

# PrestigeCars Normalized Database

Ridhwan Ibrahim

Giorgos Stefanis

Seeram Govindan

Hasan Husseini

Youlun Wang

Michael Cipriani

# Project Overview

---

- Original PrestigeCars Database was not normalized
- Tables contained NULL values and lacked check constraints
- The goal of the project was to rebuild the tables using udts, FQDNs, FQTNs and use two valued predicate logic.
- Each group member was responsible for normalizing one table group in the DB

# Project Lifecycle

---

- First we had to decide on schemas to define Business Glossary Domains (FQDNs)
- Next we defined UDTs that enforced consistent data types and incorporated business meaning
- Each group member then normalized assigned tables, eliminating nulls and two valued predicate logic
- ERD was then created to document table relationships and domain usage

# Schemas and their meaning

---

- We separated UDTs into schemas that represent business glossary domains

Schema Name	Business Glossary Domain
PersonalInformation	Human identity attributes
FinancialInformation	Amount / Monetary values
PII	Personally Identifiable Information
Manufacturing Information	Vehicle Manufacturing data
VehicleInformation	Core vehicle characteristics
TransactionInformation	Sales transaction identifiers
ELT Information	Data-quality control types

# UDT Reuse Across the System

---

- In order to demonstrate consistency and uniformity, we confirmed that our User-Defined Data Types (FQDNs) are utilized across several tables.

	TABLE_SCHEMA	TABLE_NAME	COLUMN_NAME	BaseDataType	UDT_Schema	UDT_Name
4	CustomerData	Customer	CustomerID	nvarchar	PII	Identification
5	CustomerData	Customer	CustomerName	nvarchar	PersonInformation	FullName
6	CustomerData	Customer	IsCreditRisk	bit	PII	BooleanFlag
7	CustomerData	Customer	IsReseller	bit	PII	BooleanFlag
8	CustomerData	Customer	PostCode	nvarchar	PersonInformation	Address
9	CustomerData	Customer	ReviewRowStatus	bit	ELTInformation	ReviewRow
10	CustomerData	Customer	Town	nvarchar	PersonInformation	Address
11	OperationsMana...	SalesDetails	LineItemDiscou...	numeric	FinancialInformati...	Amount
12	OperationsMana...	SalesDetails	LineItemNumber	tinyint	TransactionInfor...	LineNumber
13	OperationsMana...	SalesDetails	ReviewRowStatus	bit	ELTInformation	ReviewRowType
14	OperationsMana...	SalesDetails	SalePrice	numeric	FinancialInformati...	Amount
15	OperationsMana...	SalesDetails	SalesDetailsID	int	TransactionInfor...	SalesDetailsI...
16	OperationsMana...	SalesDetails	SalesID	int	TransactionInfor...	SalesIdentifi...
17	OperationsMana...	SalesDetails	StockID	nvarchar	InventoryInformati...	StockCode
18	OperationsMana...	Stock	BuyerComments	nvarchar	VehicleInformati...	BuyerComments
19	OperationsMana...	Stock	Color	nvarchar	VehicleInformati...	Color
20	OperationsMana...	Stock	Cost	numeric	FinancialInformati...	Amount
21	OperationsMana...	Stock	IsRHD	bit	PII	BooleanFlag
22	OperationsMana...	Stock	ModelID	smallint	VehicleInformati...	ModelID
23	OperationsMana...	Stock	PartsCost	numeric	FinancialInformati...	Amount
24	OperationsMana...	Stock	RepairsCost	numeric	FinancialInformati...	Amount
25	OperationsMana...	Stock	ReviewRow	bit	ELTInformation	ReviewRow
26	OperationsMana...	Stock	StockCode	nvarchar	VehicleInformati...	StockCode
27	OperationsMana...	Stock	TransportInCost	numeric	FinancialInformati...	Amount
28	ReferenceData	Make	MakeCountry	char	ManufacturingInf...	MakeCountry
29	ReferenceData	Make	MakeID	smallint	ManufacturingInf...	MakeID
30	ReferenceData	Make	MakeName	nvarchar	ManufacturingInf...	MakeName
31	ReferenceData	Make	ReviewRowStatus	bit	ELTInformation	ReviewRow
32	ReferenceData	Model	MakeID	smallint	ManufacturingInf...	MakeID
33	ReferenceData	Model	ModelID	smallint	VehicleInformati...	ModelID

