

Retail Customer Service Database

By Group 1

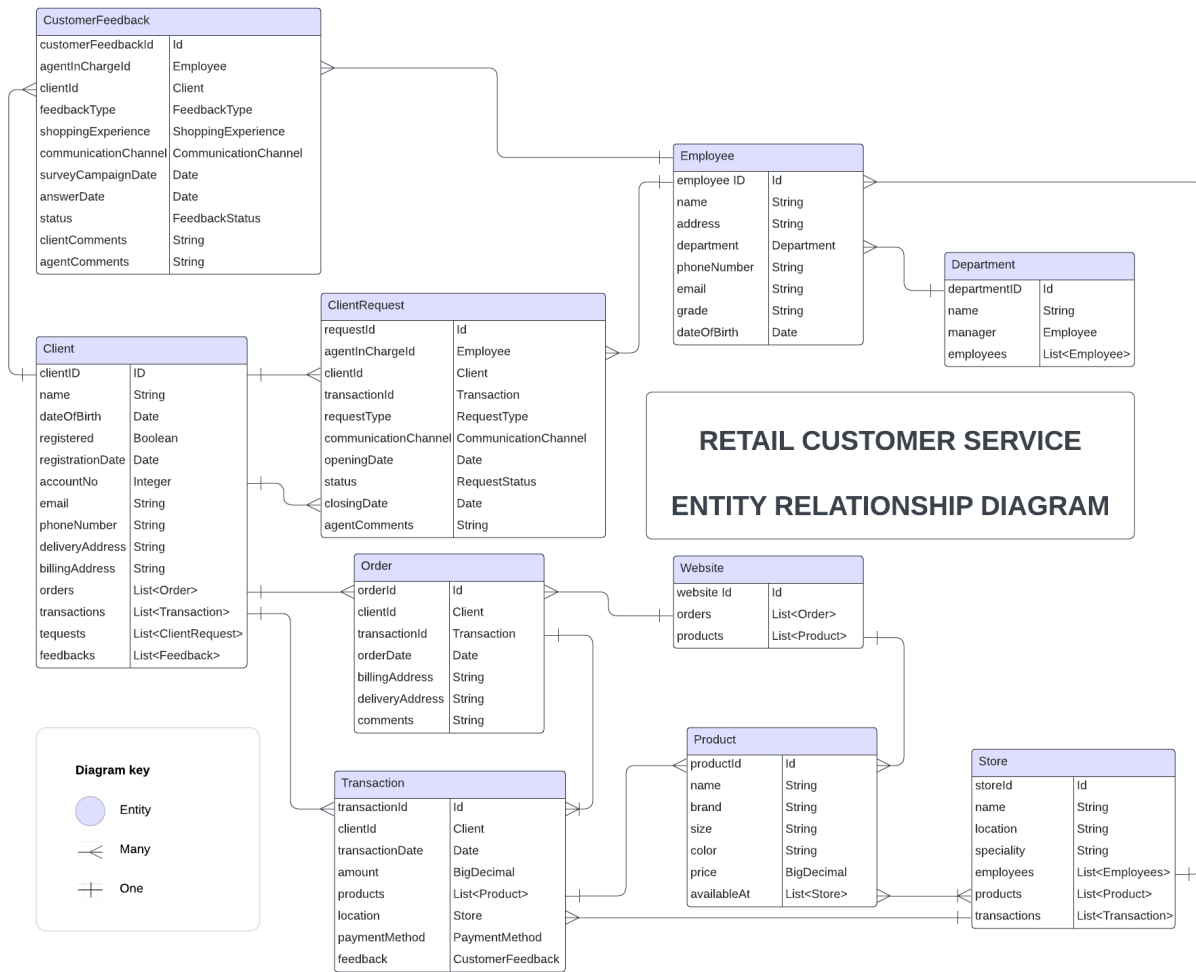
1. Introduction

Advanced technology has led to the birth of “untact” services in the world of retailing in the United Kingdom and other areas of the world. “Untact” created from two words: no (-un) and con(tact) was first coined in South Korea. It is a form of service initiated and received by a customer without a face-to-face encounter between employee and customer that is aided by digital technology (Kim et al., 2018; Bordoloi et al., 2018; Lee and Lee, 2020). It becomes pertinent for businesses to listen to the customers’ voices by making available a communication environment where the customers’ needs and complaints can be harvested and responded to autonomously. The following database design aims to store clients’ feedback on the services received. An analysis of this would be used to drive decisions that would lead to improved clients’ satisfaction index and their loyalty in our retail industry.

