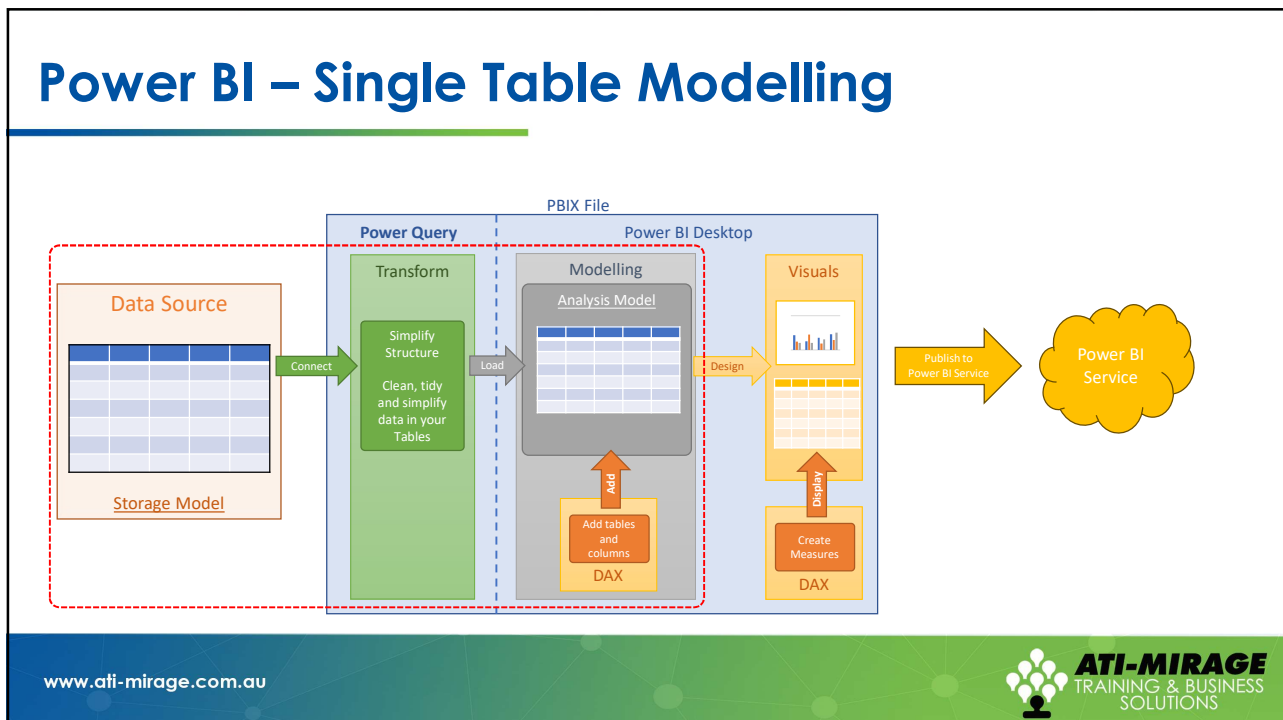


Single Table Modelling

Importing, Tidying and Modelling a Single Table Source

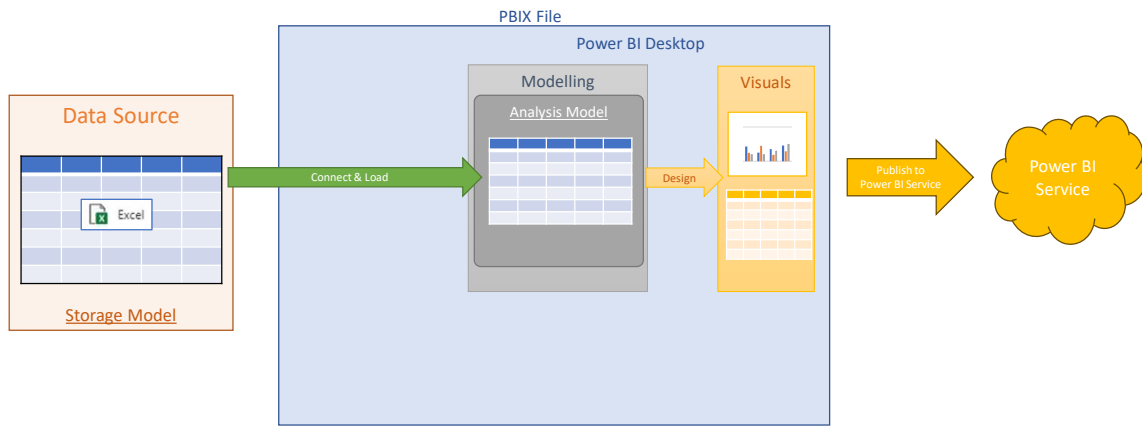
- ✓ Over 30 Years Experience
- ✓ Over 200,000 Happy Customers
- ✓ 100% Quality Guarantee
- ✓ Complimentary helpline

1



2

Power BI Process: Import and Go!

