



**THE  
POWER  
TO KNOW.**

# OLAP Technologies and Applications

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# Objectives

- Define Business Intelligence
- Identify role of OLAP in the BI Platform
- Discuss cube structure
- Demo SAS OLAP Applications
- Address Q & A

# What Is Business Intelligence?

- *Business intelligence uses knowledge management, data warehouse[ing], data mining and business analysis to identify, track and improve key processes and data, as well as identify and monitor trends in corporate, competitor and market performance.*

– BETTERMANAGEMENT.COM

- *Getting the right data to the right people at the right time*

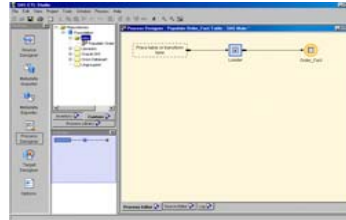
– SAS

# SAS Business Intelligence Applications

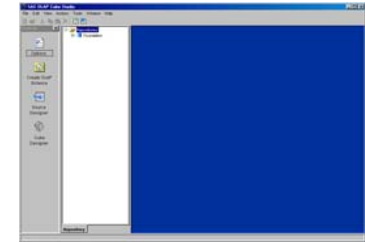
**SAS Management Console**



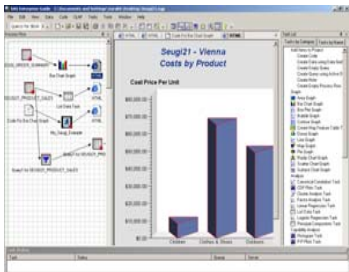
**SAS Data Integration Studio**



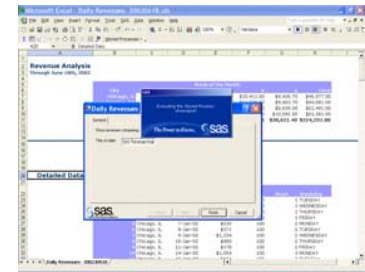
**SAS OLAP Cube Studio**



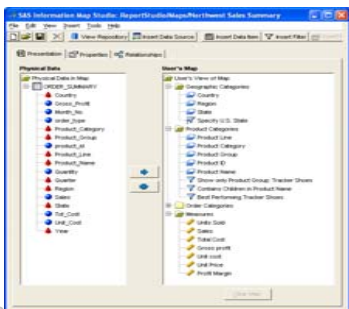
**SAS Enterprise Guide**



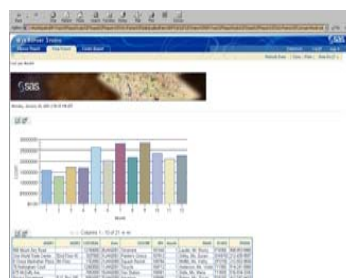
**SAS Add-In for Microsoft Office**



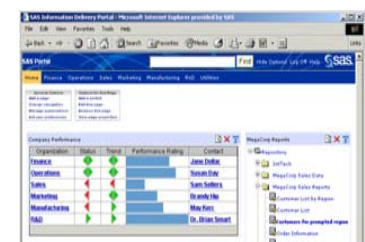
**SAS Information Map Studio**



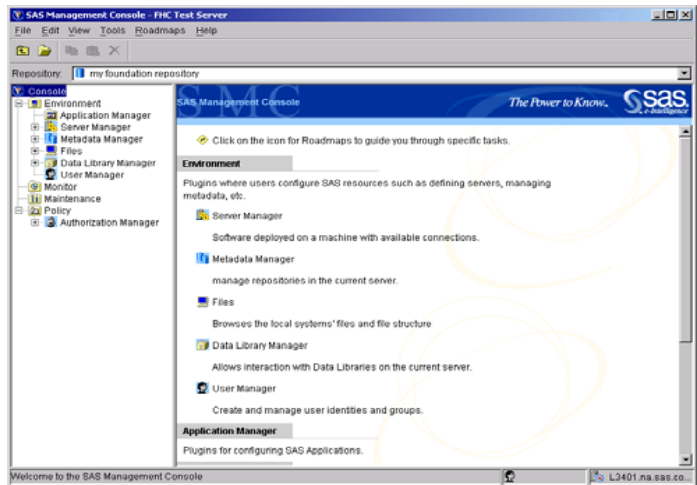
**SAS Web Report Studio**



**SAS Information Delivery Portal**

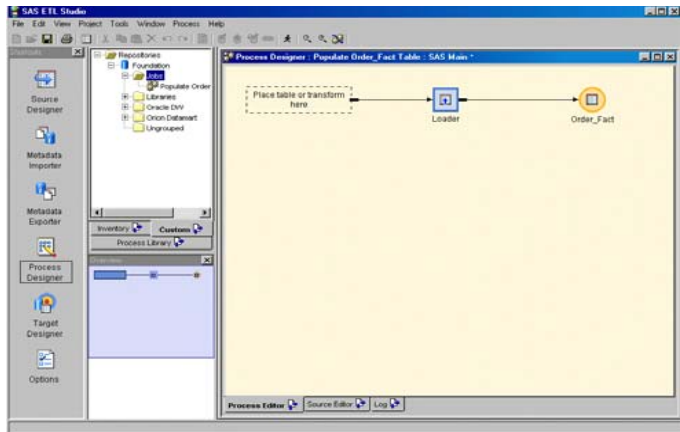


# BI Tools – IT Staff



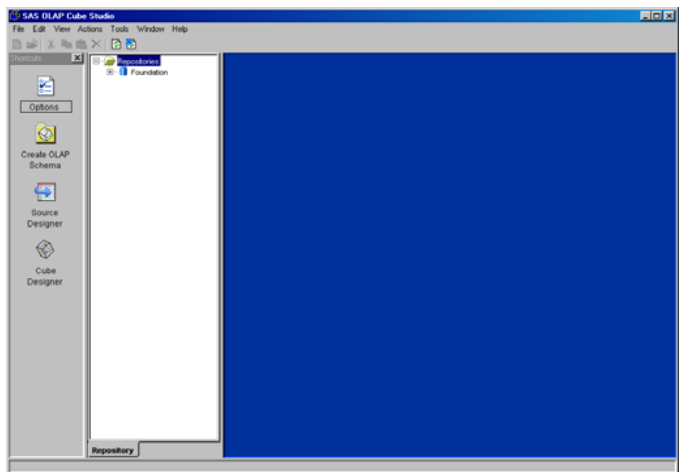
