

ENTITY-RELATIONSHIP DIAGRAM (ERD) DOCUMENTATION FOR ATLIQ MART SUPPLY CHAIN ANALYSIS

Introduction

This document provides a detailed analysis of the Entity-Relationship Diagram (ERD) designed for AtliQ Mart's supply chain. The ERD serves as the foundation for capturing, analyzing, and reporting on key metrics related to AtliQ Mart's delivery performance. By understanding customer delivery expectations, tracking actual delivery data, and analyzing discrepancies, this data model enables data-driven insights to improve customer satisfaction and optimize supply chain operations.

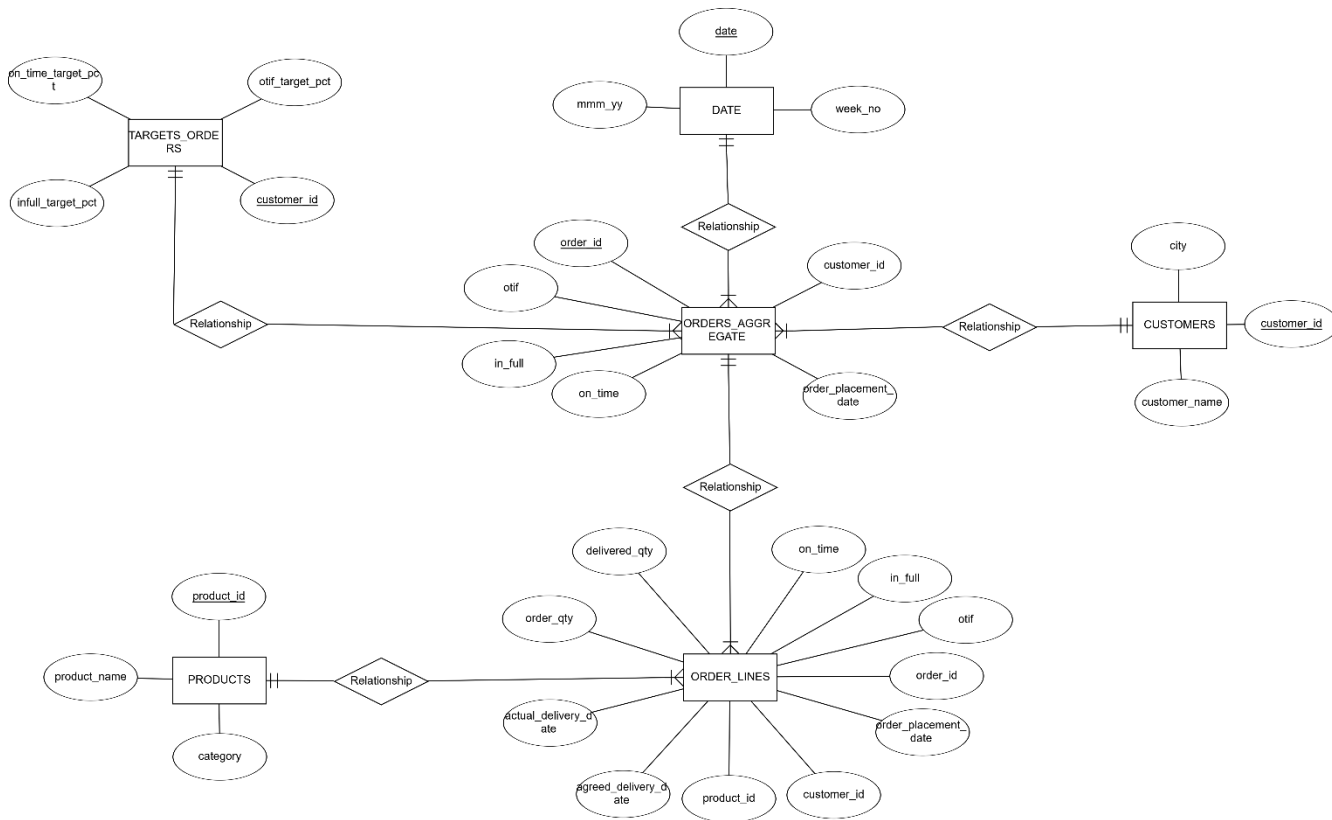
Purpose of the ERD

The primary purpose of this ERD is to support data analysis for AtliQ Mart's supply chain, specifically to:

- Measure delivery performance against customer-specific targets.
- Identify trends, delays, and partial fulfillment occurrences.
- Analyze supply chain data based on customer demographics, product categories, and temporal patterns.
- Provide actionable insights to address delivery service issues, enhancing customer satisfaction and supporting potential expansion initiatives.

ERD Components and Their Roles

The ERD is composed of several key entities, each with specific attributes that facilitate different aspects of supply chain analysis. The following sections detail each entity and its role in the data model.



1. TARGETS_ORDERS

- **Attributes:**
 - **otif_target_pct** (On-Time In-Full target percentage)
 - **infull_target_pct** (In-Full target percentage)
 - **on_time_target_pct** (On-Time target percentage)
 - **customer_id** (Unique Identifier for each customer)
- **Description:** The **TARGETS_ORDERS** table stores the delivery performance targets for each customer. These targets represent service expectations that AtliQ Mart aims to meet, such as the desired rates for on-time and in-full deliveries. This entity allows analysts to measure actual delivery data against customer expectations, identifying areas where the company may need to improve service reliability.

2. CUSTOMERS

- **Attributes:**
 - **customer_id** (Unique identifier for each customer)
 - **customer_name** (Name of the customer)
 - **city** (Location of the customer)
- **Description:** This table contains demographic information for AtliQ Mart's customers. By associating delivery data with customer profiles, analysts can segment delivery performance by region or specific customers, identifying if certain areas face more delivery issues than others.