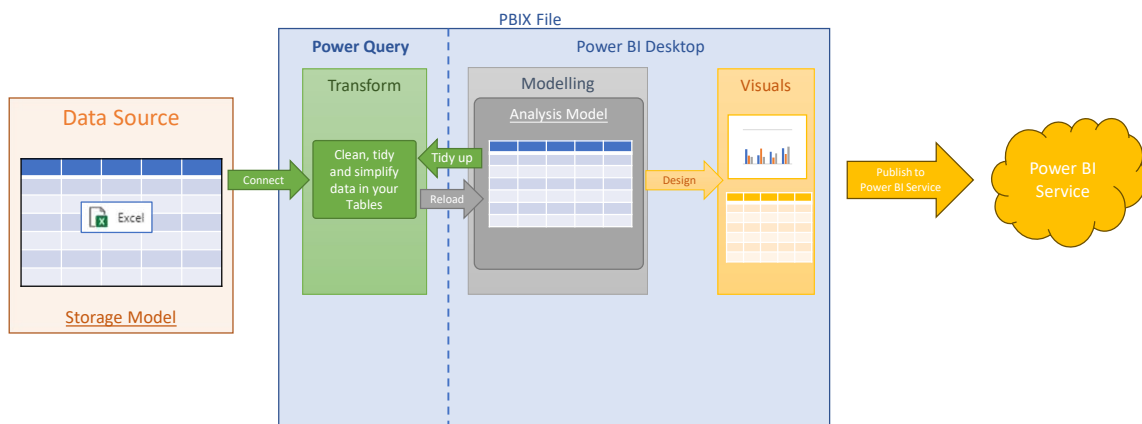


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3

Power BI Process: Clean & Tidy Data



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4

Let's go and play ...

The screenshot shows the Power BI Desktop interface. The 'Queries' pane on the left lists 'Customers'. The main area displays the 'Source' formula bar with the query: `Source([Name = "Customers", Signature = "table"])[Data]`. Below this, a table of customer data is shown.

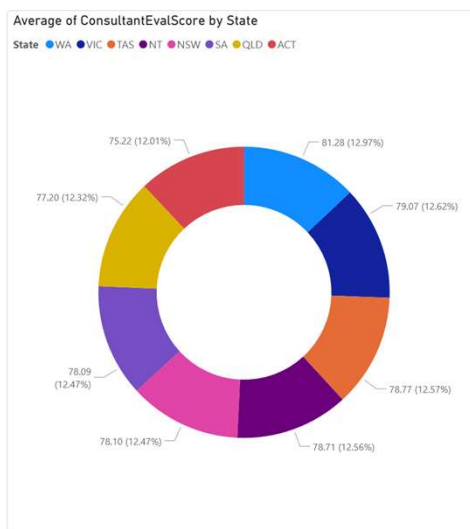
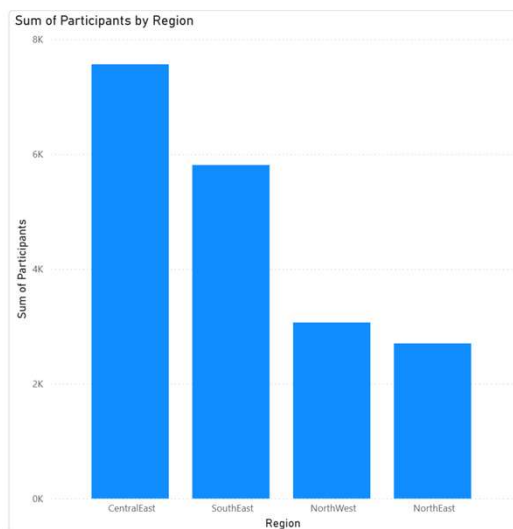
	CompanyName	ContactName	ContactTitle
1	ALFKI	Alfreds Futterkiste	Sales Representative
2	ANATR	Ana Trujillo Emparedados y heladerías	Owner
3	ANTON	Antonio Moreno Taquería	Owner
4	AROUT	Around the Horn	Sales Representative

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5

Exercise: Create 2 visuals



6

What Power Query can do for us

1. Individual tables: simplify, fix, tidy up and add columns.
2. Multi-table related models: Simplify the structure:
 - Append
 - Merge
3. Combine tables from different (non-related) data sources. (Intermediate course)

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7

Exercise: Check Data Types

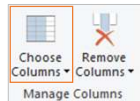
Field Name	Data Type Change
Days	Decimal
MaterialsPerParticipant	Fixed Decimal
PricePerDay	Fixed Decimal
CostPerDay	Fixed Decimal
PostCode	Text
Hourly Rate	Fixed Decimal

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8

Exercise: Choose Columns 1



Choose Columns

Choose the columns to keep

(Select All Columns)

- ☒ Date
- ☒ Status
- ☒ Participants
- ☒ ConsultantEvalScore
- ☒ Title
- ☒ Days
- ☒ MaterialsPerParticipant
- ☒ Category
- ☒ PricePerDay
- ☒ Company Name
- ☒ CostPerDay
- ☒ City
- ☒ State
- ☒ Firstname
- ☒ Surname
- ☒ Hourly Rate

OK Cancel

Field Name
Date
Status
Participants
ConsultantEvalScore
Title
Days
MaterialsPerParticipant
Category
PricePerDay
Company Name
CostPerDay
City
State
Firstname
Surname
Hourly Rate

Data

Search

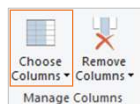
- ▼ ScheduleFull
 - ☐ Category
 - ☐ City
 - ☐ Company Name
 - ☐ ConsultantEvalScore
 - ☐ CostPerDay
- ▼ Date
 - ▼ Date Hierarchy
 - ☐ Year
 - ☐ Quarter
 - ☐ Month
 - ☐ Day
 - ☐ Days
 - ☐ Firstname
 - ☐ Hourly Rate
 - ☐ MaterialsPerParticipant
 - ☐ Participants
 - ☐ PricePerDay
 - ☐ State
 - ☐ Status
 - ☐ Surname
 - ☐ Title

