6. Generic Data Models

6.0 Welcome

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6.1 Introduction

This Chapter will discuss a number of different Generic Data Models.

6.1.1 What is this ?

Generic Data Models are generalised solutions to problems that occur many times and perhaps in slightly different forms.

When we look around us, we can find many examples of the same situation occurring repeatedly.

A simple example is making a reservation or buying something, like a newspaper or a coffee.

6.1.2 Why is it important ?

Generic Data Models are very powerful because they cover a wide area of applications.

They expose the underlying structure of a specific area of application. This can be used to identify the common occurrences of Design Patterns and provide insight to a variety of solutions.

This Chapter includes a selection taken from this list on the Database Answers Web Site :-

a. Circus (Events & Players)
b. Customers and Services
c. Document Management
d. Father of All Models
e. Generic Foundation
f. Generic Me and My Life
g. Organisations and People
h. Organisations, People and Transactions
i. Organisations, Members & Meetings

j. Patient Care
k. Reservations
l. Shrek 2 Movie (Events & Places)
m. Transport
n. User-defined Hierarchies

6.1.3 What will I Learn ?

You will learn how to quickly recognise and understand situations similar to ones that you have already encountered and for which you have a solution in your head – in other words, a Generic Data Model.

6.2 Circus

This Model is a very interesting example of a generic Model involving Customers, Events and People.

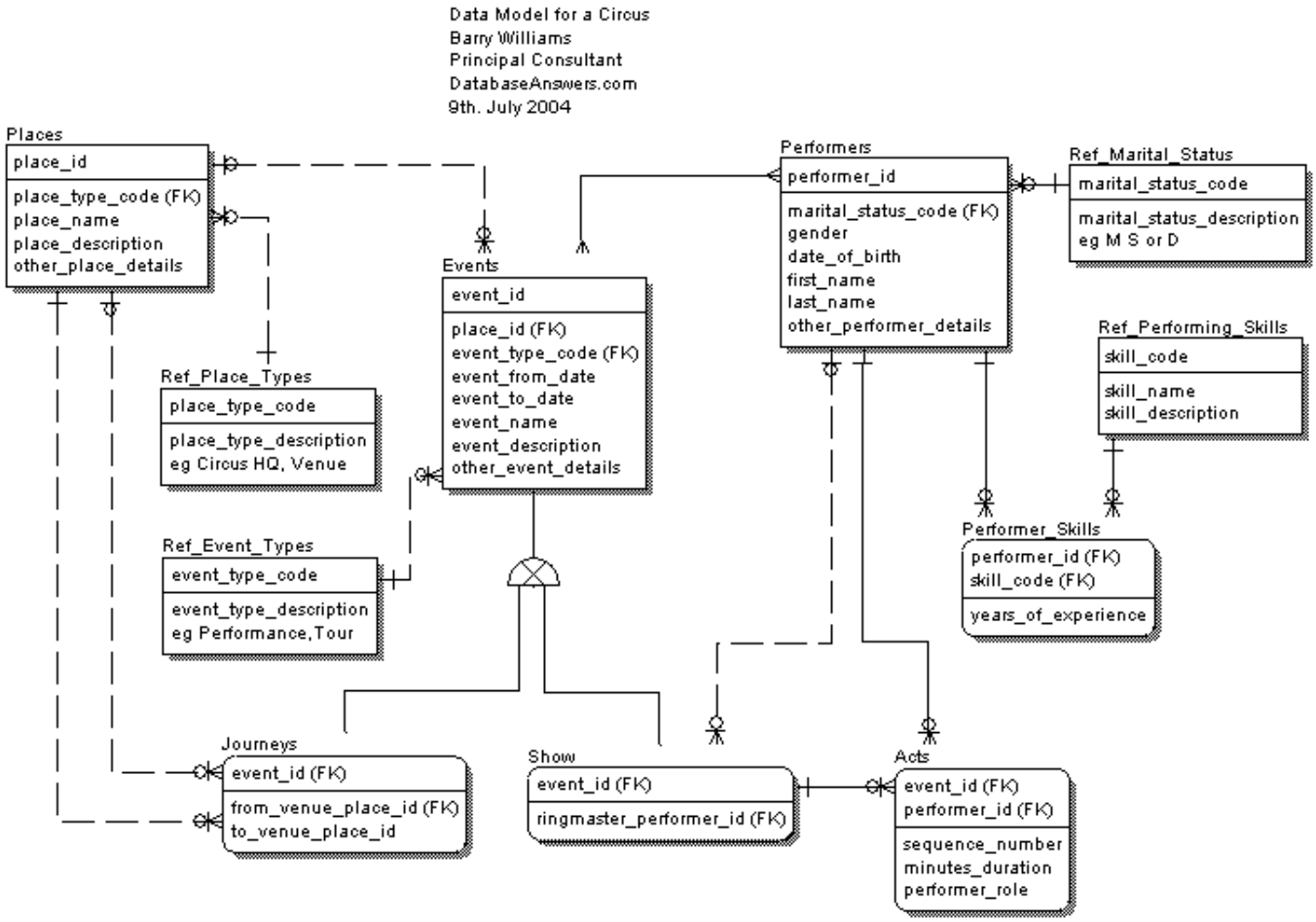
In this case, of course, the People are Performers.

The Model centres on Events and performers.

There is a Many-to-Many Relationship between them.

Other Relationship Rules that we can see include :-

- A Performer can have one or many Skills
- There is a defined list of Skills
- An Event takes place at a specified or unspecified Place.
- An Event is a 'Super-Type' and has Journeys and Sows as Sub-Types.