2. Logical Design

2.1. Entity Relationship Diagram (ERD)

The *Retail Customer Service ERD* represents the relationships between various entities in a retail environment, focusing on customer interactions, employee involvement, and transactions. Each entity has its Primary Key, a unique identifier (entityId).



2.2. Relationships and Associations

1. Client

- A client can have multiple Orders.
- A client can initiate multiple Transactions.
- A client can send multiple ClientRequests.
- A client can provide multiple CustomerFeedback entries.

2. Employee

- Each employee is associated with a department.
- Employees handle client requests and feedback.

3. Department

- A department can have many employees.

4. *ClientRequest*

- A request is linked to one client, handled by one employee, and may refer to one transaction.

5. CustomerFeedback

- Feedback is linked to one client and one employee.

6. Order

- An order belongs to one client and may involve one transaction.

7. Transaction

- Each transaction is linked to one client, can involve one or multiple products, and may have one associated feedback.

8. Product

- A product is linked to multiple stores and transactions.

9. Store

- A store employs multiple employees.
- A store sells multiple products and handles multiple transactions.

10. Website

- The website facilitates transactions and order management.

2.3 ERD Assumptions

General Assumptions

1. All monetary values (price, amount) are recorded in pounds (£).

2. Feedback provided by customers is in the form of close-ended and multiple-choice questions, ensuring structured and concise responses.
3. Each transaction can have at most one feedback entry.
4. Not product-specific customer feedback is handled by the *Remediation Department*.
5. Orders are exclusively processed through the online store.
6. The *shoppingExperience* (whether online or in-store) is tracked to understand customer behaviour.
7. A *Department* is a team responsible for specific client needs or situations. Examples: Deliveries, Client Satisfaction, After-Sales Support, Returns, and Remediation.

Client Requests

1. Each client request is assigned to one employee.
2. Client requests must be resolved within 10 working days.
3. If a client decides to change their initial request, they must create a new request with the appropriate *requestType*.

RequestType

- **Return**
 - Within a 14 days limit
- **Refund**
 - Default refund method: a voucher for the equivalent amount.
 - If the voucher is refused, a bank transfer will be issued.
- **Exchange**

Request Status

- **Opened**
- **In Progress**
- **Closed**
- **Urgent**

FeedbackType

- **Complaint**
- **Satisfaction Survey**
- **After-Sale**
- **Request Dealing**

- **Satisfaction Rating**

FeedbackStatus

- **Received**
- **Processed**
- **Reported**
- **No Action Needed**
- **Expired**

CommunicationChannel

- **Email**
- **Text Message**
- **Website** (online request forms)
- **Phone**

PaymentMethod:

- **Credit Card**
- **Cash**
- **Gift Card**
- **Voucher**

3. Database Management System (DBMS)

Chosen DBMS: MySQL

- **Storage Requirements:**
MySQL's InnoDB supports foreign keys and ensures data integrity in the stored datasets. InnoDB is scalable for medium to large datasets.
- **User Access Needs:**
MySQL includes role-based access control which makes data accessibility more secure. MySQL allows us to implement restrictions in accessing data based on different organisational roles, as well as handle concurrent user connections making it ideal for retail environments.
- **Data Manipulation and Retrieval:**
MySQL is highly efficient for handling data and performing CRUD (Create, Read, Update, Delete) operations.