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9

Exercise: Choose Columns 2



Choose Columns

Choose the columns to keep

(Select All Columns)

- ☒ Date
- ☒ Status
- ☒ Participants
- ☒ ConsultantEvalScore
- ☒ Title
- ☒ Days
- ☒ MaterialsPerParticipant
- ☒ Category
- ☒ PricePerDay
- ☒ Company Name
- ☒ CostPerDay
- ☒ City
- ☒ State
- ☒ Region
- ☒ Firstname
- ☒ Surname
- ☒ Hourly Rate

OK Cancel

Field Name
Date
Status
Participants
ConsultantEvalScore
Title
Days
MaterialsPerParticipant
Category
PricePerDay
Company Name
CostPerDay
City
State
Region
Firstname
Surname
Hourly Rate

Data

Search

- ▼ ScheduleFull
 - ☐ Category
 - ☐ City
 - ☐ Company Name
 - ☐ ConsultantEvalScore
 - ☐ CostPerDay
- ▼ Date
 - ▼ Days
 - ☐ Firstname
 - ☐ Hourly Rate
 - ☐ MaterialsPerParticipant
 - ☐ Participants
 - ☐ PricePerDay
 - ☐ Region
 - ☐ State
 - ☐ Status
 - ☐ Surname
 - ☐ Title

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10

Exercise: Reorder Columns

	Field Name
Date	Date
Course	Category
	Title
	Status
	Participants
	Days
	PricePerDay
Venue	MaterialsPerParticipant
	Company Name
	City
	State
	Region
	CostPerDay
Consultant	Firstname
	Surname
	Hourly Rate
	ConsultantEvalScore

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Exercise: Rename Fields


	Field Name	
Date	Date	
Course	Category	Course Category
	Title	Course Title
	Status	
	Participants	
	Days	Duration
	PricePerDay	Course Price Per Day
Venue	MaterialsPerParticipant	Materials Cost Per Participant
	Company Name	Venue Name
	City	
	State	
	Region	
	CostPerDay	Venue Cost Per Day
Consultant	Firstname	Consultant First Name
	Surname	Consultant Surname
	Hourly Rate	
	ConsultantEvalScore	Consultant Evaluation Score

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12

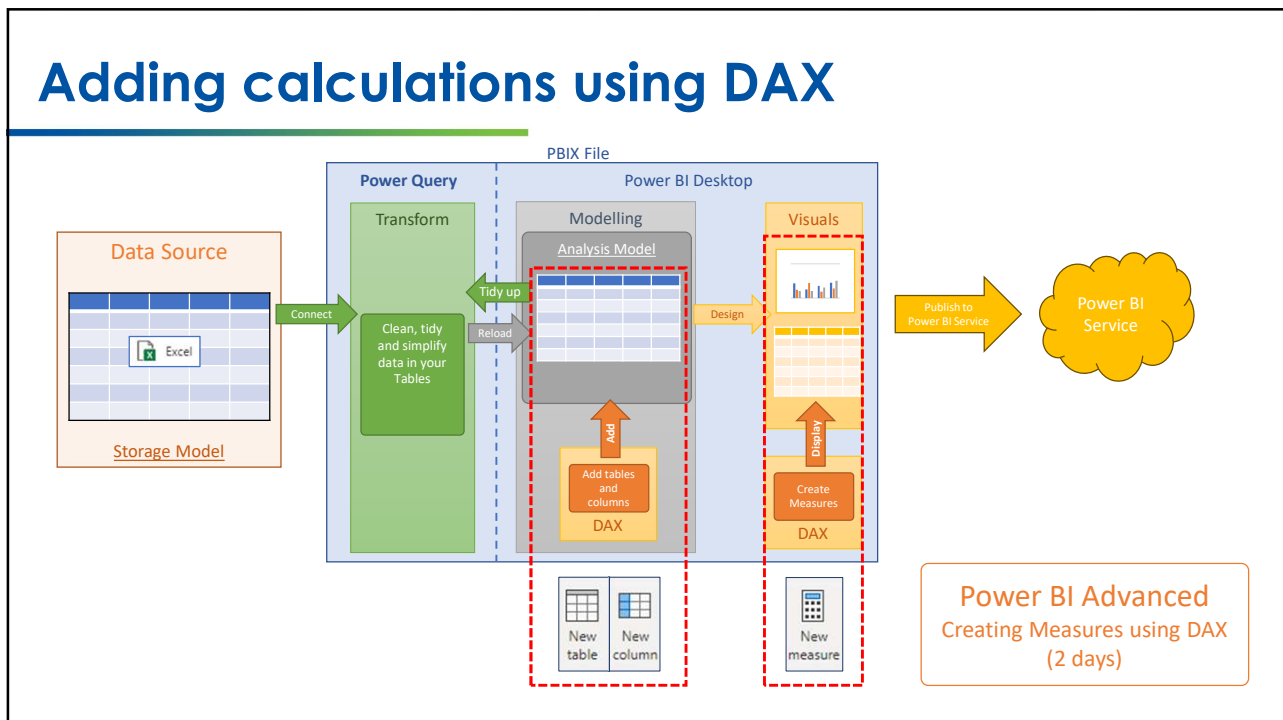


Adding calculations

Using Data Analysis Expressions (DAX)

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14

Syntax for Tables and Columns

💡 To refer to a **table**:

FactSchedule

'Fact Schedule'

💡 To refer to a **column** in a table:

FactSchedule[Participants]