# How Our UDTs Encode Business Meaning

---

- Every UDT name is not meaningless, rather than reflecting a technical field type, the TypeName represents an actual business notion.
  - Every UDT contains:
    - The appropriate dimensions and accuracy
    - Validation of domains
    - Default values that avoid NULL
    - The schema defines the domain scope.
- 

	SchemaName	UDT_Name	system_type_id	max_length	is_nullable
1	PII	Identification	231	10	1
2	PersonInformation	FullName	231	300	1
3	PersonInformation	Address	231	100	1
4	PersonInformation	Country	239	20	1
5	PII	BooleanFlag	104	1	1
6	ELTInformation	ReviewRow	104	1	1
7	ManufacturingInformation	MakeID	52	2	1
8	ManufacturingInformation	MakeName	231	200	1
9	ManufacturingInformation	MakeCountry	175	3	1
10	VehicleInformation	ModelID	52	2	1
11	VehicleInformation	ModelName	231	300	1
12	VehicleInformation	ModelVariant	231	300	1
13	VehicleInformation	CarYear	175	4	1
14	TransactionInformation	SalesDetailsI...	56	4	1
15	TransactionInformation	SalesIdentifi...	56	4	1
16	TransactionInformation	LineNumber	48	1	1
17	InventoryInformation	StockCode	231	100	1
18	FinancialInformation	Amount	108	9	1
19	ELTInformation	ReviewRowType	104	1	1
20	VehicleInformation	StockCode	231	100	1
21	VehicleInformation	Color	231	100	1
22	VehicleInformation	BuyerComments	231	8000	1

# Hierarchy & use of UDT names

---

- Our team established a shared Business Glossary Domain Library, where UDT was defined once and reused across the entire DB.
- This ensured consistent meaning and consistent datatypes and consistent constraints wherever the domain appears.

# Subsystem Schemas (FQTN)

- OperationsManagement – Stock, Sales, Workflow
- ReferenceData – Country, Budgets
- Data – Legacy structures
- Output – Reporting extracts
- SourceData – Raw ingestion tables

# OperationsManagement.Stock

- OperationsManagement was chosen schema because it describes the enterprise domain where a stock table belongs.
- Stock table describes physical inventory which is used primarily in operations of the company.
- Udt's were created based on existing schemas to enforce a certain type.
  - Example:
    - VehicleInformation.StockCode → uniquely identifies each vehicle.
    - VehicleInformation.ModelID → ties stock to vehicle specifications.
- Default values also ensured no attribute is entered as a NULL
- COALESCE converted missing inputs into default inputs

# Constraints and Default values used

---

- Constraints enforce specific values that make sense for the business
  - Example: (Cost >= 0)
- UDT-level rules (booleanFlag)
- Default Values eliminate NULLs and enforce two-valued logic
  - Default 0.00 for Amount
  - Default 0 for BooleanFlag
  - Default "Unknown" for text fields
  - Default "1900-01-01" for unknown dates

# ReviewRow

---

- We count how many NULLS were encountered
- If NULLS exist, then ReviewRow is set to 1
- If ReviewRow = 0 then it is clean, no need for substitutions
- Else if ReviewRow = 1, there is at least one NULL value that was replaced
- This identifies which rows were originally clean as well as review cleaned rows.

	StockCode	ModelID	Cost	RepairsCost	PartsCost	TransportInCost	IsRHD	Color	BuyerComments	DateBought	TimeBought	ReviewRow
1	558620F5-B9E8-4FFF-8F73-A83FA9559C41	11	15600.00	660.00	0.00	150.00	1	British Racing Green	An absolute example of the pinnacle of British e...	2015-01-29	12:55:00.0000000	0
2	B1C3B95E-3005-4840-8CE3-A7BC5F9CFB3F	2	52000.00	2175.00	1500.00	750.00	1	Red	Superb Car! Wish I could afford a second one!	2015-01-01	12:55:00.0000000	0
3	E6E6270A-60B0-4817-AA57-17F26B2B8DAF	23	39600.00	2500.00	1500.00	550.00	1	Black	FAbulous motor!	2015-03-15	12:55:00.0000000	0

# Data cleansing strategy

---

- Our ELT pipeline converts nullable inputs into well-defined default values using domain UDT rules and flags any substituted rows using the ReviewRow bit, ensuring two-valued predicate logic for reliable downstream processing.
- Every column uses COALESCE in order to prevent NULL and enforce the default values.

