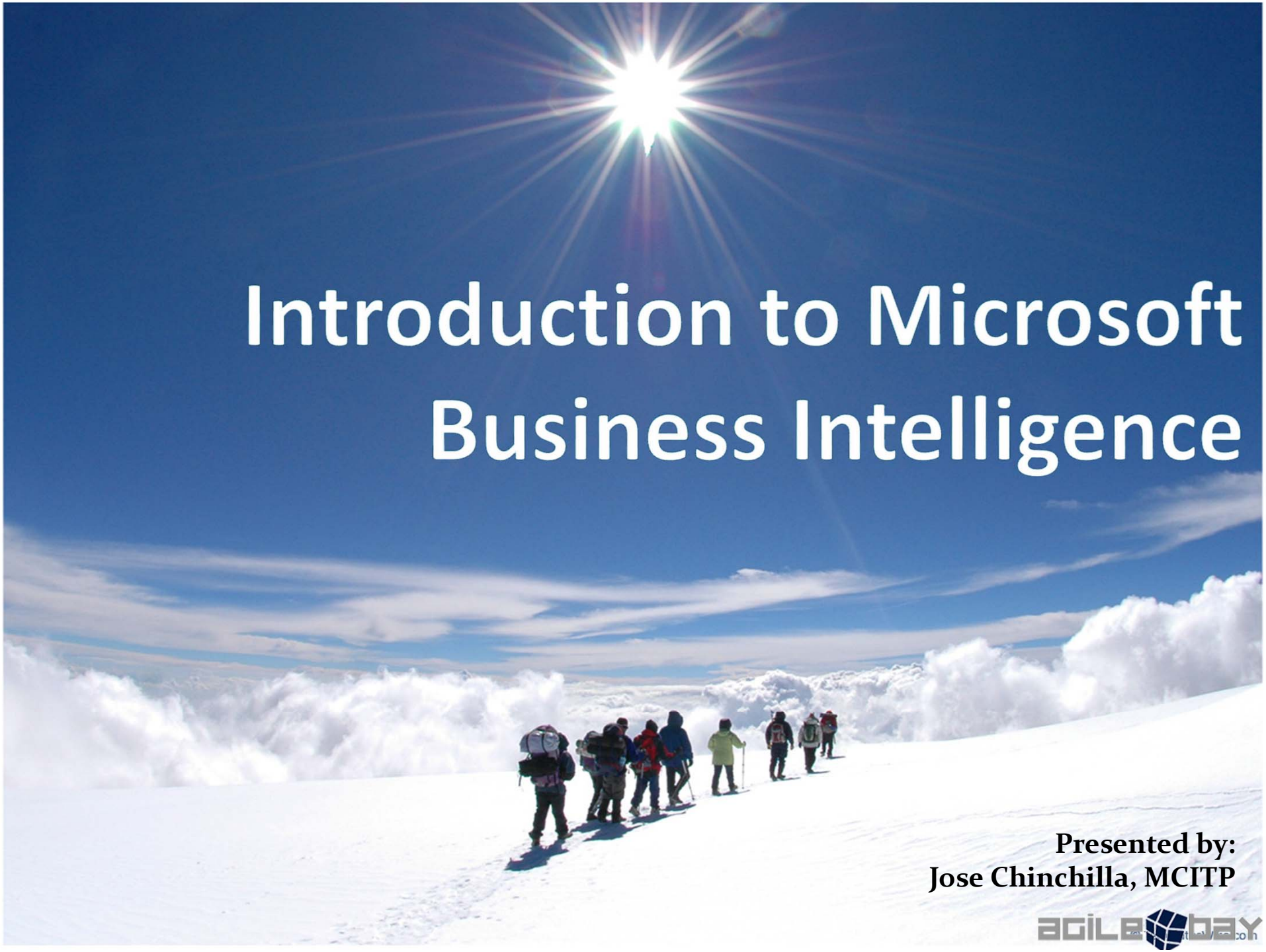

Introduction to Microsoft
Business Intelligence
Presented by:
Jose Chinchilla, MCITP

Jose Chinchilla

MCITP: Database Administrator, SQL Server 2008

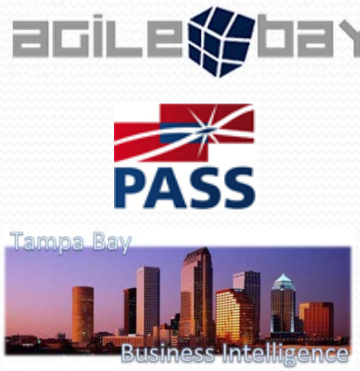
MCITP: Business Intelligence SQL Server 2008

Current Positions:

President, Agile Bay, Inc.

President, Tampa Bay Business Intelligence User Group

Regional Mentor, PASS Greater Southeast



Blog: http://www.sqljoe.com

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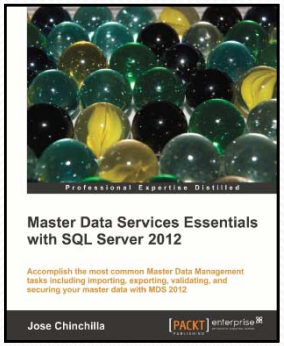
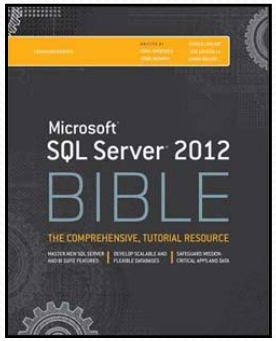
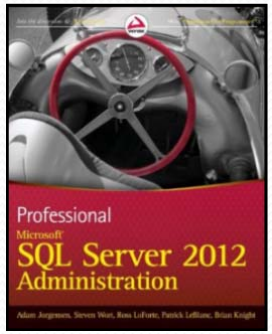
Email: jchinchilla@sqljoe.com







Customers & Partners

Agenda

- Data Warehousing & Business Intelligence
- Enterprise BI
- Self-Service BI
- The Microsoft BI & Data Warehouse Toolset
- Demo:
  - Integration Services
  - Analysis Services
  - Reporting Services
  - PowerPivot
  - Power View
  - Power Map

Manager:
Where are my TPS reports?
Developer:
They are still running since yesterday.

What is:

- Data Warehouse?
- Business Intelligence ?

Terms and Acronyms

- BI: Business Intelligence
- ETL: Extract, Transform & Load
- DW: Data Warehouse
- KPI: Key Performance Indicator
- Fact: A business measurement
- Measure: A quantifiable business process
- Dimension: Breakdown measures according to an area of interest
- Attribute: Characteristics that makeup a dimension member
- OLTP: On-Line Transactional Processing
- OLAP: On-Line Analytical Processing
- Cube: Data structure that groups measures, dimensions, KPIs, data mining models, perspectives
- Metadata: Data about data
- Granularity: Level of detail or summarization of the data
- SCD: Slowly Changing Dimensions
- Alternate Key: Unique key from data source
- Surrogate Key: Unique key in the data warehouse

Data Warehouse

A data warehouse is a central repository for all or significant parts of the data that an enterprise's various business systems collect.

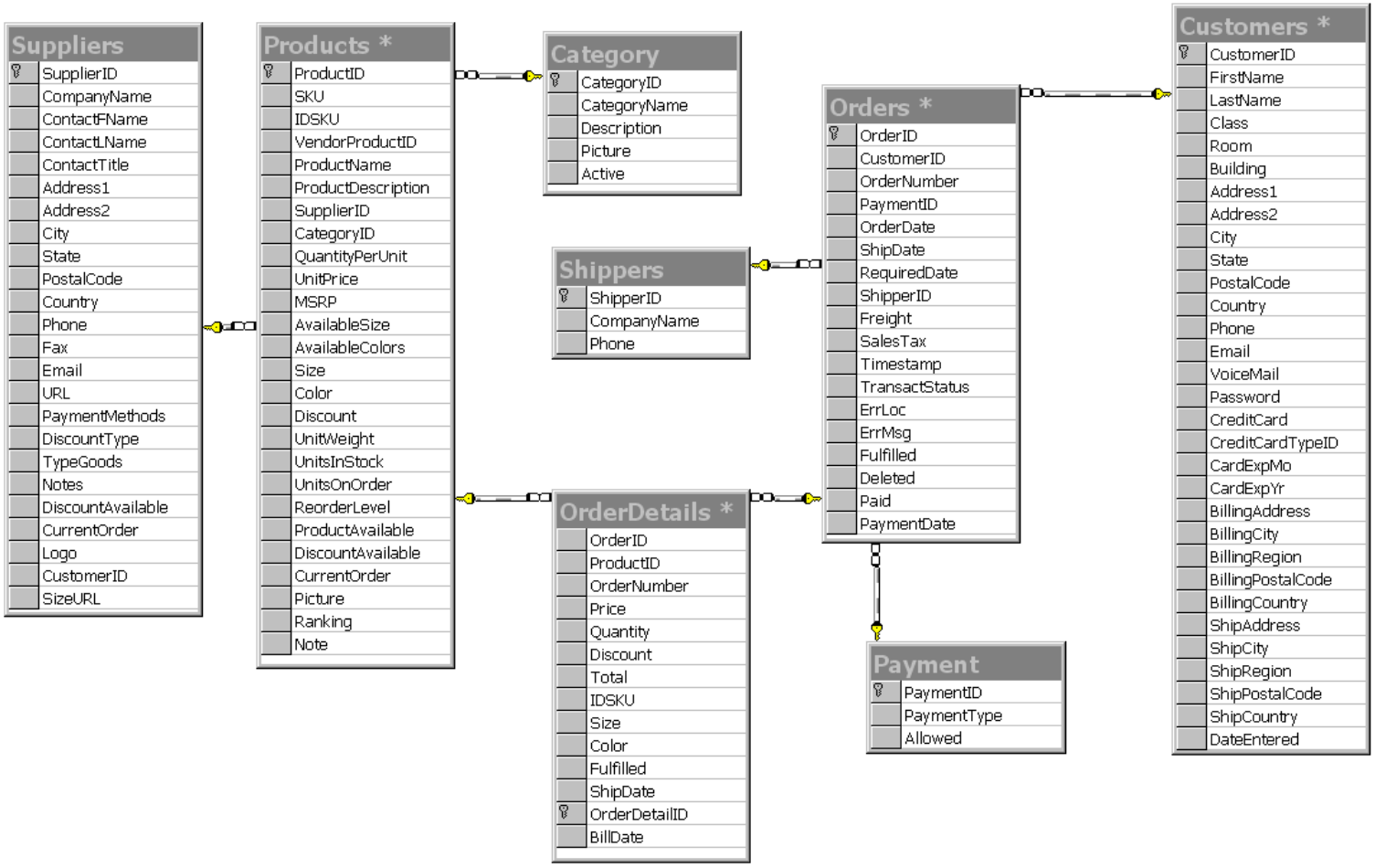
- Bill Inmon

A data warehouse is a central repository for all or significant parts of the data that an enterprise's various business systems collect.

- Bill Inmon

Data Warehouse:

Central repository for all significant data that an enterprise collects.