💡 It is possible to leave out the table name in column formulas if the column is in the same table:

[Participants]

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15

Exercise: DAX Formulas

DAX Date Formulas

Day Number = WEEKDAY([Date], 2) Note: 2 = start week on Monday

Day Name Short = FORMAT([Date], "DDD")

Day Name Long = FORMAT([Date], "DDDD")

DAX Financial Formulas

Revenue = [Participants] * [Course Price]

Venue Expense = [Venue Cost Per Day] * [Duration]

Consultant Expense = [Consultant Daily Rate] * [Duration]

Materials Expense = [Materials Cost Per Participant] * [Participants]

Total Expenses = [Venue Expense] + [Consultant Expense] + [Materials Expense]

Gross Margin = [Revenue] - [Total Expenses]

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16

Exercise: Display Folders

Properties >>

General

Name
Calendar Year

Description
Enter a description

Synonyms
calendar year, year

Display folder

01 Date

Is hidden
☐ No

Model View

Model View

- [-] Schedule
 - [-] 01 Date
 - ☐ Calendar Year
 - ☐ Date
 - ☐ Day Name Long
 - ☐ Day Name Short
 - ☐ Day Number
 - ☐ Month Name Long
 - ☐ Month Name Short
 - ☐ Month Number
 - ☐ Quarter Name
 - ☐ Quarter Number
 - [-] 02 Course
 - ☐ Course Category
 - ☐ Course Price
 - ☐ Course Title
 - ☐ Duration
 - ☐ Participants
 - ☐ Status


Display View


- [-] Schedule
 - > 01 Date
 - > 02 Course
 - [-] 03 Venue
 - ☐ City
 - ☐ Region
 - ☐ State
 - ☐ Venue Name
 - [-] 04 Consultant
 - ☐ Consultant Evaluation Score
 - ☐ Consultant First Name
 - ☐ Consultant Surname
 - [-] 05 Financial
 - ☐ Consultant Expense
 - ☐ Gross Margin
 - ☐ Materials Expense
 - ☐ Revenue
 - ☐ Total Expenses
 - ☐ Venue Expense

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17





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Simplify Related Source

Connecting to Relational Database models

✓ Over 30 Years Experience

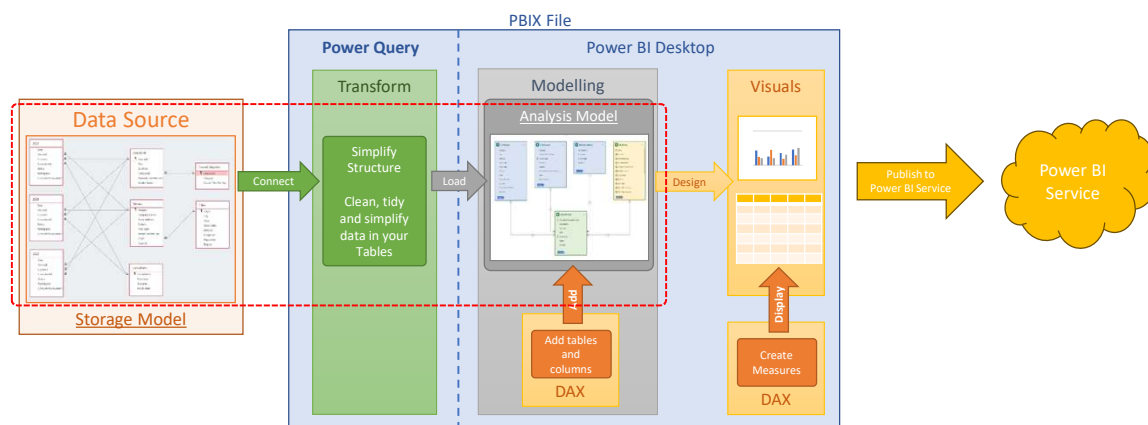
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✓ Complimentary helpline

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Power BI – Simplify Related Source



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19

Date Tables



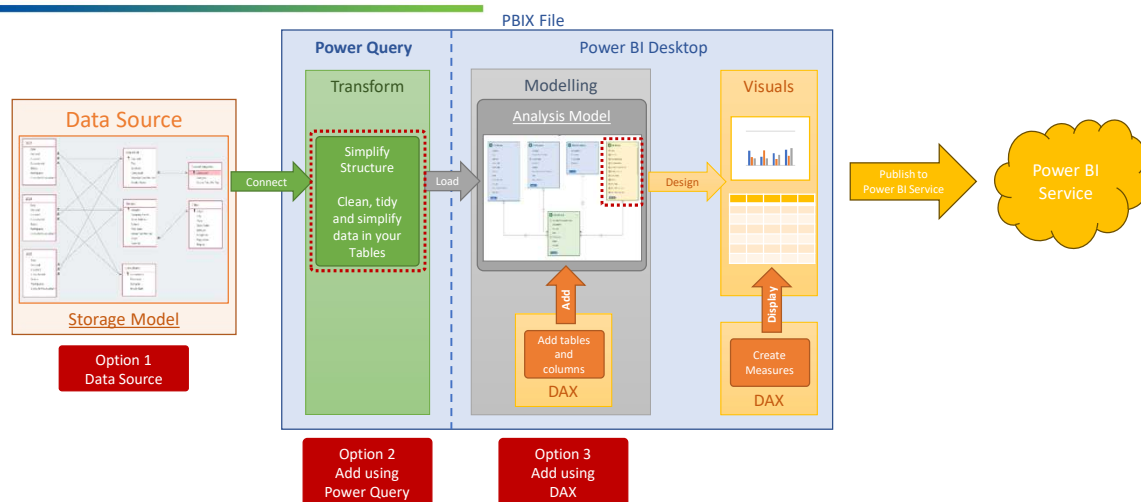
- 💡 Date tables are very useful for related data models containing dates.
- 💡 Having a date table allows you to:
 - Categorise based on date components (year, quarter, month, etc)
 - Create timelines more easily
 - Create 'time intelligence' functions (YTD, MoM, etc)
- 💡 Where do you get them from?

