WELCOME TO TECH | IMMERSION

Track: SQL/BI

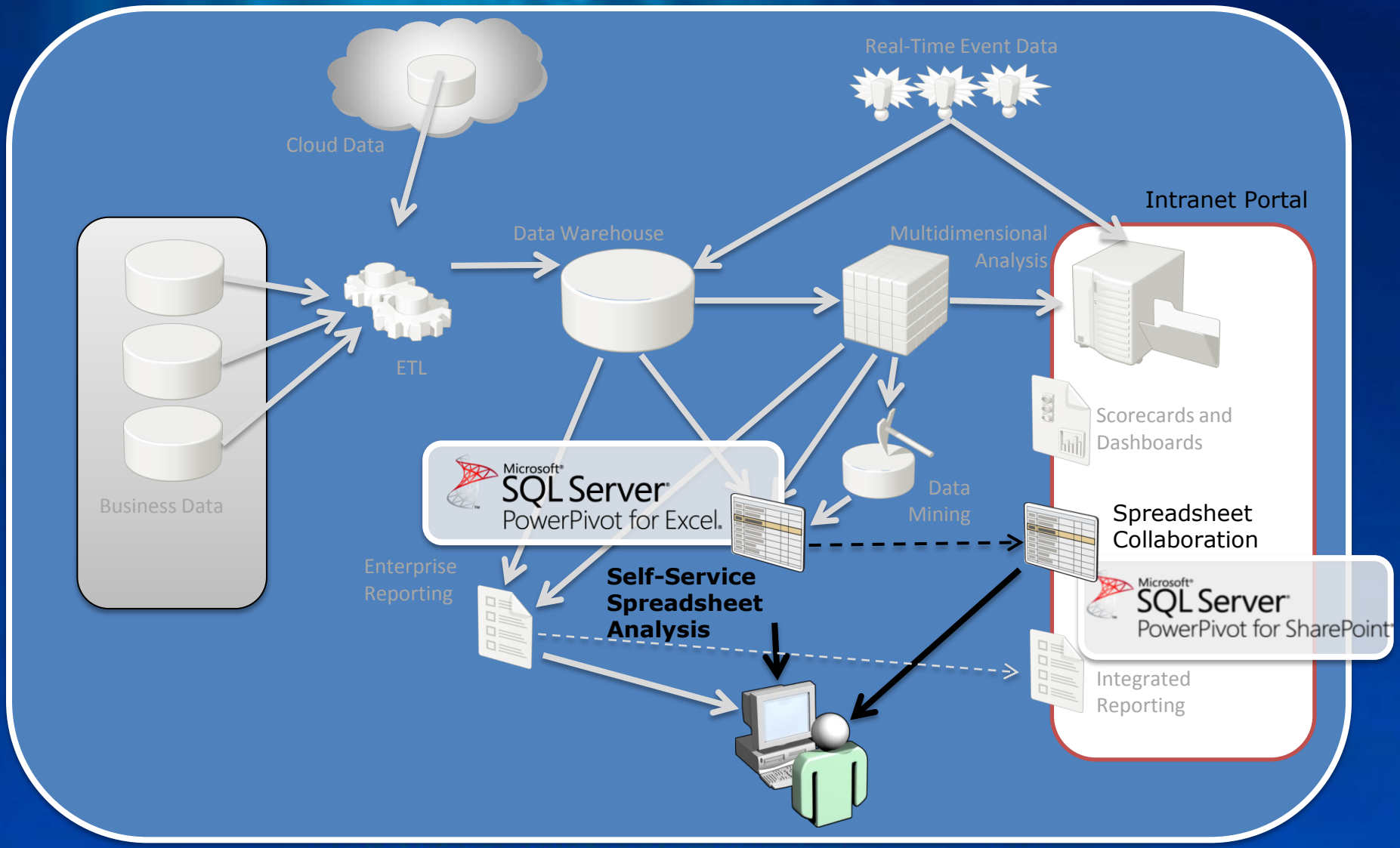
PowerPivot with Excel 2010

Presenter: Jeff Jones

Outline

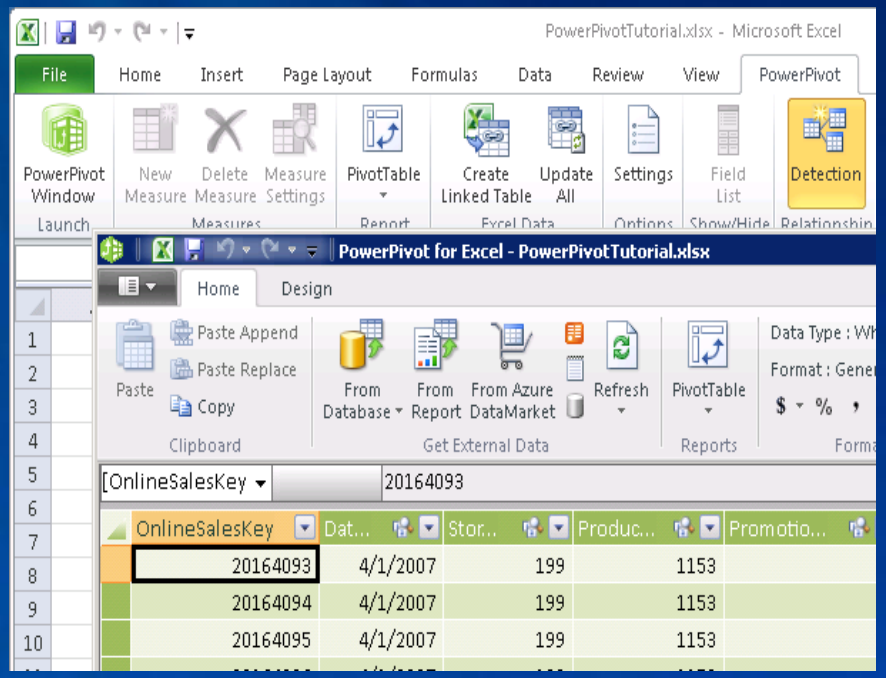
- BI EcoSystem
- PowerPivot for Excel
  - What, Why, Who?
- Using PowerPivot
- New Powerful Formulas
- Using DAX Functions
- PowerPivot Deep Dive