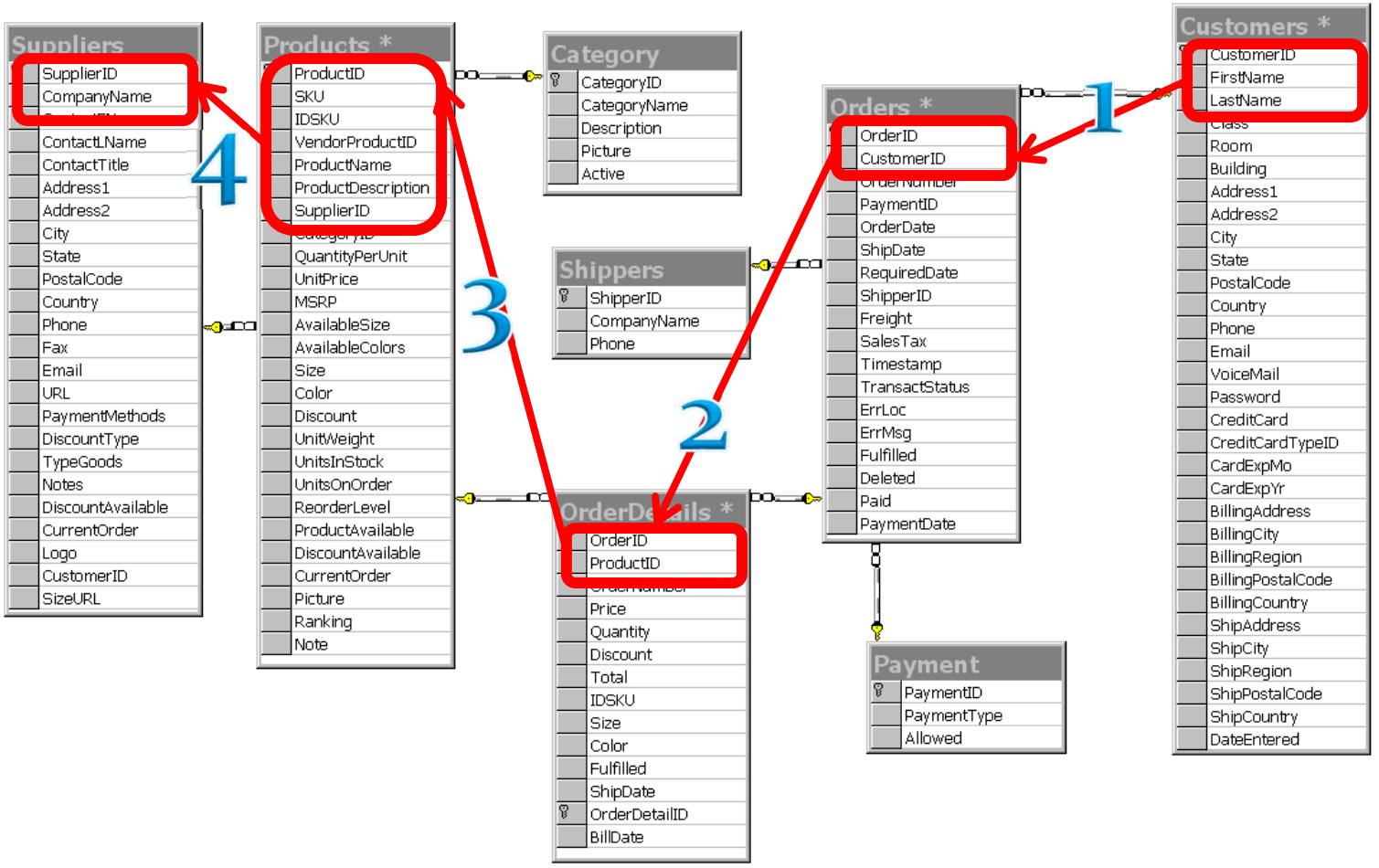


Small OLTP database

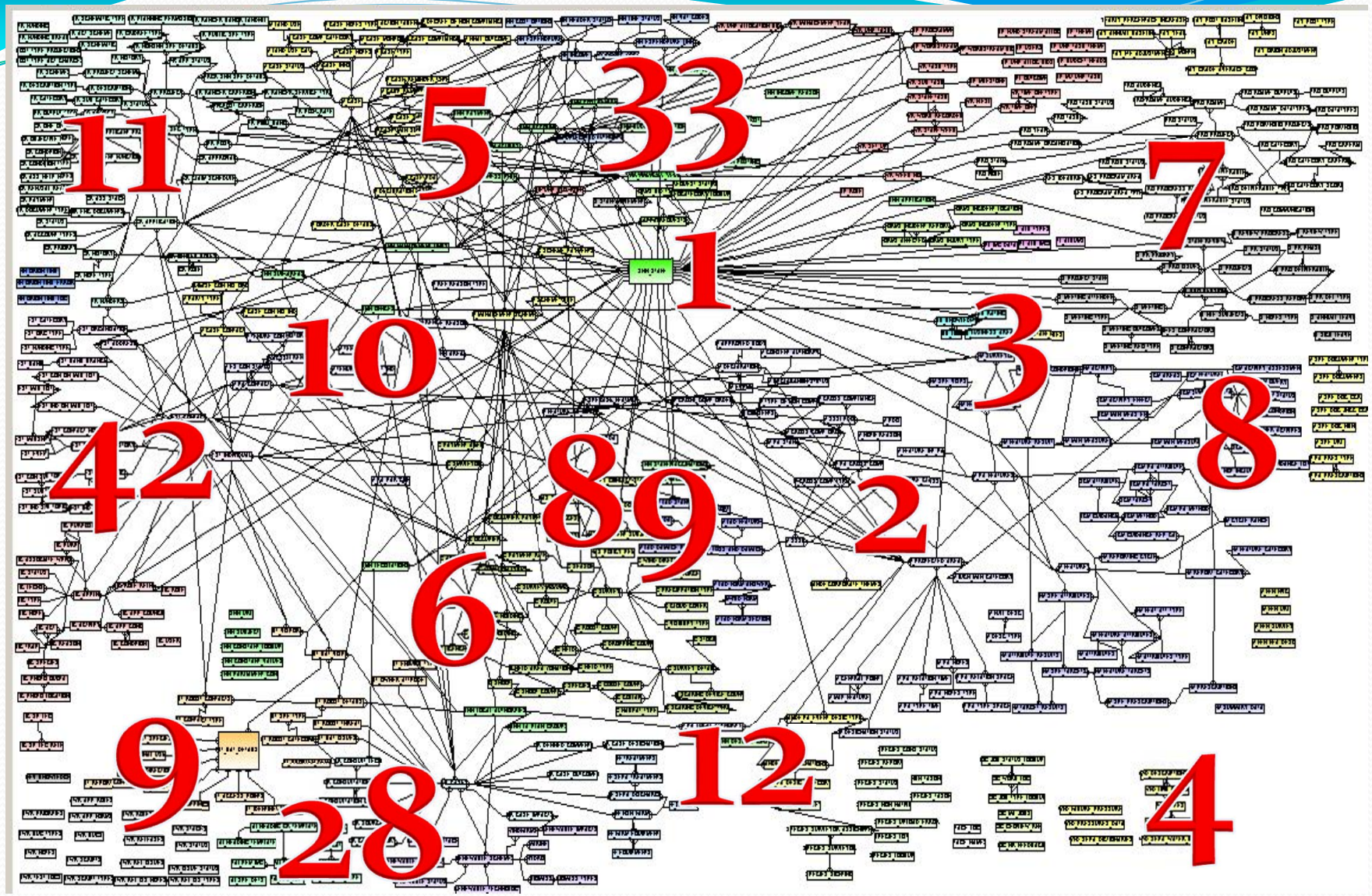
Business Issue:
A customer's order was seriously delayed.

Manager: Why was the order delayed?
Order Fulfillment: Supplier issue.

Simple Business Question:
Who was our product supplier?



Small OLTP database



Large OLTP database

Ralph Kimball

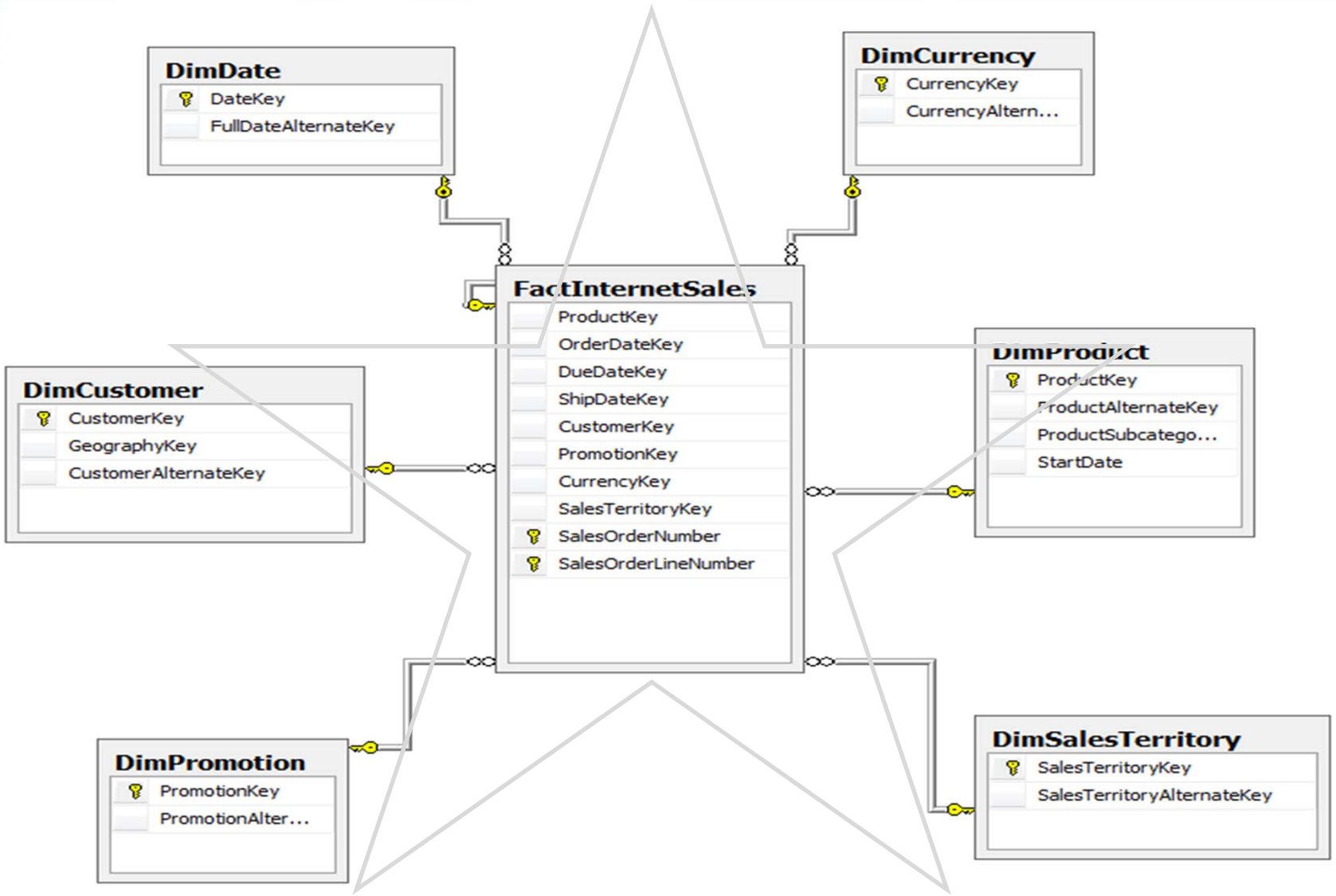
Vs.