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20

Power BI – Simplify Related Source



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21

Suggestion: Template PBIT files

- Pre-created date table (may need to adjust the dates)
- Your standard Theme and defaults
- Your standard Page setup, background images, etc
- Downloaded 3rd Party Visuals
- Any other standard reference tables, visuals, etc

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22

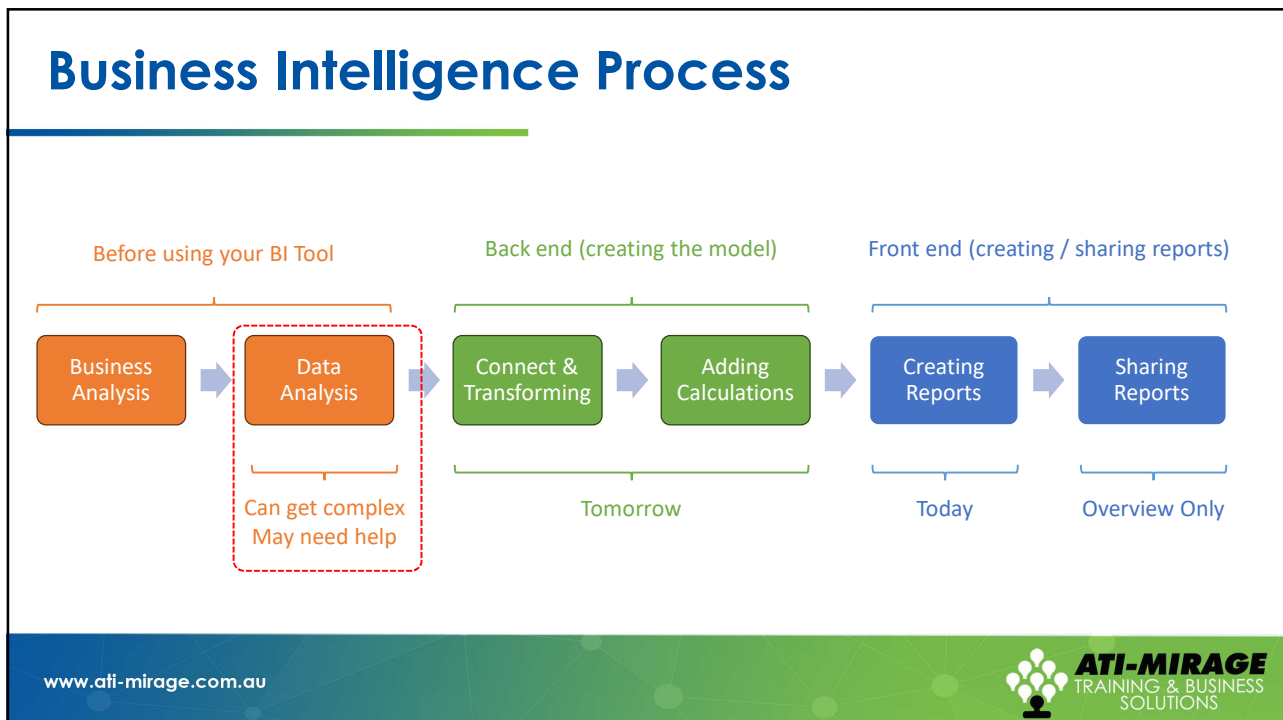


Database table structures

What Database Designers do

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24

Expenses: Single (flat) table version

Employee Id	Name	Department	Phone No	Expense Date	Amount
1	Julianne Kerr	Executive	60001	2/01/2015	\$145.00
2	Augustine Millson	Administration	61022	2/01/2015	\$125.50
9	George Samuelson	Administration	61024	2/01/2015	\$7.72
12	Vivienne Clark	Administration	61027	2/01/2015	\$154.50
58	Elizabeth Dangaard	Research & Development	62022	2/01/2015	\$48.39
2	Augustine Millson	Administration	61052	16/01/2015	\$155.60
20	Belinda Moore	Sales & Marketing	63034	2/02/2015	\$5.73
34	Syed Ali	Sales & Marketing	63014	2/02/2015	\$49.23
2	Augustine Millson	Administration	61022	4/02/2015	\$239.10
12	Vivienne Clark	Administration	61027	4/02/2015	\$295.81
2	Augustine Milson	Administration	61022	6/02/2015	\$60.13
9	George Samuelson	Administration	61024	6/02/2015	\$13.77
53	Victoria McDonald	Research & Development	62029	6/02/2015	\$154.11
2	Augustine Millson	Administration	61022	18/02/2015	\$267.48
1	Julianne Kerr	Executive	60001	2/03/2015	\$349.54

Not great because:

- Lots of repetition (Augustine Millson)
- Easy to make mistakes (Millson Vs Milson)