  - How do they do it?
- Future Directions

PowerPivot in the BI Ecosystem



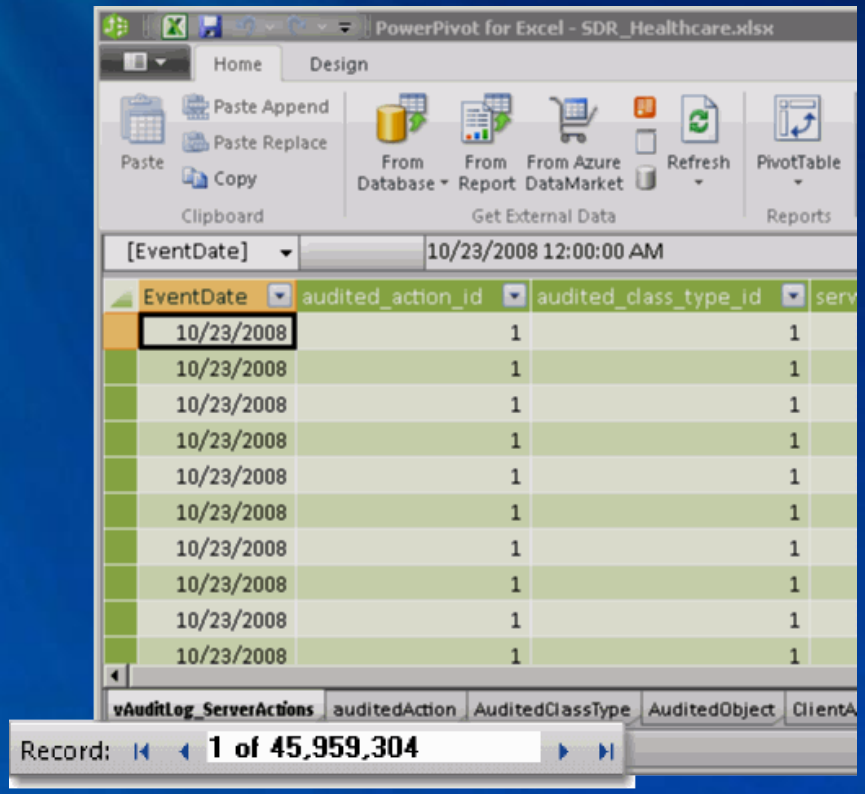
PowerPivot for Excel

- What?
  - Tool for Information Workers
  - Leverages existing knowledge in Excel
  - Free Add-in into Excel 2010
  - Supports analysis of large, related datasets
  - Provides a local Analysis Services engine