- Work with Metadata using SAS Management Console
  - Create/manage server definitions
  - Plan and Implement the User environment
  - Control access to data, tools, capabilities

# BI Tools – Data Modelers



## ■ Data Integration Studio

- Create and manage metadata for source tables, target tables and jobs to populate data warehouses and data marts
- Use Data Quality add-ins to cleanse data



## ■ OLAP Cube Studio

- Define dimensions, levels, measures
- Generate aggregation levels
- Create OLAP cubes that can be accessed using SAS BI tools and MDX compliant tools

# BI Tools – Programmers/Developers

```

%macro parmv1;
  %global alpha method lead;
  %let alpha = %scan(%alpha,1,' ');
  %let method = %scan(%smethod,1,' ');
  %if %alpha = %str() %then %let alpha = 0.05;
  %if %smethod = %str() %then %let method = STEPAR;
  %if %lead = %str() %then %let lead = 6;
%mend;

%parmv1;

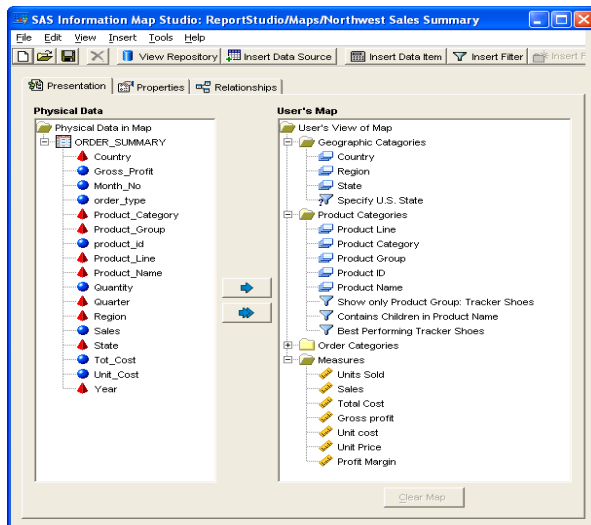
*let _GOPT_DEVICE=act:mg;
%let _GOPT_NPIXELS=700;
%let _GOPT_MPIXELS=420;
%let _ODSTYLB=seaside;

%stpbegin;

%libname orsum "c:\workshop\winsas\ship\orion_star_15AUG03\orsum";
%libname AMO meta library="AMO Orsum Data" reptime="Foundation";
%proc forecast data=AMO.profit alpha=%alpha interval=month lead=%lead
  out=fcast outall method=%method ;
  id yymm;
  var sales;
  where company eq "Orion USA";
run;
  