Database Designers would design the storage structure better than this

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25

Expenses: Related table version

(Child Table)

many Expenses

one-to-many

Expense Date	Amount	Employee Id
2/01/2015	\$145.00	1
2/01/2015	\$125.50	2
2/01/2015	\$7.72	3
2/01/2015	\$154.50	4
2/01/2015	\$48.39	8
16/01/2015	\$155.60	2
2/02/2015	\$5.73	5*
2/02/2015	\$49.23	6
4/02/2015	\$239.10	2
4/02/2015	\$295.81	4
6/02/2015	\$60.13	2
6/02/2015	\$13.77	3
6/02/2015	\$154.11	7
18/02/2015	\$267.48	2
2/03/2015	\$349.54	1

one Employee

(Parent Table)

Id	Name	Department	Phone No
1	Julianne Kerr	Executive	60001
2	Augustine Millson	Administration	61022
3	George Samuelson	Administration	61024
4	Vivienne Clark	Administration	61027
5	Belinda Moore	Sales & Marketing	63034
6	Syed Ali	Sales & Marketing	63014
7	Victoria McDonald	Research & Development	62029
8	Elizabeth Dangaard	Research & Development	62022

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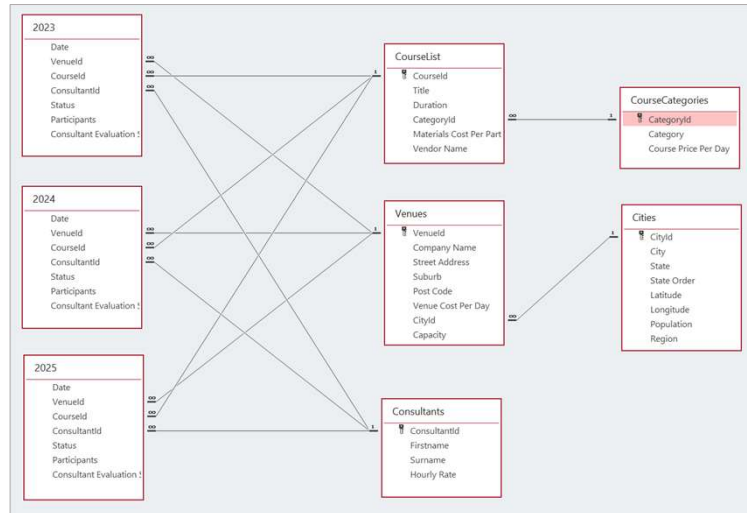
26

[illegible]

Database Data Source (Training Mgt System)

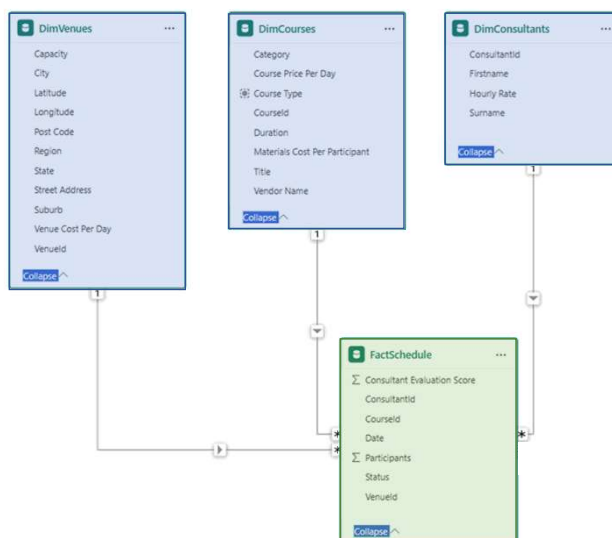


Training Mgt System: Original Storage Model



29

Training Mgt System: Desired Analysis Model



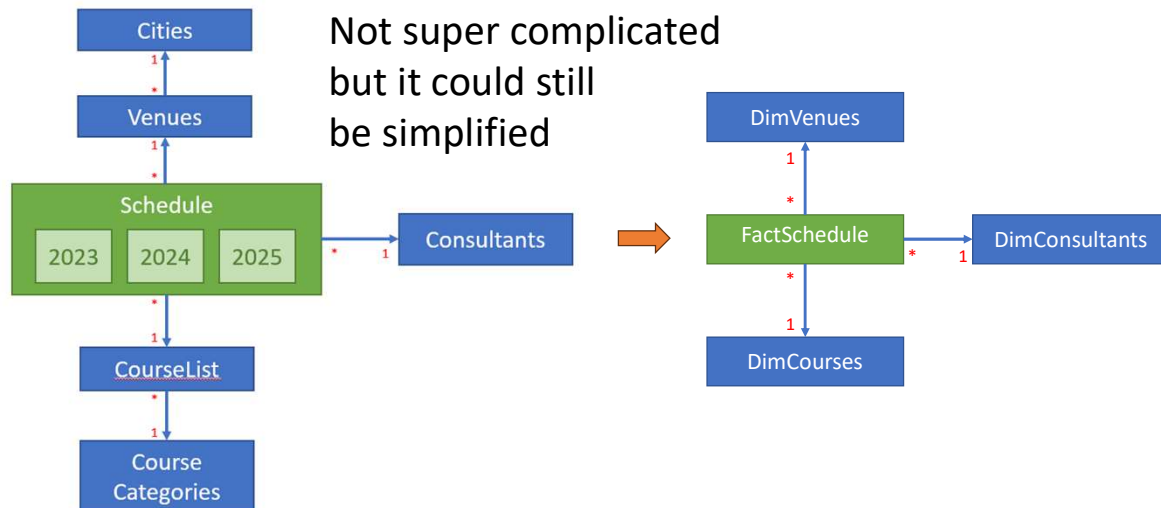
Why? Model Best Practices

- Less tables
- Less relationships
- Less Levels of relationships (2 ideally)
- One-to-many only
- Single direction Filter Prop

Where is DimDates?