Data Model for a Circus
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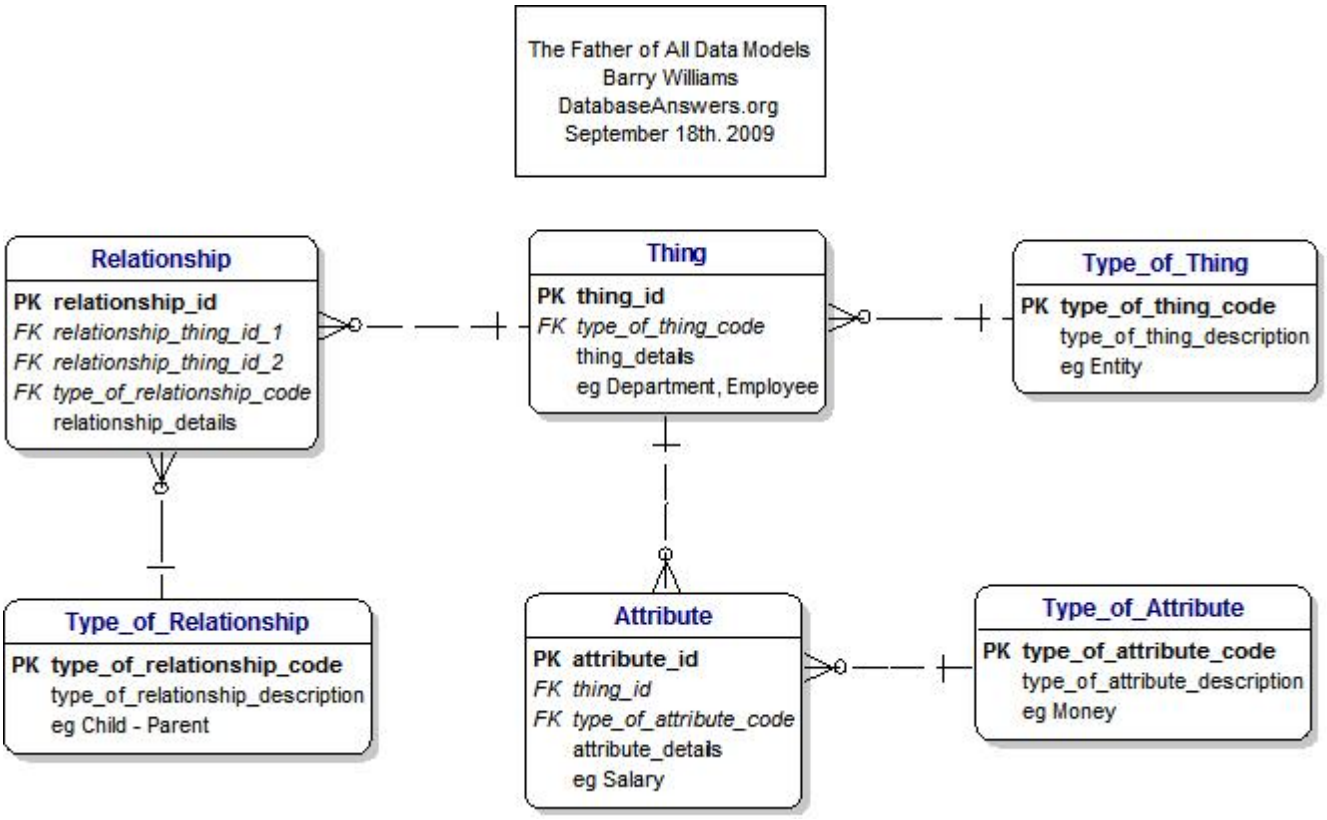
Places
place_id
place_type_code (FK)
place_name
place_description
other_place_details
Performers
performer_id
marital_status_code (FK)
gender
date_of_birth
first_name
last_name
other_performer_details
Ref_Marital_Status
marital_status_code
marital_status_description
eg M S or D
Events
event_id
place_id (FK)
event_type_code (FK)
event_from_date
event_to_date
event_name
event_description
other_event_details
Ref_Performing_Skills
skill_code
skill_name
skill_description
Ref_Place_Types
place_type_code
place_type_description
eg Circus HQ, Venue
Performer_Skills
performer_id (FK)
skill_code (FK)
years_of_experience
Ref_Event_Types
event_type_code
event_type_description
eg Performance,Tour
Journeys
event_id (FK)
from_venue_place_id (FK)
to_venue_place_id
Show
event_id (FK)
ringmaster_performer_id (FK)
Acts
event_id (FK)
performer_id (FK)
sequence_number
minutes_duration
performer_role

6.3 Father of all Data Models

This is a wonderful Data Model that shows a design for a foundation for all other Data Models that can possibly be created.

This could be considered to be a variation of the "Entity-Attribute-Value" Approach and Wikipedia has a useful entry -