3. ORDERS_AGGREGATE

- **Attributes:**
 - **order_id** (Unique identifier for each order)
 - **customer_id** (ID linking the order to a customer)
 - **order_placement_date** (Date when the order was placed)
 - **otif** (On-Time In-Full indicator)
 - **in_full** (Indicator for whether the order was delivered in full)
 - **on_time** (Indicator for whether the order was delivered on time)
- **Description:** The **ORDERS_AGGREGATE** table summarizes key delivery metrics for each order, such as on-time and in-full delivery statuses. This aggregated view is essential for evaluating delivery performance at a high level, providing insights into whether AtliQ Mart consistently meets delivery expectations and where improvements are needed.

4. ORDER_LINES

- **Attributes:**
 - **order_id** (Links line items to the order)
 - **customer_id** (Customer associated with the order)
 - **product_id** (Product ordered)
 - **order_qty** (Quantity of the product ordered)

- **delivered_qty** (Quantity of the product delivered)
- **order_placement_date** (Date when the order was placed)
- **actual_delivery_date** (Date when the order was actually delivered)
- **agreed_delivery_date** (Date agreed upon for delivery)
- **otif** (On-Time In-Full indicator)
- **in_full** (Indicator for whether the order was delivered in full)
- **on_time** (Indicator for whether the order was delivered on time)
- **Description: ORDER_LINES** provides line-item detail for each order, including ordered and delivered quantities, and the actual vs. agreed delivery dates. This granular data supports analysis of specific items that may face frequent delays or partial fulfillment issues, helping AtliQ Mart pinpoint problems at a detailed level within the supply chain.

5. PRODUCTS

- **Attributes:**
 - **product_id** (Unique identifier for each product)
 - **product_name** (Name of the product)
 - **category** (Product category)
- **Description:** The PRODUCTS table contains information on all products offered by AtliQ Mart. By linking order data to specific products and categories, analysts can determine if certain categories experience higher rates of delays or incomplete deliveries. This data is crucial for addressing product-specific issues within the supply chain.

6. DATE

- **Attributes:**
 - **date** (Specific date)
 - **mmm_yy** (Month and year in text format)
 - **week_no** (Week number of the year in text format)
- **Description:** The DATE table provides a temporal dimension for analyzing delivery performance over time. By organizing data into months and weeks, AtliQ Mart can identify seasonal patterns in delivery performance, track improvements over time, and identify peak periods that may require additional resources.

Relationships Between Tables

The relationships between tables in the ERD define how data from different sources interact and support detailed analysis. Below are the primary relationships in the ERD:

1. TARGETS_ORDERS and ORDERS_AGGREGATE

- **Relationship Type:** One-to-Many
- **Description:** Each customer in the **ORDERS_AGGREGATE** table has only one delivery performance targets in the **TARGETS_ORDERS** table. This relationship enables the model to store and compare the delivery goals for each customer, which can be later compared to actual delivery performance.

2. CUSTOMERS and ORDERS_AGGREGATE

- **Relationship Type:** One-to-Many
- **Description:** Each customer can place multiple orders, with each order represented in the **ORDERS_AGGREGATE** table. This relationship allows tracking of delivery performance metrics per customer, facilitating analysis by customer demographics or location.

3. ORDERS_AGGREGATE and ORDER_LINES

- **Relationship Type:** One-to-Many
- **Description:** Each order in **ORDERS_AGGREGATE** can have multiple line items in the **ORDER_LINES** table, representing individual products ordered. This relationship supports detailed analysis at the product level within each order, helping identify specific items that may frequently encounter delivery issues.

4. PRODUCTS and ORDER_LINES

- **Relationship Type:** One-to-Many
- **Description:** Each product in the **PRODUCTS** table can appear in multiple order lines in the **ORDER_LINES** table. This relationship enables analysis based on product categories or specific items, allowing AtliQ Mart to address supply chain challenges at a granular level.

5. DATE and ORDER_AGGREGATE

- **Relationship Type:** One-to-Many
- **Description:** Each date in the **DATE** table can correspond to multiple orders in **ORDERS_AGGREGATE** based on **order_placement_date**. This relationship supports temporal analysis, helping AtliQ Mart detect patterns in delivery performance across different time periods.

How the ERD Supports Project Objectives

The ERD is designed to facilitate comprehensive analysis of AtliQ Mart's delivery performance and customer satisfaction. With this structure, analysts can:

1. **Measure performance against customer-specific targets:** Using the **TARGETS_ORDERS**, **ORDERS_AGGREGATE**, and **ORDER_LINES** tables, AtliQ Mart can assess if it meets or falls short of customer expectations.
2. **Identify trends and patterns:** The **DATE** and **FACT_ORDER_AGGREGATE** tables enable trend analysis across time, helping the company understand if delays or fulfillment issues occur during certain periods.
3. **Analyze delivery performance by region and customer:** The **CUSTOMERS** table provides segmentation based on location and customer profiles, allowing AtliQ Mart to identify areas that may need operational improvements.
4. **Perform product-specific analysis:** The **PRODUCTS** and **ORDER_LINES** tables allow AtliQ Mart to track delivery performance for individual products or categories, supporting targeted strategies to address supply chain challenges.
5. **Improve customer satisfaction and operational efficiency:** By identifying the root causes of delivery issues, AtliQ Mart can implement solutions that enhance service reliability, potentially leading to higher customer retention and expansion opportunities.

Conclusion

The ERD serves as a critical asset in AtliQ Mart's data-driven approach to improving supply chain operations. By providing a structured view of customer, order, product, and time dimensions, the data model enables comprehensive analysis that supports informed decision-making. This ERD not only aids in identifying delivery service issues but also lays the groundwork for achieving higher levels of customer satisfaction and operational excellence.