Bill Inmon

Star Schema

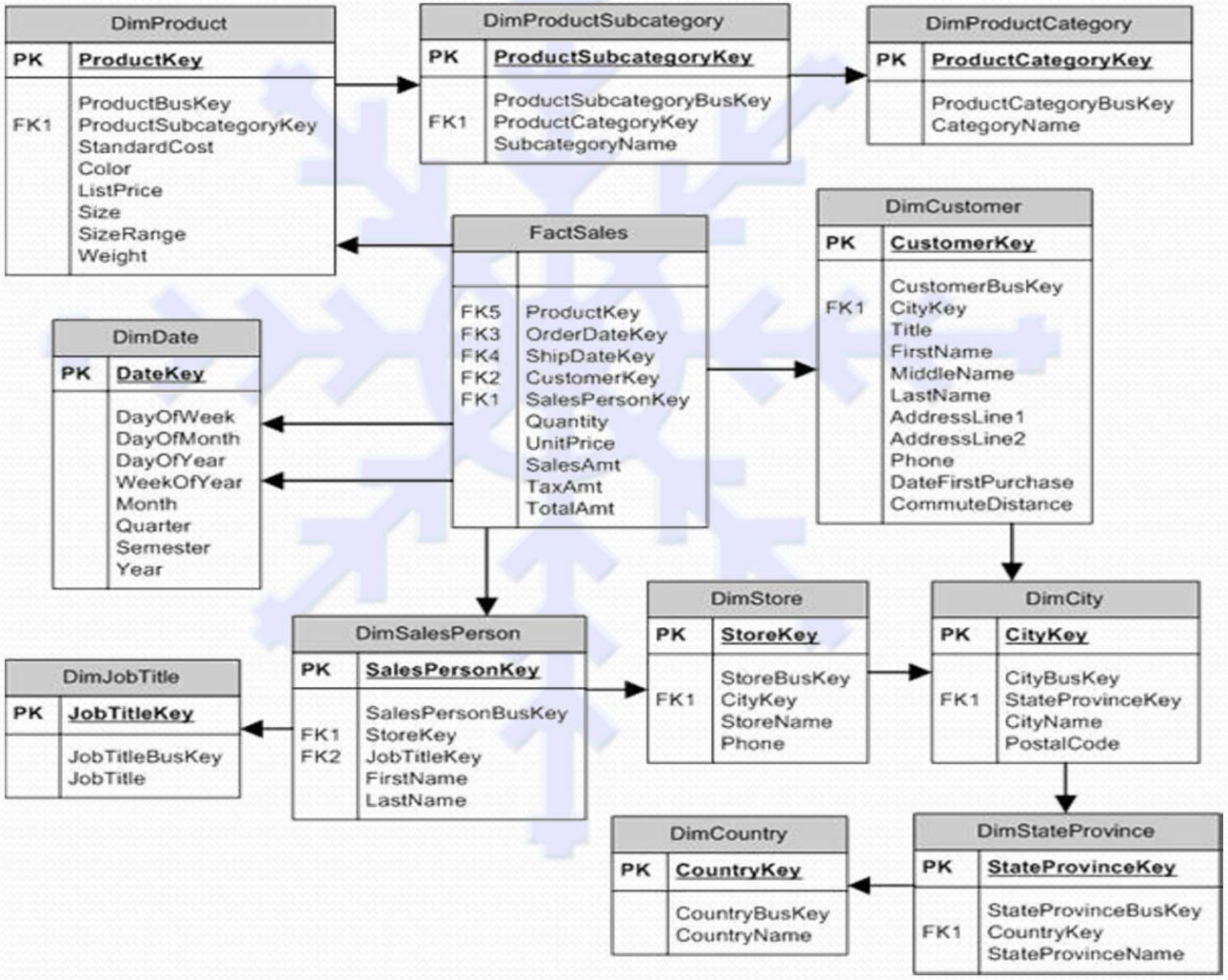
Snowflake Schema

Data Warehouse: Data Model



Data Model: Star Schema

1 to Many to Many



Data Model: Snowflake Schema

Dimensional Modeling

*"The central attraction of the dimensional model of a business is its **simplicity**.... that simplicity is the fundamental key that allows users to **understand** databases, and allows software to navigate databases efficiently."*

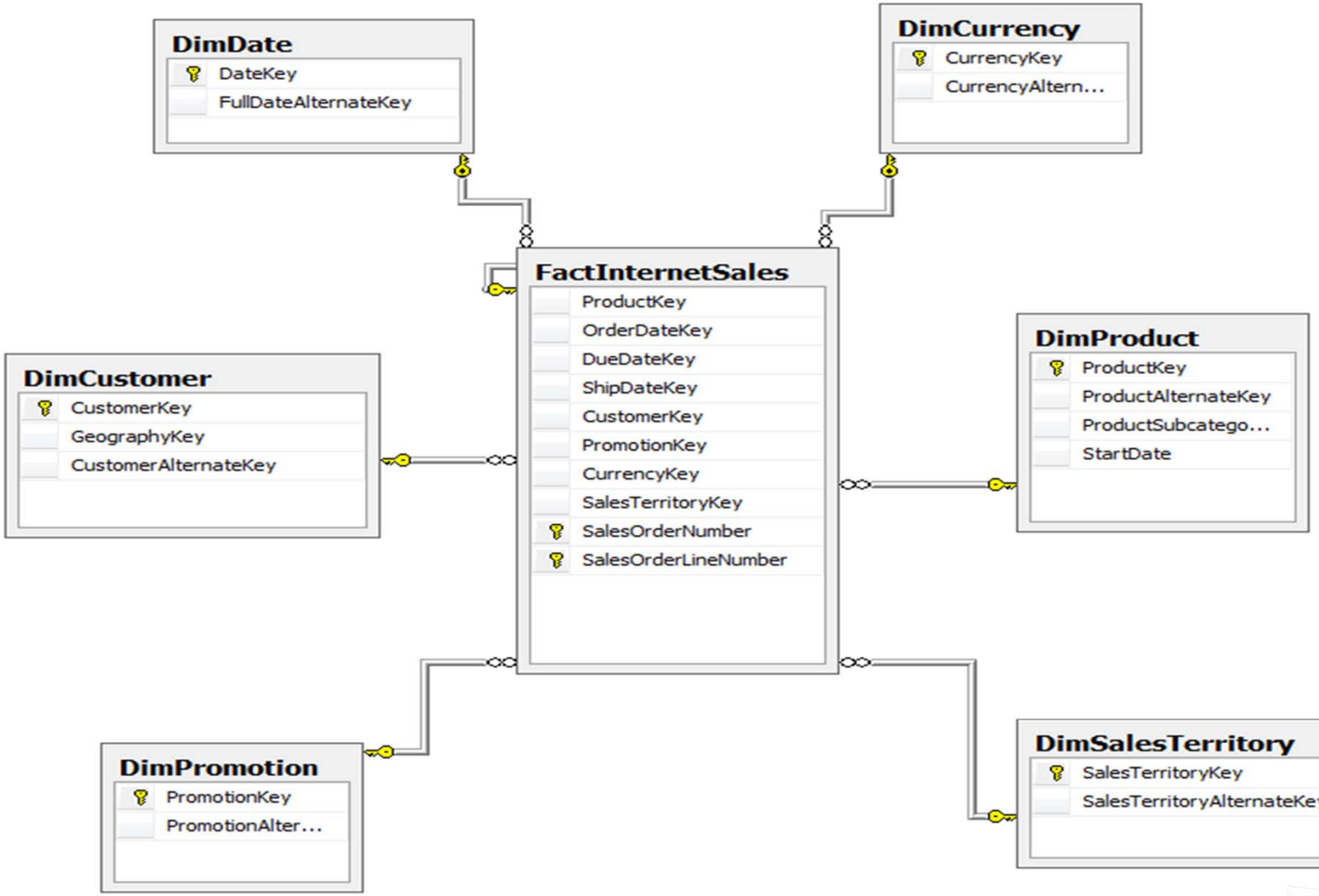
-Ralph Kimball

Dimensional Modeling

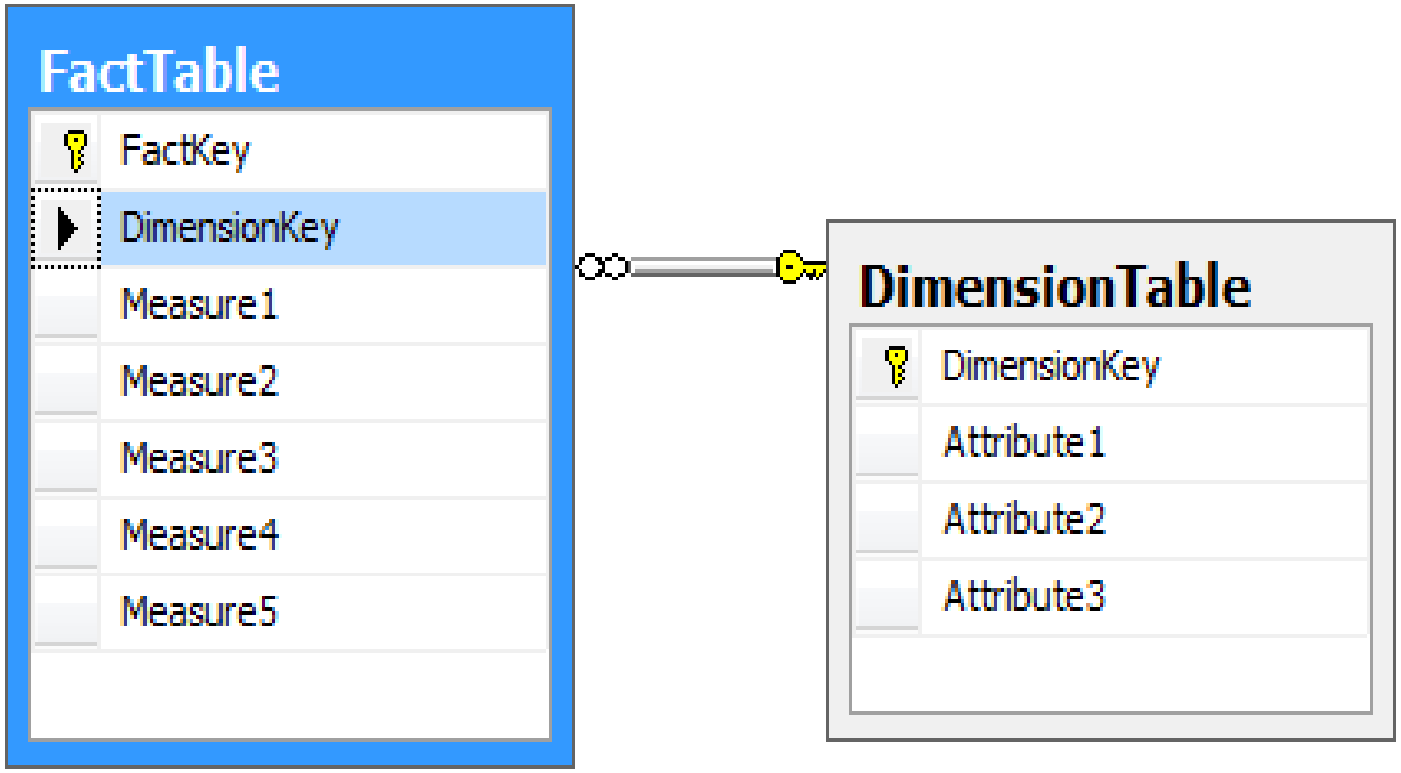
- Logical view of the enterprise
- Shows main entities of the enterprise
- business and relationships between them
- Not tied to a physical database and tables

Main Components

- Dimensions
  - Attributes
  - Hierarchies
- Facts
  - Measures


DimDate
DateKey
FullDateAlternateKey
DimCurrency
CurrencyKey
CurrencyAltern...
FactInternetSales
ProductKey
OrderDateKey
DueDateKey
ShipDateKey
CustomerKey
PromotionKey
CurrencyKey
SalesTerritoryKey
SalesOrderNumber
SalesOrderLineNumber
DimCustomer
CustomerKey
GeographyKey
CustomerAlternateKey
DimProduct
ProductKey
ProductAlternateKey
ProductSubcatego...
StartDate
DimPromotion
PromotionKey
PromotionAlter...
DimSalesTerritory
SalesTerritoryKey
SalesTerritoryAlternateKey

1 to Many



Data Warehouse: Relationships

Fact Measure

- What the business does → Business Process
- Usually describes an **action** or **event** (verb)

Fact Tables: contain *measure* columns and *dimension* key columns

Measure: numerical values that can be aggregated, semi-aggregated, or non-aggregatable

Dimension: group of attributes that describe a business process

Attribute: characteristics of a dimension member

- Fact Internet Sales
  - Sales Amount
  - Discount Amount
  - Profit
  - Profit Margin

- Dim Customer
  - Name
  - Gender
  - Yearly Income

- Dim Product
  - Color
  - Size

Data Warehouse: Fact & Dimensions

Business Process: Sales

Business Intelligence

"BI results when organizational culture, business processes and technologies are designed and implemented with the goal of improving the strategic and operational decision-making capabilities of a wide range of internal and external stakeholders."