- http://en.wikipedia.org/wiki/Entity-attribute-value_model



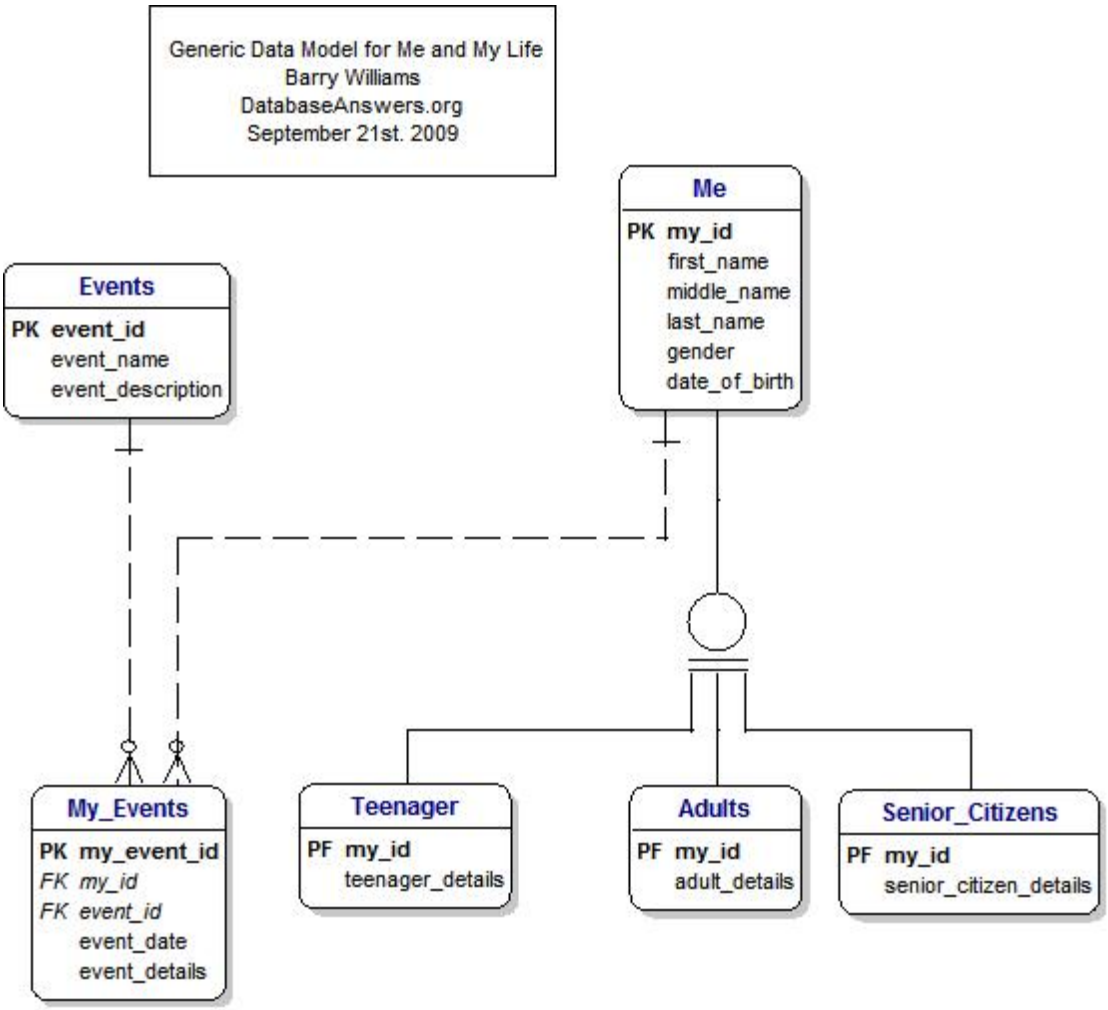
6.4 Me and Events in my Life

Generic and Specific Data Models are very important because they illustrate how a number of specific Data Models can be incorporated into one Generic Model.

In this case, the concept of a Life-Cycle from the Cradle to the Grave is used to generate Scenarios :-

1. Baby (Me and Mommy)
2. Teenager (Traffic Cops and Tickets
3. Student (Behaviour Monitoring)
4. Adult (Partnerships and Relationships)
5. Adult (Golf Club Tournament)
6. Senior Citizen (Health Centres)

Here is the Page :- http://www.databaseanswers.org/data_models/generic_and_specific_models/index.htm



6.5 Retail Customers

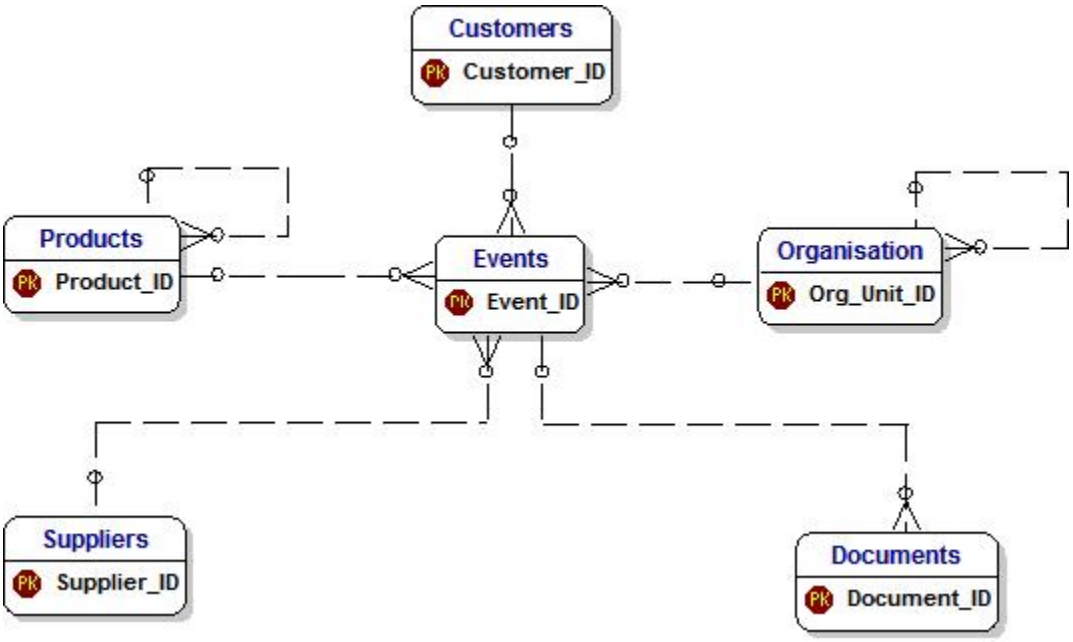
This Section provides a very powerful and broad set of Models that can be used as a foundation for a wide range of Generic applications.

