing, then conversion programs will have to be created to reformat the data for importing.

* 1. ***Set up Security and Grant User Privileges***

The various storage groups have different views suitable for either the administrative staff, drivers, or customers whom made orders. For instance, customers cannot view, modify, delete or update other customers’ personal information. Also, they have no access to the company or administrative side of the database.

The reason for this is to ensure that data is safe and does not end up being seen by wrong people or being misused. Also, the authenticity of the data needs to be protected and that of a sensitive information.

* 1. ***Backup Plans***
* It is of outermost important that the database is readily available for usage and that its data be safely kept at all times.
* For auto recovery, the DBMS also saves our data on the server, in case we might lose our data.
* To backing up our database files, we will use the MySQL dump program; this will help us in the event of a system crash.

1. **Testing and Evaluation**

The testing and evaluation process occurs in parallel with website programming. The database tools such as report generator, screen painters, menu operators, CSS, JavaScript, JQuery, HTML, PHP will be used to prototype the delivery management system. Options to enhance the system if implementation fails will also be supported. Such options are as follows:

* **Fine-tuning the system and DBMS configuration parameters;** that is, we fine-tune the website to provide maximum system performance. It should work efficiently by customizing settings and configuration parameters for the database and DBMS.
* **Modify physical design;** we will continuously need to monitor the performance and data integrity characteristics of the database as time passes by. Denormalization should be considered at some stage to improve performance, use hash access and/or indexes to optimize data access.
* **Performance and security measures;** that is, to provide unique access rights and password security for specific users that is not prone to hacking, audit trails given by the database management system to check for problems such as invalidation or access violations, and data encryption to ensure the safety and security of the database and eventually making data useful for authorized users. We will use tools such as sp\_Blitz® and sp\_WhoIsActive to diagnose server reliability and performance issues.
* **Upgrade or change DBMS software and/or hardware platform;** to avoid inconsistency, data redundancy, and loss of data, it is recommended using distributed storage devices. Therefore, data and data files will be distributed across different storage devices and will always be updated every time transactions are made ensuring fully backed up data for Britehouse administration.

# **Operation**

Once the database has passed its evaluation stage, it will be considered operational. This operational phase demonstrates the main operations that are taking place within the Britehouse delivery organization. This includes daily activities that the database and website are running such as establishing schedule, clients placing orders, management of vehicles and drivers etc. These represents events that are taking place within Britehouse delivery organization. The beginning of operational phase starts the process of system evolution.

# **Maintenance and Evolution**

Intellibase is responsible for the maintenance of the system should there be any changes or improvements required. The team will keep itself up-to-date with the changes in the business environment mainly by allotting one or two IT technicians to the Company’s IT department for convenience sake as we are aware that the staff may not be well equipped with IT skills and therefore need an advanced IT personnel available at all times to do the tasks of system maintenance. System improvements and enhancements will be run only when needed.

Here, we look at the different types of maintenance which are significant to the efficient and effective operation of the database which entails preventive maintenance, corrective maintenance, and adaptive maintenance.

* **Preventive maintenance (backup);** system breakdowns and malfunction are not always predictable, they sometimes happen when least expected and they can cause great harm to the normal operations and transactions of the flight reservations and they can also lead to loss of data. However, these problems can be curbed and minimized by maintaining a preventive maintenance program scheduled regularly which runs the basic maintenance such as back-up of software updates, critical data and other forms of maintenance preventing loss of data. Intellibase provides the preventive maintenance activities for those SIXSAir airlines because they do not have their own backup programs. The preventive maintenance programs offered by Intellibase include:
* Anti-virus software updates and regular virus scans.
* Data backup facilities, offsite backup protection, and disaster recovery planning. Also verifying the data backup functionality and data restores.
* Regular system scans, malware, and spyware scans, as well as malicious software removal. (This prohibits intruders from accessing unauthorized data or even manipulating it, prevents them from identity theft, hacking and manipulating your system.)
* **Corrective maintenance (recovery);** corrective maintenance is the correction of a system error or system breakdown. The plan is to diagnose any problem within the computer software or system and find the root cause of the problem. Thereafter, we restore/repair the system by correcting the problem. Examples of a Corrective maintenance include;
* the removal of errors and bugs
* running a system restore
* removing malicious programs, and
* Reformatting, etc.

To restore the database we are going to use the MS SQL Server 2008(preventive maintenance).

* **Adaptive maintenance;** adaptive maintenance as mentioned above involves advancement and enhancement of an information system so as to keep it up-to-date with the changes and needs of the business environment at that specific moment of time. This includes adding new features, increasing the system capability, or even improving the effectiveness of the operation system. The need for adaptive maintenance in a business doesn’t occur too often, therefore, our team will be working on this task after some period of time-based on the intensity of change within the business environment and the requirement for change of the system.

# **System Screenshots**

# **References**

1. <http://www.locisolutions.com/blog/7-disadvantages-paper-based-document-management>