- International Data Corporation (IDC)

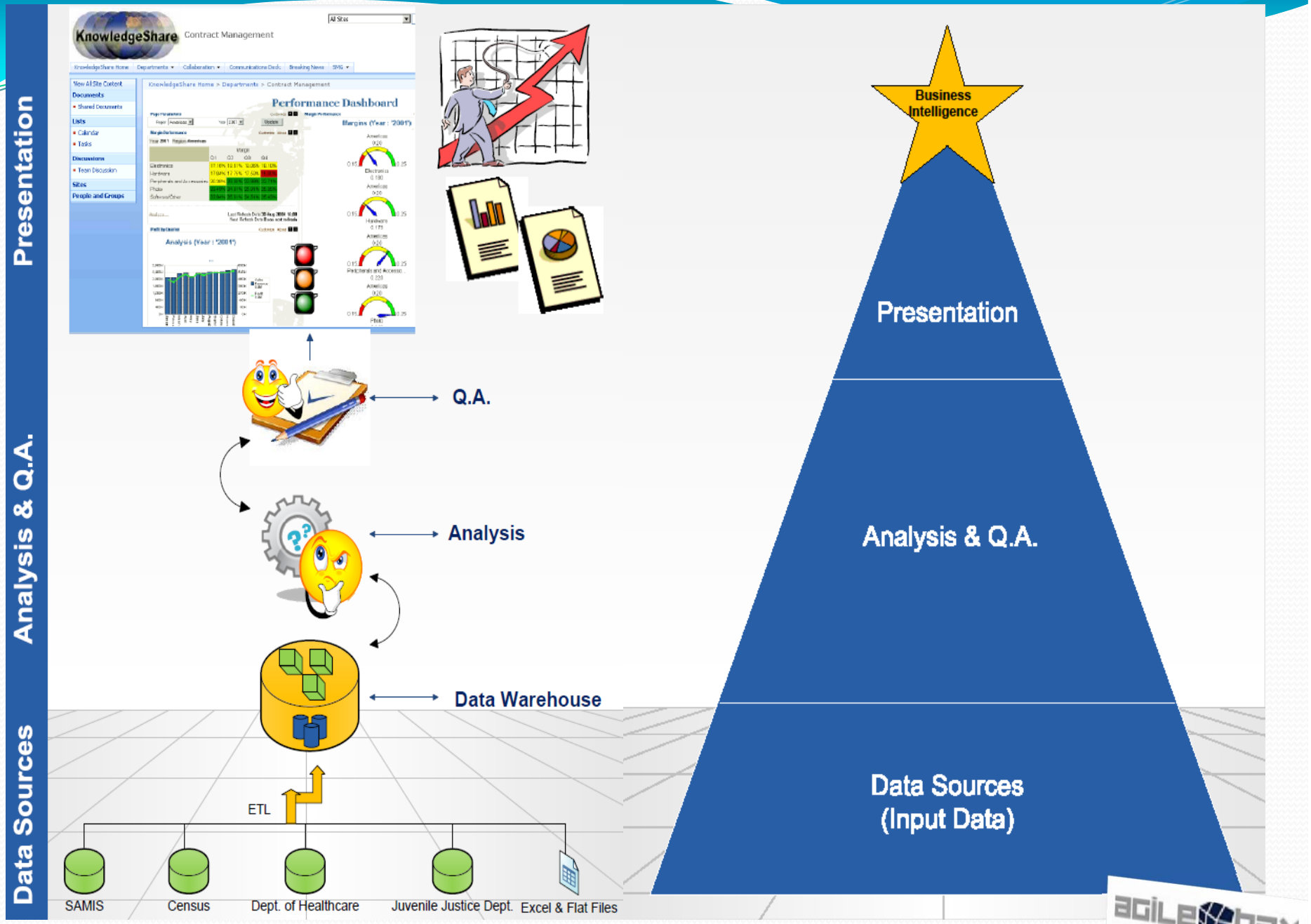
*"BI results when organizational **culture**, business **processes** and **technologies** are designed and implemented with the goal of **improving** the strategic and operational **decision-making** capabilities of a wide range of internal and external **stakeholders**."*

- International Data Corporation (IDC)

Business Intelligence:

Culture, processes and technologies to improve decision making for stakeholders.

3 Layers of BI &
The Microsoft Toolset


Presentation
Analysis & Q.A.
Data Sources
KnowledgeShare
Contract Management
Performance Dashboard
Q.A.
Analysis
Data Warehouse
ETL
SAMIS
Census
Dept. of Healthcare
Juvenile Justice Dept.
Excel & Flat Files
Business Intelligence
Presentation
Analysis & Q.A.
Data Sources
(Input Data)

The Microsoft Toolset

PowePivot

Excel

Presentation

- SQL Server Reporting Services
- SharePoint
- Report Builder
- Performance Point
- Excel
- Power View

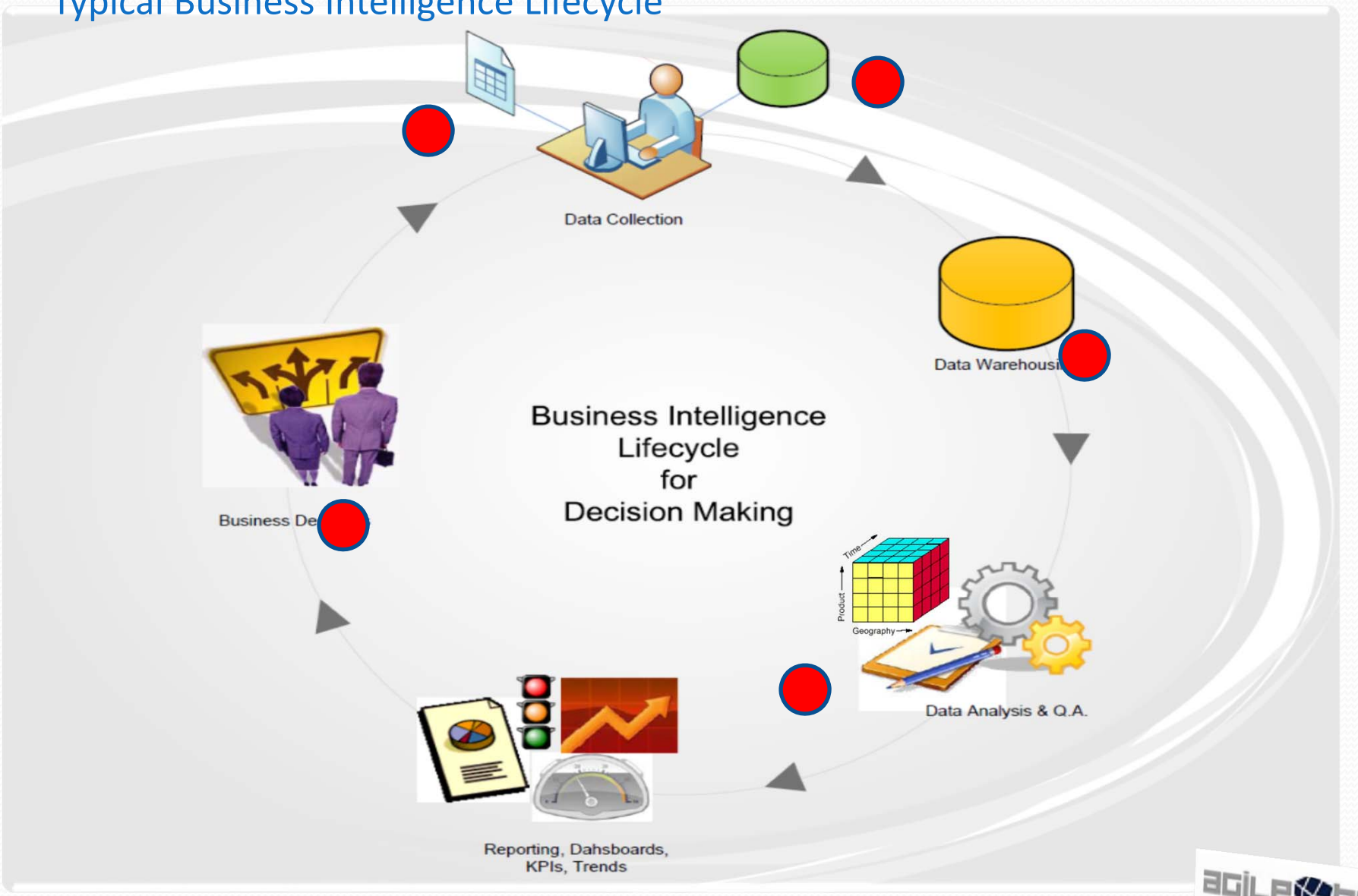
Analysis

- SQL Server Analysis Services
- PowerPivot

E.T.L

- SQL Server Integration Services

Typical Business Intelligence Lifecycle



What Business Intelligence is not.

What it is not…

- Application
- Tool
- Department
- Project
- Report Base
- Archive
- IT Service

What it is…

- Solution
- Suite
- Interdepartmental Team
- Continuous process
- Knowledge Base
- Actionable Information
- Business Asset

What is Business Intelligence?

Why Business Intelligence?

The complaints:

- *"We need information but all we have is data!"*
  Why Companies Need Business Intelligence by Jose Allan Tans
- *"Need to make data manageable and actionable in a timely manner"*
  Need for Business Intelligence Grows by Diann Daniel (CIO Magazine)
- ***"Information overload"***

How will BI solve it?