It consists of a Top-Level 'overview' Data Model, with Subject Area Models for the Entities that appear in the Top Level Model.

6.5.1 Top-Level Model

This is the Top-Level Model and is shown on this page on my Database Answers Web Site :-

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



The following Sections contain a Data Model for each of the Entities in the Top-Level Model shown above.

You will see that the Subject Area Models all follow a similar Pattern :-

- Generic Entities
- ID fields for Primary Keys
- Codes for Reference Data

Following this simple pattern allows us to extend each Model and still maintain a basic common architecture.

Here are the Subject Area Models, listed alphabetically :--

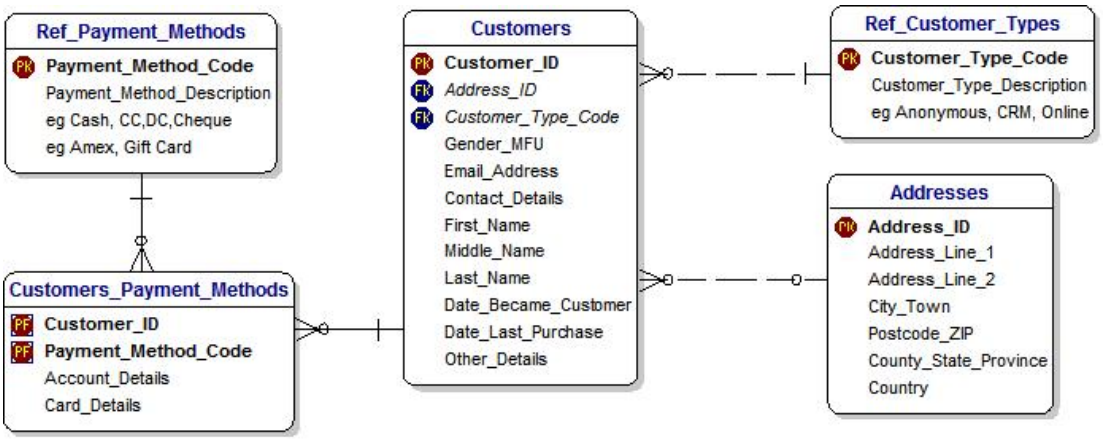
6.5.2 Customers

You can see that the dominant Entity is Customers, as you would expect.

Customers have only one Address so there is a Foreign Key for the Address ID in the Customers Entity.

Each Customer can have multiple Payment Methods, such as Cash, Cheque and so on.

This gives us a Many-to-Many Relationship between Customers and Payment Methods and we resolve this with an 'Associative Table' called 'Customer Payment Methods'.



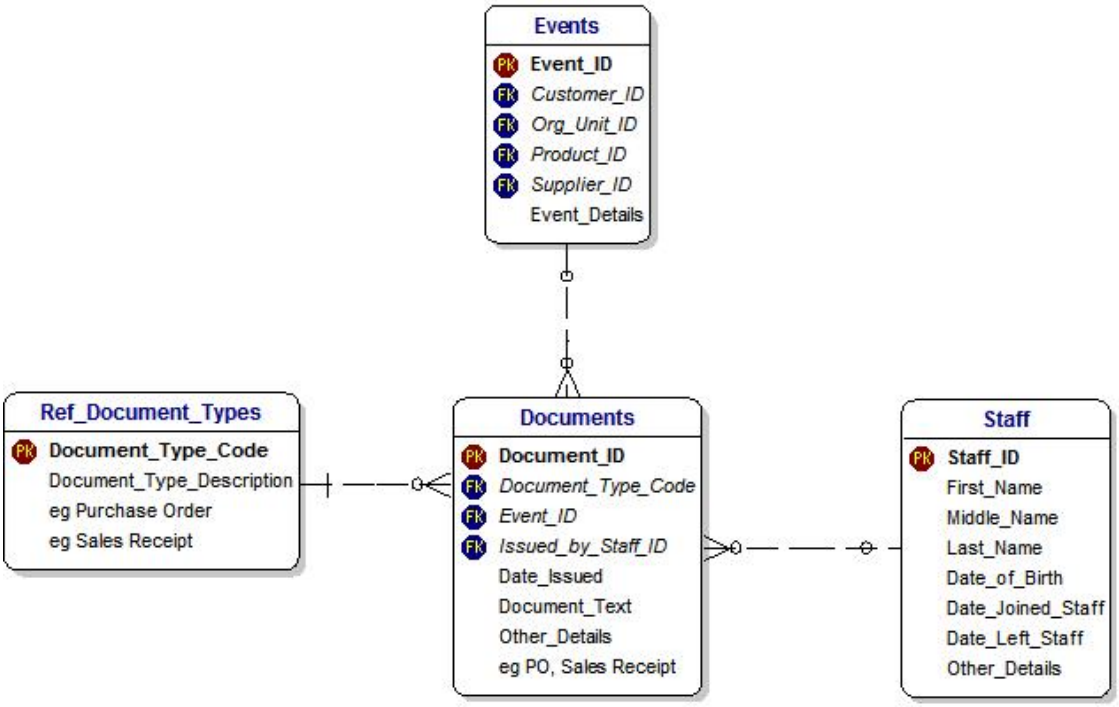
6.5.3 Documents

You can see that the dominant Entity is Documents, as you would expect.

This Model assumes that each Event creates at most one Document, and maybe not any.

Is also provides for a member of Staff to optionally issue a Document.

Documents can, of course, be of a predefined number of different types, such as Purchase Orders and Sales Receipts.