# Views

---

- We created views to present normalized tables and data
- Our views display FQTNs and FQDs only, hiding the raw legacy structure
- This ensures the consistency of column naming convention, and elimination of 3-valued predicate logic through its conversion into 2-valued predicate logic
- The views allow users to interact with the normalized data without needing to understand the overall domain structure.

# Foreign Keys

---

## Foreign Key Relationships

- **SalesDetails → Sales**
  - Linked by SalesID to ensure each detail belongs to a valid sale
- **SalesDetails → Stock**
  - Linked by StockID to prevent selling items that don't exist in stock
- **Model → Make**
  - Ensures each model belongs to an existing manufacturer
- **Sales → Customer**
  - Linked by CustomerID to make sure every sale references a valid customer

	ForeignKeyName	FK_Schema	FK_Table	FK_Column	Ref_Schema	Ref_Table	Ref_Column
1	FK_SalesDetails_Sales	OperationsManagement	SalesDetails	SalesID	SalesData	Sales	SalesID
2	FK_SalesDetails_Stock	OperationsManagement	SalesDetails	StockID	OperationsManagement	Stock	StockCode
3	FK_Model_Make	ReferenceData	Model	MakeID	ReferenceData	Make	MakeID
4	FK_Sales_Customer	SalesData	Sales	CustomerID	CustomerData	Customer	CustomerID

# Make

Move	Name	Type	Primary Key	Allow Nulls	Default Value	Remove	More Actions
==	MakeID	ManufacturingInfo...	<input checked="" type="checkbox"/>	<input type="checkbox"/>			...
==	MakeName	ManufacturingInfo...	<input type="checkbox"/>	<input checked="" type="checkbox"/>	('Unknown')		...
==	MakeCountry	ManufacturingInfo...	<input type="checkbox"/>	<input checked="" type="checkbox"/>	('TBA')		...
==	ReviewRowStatus	ELTInformation.Re...	<input type="checkbox"/>	<input checked="" type="checkbox"/>	((0))		...

## Scripts

```
1 CREATE TABLE [ReferenceData].[Make] (
2     [MakeID] [ManufacturingInformation].[MakeID] NOT NULL,
3     [MakeName] [ManufacturingInformation].[MakeName] CONSTRAINT [DF_MakeName] DEFAULT ('Unknown') NULL,
4     [MakeCountry] [ManufacturingInformation].[MakeCountry] CONSTRAINT [DF_MakeCountry] DEFAULT ('TBA') NULL,
5     [ReviewRowStatus] [ELTInformation].[ReviewRow] DEFAULT ((0)) NULL,
6     CONSTRAINT [PK_Make] PRIMARY KEY CLUSTERED ([MakeID] ASC)
7 );
```

# Model

Move	Name	Type	Primary Key	Allow Nulls	Default Value	Remove	More Actions
==	ModelID	VehicleInformation... [VehicleInformation].[ModelID]	<input checked="" type="checkbox"/>	<input type="checkbox"/>			...
==	MakeID	ManufacturingInfo... [ManufacturingInformation].[MakeID]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	((0))		...
==	ModelName	VehicleInformation... [VehicleInformation].[ModelName]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	('Unknown')		...
==	ModelVariant	VehicleInformation... [VehicleInformation].[ModelVariant]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	('Unknown')		...
==	YearFirstProduced	VehicleInformation... [VehicleInformation].[CarYear]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	('TBA')		...
==	YearLastProduced	VehicleInformation... [VehicleInformation].[CarYear]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	('TBA')		...
==	ReviewRowStatus	ELTInformation.Re... [ELTInformation].[ReviewRow]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	((0))		...

