Database Answers

Enterprise Data Modelling by Example

Barry Williams
1. Welcome

1.1 Introduction
This is a collection of Essays on Best Practice in Data Management.

Data Management is like a ‘Slowly-Changing Dimension’

It changes imperceptibly and then after about a year (on the average) you realize that the landscape has changed.

Our intention in this book is to capture and define Best Practice at a particular point in time and then keep it up-to-date with new versions of the Book every quarter.

1.2 The Approach
Use Horizontal Subject Areas as Design Patterns.

These provide generic solutions to commonly occurring situations.

Use the Canonical Data Model as an Event-oriented technique and apply it incrementally.
In each Chapter, we follow our Best **Practice sequence of** Steps.

After reviewing our ten EDMs and completing our ten Chapters, we are in a good position to review the results and determine whether we have validated our Approach, or whether it needs to be modified in some way.

The Steps are as follows:

- **Step 1.** Create a Statement of Business Objectives
- **Step 2.** Review the Enterprise Data Model
- **Step 3.** Adapt and incorporate Subject Area Models
- **Step 4.** Review Generic Data Mart
- **Step 5.** Validate the Canonical Data Model
- **Step 6.** Map to the Canonical Data Model
- **Step 7.** Review Source Documents
- **Step 8.** Create initial Information Catalogue.
2. Customer Services

2.1 Link
The material is shown on this page:-

- [http://www.databaseanswers.org/data_models/customers_and_services_generic/index.htm](http://www.databaseanswers.org/data_models/customers_and_services_generic/index.htm)

2.2 The Steps
Step 2. Review the Enterprise Data Model
Step 3. Review Subject Area Models

Customers –

- [http://www.databaseanswers.org/data_models/retail_customers/customers_area_model.htm](http://www.databaseanswers.org/data_models/retail_customers/customers_area_model.htm)
Step 4. Review Generic Data Mart

The Data Mart is published on this page:

- [http://www.databaseanswers.org/best_practice_road_map/customer_services_Data_Mart.htm](http://www.databaseanswers.org/best_practice_road_map/customer_services_Data_Mart.htm)
Step 6. Validate the Canonical Data Model

Step 7. Map to the Canonical Data Model

Step 8. Review Source Documents
Step 9. Create initial Information Catalogue.

3. Entertainment

3.1 Link
The material in this Chapter is shown on these pages of our Web Site :-

- http://www.databaseanswers.org/data_models/top_ten_data_models_entertainment.htm
3.2 The Steps
Step 2. Review the Enterprise Data Model

- [http://www.databaseanswers.org/data_models/entertainment_top_level/index.htm](http://www.databaseanswers.org/data_models/entertainment_top_level/index.htm)

![Diagram of the Enterprise Data Model](image-url)
Step 3. Adapt and incorporate Subject Area Models

- Circus - [http://www.databaseanswers.org/data_models/circus/index.htm](http://www.databaseanswers.org/data_models/circus/index.htm)
  This Model features in our downloadable e-Book entitled “Tourist Guide to London for Data Modellers”:
- Licences and Permits - [http://www.databaseanswers.org/data_models/licences_and_permits/index.htm](http://www.databaseanswers.org/data_models/licences_and_permits/index.htm)
- Making a Movie (for beginners) –
  - [http://www.databaseanswers.org/data_models/movie_making/making_a_movie4_beginners.htm](http://www.databaseanswers.org/data_models/movie_making/making_a_movie4_beginners.htm)
Step 4. Review Generic Data Mart

This Dimensional Model for a Clown Registry is appears on this page:

- [http://www.databaseanswers.org/best_practice_road_map/entertainment_Data_Mart.htm](http://www.databaseanswers.org/best_practice_road_map/entertainment_Data_Mart.htm)

Step 6. Validate the Canonical Data Model

Step 7. Map to the Canonical Data Model

Step 8. Review Source Documents

Step 9. Create initial Information Catalogue.
4. Gym Management

4.1 Link

The material in this Chapter is shown on this page of our Web Site:

- [http://www.databaseanswers.org/data_models/gym_management/index.htm](http://www.databaseanswers.org/data_models/gym_management/index.htm)

This Model is an excellent example of our Approach of having a Top-Level Model which contains Subject Areas, each with its own Model.