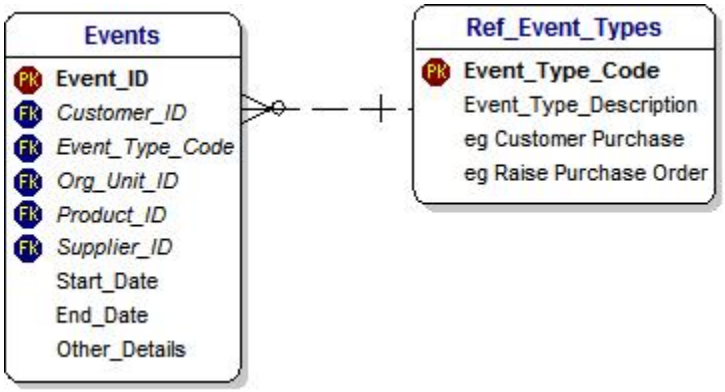
6.5.4 Events

You can see that the dominant Entity is Events, as you would expect.

This Model is very simple because we have not repeated the Entities which are shown in the Top-level Model.

Therefore, the only additional Entity that we show is for Event Types.

Typical Events would be Customers Purchases and raising Purchase Orders.

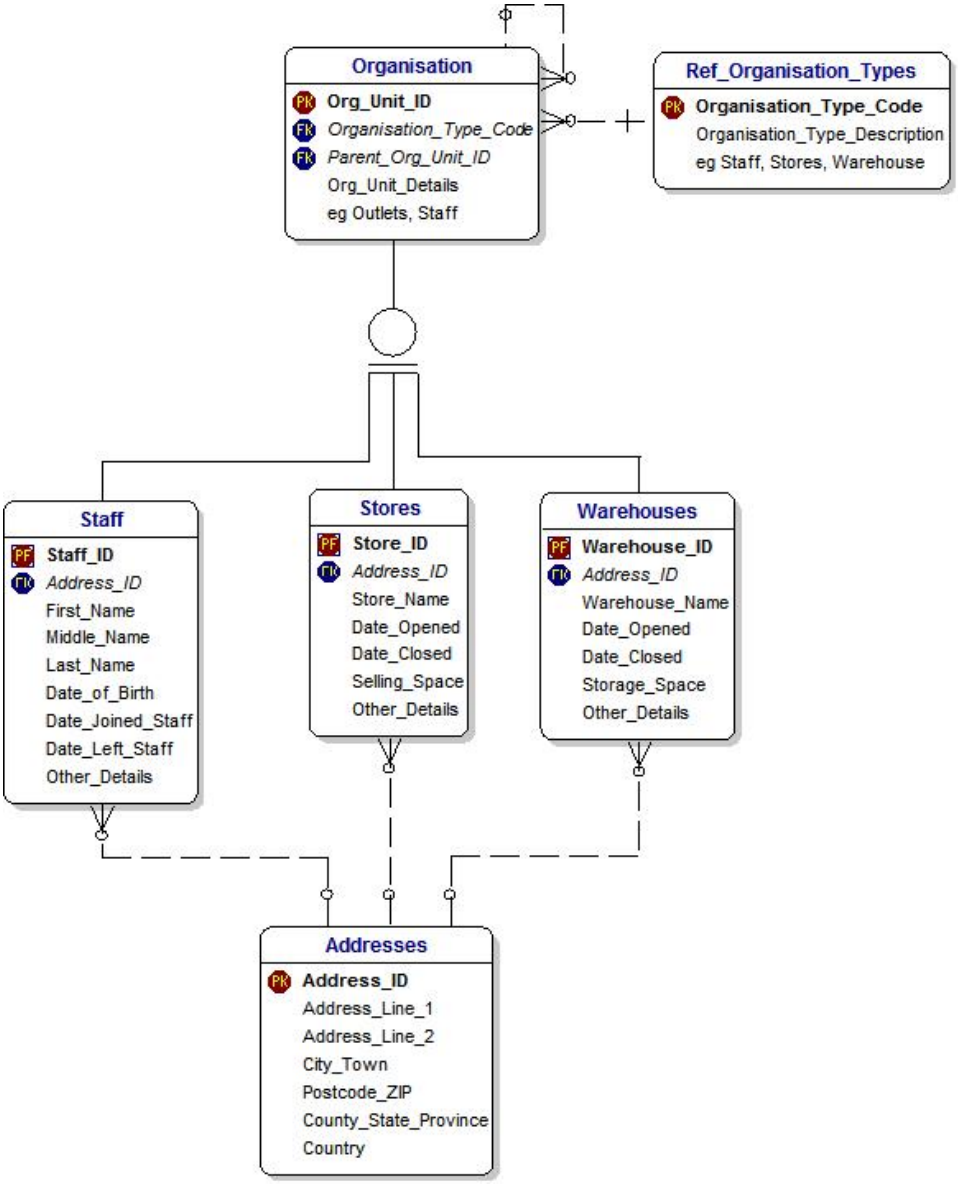


6.5.5 Organisation

Firstly, we see a familiar Pattern of Entity and Entity Data Types.

In this case, of course, it is Organisations and Organisation Types.

Then we introduce the concept of Inheritance because Staff, Stores and Warehouses are all different types of Organisation.