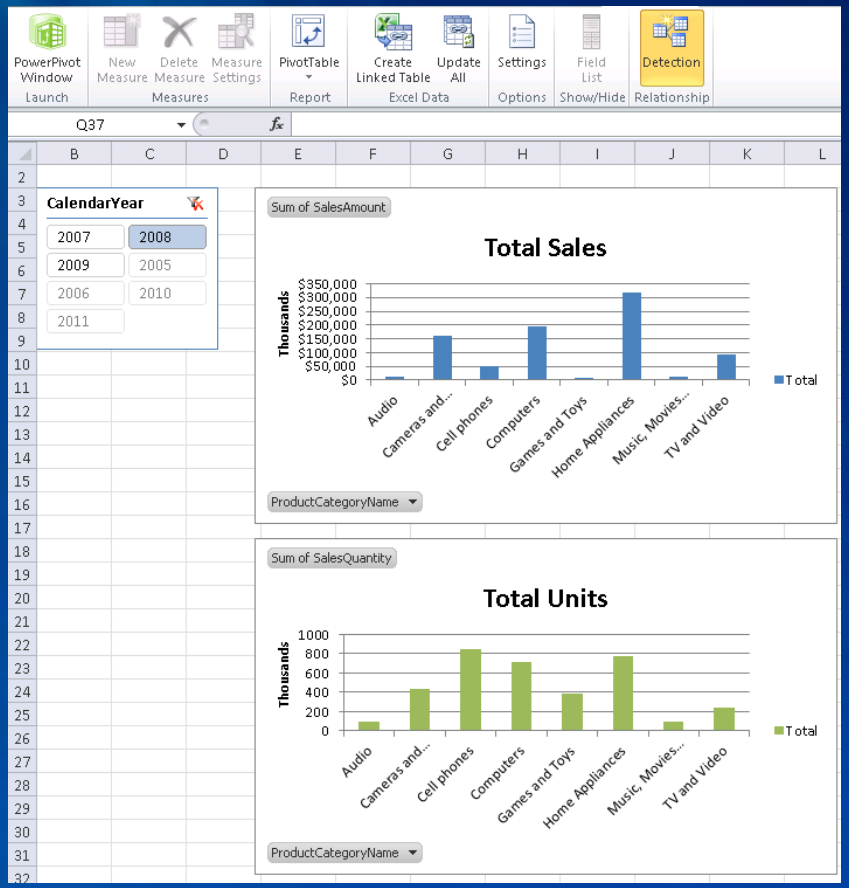
PowerPivot for Excel

- PowerPivot BreakThroughs:
  - Large datasets, small files and fast access
  - Create “Analysis Mashup” without VLOOKUP
  - Professional-grade formulas (new DAX functions)
  - Import data from anywhere



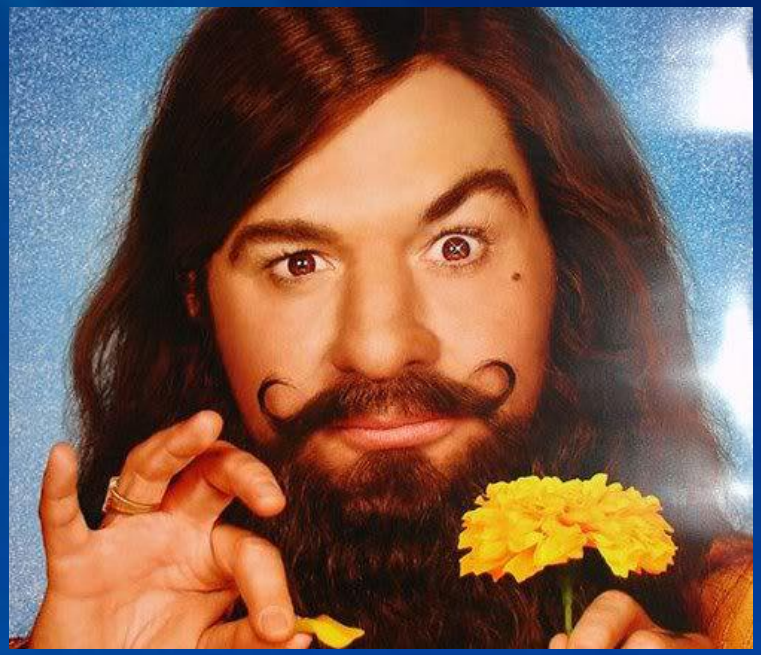
PowerPivot for Excel

- Why?
  - Need BI applications quicker
  - Need users to build their own BI applications easier
  - Need easy deployment enterprise-wide when necessary