4.2 The Steps

Step 1. Create a Statement of Business Objectives

Our Specifications were provided in a question to our Web Site:

“We would please like a schema for or one that will fit the following example or one that you think could easily adjust to fit from your site to manage and maintain a gym membership, facilities and equipment e.g. weight lifting, swimming, boxing etc. covering the branches, facilities, staff, membership, suppliers, parts and repairs.”

Step 2. Review the Enterprise Data Model

This shows the current draft of the EDM:-
Step 3. Adapt and incorporate Subject Area Models

We have a number of Subject Area Data Models on our Web Site.

They are featured on this page :-

- [http://www.databaseanswers.org/data_models/subject_area_data_models.htm](http://www.databaseanswers.org/data_models/subject_area_data_models.htm)

Here are the ones that are appropriate to Gym Management :-

- Classes - [Workout Programmes](http://www.databaseanswers.org/data_models/subject_area_data_models.htm)
- Equipment - Maintenance and Repairs
- Facilities - Subject Area
- Members - Invoices and Payments and Personal Training
- Staff - Movements and Museums
- Suppliers - Procurement
Step 4. Review Generic Data Mart

This Dimensional Model is shown on this page:

- [http://www.databaseanswers.org/data_models/gym_training_diary/data_mart.htm](http://www.databaseanswers.org/data_models/gym_training_diary/data_mart.htm)

Step 6. Validate the Canonical Data Model

Step 7. Map to the Canonical Data Model

Step 8. Review Source Documents

Step 9. Create initial Information Catalogue.
5. Insurance

5.1 Link
This material is available on this page of our Web Site:


5.2 The Steps
Step 1. Create a Statement of Business Objectives

We start by agreeing a Statement of Business Objectives to establish the scope of the Enterprise

Step 2. Review the Enterprise Data Model

This EDM is on the page quoted above:

![Data Warehouse Diagram]

- Customers
- Types of Policies
- Customers Policies
- Car, Home and Life
- Marine
- Customers, Claims and Payments
Step 3. Adapt and incorporate Subject Area Models

We have also created Data Models for these **Subject Areas**:

- Customers, Claims and Brokers
- Personal Insurance, Claims and Payments
- Types of Insurance - Car, Home and Life
- Types of Insurance - Marine and Motor Vehicles

Step 4. Review Generic Data Mart

Step 6. Validate the Canonical Data Model

Step 7. Map to the Canonical Data Model

Step 8. Review Source Documents

Step 9. Create initial Information Catalogue.
6. **Investment Banking**

6.1 **Link**
This material is available on this page of our Web Site:

- [http://www.databaseanswers.org/data_models/enterprise_data_model_for_investment_banks/marketing_pack_for_investment_banking.htm](http://www.databaseanswers.org/data_models/enterprise_data_model_for_investment_banks/marketing_pack_for_investment_banking.htm)

6.2 **The Steps**
The results of applying the Steps are as follows:

**Step 1. Create a Statement of Business Objectives**

We start by agreeing a Statement of Business Objectives to establish the scope of the Enterprise Data Model.

Once we have agreed the Statement of Business Objectives we can create a draft Top-Level Model with associated Subject Areas, each of which is shown in its own Model.

This is an example of a Statement of Business Objectives for an Investment Bank:

"Our Business objectives are to offer a range of Services to Clients, which can be either organizations or High-Net-Worth Individuals. These Services will involve completing Deals for our Clients in which our Staff will participate with the purpose of achieving acceptable returns on investment. Brokers may participate in these Deals, which will all be completed by Settlements. Deals may involve multiple Currencies and incur subsequent Transactions, such as adjustments.

The Enterprise Data Model will establish the data available for a Data Warehouse to meet Business Intelligence requirements."
Step 2. Review the Enterprise Data Model

After we have agreed the Statement of Business Objectives with the business we can review our Enterprise Data Model. This will establish the data available for Data Marts to meet Business Intelligence requirements.

We can adopt an approach geared to a Product Lifecycle (Buy and Sell) or to a Customer (Engage, Service, Disengage) or KPI-related, or some combination of these.

Step 3. Adapt and incorporate Subject Area Models

We have also created Data Models for these Subject Areas:

- Accounts
- Brokers
- Customers/Clients
- Deals
- Deals FX
- Deals (General)
- Financial Products
- FpML Products
- FpML Products Data Model
Step 4. Review Generic Data Mart

This is :-

- Key Performance Indicator (KPI)
- Settlements
- Staff
- Transactions
- Other Subject Areas
For Investment Banking, we have also created this Data Mart for a KPI which monitors Total Settlements Amounts by Currencies. :-

Step 5. Validate the Canonical Data Model

![Data Mart Diagram]

![Canonical Data Model Diagram]
Step 7. Map to the Canonical Data Model

This is an example of mapping to the Canonical Data Model.