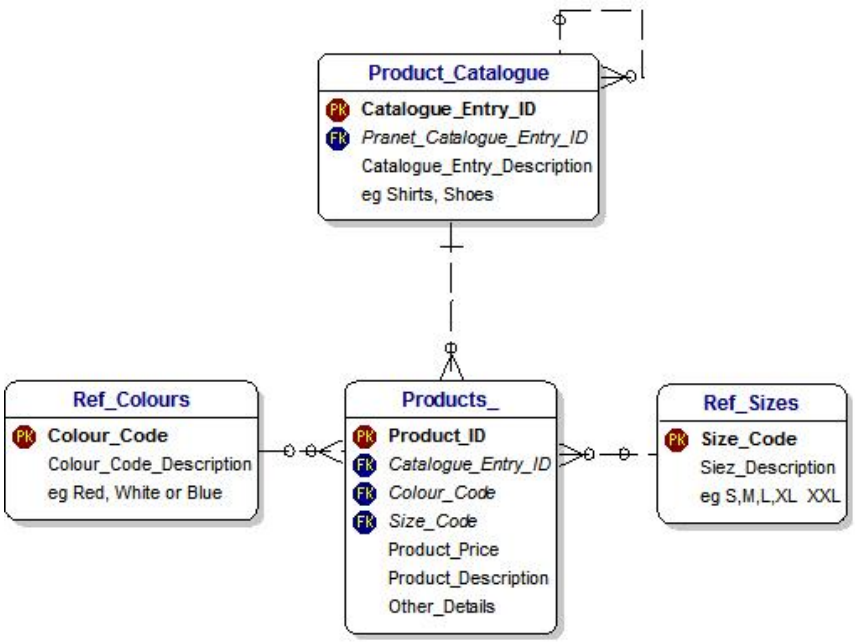
6.5.6 Products

You can see that the dominant Entity is Products, as you would expect.

It is interesting to see the 'Rabbits-Ear' or recursive relationship on the Product Catalogue Entity.

This is a very powerful technique which says 'An Entry in the Product Catalogue can be related to a Parent Entity'.

By using this simple technique, we are able to implement a hierarchy.



6.5.7 Suppliers

You can see that the dominant Entity is Suppliers, as you would expect.

We can see a familiar Pattern with a Suppliers Entity and associated Reference Data.

We can also see two Many-to-Many Relationships broken down into two One-to-Many Relationships :-

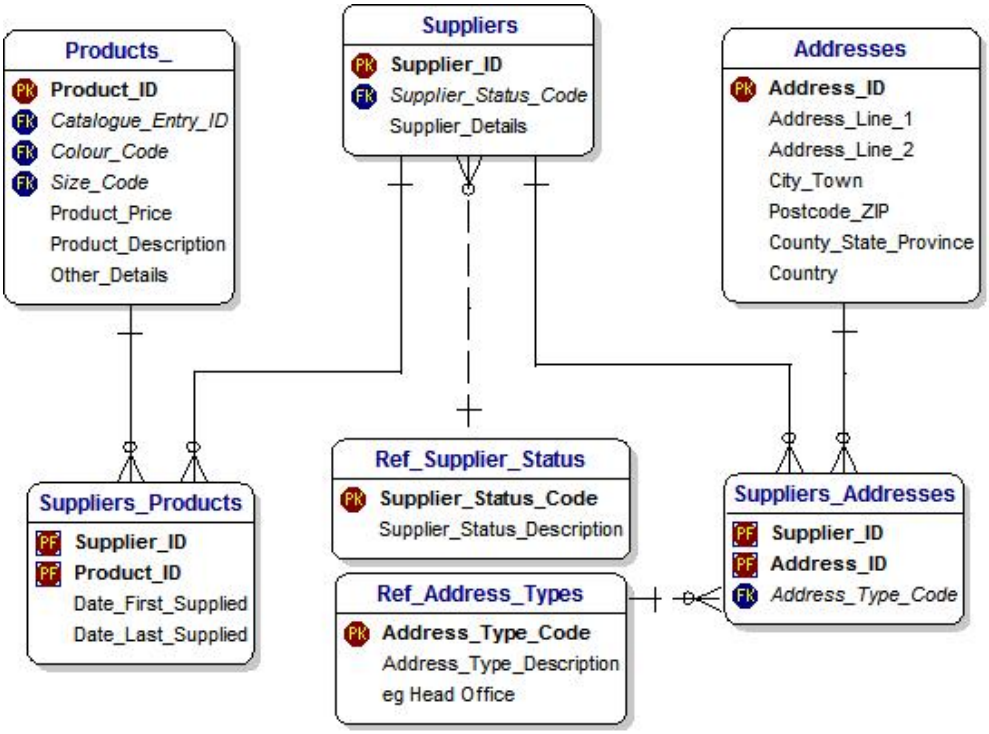
- A Supplier can have many Addresses, such as Billing, Warehouses, Regional Offices, Head Office and so on.
- Many Suppliers can also share the same Address

There we show this Many-to-Many broken down with an Associate Entity that we call Suppliers Address.

For each record, we have an Address Type Code field that tells us what type of Address this is for each Supplier.

The same argument applies to Suppliers and Products.

We recommend this as an exercise for the student ;-0)