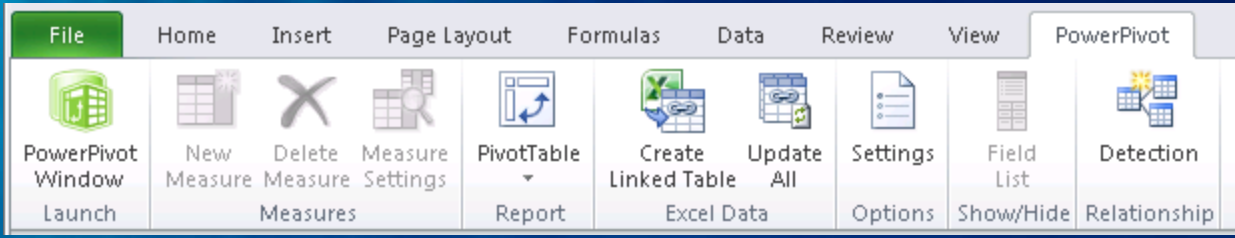


PowerPivot for Excel

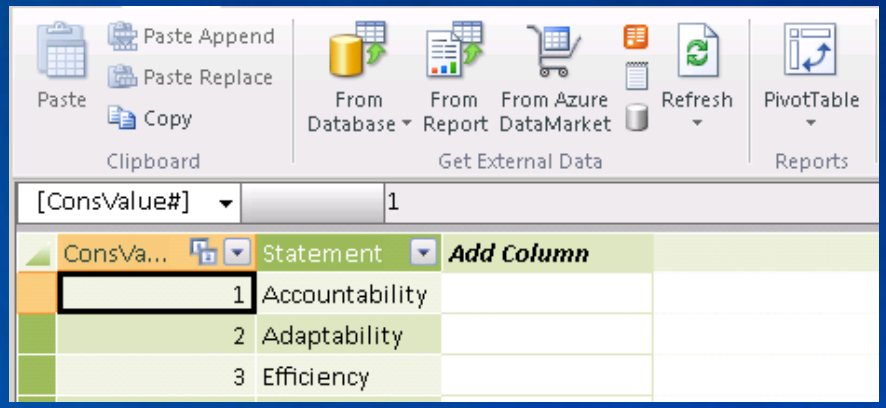
- Who?
  - Excel Guru's
    - Business Analyst
    - Marketers
    - Business users that have become Excel geeks
  - Technical Data Guru's
    - Database developers
    - BI Developers
    - Technical people that focus on data analysis applications



Using PowerPivot



- Install PowerPivot add-in
- Open PowerPivot
- Select and Import data
- Define Relationships
- Define PivotTable
- Add calculations
- Create Named Sets
- Save file