30

Our original Storage Model



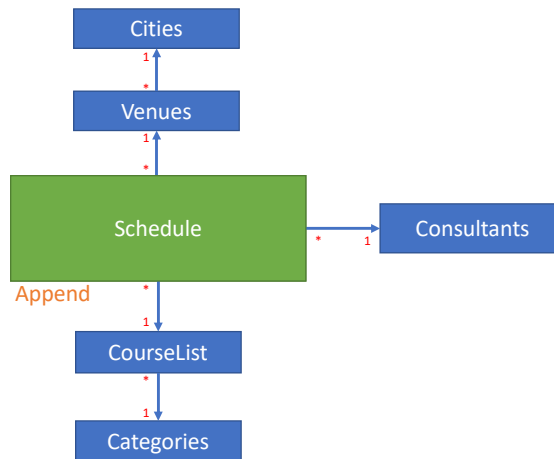
31

What Power Query can do for us

1. Individual tables: simplify, fix, tidy up and add columns.
2. Multi-table related models: Simplify the structure:
 - Append
 - Merge
3. Combine tables from different (non-related) data sources. (Intermediate course)

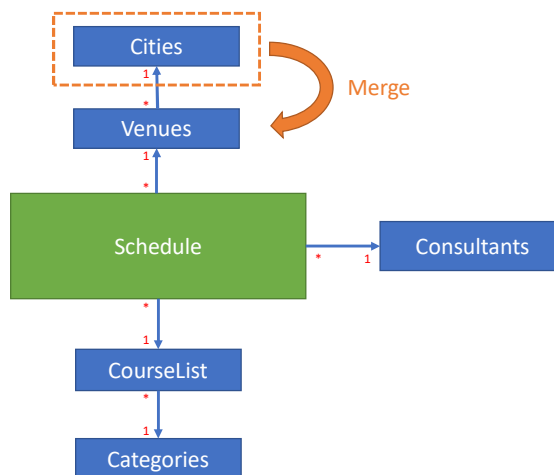
32

Combining tables using Append



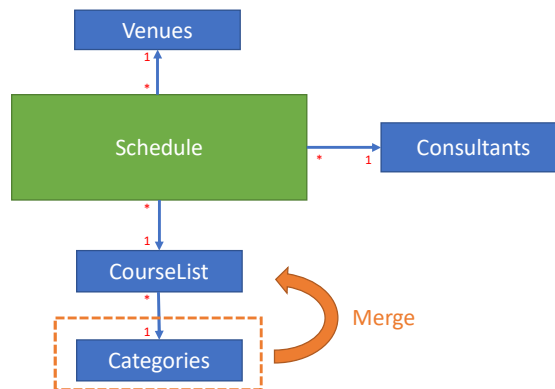
33

Combining tables using Merge



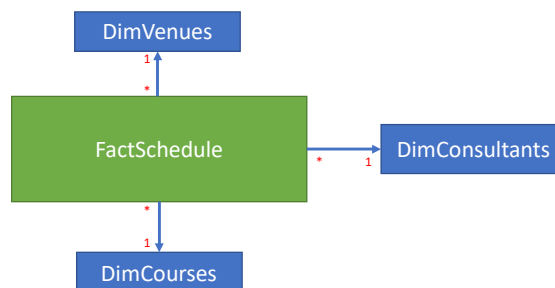
34

Combining tables using Merge



35

Final Rename of tables



36

Let's go and play ...

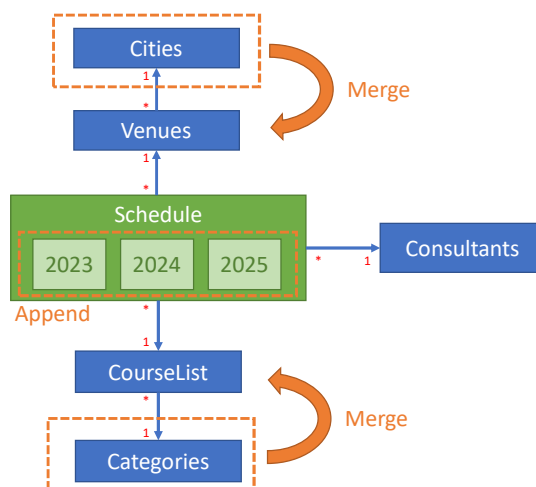
	CompanyName	ContactName	ContactTitle
1	ALFKI	Alfreds Futterkiste	Sales Representative
2	ANATR	Ana Trujillo Emparedados y heladerías	Owner
3	ANTON	Antonio Moreno Taquería	Owner
4	AROUT	Around the Horn	Sales Representative