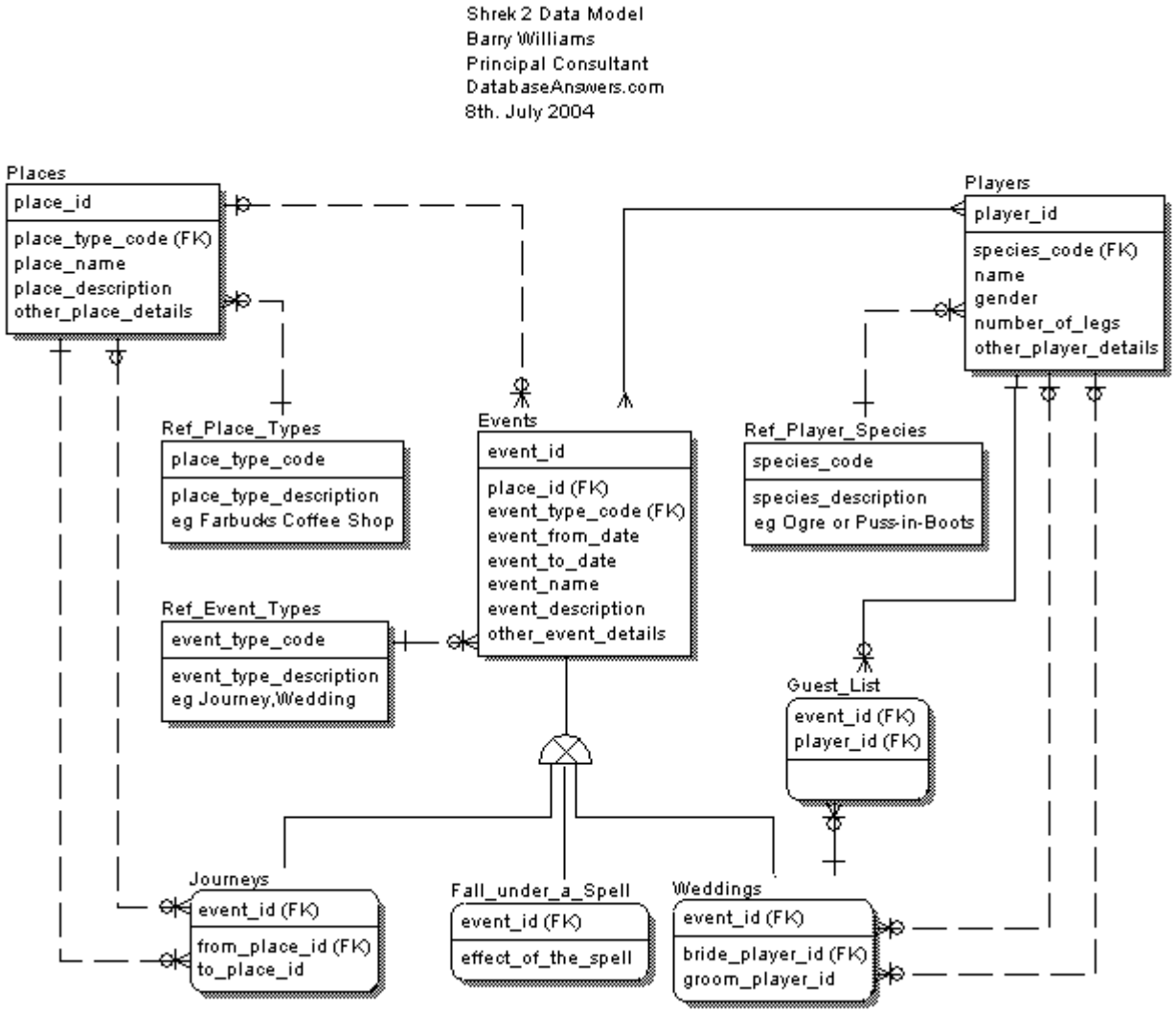
6.6 Shrek Movies

My wife enjoyed the Shrek 2 movie so I created this Model.

It turned out to be a very interesting exercise in generality.

You can see that Events are the dominant Entity which are the Super-Type, and examples of Sub-Types are Journeys, Weddings and people Falling under a Spell.

I also found a need for Inheritance so creating the Data Model turned out to be a worthwhile task.