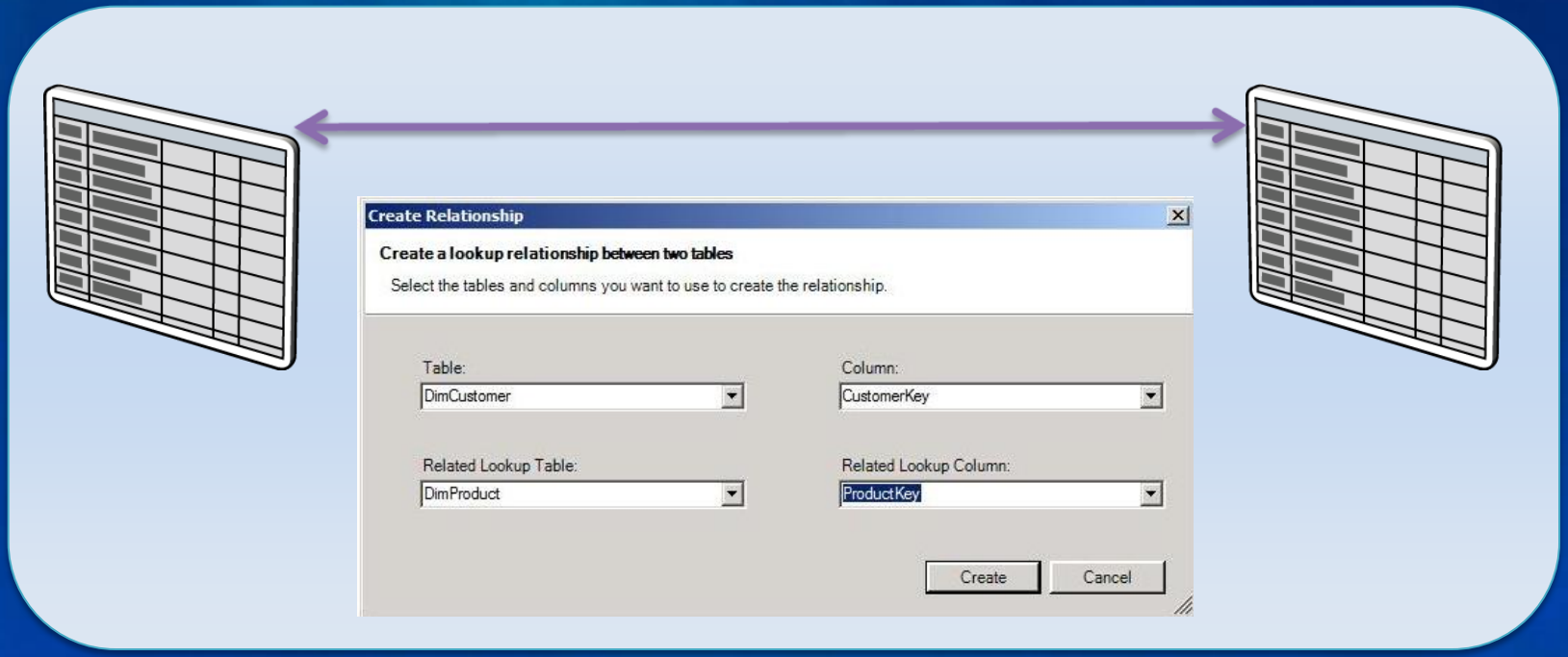


Data Connection Options

- Enables information workers to access data across multiple heterogeneous systems
- Provides a wide range of connection options, including connectivity to third-party products
- Enables you to use data feeds as data sources
- Enables portability because data configuration information is stored in the workbook
- To access Sharepoint Lists from PowerPivot install Data Services Update for .NET 3.5 SP1

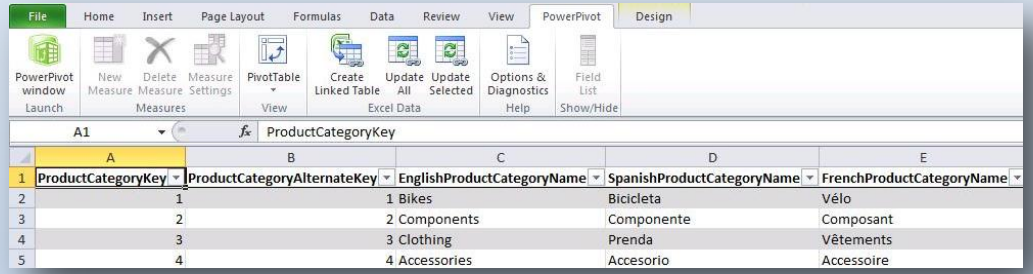
Data Relationships

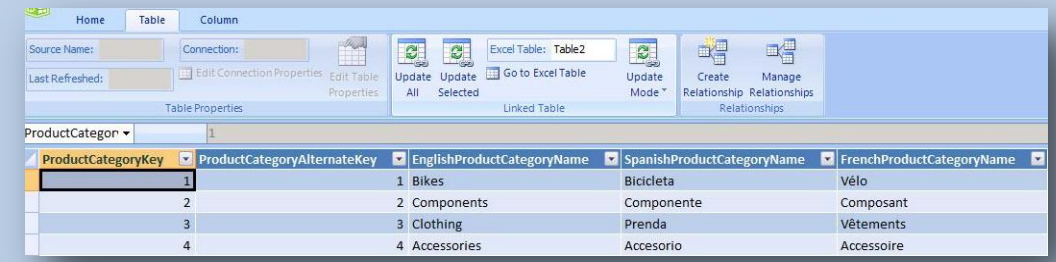
- Automatically recognize relationships based on foreign keys
- Manually create relationships when they are not explicitly defined



