**Report:** **E-commerce Order Fulfillment & Delivery Analytics**

**Background**

FastCart, an online retailer specializing in consumer goods and electronics, implemented Oracle NetSuite ERP to manage sales, inventory, and logistics. However, the company faced significant challenges due to:

• Delayed deliveries, leading to customer dissatisfaction.

• Inefficient tracking, making it difficult to monitor order fulfillment performance.

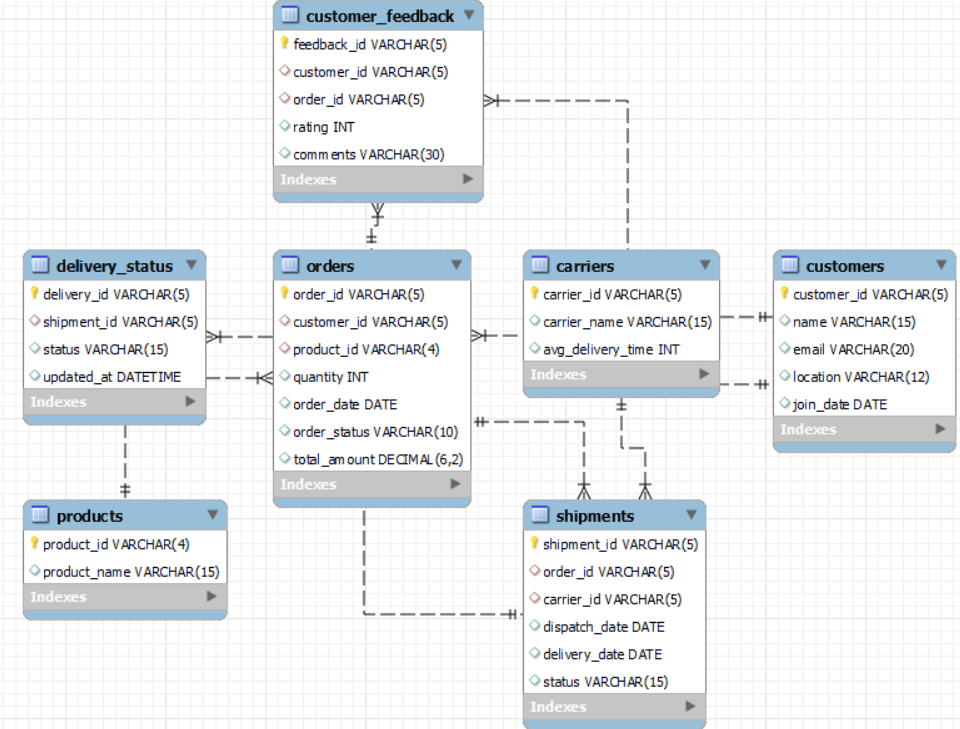
• Lack of real-time analytics, preventing data-driven decision-making.

To address these issues, FastCart decided to integrate its ERP system with a cloud-based data warehouse (Amazon Redshift) and use Power BI for advanced analytics.

**Work Flow**

**Database Creation**:

* Created a database ‘ecommerce2’ in MYSQL Workbench.
* Table definitions are given in ‘Dataset\_Ecommerce.xlsx’.
* There is total 6 tables in the sheet I created a new table products.



* Customers, products, carriers, orders, shipments, delivery\_status and customer\_feedback are the tables.
* For inserting the data I have made some assumptions.

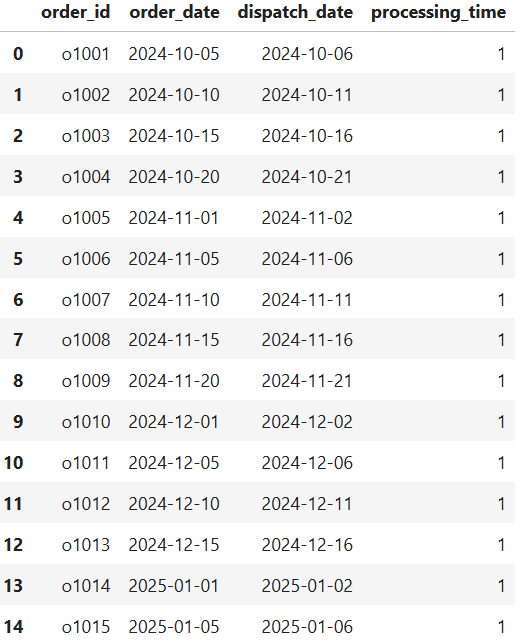
1. Products – 5
2. Customers - 7
3. Carriers – 5

* I inserting the data of 15 orders.