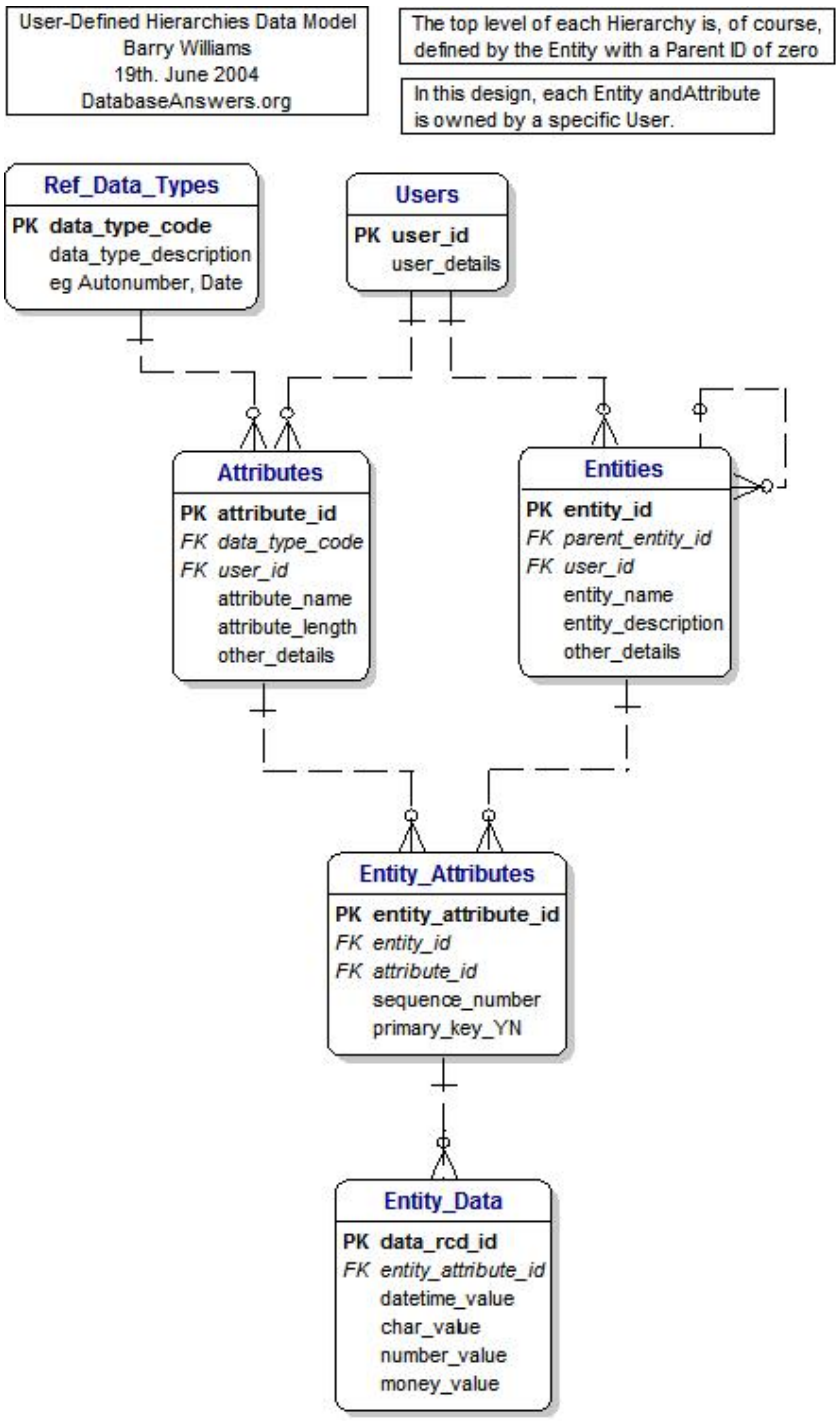
6.7 User-Defined Hierarchies

Here is the page Link :-

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

The Model shows an Entity-Attribute Value design which is described quite well in Wikipedia :-

- http://en.wikipedia.org/wiki/Entity-attribute-value_model



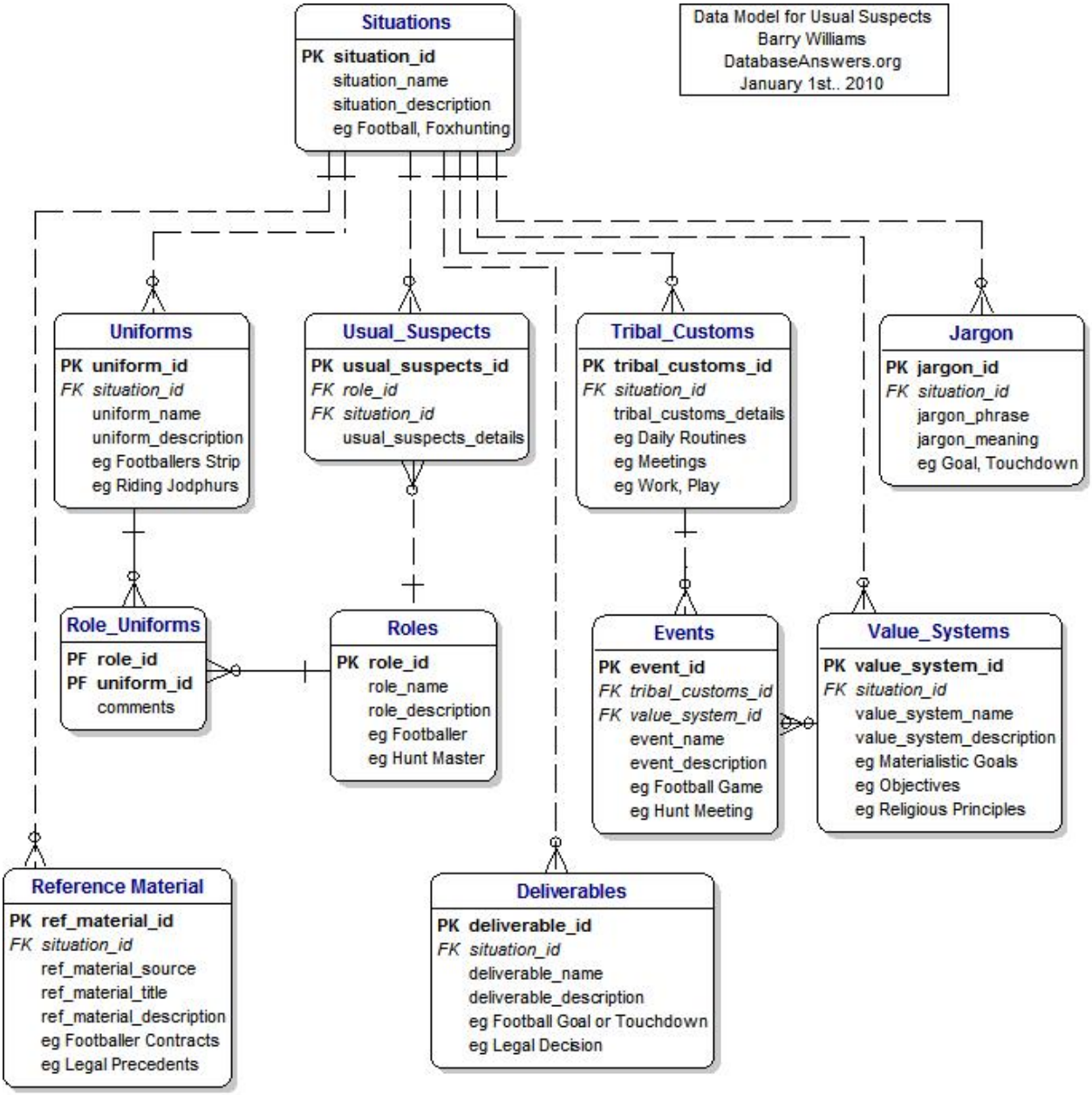
6.8 Usual Suspects

Here is the page Link :-

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

The striking aspect of this Model is that the approach of 'Usual Suspects' applies in many environments in everyday life where this pattern can be identified :-

- People wear specific kinds of uniforms
- They use a particular Jargon
- They behave in predictable ways which we can call 'Tribal Customs'



6.9 What have we learned ?

In this Chapter, we have learned about Generic Data Models.

These are Models that can apply to many real situations that share a common structure.

A good example is Usual Suspects that can apply to many situations and which we discuss in the Section above.