Linked Tables

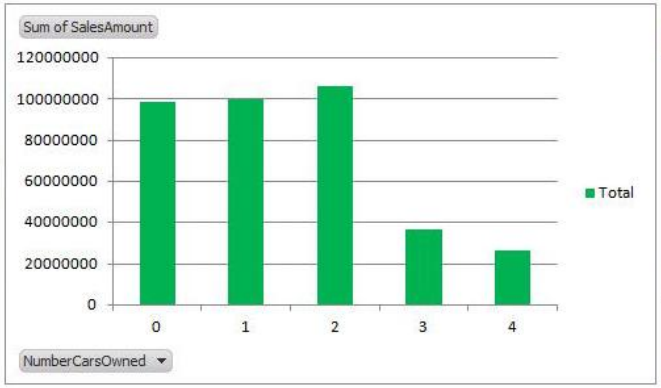
- Link to tables in workbooks in Excel
- Update the table in PowerPivot as the linked table in Excel changes
- Update automatically or manually

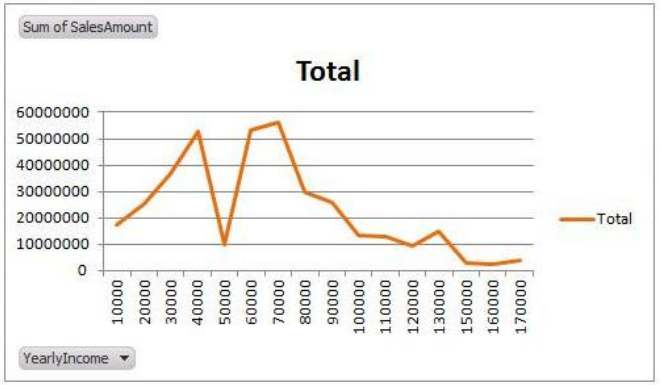




PivotTable Tables and PivotChart Charts in PowerPivot for Excel

- Add PivotChart charts and PivotTable tables with drill-down capabilities
- Use the task pane to add values, labels, and filters
- Use extensive formatting options to create visually impressive applications