**Data Analysis Using Python Pandas**

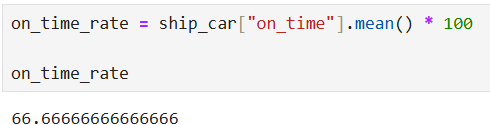
* Now I have connected the python and database tables using sqlalchemy library using engine.
* Load the database tables into Dataframes using pandas.
* Dispose the engine to close database connection.
* **Order Processing Time** (order placement to shipment dispatch).

1. Formatted date columns in orders and shipment dataframes.
2. Merged the orders and shipment dataframes based on orders\_id column.
3. Calculated the time difference between Order\_Date and Dispatch\_Date and saved it in ‘processing\_time’ column.

 Findings: the processing\_time is 1 day for all orders.

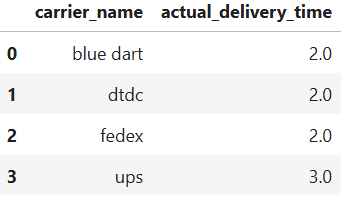
* **On-Time Delivery Rate** by analyzing late vs. on-time shipments.

1. Merged the carriers and shipment dataframes based on carriers\_id column.
2. Excluded rows where status of shipment is canceled.
3. Findings: 3 rows are excluded.
4. Calculated Actual\_Delivery\_Time by difference between Delivery\_Date and Dispatch\_Date.
5. Compared Actual\_Delivery\_Time with Avg\_Delivery\_Time to determine if a shipment was on time.
6. Calculated the percentage of on time delivery.

 Findings: on time delivery rate is 66.67%.

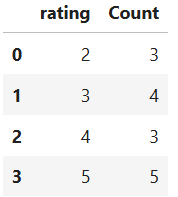
* **Carrier Performance** based on average delivery times.

1. Used the merged dataframe of carriers and shipment.
2. Grouped by Carrier\_Name and Actual\_Delivery\_Time columns.
3. Calculated mean and rested the index.

 Findings: lowest average delivery time meaning it is the fastest carrier. Blue dart, dtdc and fedex are fastest carriers.

* **Customer Feedback** to identify key service improvement areas.

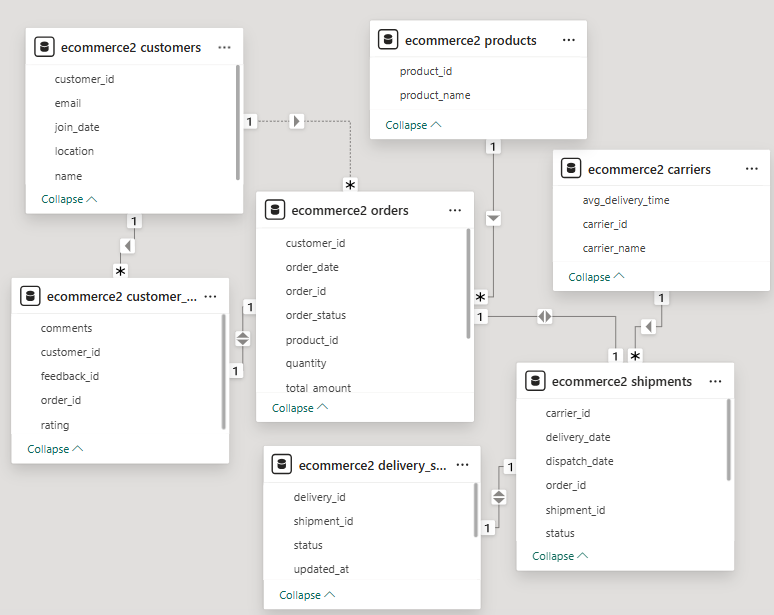
1. Considered the feedback dataframe.
2. Grouped by ratings column and named column as count.

 Findings: rating 5 and 4 are considered as positive feedback. Overall the feedback is on positive side.

**Analytics & Reporting (Power BI Dashboards)**

* The 7 Tables in MYSQL Workbench are loaded into power query for transformation.
* The data types are changed for ID columns from number to text as there is no need of performing mathematical calculations.
* After transformation data is loaded into report.
* Goto Model view and check the relationships.

Findings: I have checked the relations they are correctly established.



* I added title ‘E-commerce Order Fulfillment & Delivery Analytics’ using text box.
* Created measure ‘**total orders’** under ecommerce2 orders table. Displayed using card visual.

 Findings: total number of orders done is 15.

* Created measure ‘**total shipments’** under ecommerce2 shipments table. Displayed using card visual.

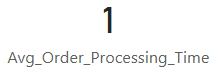
 Findings: total number of shipments done is 12. Canceled orders are not considered.

* Created measure ‘**total deliveries’** under ecommerce2 delivery\_status table. Displayed using card visual.