Step 8. Review Source Documents

This is an example of a Client Asset Holding Weekly Report.
Step 9. Create initial Information Catalogue.

This is an example of an Operational Data Store that shows the data in a typical Source Document.

We can use this to create our initial Information Catalogue.
7. Law Enforcement

7.1 Link
The material in this Chapter appears on this page :-

- [http://www.databaseanswers.org/data_models/top_ten_data_models_law_enforcement.htm](http://www.databaseanswers.org/data_models/top_ten_data_models_law_enforcement.htm)

7.2 The Steps
We also have a Tutorial for MDM in Law Enforcement :-

- [http://www.databaseanswers.org/tutorial4_mdm_in_law_enforcement/index.htm](http://www.databaseanswers.org/tutorial4_mdm_in_law_enforcement/index.htm)

The Steps are as follows :-

Step 1. Create a Statement of Business Objectives

Step 2. Review the Enterprise Data Model
The Police Generalised Data Model :-


Also check out the associated Tutorial :-


Starts here :-

"The Area being Modelled is :-
A Generalised Database for any Police Service

Source material for this work was originally taken from the UK Pito Corporate Data Model

A. THE USER REQUIREMENTS :
A Generalised Database that will apply to any Police Force, anywhere in the world.

B. THE APPROACH :
The Approach was to start with the Generic Data Model for Organisations and People, and map the Police Force Database on to this Data Model.

Details of Entity Mappings are contained in this Table.
And ends here ****************

Step 3. Adapt and incorporate Subject Area Models

- Police Departments - http://www.databaseanswers.org/data_models/police_departments/index.htm

Step 4. Review Generic Data Mart

This is a Data Mart for Traffic Cops and Tickets :-}
Step 6. Validate the Canonical Data Model

Step 7. Map to the Canonical Data Model

Step 8. Review Source Documents

Step 9. Create initial Information Catalogue.

8. Local Government

8.1 Link
The material in this Chapter appears on this page:


8.2 The Steps
Step 2. Review the Enterprise Data Model

This Model is on this page:
Step 3. Adapt and incorporate Subject Area Models

We have also created Data Models for these **Subject Areas**:

- Children's Attainments
- Citizens
- Citizens and Addresses
- Services
- Customers and Services
- Education Services
- Housing Services

Step 4. Review Generic Data Mart

This Model needs replacing.
9. Logistics

9.1 Link
The material in this Chapter appears on this page :-


9.2 The Steps
The Steps are as follows :-

Step 1. Create a Statement of Business Objectives
Step 2. Review the Enterprise Data Model
Step 3. Adapt and incorporate Subject Area Models
Step 4. Review Generic Data Mart
Step 6. Validate the Canonical Data Model
Step 7. Map to the Canonical Data Model
Step 8. Review Source Documents
Step 9. Create initial Information Catalogue.
Step 2. Review the Enterprise Data Model

This Data Model is available on this page:

Step 3. Adapt and incorporate Subject Area Models

Step 4. Review Generic Data Mart

This Data Mart has been named according to the style recommended by Pragmatic Works where Dimension and Fact Tables are named appropriately.
10. Postal Services

10.1 Link

The material in this Chapter appears on this page :-

- http://www.databaseanswers.org/data_models/postal_services/index.htm

10.2 The Steps.

Step 1. Create a Statement of Business Objectives

Our main sources of information is the TNT Post Web Site.

We find that one of the Services they offer is Tracking

Our first thought as outsiders who have sent and received post is that the business delivers letters, packages and parcels to an Address for a fee.

We decide to call these Things of Interest ‘Deliverables’.

We look for some kind of "Business Mission Statement" that can help us to derive a Top-Level view of the business.

We find this statement on the Web Site :-
"TNT Post is the Royal Mail's number one challenger for business mail of all kinds.

Whether we're handling your letters, packets and parcels or successfully managing your unaddressed doordrop strategy, you'll find we're straight-talking people who get the job done.