...The Snake Oil selling points:

- *Surface performance & operational efficiencies and deficiencies*
- *Reveal untapped opportunities*
  - *Data Mining*
  - *Forecasting & Trending*
- *Democratization of the data*
- *Decision Support System (DSS)*
- *Dashboards & Balanced Scorecards*
- *Key Performance Indicators (KPIs)*

But wait there's more,

if you call in the next 10 minutes…

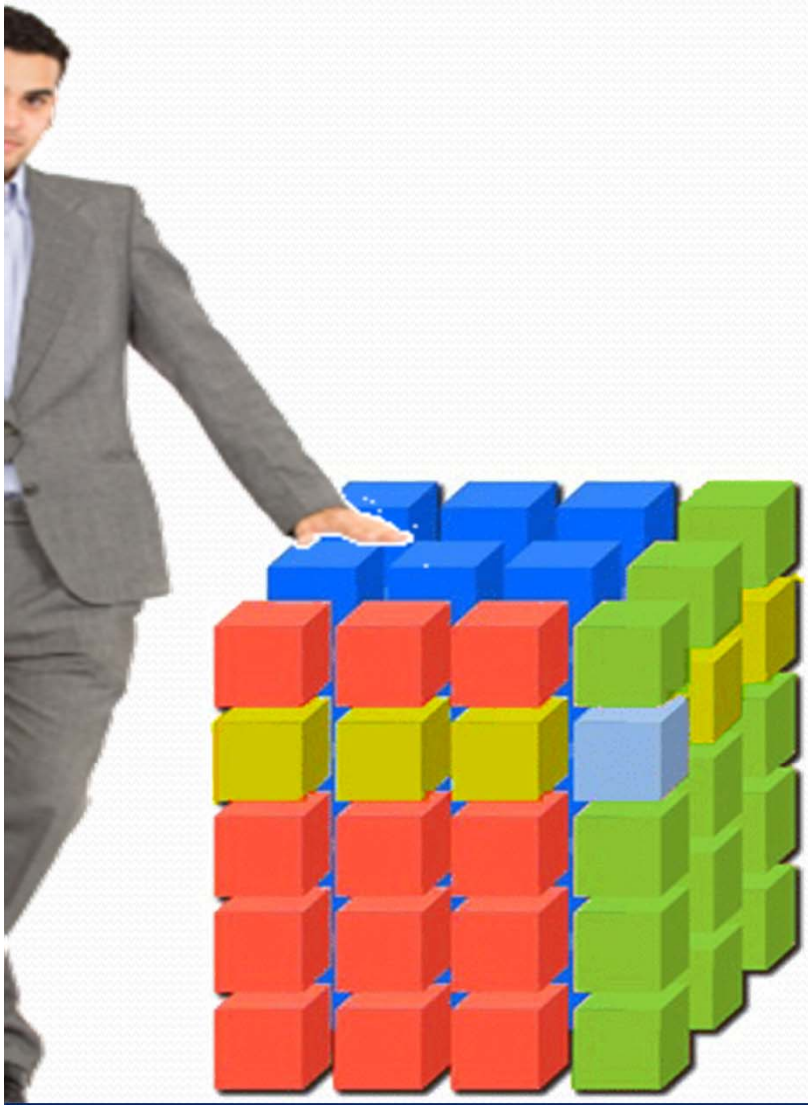
Self-Service BI.
(No need for IT)

...Reactive Manager

- Answer questions
- Solve issues
- Trending
- Make decisions
- Understand your customers
- Report

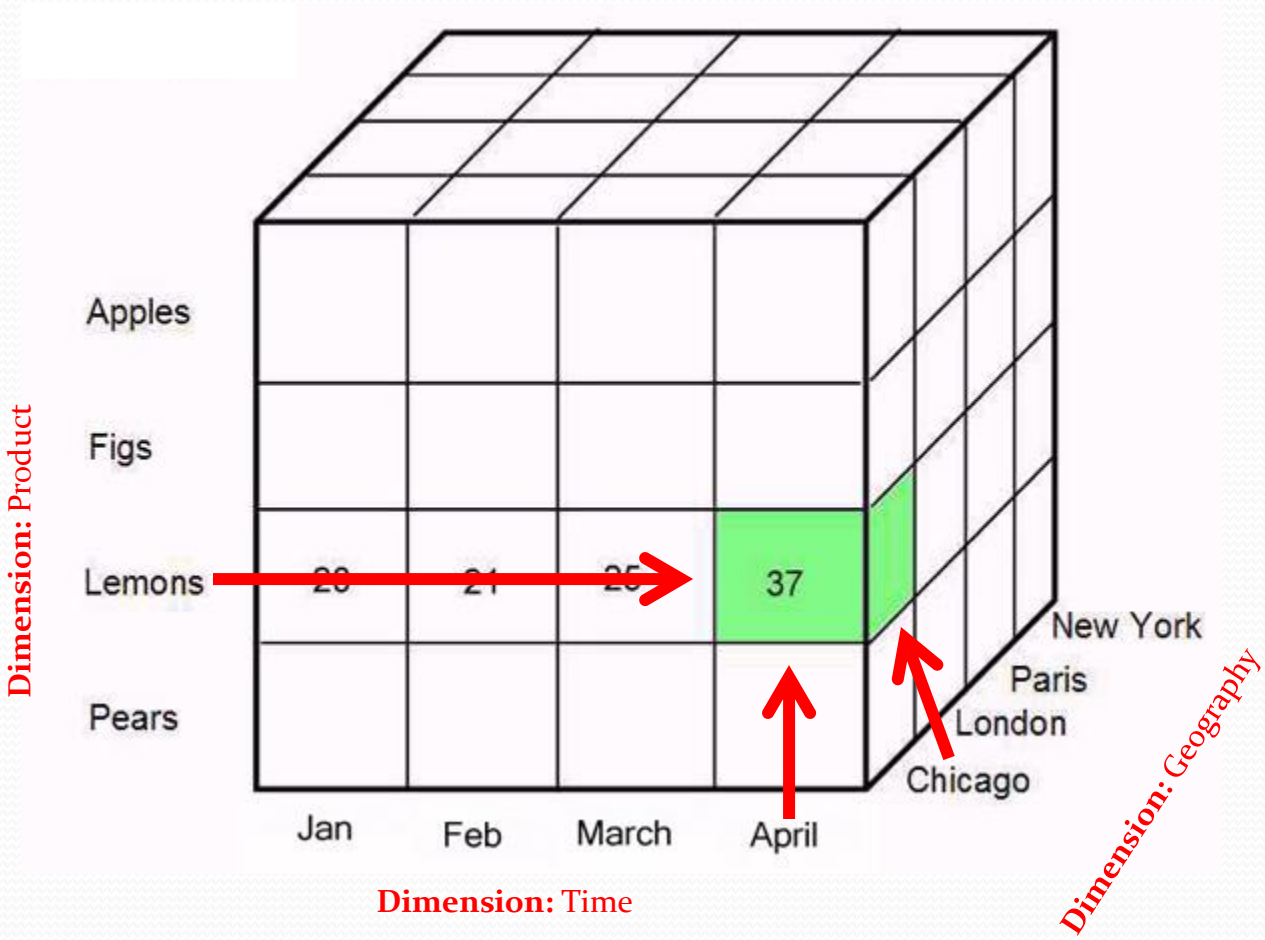
Proactive Manager...

- Propose new questions
- Identify future issues
- Forecasting
- Surface decision points
- Discover potential customers
- Gain insight



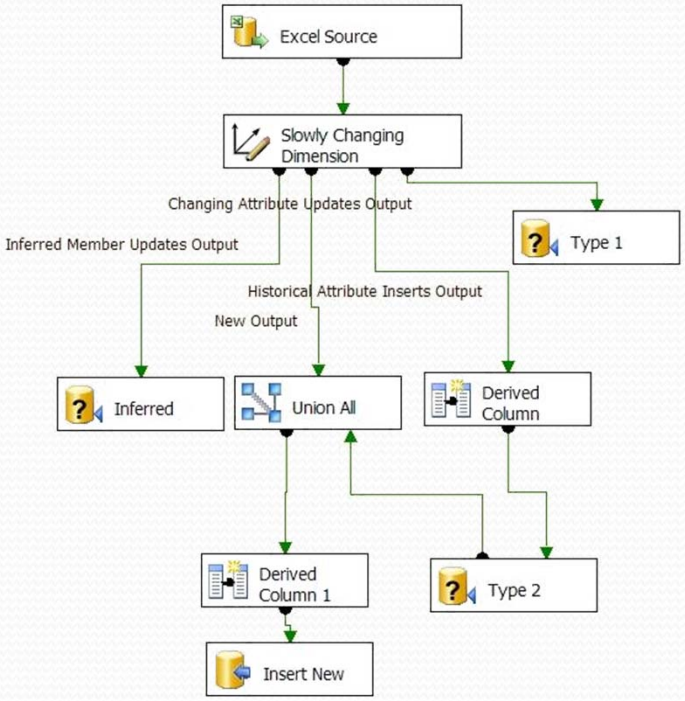
The OLAP Cube

Measure: Units sold



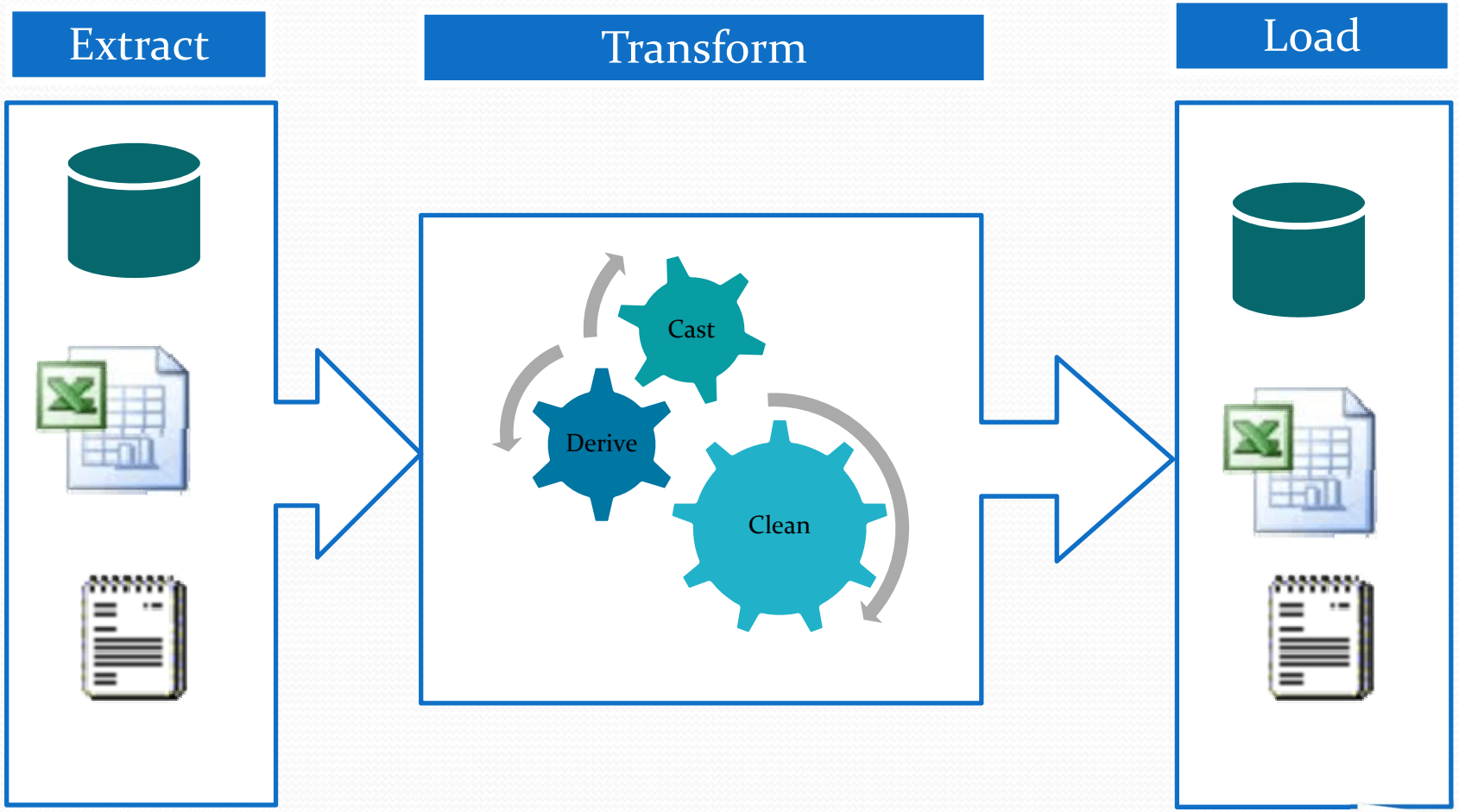
Fact:

37 Lemons were sold during April in our Chicago stores.



SQL Server Integration Services

ETL Process (simplified)

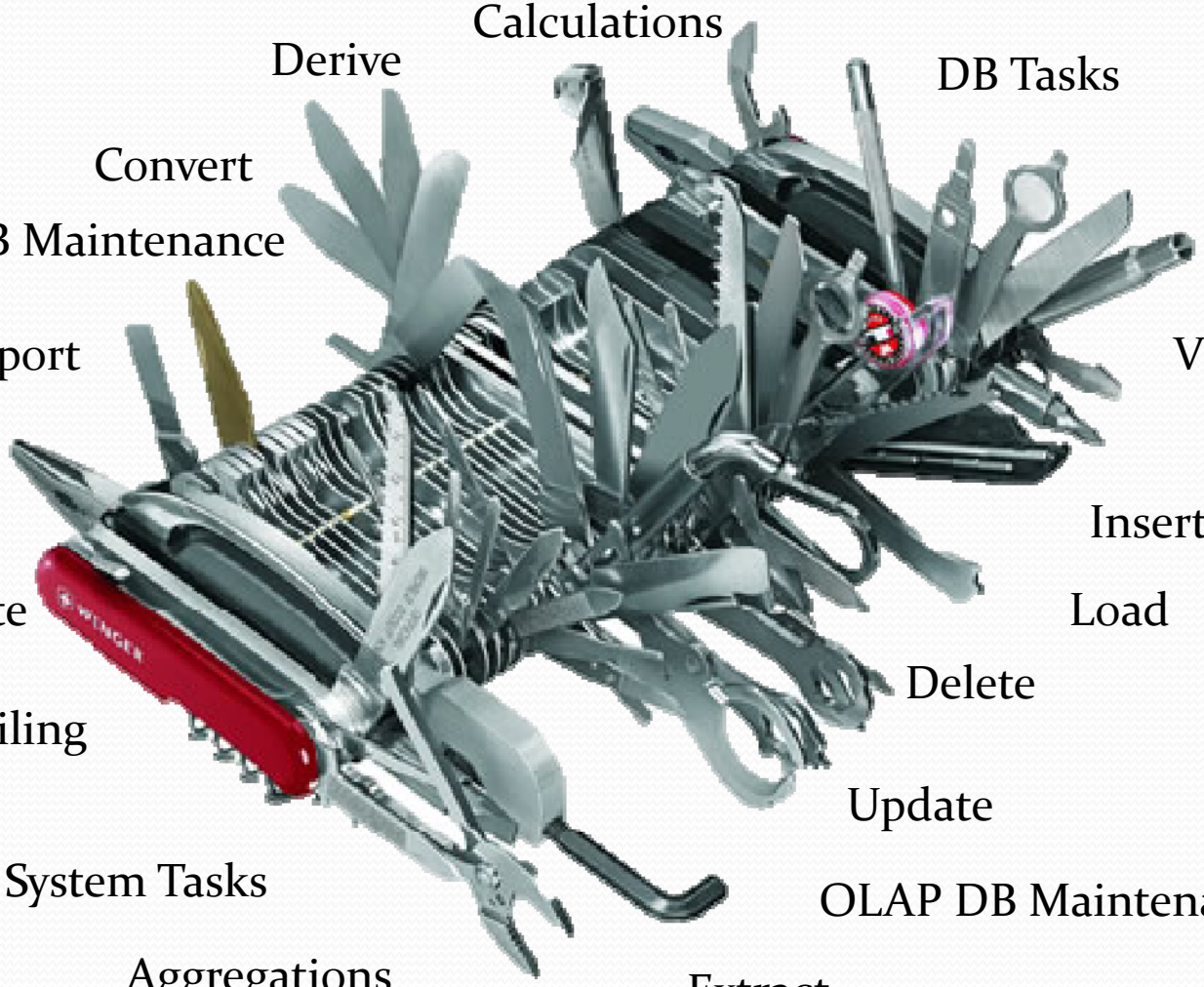


ETL process Mantra

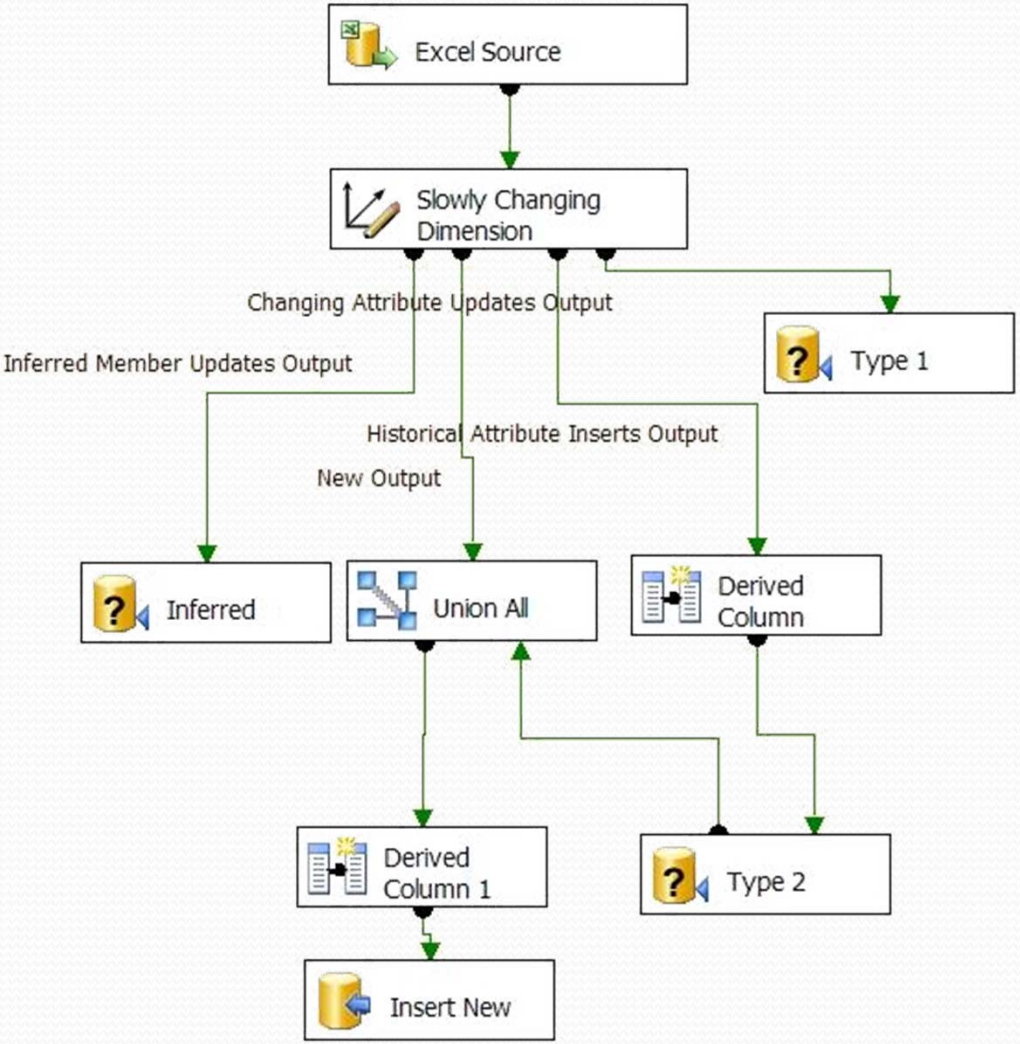
Extracting Data
Transforming Data
Loading Data

- Fast
- Efficient
- Scalable

SSIS – Jack of all trades



Loading a Data Warehouse with SSIS



SQL Server Analysis Services

Analysis Services

Three Installation Modes

1. Multidimensional & Data Mining Mode
   - UDM
   - MDX

2. Tabular Mode
   - BISM
   - xVelocity (Vertipaq)
   - In-memory cubes
   - DAX & MDX

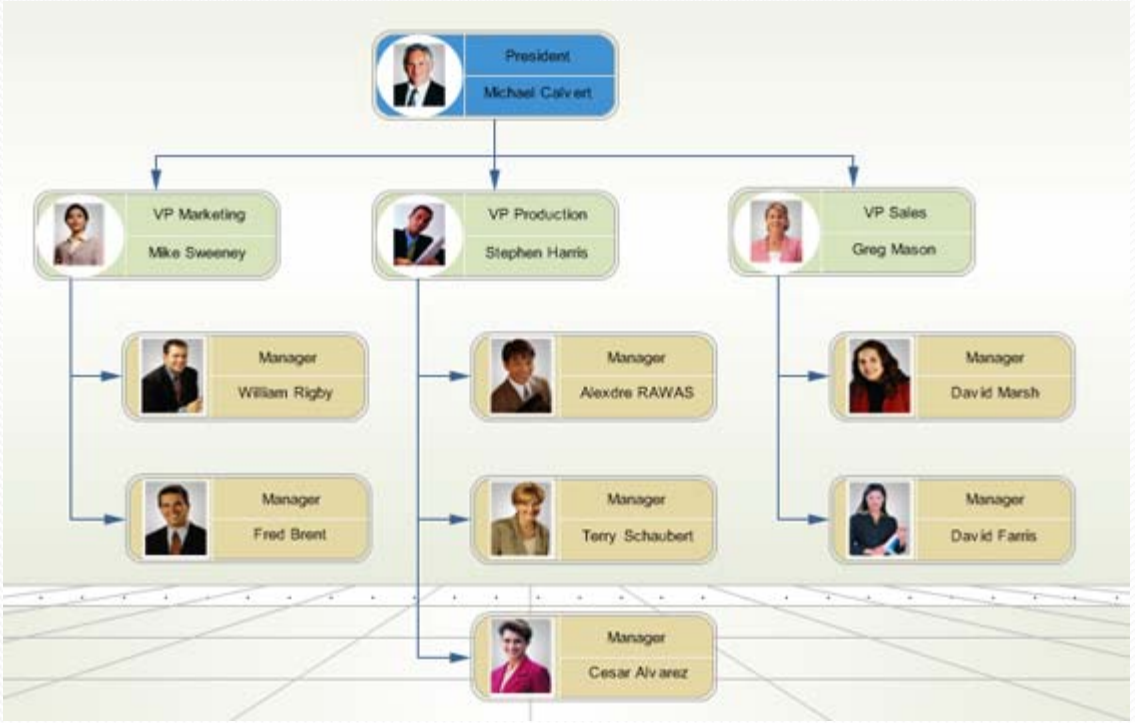
3. PowerPivot for SharePoint
   - Dedicated Tabular Mode

Analysis Services

Main Features

1. Data Sources
2. Views
3. Cubes
4. Dimensions
   - Attributes
   - Attribute Hierarchies
5. Measure Groups
   - Measures
6. Calculations
7. KPIs
8. Perspectives
9. Translations
10. Partitions
11. Aggregations
12. Roles
13. Data Mining Models

