# EVERYTHING AUTO

# ONLINE CHANNEL AND INVENTORY SYSTEM

A sample business case designed to facilitate discussions in a classroom context.

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Everything Auto (EA) is a dealership which sells a variety of auto-part products. It maintains partnerships with a list of vendors who supply auto-part products.  With its impressive growth over the past 3 years, EA has expanded its business into different regions in Ontario and Quebec with 6 stores.

Most sales are currently conducted in stores or by customers calling in to place orders.

The current data that EA collects includes financial info (orders, billing), customer information, inventory, vendors, sales, promotions are stored in Excel and flat files local to each store.  A self-taught IT technician who is also the firm's accountant maintains all aspects of the firm's IT.

EA believes that there is a great potential demand for their products. If customers could reach them via an online channel, view product catalogue, and place orders, sales would increase. There is also a need for process efficiency improvement, which would reduce the amount of manual work for bookkeeping and taking orders via telephone. Product inventory would be tracked in real-time to support just-in-time stock level requirements and facilitate better integration with suppliers.

Your team has been hired as consultants to build the online order system and create a centralized relational database to support both internal and external operations.

For this exercise, you are only required to focus on designing a database for the online order system.

## A) Review the business case from the business owner's viewpoint

You would play a role as a consulting team to identify the business opportunities & challenges before looking into technologies as enablers.  Ask the follow questions:

1. What is the business goal the business owner seeks when this project is implemented? For example: Increase sales and maximize profit.
2. What are the operations this project will support to achieve the business goal?
   a. Provide an online channel to reach customers across different geographic locations and potentially globally; order fulfillment is open 24/7.
   b. Online transactions require less support operations, hence would reduce operating costs
   c. Inventories tracked in real time hence would result in more effective supply chain operation and vendors/supplier management
   d. Online customer data are collected for analysis to better support customers and identify opportunities to boost sales
   e. Financial operations are carried out more effectively and timely
      i. Monthly, quarterly, bi-annually, and annually sales per store
      ii. Revenue versus expense per store
   f. Track customer acquisition costs and loyalty to provide customer insights
3. Other supportive operations
   a. Customer can register online and create a shopping account
   b. Customer can define methods of payment (visa, master card), contact information, shipping information
   c. Personnel have different roles: admin, sales, managers
   d. Orders' HST and Total amount generated real time based on order items
   e. Invoices can be generated and printed


## B)  Review the business case from the project implementation perspective

Ask the following questions

1. Who are the key stakeholders of this project (they are the people you will need to interview to gather detailed business requirements and later define system requirements)?
   a. Business owner
   b. Store managers
   c. Accountant
   d. Technician
   e. Store/sales staffs
   f. Inventory management staffs
2. What is the data being collected today?

3. Where is data being stored (files, hardcopy, book of records...)
4. What is new data to be collected?
5. What are the data types to be collected to support the new online order system with regard to the operations identified in Section A) 2.

# C) Database Design

Items to be in focus:

- List of Entities
- Usage purpose (support what operations)
- Entities and their attributes
- Relationships between the entities
- Entity Diagrams
- Entity physical specifications (required an underlying DB, I.e MySQL, to support, data types, constrains, etc.)

## 1. Conceptual Data Model -- Identify the data entities required for the system

1. Customer
2. Customer Account
3. Contact
4. Store
5. Personnel
6. Suppliers
7. Order
8. Order Item
9. Product
10. Payment
11. Customer Contact
12. Shipment
13. Inventory

## 2. Logical Data Modelling – Identify the attributes for each data entity

| Entity | Attributes |
| --- | --- |
| Customer | Customer ID, First Name, Last Name, Date of Birth, Registered Date |
| Customer Contact | Contact ID, Apt Unit, Address, City, Province, Country, Postal Code, Phone 1, Phone 1, Phone 1 Label,  Email |

| Customer Account | AccountID, Password, Active, CreatedDateTime, LastUpdatedDateTime, LastLogOn |
|---|---|
| Store | Store ID, Address, City, Province, Country, Postal Code, Phone, Fax, Email |
| Payment | Payment ID, Payment Method, Card Number, Card Holder First Name, Cust Holder Middle Name, Card Order Last Name, Card Expiry Date, Card Security Code |
| Order | Order ID, Order Date, Customer ID, Salesperson ID, Shipment ID, Promotion Code, Note |
| Order Item | Order Item ID, Order ID, Product ID, Unit Price, Quantity, Total Amount |
| Product | Product ID, Skew Code, Name, Description, Manufactured Date, Origin Country, Supplier ID |
| Supplier | Supplier ID, Name, Description, Address, City, Province, Country, Postal Code, Phone, Fax, Email, Website |
| Personnel | Personnel ID, First Name, Last Name, Department, Role, Phone, Email |
| Shipment | Shipment ID, Description, From Address, To Address ID, Customer ID, Shipment Start, Expected Delivery Date, Status |
| Inventory | Inventory ID, Product Id, Quantity Available, Note |

# Entity Relationship Analysis

a)   A Customer may have 1 or more Contact's, e.g. Home Address, Shipment Address
b)   A Customer may have 1 or more Payment's method, e.g. Visa 1, Visa 2, Master Card
c)   An Order has 1 or more Order Item's
d)   An Order Item has 1 and only 1 product
e)   An Order has 1 Shipment
f)   A Supplier has 1 or more Product's
g)   An Inventory has 1 Product
h)   An Inventory has 1 Supplier
i)   A Store has 1 manager
j)   A Store has several employees
k)   An employee may work for several stores