Our can-do approach and our focus on efficiency make us different, saving you time and money. We provide a high quality, full service concept for all your business mail and distribution needs. Our portfolio is designed to deliver what you want. We are confident that we can meet your postal service requirements and exceed your expectations, whatever the scale and scope of your enterprise.”

On the Web Site, we see an option for Customers to register Complaints.

We decide to model that as a more general Feedback facility, to include Compliments and Suggestions.

At this point, we can say that the Things of Interest are :-

1. Contracts
2. Customers
3. Deliverables
4. Deliveries
5. Distribution Centres (the mail has to be stored somewhere)
The Organisation offers Services, which include:

1. Deliver items.
2. Receive Payments
3. Publish Schedules
4. Agree Contracts with Customers

At this point, we can create our first draft of the Top-Level Data Model. We will need to decide what our Subject Areas are going to be. Then we will need to review our first draft with the Review Committee of business users.

Finally, we define the Business Data Rules.

Now that we have defined the 'Things of Interest' we can establish how they are related. We call these the 'Business Data Rules' and then we review the with our Steering Group and modify them as required.

1. A Customer always signs one or more Contracts for Services.
2. Customers can post Deliverables in line with the terms of a Contract.
3. The Postal Company provides Services that deliver Deliverables according to the terms of a Contract.

**Step 4. Identify the Reference Data**
The Reference Data is important because it provides the Foundation for all the other Data.
Step 2. Create the first draft Enterprise Data Model

This is our first Version:

NOTE
The Deliverable Types are:
1) Door Drops, e-Commerce
2) Mail, Packets and Parcels
The following day, I reviewed the Web Site in more detail and here is my second Version :-

[Data Model Diagram]

Data Model for Postal Services - Version 2
Barry Williams
DatabaseAnswers.org
January 18th 2014
Step 3 : Incorporate Subject Area Models

Working from this second Version, I located some appropriate Subject Area Models in my Library :-

- [http://www.databaseanswers.org/data_models/subject_area_data_models.htm](http://www.databaseanswers.org/data_models/subject_area_data_models.htm)

Subject Areas are :-

- **Contracts**
- **Customers**
- **Customer and Addresses**
- **Deliveries (Schedules)**
- **Feedback**
- **Invoices and Payments**
- **Staff**
- **Vehicle Maintenance and Tracking**
Step 4. Create a Data Mart

We are now in a position where we can create design for the Data Mart:

Step 5. Validate the Canonical Data Model

Step 6. Map to the Canonical Data Model

Step 7. Review Source Documents

Step 8. Create initial Information Catalogue.
11. Retail Business

11.1 Link
The material in this Chapter appears on this page :-


11.2 The Steps.
Step 1. Create a Statement of Business Objectives

The Specifications are available for review.

We start by agreeing a Statement of Business Objectives to establish the scope of the Enterprise Data Model.

Once we have agreed the Statement of Business Objectives we can create a draft Top-Level Model with associated Subject Areas, each of which is shown in its own Model.

This is an example of a Statement of Business Objectives for a Retail organization :-
"Our Business objectives are to offer a wide range of affordable Products. We will control costs to achieve maximum profit potential from a wide range of affordable Products which are sourced on a 'just-in-time' basis tailored to our target market, with specific Customer profiles. The Enterprise Data Model will establish the data available for a Data Warehouse to meet Business Intelligence requirements."

This Data Model is a variation of the Retail Customers Model.

The Specifications are available for review.

We start by agreeing a Statement of Business Objectives to establish the scope of the Enterprise Data Model.

Once we have agreed the Statement of Business Objectives we can create a draft Top-Level Model with associated Subject Areas, each of which is shown in its own Model.

This is an example of a Statement of Business Objectives for a Retail organization :-
"Our Business objectives are to offer a wide range of affordable Products."
We will control costs to achieve maximum profit potential from a wide range of affordable Products which are sourced on a 'just-in-time' basis tailored to our target market, with specific Customer profiles. The Enterprise Data Model will establish the data available for a Data Warehouse to meet Business Intelligence requirements.