SSAS Hierarchies

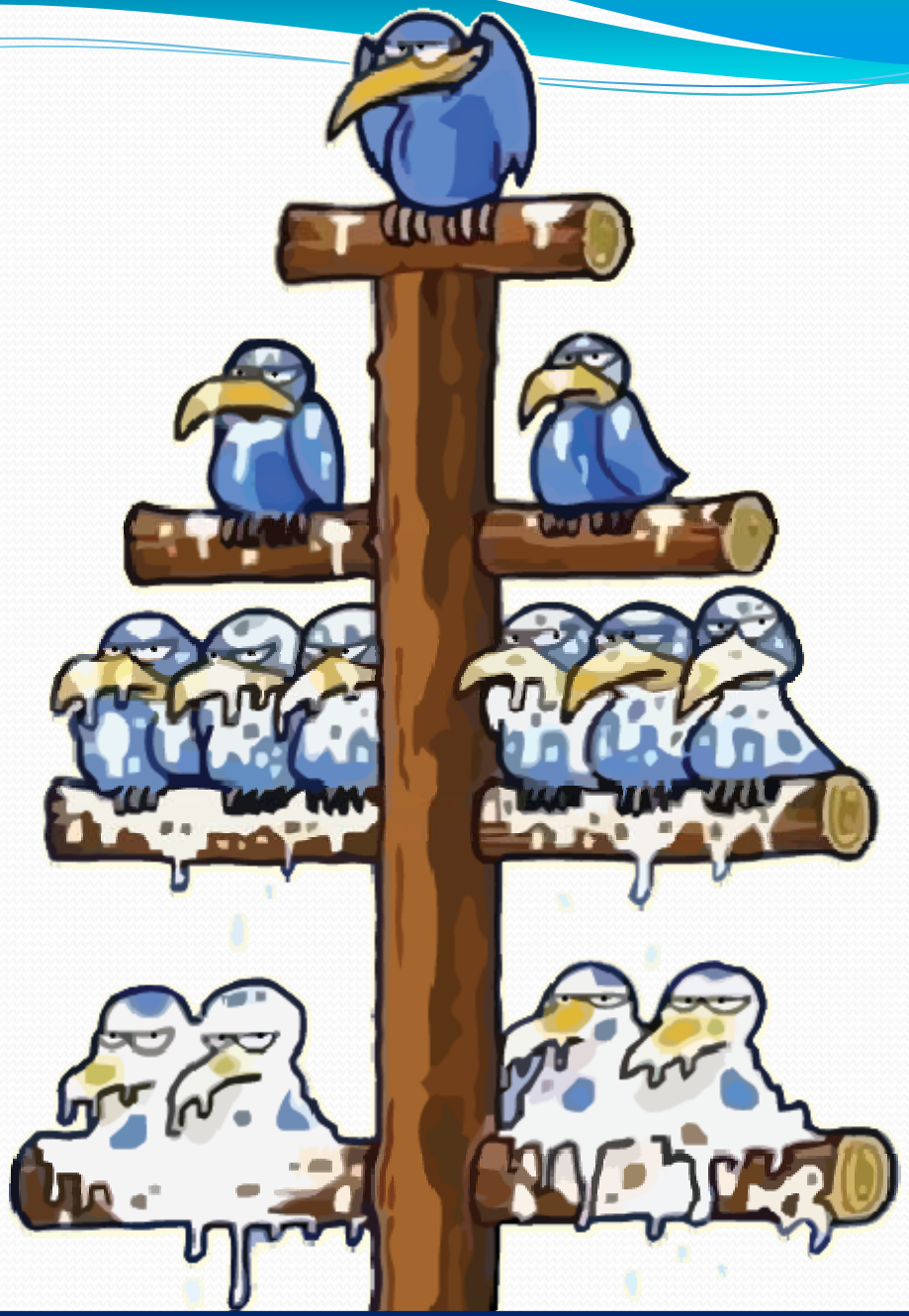


Executives

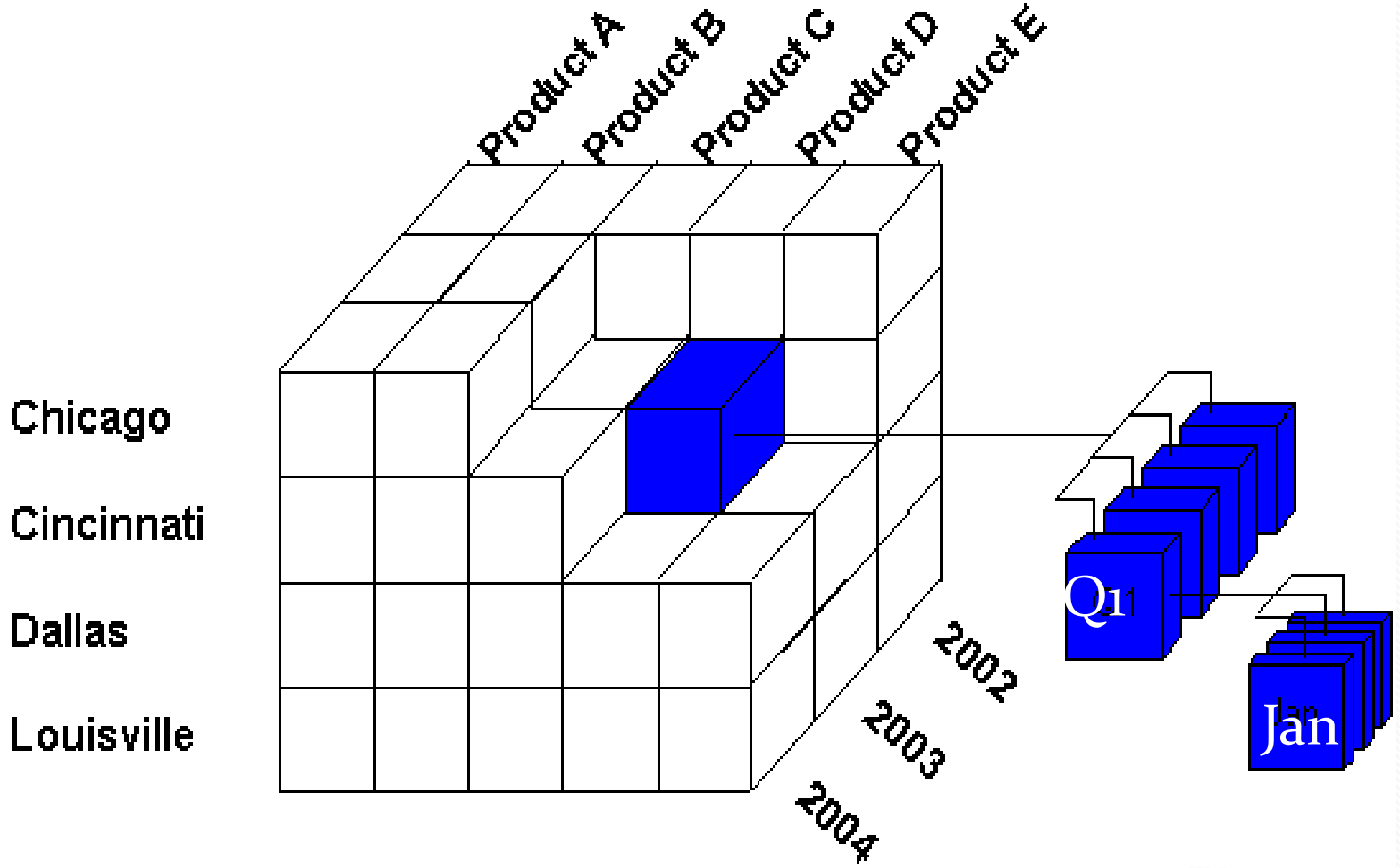
Analysts

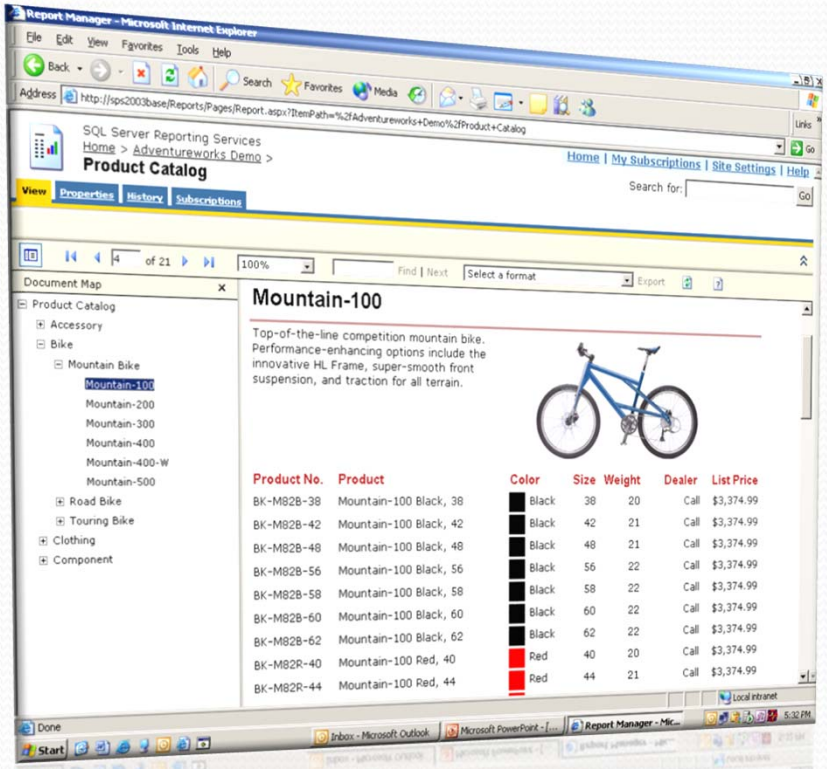
Developers

DBAs



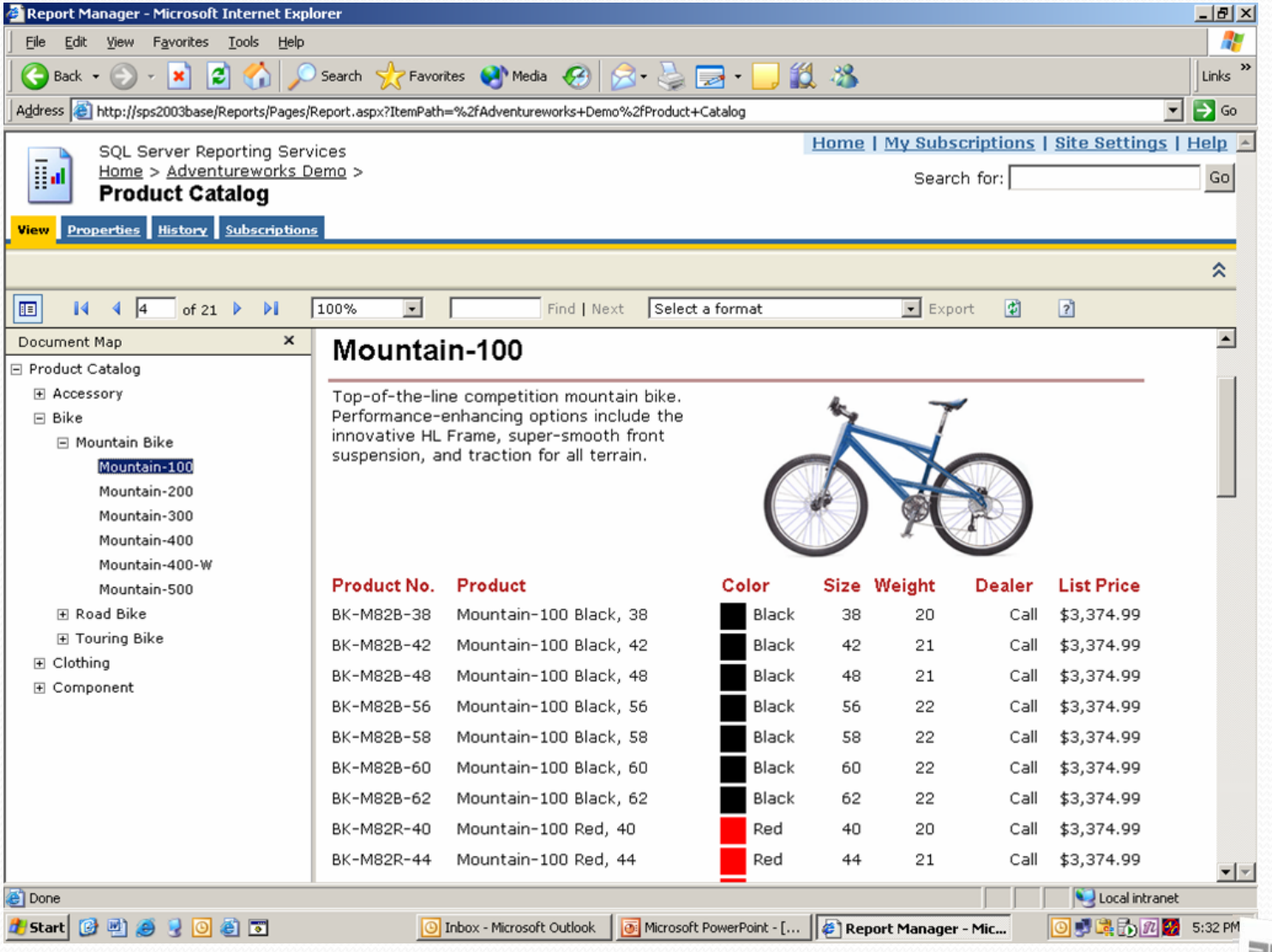
Blame Flow


Product A
Product B
Product C
Product D
Product E
Chicago
Cincinnati
Dallas
Louisville
2002
2003
2004
Q1
Jan
Jan