Note: Managers and employees are part of Personnel

# Entity Relationship Diagram

*See File:  Everything_Auto_DB_ERD.mwb*

## 3. Physical Data Modelling

**Table: contact**

**Columns:**
| | |
|---|---|
| id | int AI PK |
| cust_id | int |
| contact_type | enum('R','D') |
| address | varchar(100) |
| city | varchar(50) |
| prov | varchar(50) |
| postalcode | varchar(10) |
| country | varchar(50) |
| phone | varchar(15) |
| phone_label | varchar(50) |
| created_time | datetime |
| last_updated | datetime |

**Table: customer**

**Columns:**
| | |
|---|---|
| id | int AI PK |
| sys_acct_id | int |
| first_name | varchar(50) |
| last_name | varchar(50) |
| dob | int |
| enabled | enum('Y','N') |
| last_updated | datetime |

**Table: department**

**Columns:**
| | |
|---|---|
| id | int AI PK |
| name | varchar(50) |

**Table: inventory**

**Columns:**
| | |
|---|---|
| id | int AI PK |
| prod_id | int |
| avail_qty | int |
| note | varchar(100) |
| created_time | datetime |
| last_updated | datetime |

**Table: order_item**

**Columns:**
| | |
|---|---|
| id | int AI PK |
| order_id | int |
| prod_id | int |
| qty | int |
| unit_price | decimal(10,2) |
| amount | decimal(10,2) |
| created_time | datetime |
| last_updated | datetime |

**Table: orders**

**Columns:**
| | |
|---|---|
| id | int AI PK |
| order_date | int |
| cust_id | int |
| note | varchar(50) |
| created_time | datetime |
| last_updated | datetime |

**Table: payment**

**Columns:**

| | |
|---|---|
| **id** | int AI PK |
| **cust_id** | int |
| method | enum('VS','MC') |
| card_number | varchar(16) |
| card_first_name | varchar(50) |
| card_last_name | varchar(50) |
| card_middle_name | varchar(50) |
| exp_mm | tinyint |
| exp_yy | tinyint |
| sec_code | mediumint |
| created_time | datetime |
| last_updated | datetime |

**Table: personnel**

**Columns:**

| | |
|---|---|
| **id** | int AI PK |
| first_name | varchar(50) |
| last_name | varchar(50) |
| phone | varchar(15) |
| email | varchar(50) |
| created_time | datetime |
| last_updated | datetime |

**Table: product**

**Columns:**

| | |
|---|---|
| **id** | int AI PK |
| skew | varchar(50) |
| prod_name | varchar(100) |
| man_date | int |
| orig_country | varchar(100) |
| **supplier_id** | int |
| created_time | datetime |
| last_updated | datetime |

**Table: role**

**Columns:**

| | |
|---|---|
| **id** | int AI PK |
| name | varchar(50) |

**Table: shipment**

**Columns:**

| | |
|---|---|
| **id** | int AI PK |
| **order_id** | int |
| start_date | int |
| exp_del_date | int |
| status | enum('PACKAGING','STARTED','ON_ROUTE','ARRIVED','DELIVERED') |
| note | varchar(100) |

**Table: store**

Columns:

| id | int AI PK |
|---|---|
| address | varchar(100) |
| city | varchar(50) |
| prov | varchar(50) |
| postalcode | varchar(50) |
| country | varchar(50) |
| phone | varchar(15) |
| email | varchar(50) |
| **mgr_id** | int |
| created_time | datetime |
| last_updated | datetime |

**Table: supplier**

Columns:

| id | int AI PK |
|---|---|
| supplier_name | varchar(50) |
| address | varchar(100) |
| city | varchar(50) |
| prov | varchar(50) |
| postalcode | varchar(50) |
| country | varchar(50) |
| phone | varchar(15) |
| email | varchar(50) |
| website | varchar(50) |
| rep_name | varchar(50) |
| created_time | datetime |
| last_updated | datetime |

**Table: sys_account**

Columns:

| id | int AI PK |
|---|---|
| sys_account_id | varchar(50) |
| passwd | varchar(100) |
| email | varchar(50) |
| activated | enum('Y','N') |
| activated_date | int |
| reg_date | int |
| note | varchar(50) |
| created_time | datetime |
| last_updated | datetime |

# System Modules

| Module | Supporting Entities |
|---|---|
| 1. Registration<br>   a. Create System Account<br>   b. Create Customer Account<br>     i. Profile<br>     ii. Contact<br>     iii. Payment Method | Sys_Account<br>Customer Account<br>Contact<br>Payment |
| 2. Authentication | Sys_Account |

| | |
|---|---|
| a. Log In<br>b. Log Out | |
| 3. Order Management<br>    a. Add Item<br>    b. Check Out<br>        i. Invoice<br>        ii. Shipment | Inventory<br>Product<br>Order<br>Order_Item<br>Shipment |
| 4. Delivery Management<br>    a. Delivery Tracking<br>    b. Delivery Update | |
| 5. Inventory Management<br>    c. Low Inventory Checking<br>    d. Reporting | Inventory<br>Product<br>Supplier |
| 6. System Support<br>        i. Add/Update Role<br>        ii. Add/Update User | Personnel<br>Role |