Case Study: E-commerce Order Fulfillment & Delivery Analytics

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1. 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. The goal was to optimize:

- ❖ **Order processing times**
- ❖ **Delivery performance**
- ❖ **Logistics tracking**
- ❖ **Customer satisfaction**

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2. Case Study Scope

The project focused on building a **scalable analytics solution** by integrating order, shipment, and delivery data from **NetSuite ERP** into **Amazon Redshift**, with key reporting features in **Power BI**.

Key Components

- ◈ **Order Management System (OMS)** – Tracks orders from placement to delivery.
- ◈ **Shipping & Delivery Analytics** – Monitors logistics performance and carrier efficiency.
- ◈ **Customer Satisfaction Analysis** – Uses feedback to assess delivery experience.

The **primary objective** was to **optimize operational efficiency** and **improve the customer experience** by leveraging **data-driven insights**.

3. Key Activities

1 . Data Integration & ETL Process

- ✓ **Extract order, shipment, and customer feedback data directly from Oracle NetSuite ERP using API or ODBC/JDBC connections.**
- ✓ **Transform and clean data using Python (Pandas) or SQL scripts.S**
- ✓ **Store structured data in Amazon Redshift for efficient querying and reporting.**

2. Data Model Design

The solution included key tables for structured analytics:

Table Name	Description
Customers	Stores customer details & purchase history.
Orders	Tracks order details from NetSuite ERP.
Shipments	Stores shipping details from logistics partners.
Carriers	Information about third-party delivery providers.
Delivery_Status	Tracks real-time shipment updates.
Customer_Feedback	Stores satisfaction ratings & complaints.

Table Definitions: (Attached in excel sheet)

Table definitions.xlsx

3. Data Analysis Using Python Pandas

- **Load Data** into Pandas for preprocessing.
- **Calculate Order Processing Time** (order placement to shipment dispatch).
- **Measure On-Time Delivery Rate** by analyzing late vs. on-time shipments.
- **Evaluate Carrier Performance** based on average delivery times.
- **Analyze Customer Feedback** to identify key service improvement areas.

4. Analytics & Reporting (Power BI Dashboards)

- **Order Processing Time** – Measures efficiency of order fulfillment.
- **On-Time Delivery Rate** – Tracks percentage of timely shipments.
- **Carrier Performance Dashboard** – Evaluates logistics partners' efficiency.
- **Delivery Delay Analysis** – Identifies common causes of shipment delays.
- **Customer Satisfaction Score (CSAT)** – Assesses customer experience.

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4. Results & Business Impact

- **20% reduction in order processing time** due to improved warehouse workflows
- **15% improvement in on-time deliveries** by optimizing carrier selection.
- **Lower return rates** as shipping accuracy improved.
- **Increased customer satisfaction** through real-time tracking and automated alerts.

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5. Conclusion

By integrating **Oracle NetSuite ERP with Amazon Inventory**, Fast Cart **transformed its order fulfilment process** and optimized **delivery efficiency**.