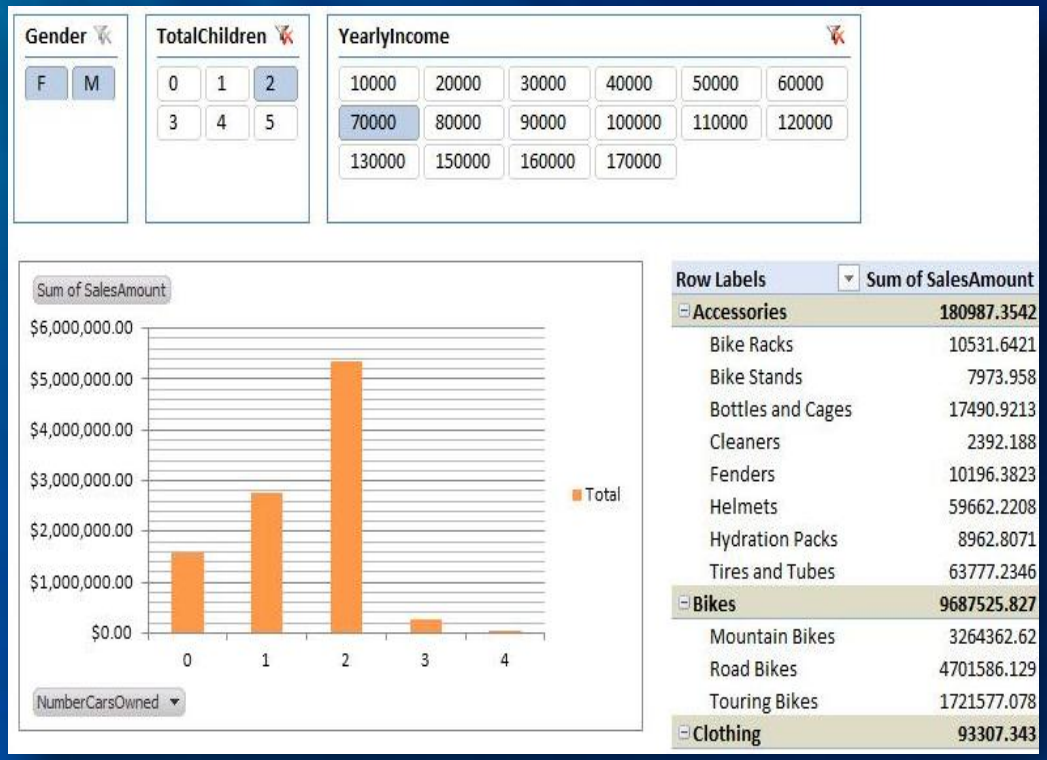




Row Labels	Sum of SalesAmount
Accessories	8785894.586
Bike Racks	493482.6584
Bike Stands	496378.8855
Bottles and Cages	712116.6845
Cleaners	90504.446
Fenders	584500.7259
Helmets	2825181.632
Hydration Packs	505364.4311
Tires and Tubes	3078365.122
Bikes	355043531.2
Mountain Bikes	124784407.5
Road Bikes	182054279.9
Touring Bikes	48204843.85
Clothing	4259956.735
Caps	246843.003
Gloves	439077.925
Jerseys	2168398.347
Shorts	894184.2185
Socks	64021.3816
Vests	447431.8602
Grand Total	368089382.5

PowerPivot Slicers

- Provide a quick way to filter the data that is displayed in charts and tables
- Add vertical or horizontal slicers to suit the layout of the application



Using DAX Functions

- Create Calculated Columns in PowerPivot tables to cleanse and extend
- Create new Measures in Excel PivotTables for advanced analysis
- Works with relational data
- Performs dynamic aggregations
- Looks similar to Excel formulas
  - Except they reference rows/columns not ranges
- Does not replace SSAS MDX

DAX Function Categories

- Date and Time (EOMonth, WeekNum)
- Filter and Value (Calculate, All, Related))
- Logical Test (True, False)
- Math (Round, Sqrt)
- Statistical (AverageX, CountRows)
- Text (Lower, Mid, Search)
- Time Intelligence (StartOfMonth, ParallelPeriod)

Aggregation Functions

- Functions to calculate averages

```
=AVERAGEX(InternetSales, InternetSales[Freight]+
InternetSales[TaxAmt])
```

- Functions to count values

```
=COUNTAX(FILTER('Reseller',[Status]="Active"),[Phone])
```

- Functions to return maximum and minimum values

```
=MINX(FILTER(InternetSales, [SalesTerritoryKey] =
5),[Freight])
```

- Functions to return sum totals

```
SUMX(FILTER(InternetSales,
InternetSales[SalesTerritoryID]=5),[Freight])
```

Filters, Values, and Relationships Functions

- RELATED and RELATEDTABLE

```
=RELATED(Products[EnglishProductName])
```

- FILTER

```
=SUMX(FILTER(Resellers,[ProductLine] = "Mountain"),
ResellerSales[ExtendedAmount])
```

- ALL and ALLEXCEPT

```
=SUMX(ALL(ResellerSales_USD), ResellerSales_USD[SalesAmount_USD])
```

- CALCULATE and CALCULATETABLE

```
=CALCULATE(SUM(ResellerSales[SalesAmount]),Reseller[ProductLine] =
"Mountain")
```

- VALUES and DISTINCT

```
=COUNTROWS(VALUES(Reseller[ResellerName]))
```

Calculated Columns and Measures

- Calculated columns
  - Define and populate a new column based on calculations using values in other columns
  - Calculated columns available to PivotTable tables and PivotChart charts