**Scripts**

```
1 CREATE TABLE [ReferenceData].[Model] (
2     [ModelID] [int] NOT NULL,
3     [MakeID] [int] CONSTRAINT [DF_Model_MakeID] DEFAULT ((0)) NULL,
4     [ModelName] [varchar](50) CONSTRAINT [DF_ModelName] DEFAULT ('Unknown') NULL,
5     [ModelVariant] [varchar](50) CONSTRAINT [DF_ModelVariant] DEFAULT ('Unknown') NULL,
6     [YearFirstProduced] [int] CONSTRAINT [DF_YearFirst] DEFAULT ('TBA') NULL,
7     [YearLastProduced] [int] CONSTRAINT [DF_YearLast] DEFAULT ('TBA') NULL,
8     [ReviewRowStatus] [int] DEFAULT ((0)) NULL,
9     CONSTRAINT [PK_Model] PRIMARY KEY CLUSTERED ([ModelID] ASC),
10    CONSTRAINT [FK_Model_Make] FOREIGN KEY ([MakeID]) REFERENCES [ReferenceData].[Make] ([MakeID])
11 );
```

# Sales Data

Move	Name	Type	Primary Key	Allow Nulls	Default Value	Remove	More Actions
=	SalesID	TransactionInformation.[SalesIdentifier]	<input checked="" type="checkbox"/>	<input type="checkbox"/>			...
=	CustomerID	PII.CustomerIdentifier	<input type="checkbox"/>	<input type="checkbox"/>	('00000')		...
=	InvoiceNumber	TransactionInformation.[InvoiceIdentifier]	<input type="checkbox"/>	<input type="checkbox"/>	('UNKNOWN0')		...
=	TotalSalePrice	FinancialInformation.[Amount]	<input type="checkbox"/>	<input type="checkbox"/>	('0.00')		...
=	SaleDate	TransactionInformation.[EventDate]	<input type="checkbox"/>	<input type="checkbox"/>	('1900-01-01')		...
=	ReviewRowStatus	ELTInformation.[ReviewRow]	<input type="checkbox"/>	<input type="checkbox"/>	((0))		...

**Schema**

SalesData

Description

System Versioning

Memory Optimized

**SalesData**

**Description**

**System Versioning**

**Memory Optimized**

---

### Scripts

```
1 CREATE TABLE [SalesData].[Sales] (
2     [SalesID] [TransactionInformation].[SalesIdentifier] NOT NULL,
3     [CustomerID] [PII].[CustomerIdentifier] CONSTRAINT [DF_SalesNew_CustomerID] DEFAULT ('00000') NOT NULL,
4     [InvoiceNumber] [TransactionInformation].[InvoiceIdentifier] CONSTRAINT [DF_SalesNew_InvoiceNumber] DEFAULT ('UNKNOWN0') NOT NULL,
5     [TotalSalePrice] [FinancialInformation].[Amount] CONSTRAINT [DF_SalesNew_TotalSalesPrice] DEFAULT ('0.00') NOT NULL,
6     [SaleDate] [TransactionInformation].[EventDate] CONSTRAINT [DF_SalesNew_SaleDate] DEFAULT ('1900-01-01') NOT NULL,
7     [ReviewRowStatus] [ELTInformation].[ReviewRow] CONSTRAINT [DF_SalesNew_ReviewRow] DEFAULT ((0)) NOT NULL,
8     CONSTRAINT [PK_Sales_New] PRIMARY KEY CLUSTERED ([SalesID] ASC),
9     CONSTRAINT [CHK_SalesNew_TotalSalePrice] CHECK ([TotalSalePrice]>=(0))
10 );
```

# SalesDetail

Move	Name	Type	Primary Key	Allow Nulls	Default Value	Remove	More Actions
==	SalesDetailsID	TransactionInformation.[SalesDetailsIdentifier]	<input checked="" type="checkbox"/>	<input type="checkbox"/>			...
==	SalesID	TransactionInformation.[SalesIdentifier]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	((0))		...
==	LineItemNumber	TransactionInformation.[LineNumber]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	((0))		...
==	StockID	InventoryInformation.[StockCode]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	('Unknown')		...
==	SalePrice	FinancialInformation.[Amount]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	((0))		...
==	LineItemDiscount	FinancialInformation.[Amount]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	((0))		...
==	ReviewRowStatus	ELTInformation.ReviewRowType	<input type="checkbox"/>	<input checked="" type="checkbox"/>	((0))		...