Step 2. Review the Enterprise Data Model

This EDM is a variation of the Retail Customers Model and appears on this page –


Step 3. Review the Subject Area Models

- Customers Subject Area
- Customers and Orders
- In-Store Shopping
- Online Shopping
- Order History
- Products Subject Area
- Products, Stores and Sales Subject Area
- Registered Users (with MDM Customer Master Index)
Step 4. Review Generic Data Mart


Step 6. Validate the Canonical Data Model

Step 7. Map to the Canonical Data Model

Step 8. Review Source Documents
12. Travel and Transport

12.1 Link
The material for this Chapter has been taken from this page on our Web Site which covers travel by Trains, Boats and Planes:


Additional material for specific modes of Travel appears on this page:

- http://www.databaseanswers.org/data_models/top_ten_data_models_transport_and_travel.htm

12.2 The Steps.
There are three sections in this Chapter:

- Air Travel
- Shipping
- Train Travel

The Steps are as follows:

Step 1. Create a Statement of Business Objectives
Step 2. Review the Enterprise Data Model

This shows the current state of our Third-Normal Form Data Model: -
12.2.1 Air Travel
Step 3. Adapt and incorporate Subject Area Models

3.1 Subject Area for Air Travel

This Model appears on this page for an Enterprise Data Model for Air Travel:

3.1.1 Detailed Subject Area for Air Travel

We have also created Data Models for these **Subject Areas** :-

- Aircraft Maintenance
- Airline Operations
- Airline Reservations
- Airport Management
- Passengers Online Bookings

Step 4. Review Generic Data Mart

Step 6. Validate the Canonical Data Model

Step 7. Map to the Canonical Data Model

Step 8. Review Source Documents

Step 9. Create initial Information Catalogue.
12.2.2 Shipping
You can download our short Discussion Paper on Enterprise Data Modelling for Container Shipping -


Step 3. Review the Subject Area Models for Shipping

12.2.2.1 Top-Level Model for Shipping

This Model appears on this page for the Top-Level Data Model for Container Shipping :


1.2.2.2.2 Subject Area Models for Shipping

- Containers -
  http://www.databaseanswers.org/data_models/container_shipping/subject_area_for_containers.htm

- Data Mart –
  - http://www.databaseanswers.org/data_models/container_shipping/data_mart.htm
12.2.3 Train Travel
Step 3. Adapt and incorporate Subject Area Models

3.1 Subject Area for Train Travel

- Public Transport
- Data Mart for Public Transport
- Railway Reservations
  - [http://www.databaseanswers.org/data_models/railway_reservations/index.htm](http://www.databaseanswers.org/data_models/railway_reservations/index.htm)
- Train Systems
  - [http://www.databaseanswers.org/data_models/train_system_map/index.htm](http://www.databaseanswers.org/data_models/train_system_map/index.htm)
- Train Ticketing Systems
  - [http://www.databaseanswers.org/data_models/train_ticketing_systems/index.htm](http://www.databaseanswers.org/data_models/train_ticketing_systems/index.htm)

13. Wine

13.1 Link
The material in this Chapter appears on this page:


13.2 The Steps
Step 2. Review the Enterprise Data Model
Step 3. Review Subject Area Models

We have created Data Models for these **Subject Areas**:
These Models have been combined in the Enterprise Data Model.

- **Wine Cellars**
- **Wine Food and Merchants**
- **Wine Food and Pairings**
- **Wine Lists**

Link to Wine Cellars Data Model:

- [http://www.databaseanswers.org/data_models/wine_cellars/index.htm](http://www.databaseanswers.org/data_models/wine_cellars/index.htm)
Wine, Food and Merchants:

- [http://www.databaseanswers.org/data_models/wine_food_and_merchants/index.htm](http://www.databaseanswers.org/data_models/wine_food_and_merchants/index.htm)
Wine, Food and Pairings:

- [http://www.databaseanswers.org/data_models/wine_food_and_pairings/index.htm](http://www.databaseanswers.org/data_models/wine_food_and_pairings/index.htm)
Wine Lists :-


Step 4. Review Generic Data Mart

Step 5. Validate the Canonical Data Model

Step 6. Map to the Canonical Data Model

Step 7. Review Source Documents

Step 8. Create initial Information Catalogue
Appendix A. Cloud Migration
This Approach to Enterprise Data Modelling can provide a very powerful technique for migrating to a Data Architecture that incorporates Cloud features.

This page shows the appropriate Data Architecture:

- [http://www.databaseanswers.org/reference_data_architecture.htm](http://www.databaseanswers.org/reference_data_architecture.htm)

The Enterprise Data Model (EDM) is used for the Data Warehouse and Data Marts.

The Master and Reference Data will be in the Clouds And will form the foundation and will be compliant with the EDM.