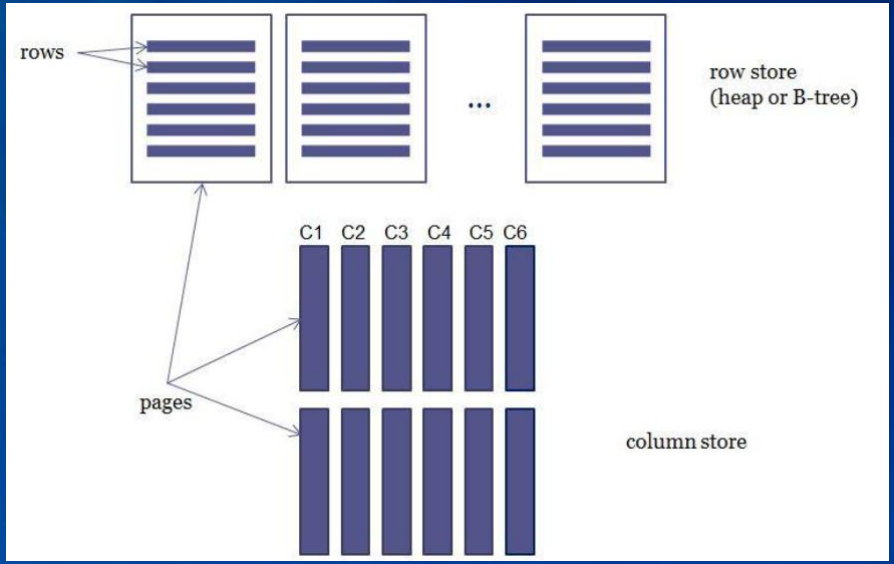
```
=RELATED(dimSalesTerritory[SalesTerritoryCountry]) & ",
" & RELATED(dimSalesTerritory[SalesTerritoryRegion])
```

- Measures
  - Added to Pivot Tables and Pivot Charts
  - PowerPivot creates implicit measures automatically
  - DAX allows you to create explicit measures to perform more complex analysis

```
=CALCULATE(SUM(FactInternetSalesPowerPivot[SalesAmount]),ALL
(dimProductSubcategory[EnglishProductSubcategoryName]))
```

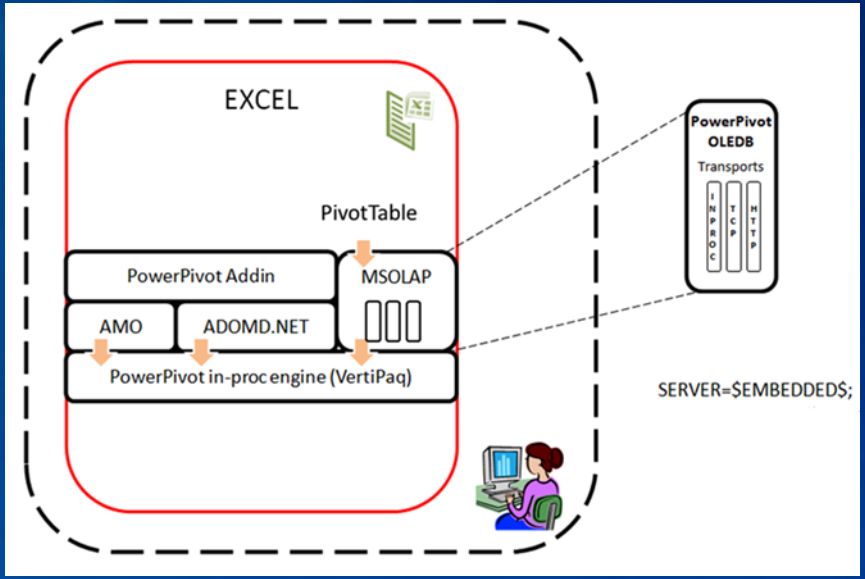
PowerPivot Deep Dive

- Data exposed as tabular, underlying model is UDM (Analysis Services)
- VertiPaq engine stores data as columns, not rows (Column Store)
- Significant compression and fast retrieval



PowerPivot Deep Dive

- VertiPaq runs in-process with Excel
- Uses AMO and ADOMD.Net API's
- Excel queries data using MDX
- Uses $EMBEDDED$ data source connection



Future Directions

- Project “Crescent”
  - Uses the new BI Semantic Model
  - KPIs
  - Perspectives
  - Multi-column relationships
  - Hierarchies
  - Parent-child hierarchies
  - Many-to-many relationships
  - Drillthrough
  - Role-based security model using Active Directory
  - Row and column level security to secure data at the deepest level

Summary

- PowerPivot for Excel and how it fits in the BI EcoSystem
- Loading, managing and accessing data in PowerPivot
- Using DAX functions for sophisticated analysis
- PowerPivot deep dive on technology
- PowerPivot future direction

Thank you.