Schema
Description
<b>System Versionin</b>
System Versioning
<b>Memory Optimiz</b>
Memory Optimized

## Scripts

```
1 CREATE TABLE [OperationsManagement].[SalesDetails] (
2     [SalesDetailsID] [TransactionInformation].[SalesDetailsIdentifier] NOT NULL,
3     [SalesID] [TransactionInformation].[SalesIdentifier] CONSTRAINT [DF_SalesID] DEFAULT ((0)) NULL,
4     [LineItemNumber] [TransactionInformation].[LineNumber] CONSTRAINT [DF_LineItemNumber] DEFAULT ((0)) NULL,
5     [StockID] [InventoryInformation].[StockCode] CONSTRAINT [DF_StockID] DEFAULT ('Unknown') NULL,
6     [SalePrice] [FinancialInformation].[Amount] CONSTRAINT [DF_SalePrice] DEFAULT ((0)) NULL,
7     [LineItemDiscount] [FinancialInformation].[Amount] CONSTRAINT [DF_LineItemDiscount] DEFAULT ((0)) NULL,
8     [ReviewRowStatus] [ELTInformation].[ReviewRowType] CONSTRAINT [DF_ReviewRow] DEFAULT ((0)) NULL,
9     CONSTRAINT [PK_SalesDetails] PRIMARY KEY CLUSTERED ([SalesDetailsID] ASC),
10    CONSTRAINT [CHK_LineItemDiscount] CHECK ([LineItemDiscount]>=(0)),
11    CONSTRAINT [CHK_SalePrice] CHECK ([SalePrice]>=(0))
12 );
```

# Stock

## Scripts

```
1 CREATE TABLE [OperationsManagement].[Stock] (
2     [StockCode] [VehicleInformation].[StockCode] NOT NULL,
3     [ModelID] [VehicleInformation].[ModelID] CONSTRAINT [DF_Stock_Model] DEFAULT (-1) NOT NULL,
4     [Cost] [FinancialInformation].[Amount] CONSTRAINT [DF_Stock_Cost] DEFAULT (0.00) NOT NULL,
5     [RepairsCost] [FinancialInformation].[Amount] CONSTRAINT [DF_Stock_RepairsCost] DEFAULT (0.00) NOT NULL,
6     [PartsCost] [FinancialInformation].[Amount] CONSTRAINT [DF_Stock_PartsCost] DEFAULT (0.00) NOT NULL,
7     [TransportInCost] [FinancialInformation].[Amount] CONSTRAINT [DF_Stock_TransportInCost] DEFAULT (0.00) NOT NULL,
8     [IsRHD] [PII].[BooleanFlag] CONSTRAINT [DF_Stock_IsRHD] DEFAULT (0) NOT NULL,
9     [Color] [VehicleInformation].[Color] CONSTRAINT [DF_Stock_Color] DEFAULT ('Unknown') NOT NULL,
10    [BuyerComments] [VehicleInformation].[BuyerComments] CONSTRAINT [DF_Stock_BuyerComments] DEFAULT ('No Comment') NOT NULL,
11    [DateBought] DATE CONSTRAINT [DF_Stock_DateBought] DEFAULT ('1900-01-01') NOT NULL,
12    [TimeBought] TIME (7) CONSTRAINT [DF_Stock_TimeBought] DEFAULT ('00:00:00') NOT NULL,
13    [ReviewRow] [ELTInformation].[ReviewRow] CONSTRAINT [DF_Stock_ReviewRow] DEFAULT (0) NOT NULL,
14    CONSTRAINT [PK_Stock] PRIMARY KEY CLUSTERED ([StockCode] ASC),
15    CONSTRAINT [CHK_Stock_Cost] CHECK ([Cost]>=(0)),
16    CONSTRAINT [CHK_Stock_IsRHD] CHECK ([IsRHD]=(1) OR [IsRHD]=(0)),
17    CONSTRAINT [CHK_Stock_PartsCost] CHECK ([PartsCost]>=(0)),
18    CONSTRAINT [CHK_Stock_RepairsCost] CHECK ([RepairsCost]>=(0)),
19    CONSTRAINT [CHK_Stock_TransportInCost] CHECK ([TransportInCost]>=(0))
20 );
21
22
```