3.1 Code for SQL queries (Sarkar and Roychowdhury, 2019)

Queries

- Start queries with BEGIN TRANSACTIONS
- End queries with COMMIT;

Tables

- CREATE TABLE client (ClientID INT PRIMARY KEY,);

Data Insertion

- INSERT into client (clientID, name) Values (1, 'John Doe');

Data update

- UPDATE client SET email = jdoe@email.com WHERE clientID = 1;

Data Deletion

- DELETE FROM client WHERE clientID = 1;

4. Data Management Pipeline

4.1. Data Capture

In the Retail Customer Service system, data is collected through:

- **User Inputs**
- **Manual Entry**
- **File Uploads**

4.2 Data Cleaning Process

Techniques Used:

- **Handling Missing Values:** missing data is either replaced with a default value or is set as missing (Davidson, 2020)
- **Normalizing Data:** Data is structured to follow 3 forms of normalization as mentioned in Davidson (2020)
 - 1NF: each row is unique and data such as first name and last name is parsed into two tables
 - 2NF: removing partial dependency by ensuring tables completely depend on primary keys and not on different variables

- 3NF removing non-key attribute to ensure there is no transitive dependency
- **Removing Duplicates**

Stages of ETL as referenced in Cote et. Al. (2017):

- **Extraction:** Data is collected using forms that customers have filled out regarding their experience or a general questionnaire via phone.
- **Transformation:** Data is validated by cleaning and formatting it to ensure that values are aggregated and have correct formats.
- **Loading:** Processed data is loaded into the data warehouse so that analytics and reporting can be performed.

4.3. Data Storage and Security

Storage Strategies ():

- **Indexing:** Primary and foreign keys are indexed to optimize query performance.
- **Partitioning:** To achieve maximum efficiency the transactions are categorized by date to improve performance on time-based queries.

Security Measures:

- **Encryption:** Sensitive data of users are encrypted in transit to ensure that data is secure between the client application and database.
- **Access Controls:** Implementing role-based privilege principle to ensure necessary access is granted to individuals assuring that data is accessible according to its relevancy based on employee roles.
- **Backups:** full or incremental backups ensure data loss does not occur.

5. Critical Evaluation

The design supports scalability, allowing integration with APIs to collect data from diverse sources like surveys or e-commerce platforms. Future integration with machine learning (ML) and Natural Language Processing (NLP) can deepen feedback analysis, providing sentiment insights and predicting trends. Operational efficiency is ensured with automated request tracking and well-defined workflows for returns, refunds, and exchanges.

However, improvements could include optional open-ended feedback for richer insights, explicit UK GDPR compliance for sensitive data, and real-time analytics for quicker response to critical feedback. Overall, the Retail Customer Service Database design is a future-proofed and scalable design that aligns well with the business goal of enhancing customer satisfaction and loyalty.

6. References

- Bordoloi, S., Fitzsimmons, J. & Fitzsimmons, M. (2018) *Service management: operations, strategy, information technology*, 9th edn. McGraw-Hill, New York.
- Cote, C., Lah, M. & Sarka, D. (2017) *SQL Server 2017 Integration Services cookbook: ETL techniques to load and transform data from various sources using SQL Server 2017 Integration Services*. 1st ed. PACKT Publishing.
- Davidson, L. (2020) *Pro SQL Server Relational Database Design and Implementation: Best Practices for Scalability and Performance*. 6th Edition. [Online]. Berkeley, CA: Apress L. P.
- Jalil, A., Kaur, H., Jogia, A.V. (2021). The Impact of E-Service Quality on Customer Loyalty in United Kingdom. *International Journal of Applied Business and Management Studies*. 6(1): 69-90. [Accessed 30 November 2024]
- Kim, R., Jeon, M., Lee, H., Choi, J., Lee, J., Kim, S., Lee, S., Seo, Y., Kwon, J (2018). Trend Korea. Mirae book Publishing Co., Seoul
- Lee, S.M., Lee, DH (2020). "Untact": a new customer service strategy in the digital age. *Service Business* 14: 1-22. [Accessed 30 November 2024]
- Lucid Software Inc. (n.d.) *ER Diagrams*. Available from: <https://www.lucidchart.com/pages/er-diagrams> [Accessed 22 November 2024].
- Sarkar, T. & Roychowdhury, S. (2019) *Data wrangling with Python: creating actionable data from raw sources*. 1st edition. Birmingham; Packt Publishing Ltd.