SQL Server Reporting Services

SQL Server Reporting Services



Self-Service BI

The Business Intelligence Roadmap

Aligned ⟷ Empowered

Organizational BI

The Org's Context

BI Solution created by IT, Established corporate context & is reusable, scalable and backed up.

Team BI

Our Context

BI Solution created by power user. Context is for a small team & it's managed on a server.

Personal BI

My Context

BI solution created by user. Context is only for user & exists as document.

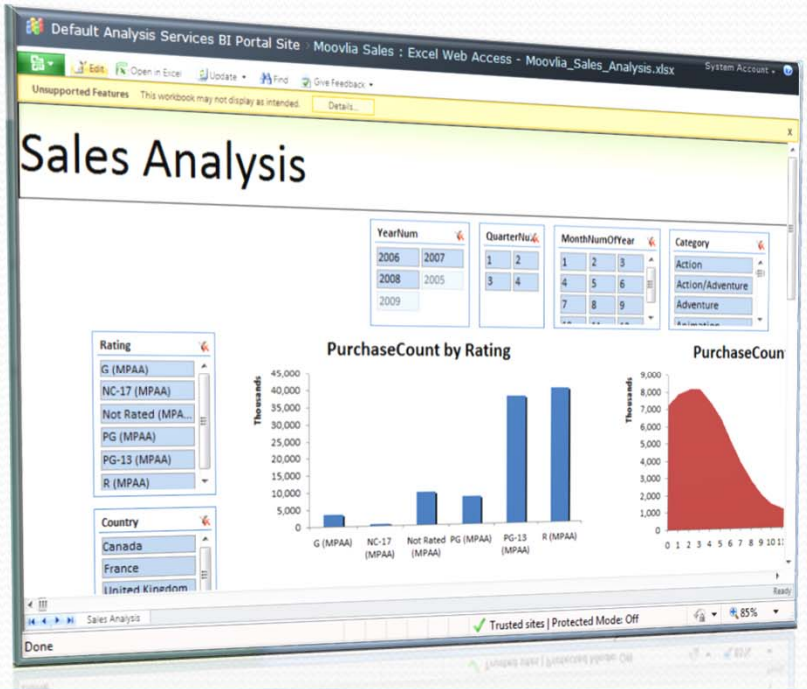
SQL Server Data Tools (new BIDS)

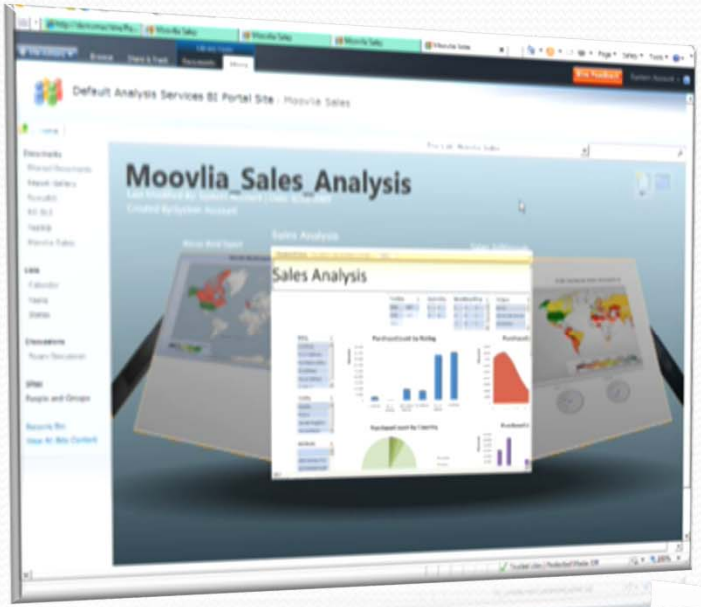
PowerPivot for SharePoint

PowerPivot for Excel
Report Builder
Power View

PowerPivot

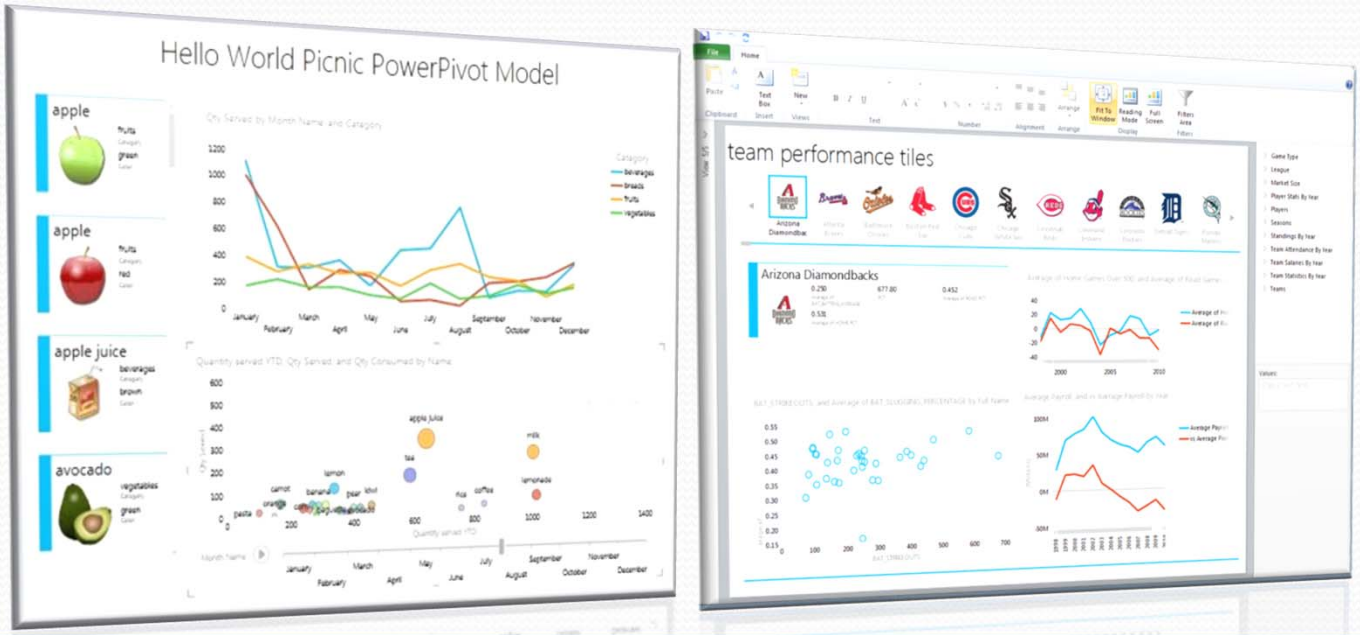
- PowerPivot Excel Add-in
- PowerPivot for SharePoint
- xVelocity (Vertipaq)
- BISM

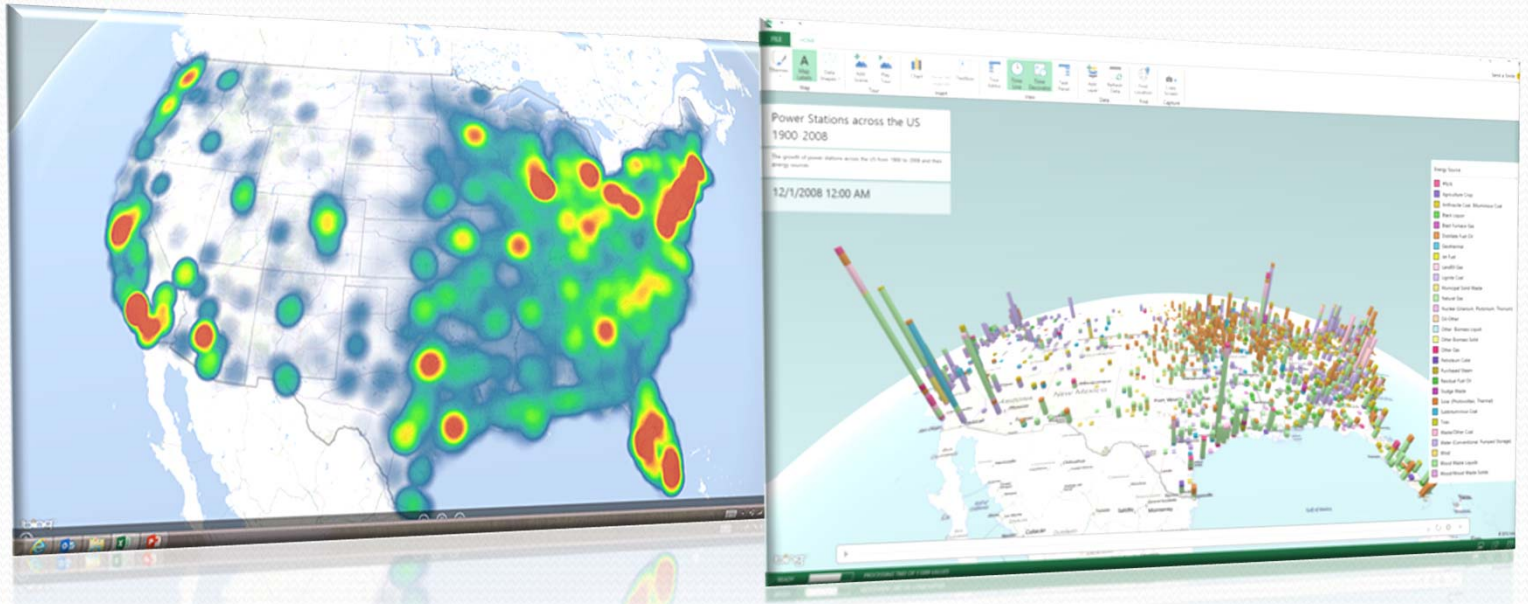




Power View

- Ad-hoc reports & dashboards
- True point & click
- Export to PowerPoint with Interactive mode
- Silverlight
- SharePoint2010 + SQL Server 2012 SSRS integration



Power Map

- 3D Mapping
- Geographical analysis
- Interactive