# Country

Move	Name	Type	Primary Key	Allow Nulls	Default Value	Remove	More Actions	Description
=	CountryName	ReferenceInformation.CountryName	<input type="checkbox"/>	<input type="checkbox"/>	('Unknown')		...	System Versioning
=	CountryISO2	ReferenceInformation.CountryISO2	<input type="checkbox"/>	<input type="checkbox"/>	('XX')		...	System Versioning
=	CountryISO3	ReferenceInformation.CountryISO3	<input type="checkbox"/>	<input type="checkbox"/>	('XXX')		...	Memory Optimized
=	SalesRegion	ReferenceInformation.SalesRegion	<input type="checkbox"/>	<input type="checkbox"/>	('Unknown')		...	Memory Optimized
=	CountryFlag	ReferenceInformation.CountryFlag	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(NULL)		...	Memory Optimized
=	FlagFileName	ReferenceInformation.FlagFileName	<input type="checkbox"/>	<input checked="" type="checkbox"/>	('Unknown')		...	Memory Optimized
=	FlagFileType	ReferenceInformation.FlagFileType	<input type="checkbox"/>	<input checked="" type="checkbox"/>	('UNK')		...	Memory Optimized
=	ReviewRowStatus	ELTInformation.ReviewRowStatus	<input type="checkbox"/>	<input type="checkbox"/>	((0))		...	Memory Optimized

## Scripts

```
1 CREATE TABLE [ReferenceData].[Country] (
2     [CountryName] [ReferenceInformation].[CountryName] CONSTRAINT [DF_Country_CountryName] DEFAULT ('Unknown') NOT NULL,
3     [CountryISO2] [ReferenceInformation].[CountryISO2] CONSTRAINT [DF_Country_ISO2] DEFAULT ('XX') NOT NULL,
4     [CountryISO3] [ReferenceInformation].[CountryISO3] CONSTRAINT [DF_Country_ISO3] DEFAULT ('XXX') NOT NULL,
5     [SalesRegion] [ReferenceInformation].[SalesRegion] CONSTRAINT [DF_Country_SalesRegion] DEFAULT ('Unknown') NOT NULL,
6     [CountryFlag] [ReferenceInformation].[CountryFlag] CONSTRAINT [DF_Country_CountryFlag] DEFAULT (NULL) NULL,
7     [FlagFileName] [ReferenceInformation].[FlagFileName] CONSTRAINT [DF_Country_FlagFileName] DEFAULT ('Unknown') NULL,
8     [FlagFileType] [ReferenceInformation].[FlagFileType] CONSTRAINT [DF_Country_FlagFileType] DEFAULT ('UNK') NULL,
9     [ReviewRowStatus] [ELTInformation].[ReviewRow] CONSTRAINT [DF_Country_ReviewRow] DEFAULT ((0)) NOT NULL
10 );
11
```

# Pivot Table

Move	Name	Type	Primary Key	Allow Nulls	Default Value	Remove	More Actions
=	Color	VehicleInformation.[Color]	<input checked="" type="checkbox"/>	<input type="checkbox"/>	('Unknown')		...
=	SalesYear	char(4)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	('0000')		...
=	TotalAmount	FinancialInformation.[Amount]	<input type="checkbox"/>	<input type="checkbox"/>	((0.00))		...
=	ReviewRowStatus	ELTInformation.ReviewRowType	<input type="checkbox"/>	<input type="checkbox"/>	((0))		...