 Findings: total number of deliveries done is 8. Canceled and in transit orders are not considered.

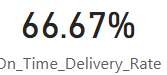
**Order Processing Time** – Measures efficiency of order fulfillment.

* Created measure ‘**Avg\_Order\_Processing\_Time’** under ecommerce2 orders table.
* calculated the difference in days between Order\_Date and Dispatch\_Date.
* calculated the average processing time across all orders.
* Displayed using card visual.

 Findings: the average order processing\_time is 1 day.

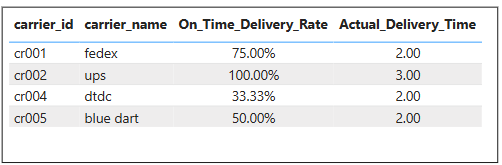
**On-Time Delivery Rate** – Tracks percentage of timely shipments.

* Created measure ‘**On\_Time\_Shipments’** under ecommerce2 shipments table.
* by finding difference between Delivery\_Date and Dispatch\_Date. Compared this with Avg\_Delivery\_Time to determine if a shipment was on time.
* Created measure ‘**On\_Time\_Delivery\_Rate’** under ecommerce2 shipments table. By dividing On\_Time\_Shipments and total shipments.
* Displayed using card visual.

Findings: on time delivery rate is 66.67%.

**Carrier Performance Dashboard** – Evaluates logistics partners' efficiency.

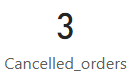
* Created measure ‘**Actual\_Delivery\_Time’** under ecommerce2 shipments table.
* by finding difference between Delivery\_Date and Dispatch\_Date.
* Displayed carrier\_id, carrier\_name, Actual\_Delivery\_Time and On\_Time\_Delivery\_Rate using table visual.



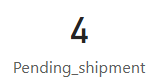
* Findings: on time delivery rate for **ups** is 100%.

**Delivery Delay Analysis** – Identifies common causes of shipment delays.

* Created measure ‘**Cancelled\_orders’** under ecommerce2 delivery\_status table. Displayed using card visual.

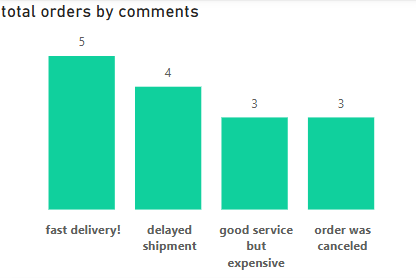
 Findings: total 3 orders are cancelled.

* Created measure ‘**Pending\_shipment’** under ecommerce2 delivery\_status table. Displayed using card visual. Considered in transit as status.

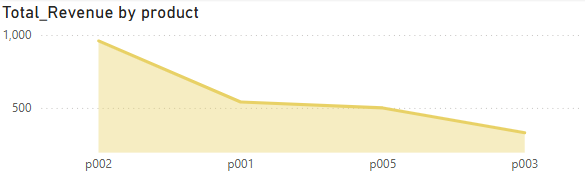
 Findings: total 4 delayed shipments.

**Customer Satisfaction Score (CSAT)** – Assesses customer experience.

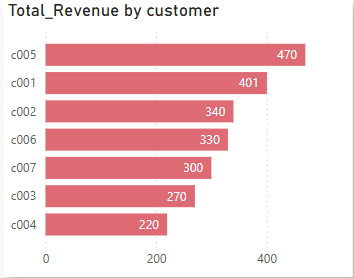
* Plotted total orders and comments using clustered column chart.

 Findings: total 5 orders are fastly delivered. 3 orders were expensive according to customer.

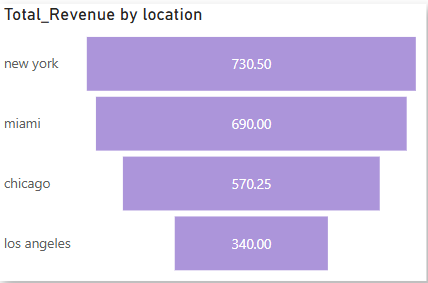
**Total\_Revenue by product –** plotted using area chart.

Findings: highest revenue generated is from P002.

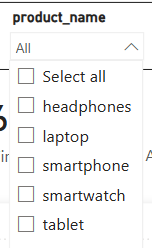
**Total\_Revenue by customer –** plotted using clustered bar chart.

Findings: highest revenue generated is from C005.

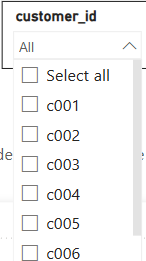
**Total\_Revenue by location –** plotted using waterfall chart.



* Findings: highest revenue generated is from New York.
* Created slicer for product to filter all the visuals.



* Created slicer for customer to filter all the visuals.



**Complete Report**