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37

Power Query: Storage Model to Analysis Model



38



Using DAX to add columns

Calculating Income, Expenses and Gross Margin

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Gross Margin Calculations - Formula Logic

$$\begin{aligned}
 \text{Gross Margin} &= \text{Revenue (FactSchedule)} - \text{Expenses (FactSchedule)} \\
 &\quad \downarrow \\
 \text{Revenue (FactSchedule)} &= \text{Participants (FactSchedule)} \times \text{Course Price (DimCourses)} \\
 &\quad \downarrow \\
 \text{Course Price (DimCourses)} &= \text{Course Price Per Day (DimCourses)} \times \text{Duration (DimCourses)} \\
 &\quad \downarrow \\
 \text{Venue Expense (FactSchedule)} &= \text{Venue Cost Per Day (DimVenues)} \times \text{Duration (DimCourses)} \\
 &\quad + \\
 \text{Materials Expense (FactSchedule)} &= \text{Materials Cost Per Participant (DimCourses)} \times \text{Participants (FactSchedule)} \\
 &\quad + \\
 \text{Consultant Expense (FactSchedule)} &= \text{Daily Rate (DimConsultants)} \times \text{Duration (DimCourses)}
 \end{aligned}$$

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Gross Margin calculations

DimCourse table

Course Price = [Duration] * [Course Price Per Day]

FactSchedule Table

Revenue = [Participants] * RELATED(DimCourses[Course Price])

Venue Expense = RELATED(DimVenues[Venue Cost Per Day]) * RELATED(DimCourses[Duration])

Consultant Expense = RELATED(DimConsultants[Daily Rate]) * RELATED(DimCourses[Duration])

Materials Expense = [Participants] * RELATED(DimCourses[Materials Cost Per Participant])

Expenses = [Consultant Expense] + [Materials Expense] + [Venue Expense]

Gross Margin = [Revenue] - [Expenses]

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41

Example DAX Measure

Gross Margin YTD =

```
CALCULATE(
    [Gross Margin],
    FILTER(
        ALL( DimDates ),
        DimDates[Year] = MAX( DimDates[Year] )
        && DimDates[Date] <= MAX( DimDates[Date] )
    )
)
```

Power BI Advanced
Creating Measures using DAX
(2 days)

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42

Course Wrap Up

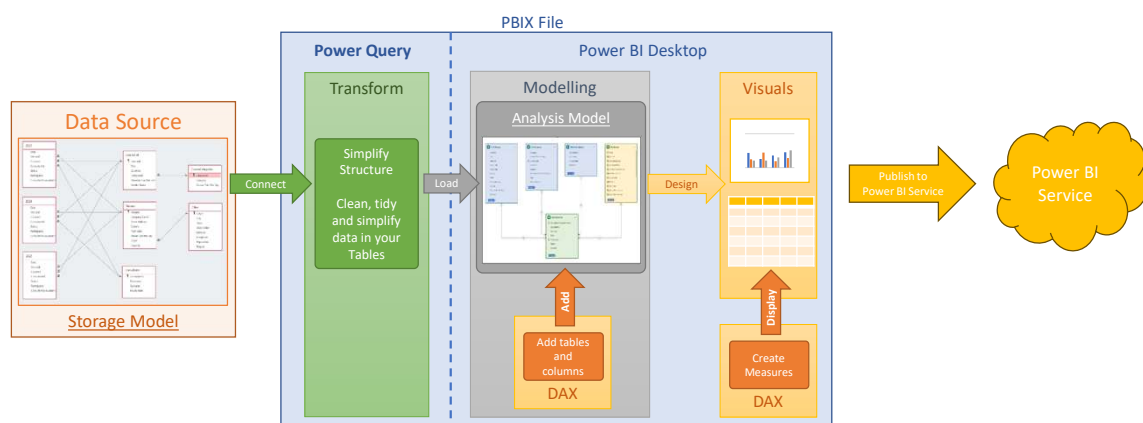
Thanks for paying attention

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43

Power BI – Components and Process

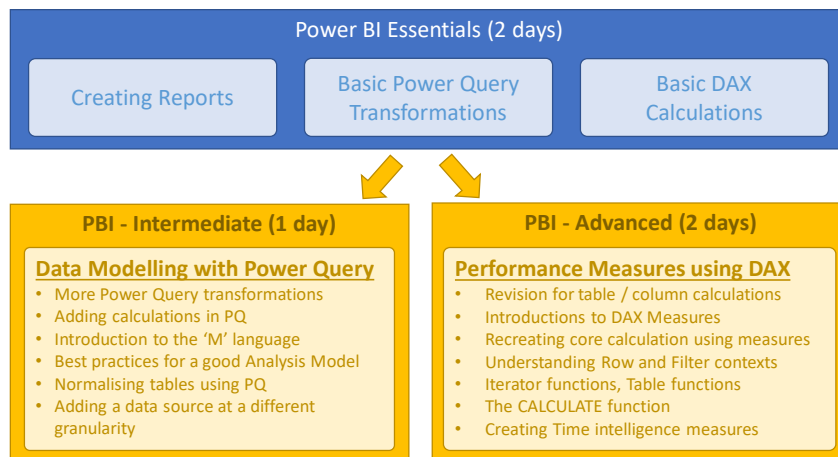


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Power BI Courses

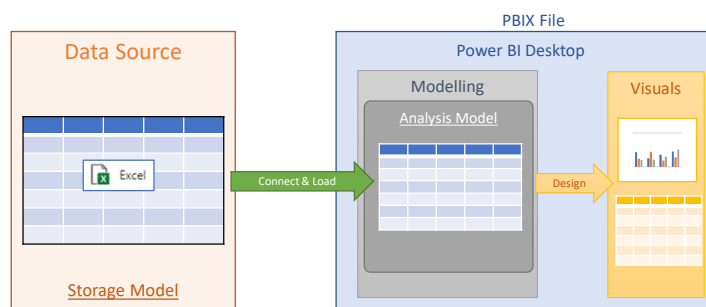


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45

What's next? Start here ... tomorrow!



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46