Columns

Description
System Versioning
System Versioning
Memory Optimized
Memory Optimized

Scripts

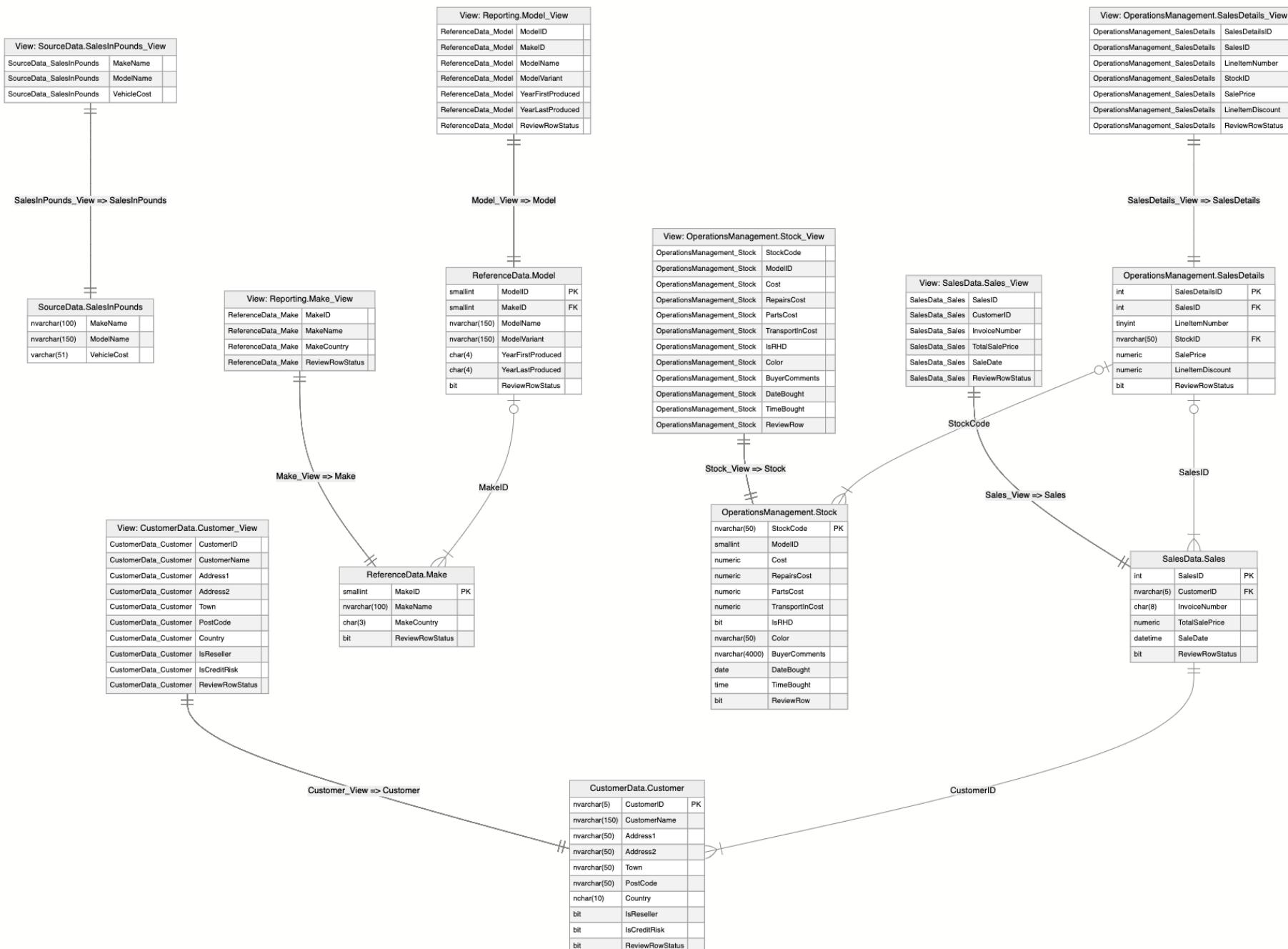
```
1 CREATE TABLE [OperationsManagement].[ColorYearSales] (
2     [Color] ..... [VehicleInformation].[Color] ..... CONSTRAINT [DF_ColorYearSales_Color] DEFAULT ('Unknown') NOT NULL,
3     [SalesYear] ..... CHAR (4) ..... CONSTRAINT [DF_ColorYearSales_Year] DEFAULT ('0000') NOT NULL,
4     [TotalAmount] ..... [FinancialInformation].[Amount] ..... CONSTRAINT [DF_ColorYearSales_Amount] DEFAULT ((0.00)) NOT NULL,
5     [ReviewRowStatus] ..... [ELTInformation].[ReviewRowType] ..... CONSTRAINT [DF_ColorYearSales_ReviewRowStatus] DEFAULT ((0)) NOT NULL,
6     CONSTRAINT [PK_ColorYearSales] PRIMARY KEY CLUSTERED ([Color] ASC, [SalesYear] ASC),
7     CONSTRAINT [CHK_ColorYearSales_Amount] CHECK ([TotalAmount]>=(0))
8 );
9
10
```

# CustomerData.Customer

Move	Name	Type	Primary Key	Allow Nulls	Default Value	Remove	More Actions
=	CustomerID	Pii.Identification	<input checked="" type="checkbox"/>	<input type="checkbox"/>			...
=	CustomerName	PersonInformation...	<input type="checkbox"/>	<input checked="" type="checkbox"/>	('Unknown')		...
=	Address1	PersonInformation...	<input type="checkbox"/>	<input checked="" type="checkbox"/>	('Unknown')		...
=	Address2	PersonInformation...	<input type="checkbox"/>	<input checked="" type="checkbox"/>	('Unknown')		...
=	Town	PersonInformation...	<input type="checkbox"/>	<input checked="" type="checkbox"/>	('Unknown')		...
=	PostCode	PersonInformation...	<input type="checkbox"/>	<input checked="" type="checkbox"/>	('Unknown')		...
=	Country	PersonInformation...	<input type="checkbox"/>	<input checked="" type="checkbox"/>	('TBA')		...
=	IsReseller	Pii.BooleanFlag	<input type="checkbox"/>	<input checked="" type="checkbox"/>	((0))		...
=	IsCreditRisk	Pii.BooleanFlag	<input type="checkbox"/>	<input checked="" type="checkbox"/>	((0))		...
=	ReviewRowStatus	ELTInformation.Re...	<input type="checkbox"/>	<input checked="" type="checkbox"/>	((0))		...

**Scripts**

```
1 CREATE TABLE [CustomerData].[Customer] (
2     [CustomerID] [Pii].Identification NOT NULL,
3     [CustomerName] [PersonInformation].[FullName] CONSTRAINT [DF_CustomerName] DEFAULT ('Unknown') NULL,
4     [Address1] [PersonInformation].[Address] CONSTRAINT [DF_Address1] DEFAULT ('Unknown') NULL,
5     [Address2] [PersonInformation].[Address] CONSTRAINT [DF_Address2] DEFAULT ('Unknown') NULL,
6     [Town] [PersonInformation].[Address] CONSTRAINT [DF_Town] DEFAULT ('Unknown') NULL,
7     [PostCode] [PersonInformation].[Address] CONSTRAINT [DF_PostCode] DEFAULT ('Unknown') NULL,
8     [Country] [PersonInformation].[Country] CONSTRAINT [DF_Country] DEFAULT ('TBA') NULL,
9     [IsReseller] [Pii].[BooleanFlag] CONSTRAINT [DF_IsReseller] DEFAULT ((0)) NULL,
10    [IsCreditRisk] [Pii].[BooleanFlag] CONSTRAINT [DF_IsCreditRisk] DEFAULT ((0)) NULL,
11    [ReviewRowStatus] [ELTInformation].[ReviewRow] DEFAULT ((0)) NULL,
12    CONSTRAINT [PK_Customer] PRIMARY KEY CLUSTERED ([CustomerID] ASC),
13    CONSTRAINT [CHK_IsCreditRisk] CHECK ([IsCreditRisk]=(1) OR [IsCreditRisk]=(0)),
14    CONSTRAINT [CHK_IsReseller] CHECK ([IsReseller]=(1) OR [IsReseller]=(0))
15 );
```



# Conclusion

---

- We refactored and normalized the PrestigeCars database using taxonomy
- Implemented UDTs FQDs and FQTNs to inject business meaning into the schema
- Eliminated nulls to enforce 2-value predicate logic
- Implemented ReviewRow for ELT data quality tracking
- Produced an ERD showing cross system alignment through shared UDTs
- We ended up with a taxonomized, normalized, and standardized version of PrestigeCars.