```

## ■ Stored Processes

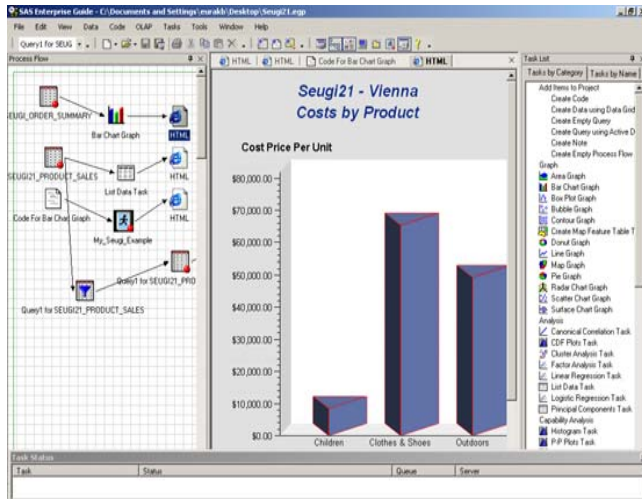
- Leverage existing SAS programs, or create new programs with embedded security, business logic, complexity
- Transparent to user



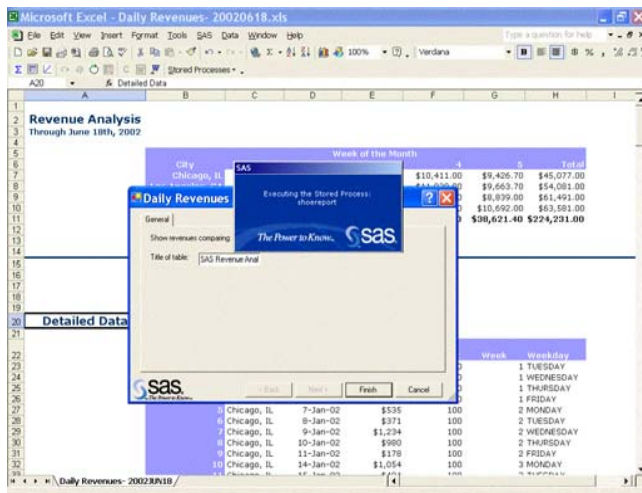
## ■ Information Map Studio

- Define data relationships, filters, calculations, data usage rules
- Create report metadata to provide end users a “self-help” approach to accessing information

# BI Tools – Analysts/Power Users



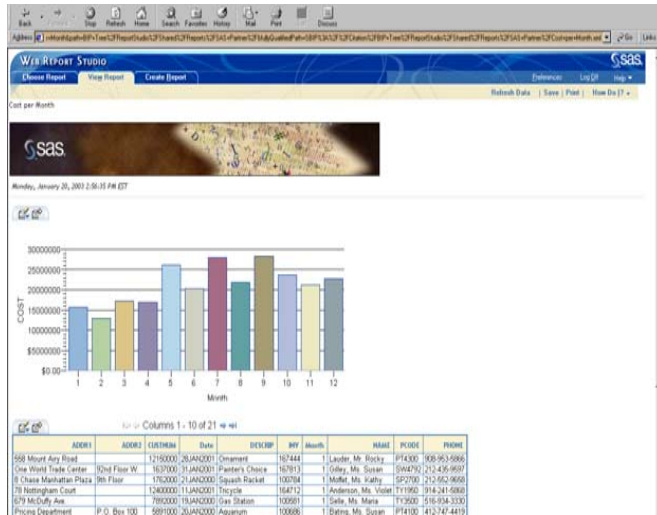
- Enterprise Guide
  - Manipulate data
  - Access underlying SAS code
  - Create and manage multiple sophisticated reports, leverage SAS Analytics, and much more



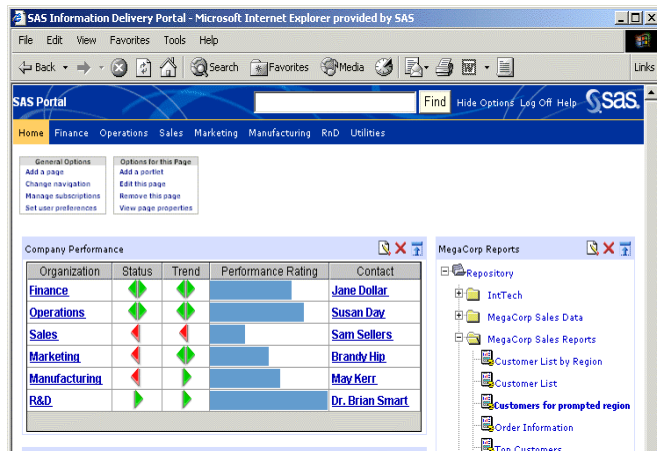
- Microsoft Office Add-In
  - Leverage the power of SAS Tasks and Analytics against SAS or Excel data
  - Use from Excel, Word or PowerPoint



# BI Tools – End Users



- Web Report Studio
  - Zero-footprint browser based
  - Create simple to complex reports, based on intuitive business-centric Information Maps



- Information Delivery Portal
  - Personalize access to personal or shared content
  - Link to or embed reports, cube views, external links, internal channel publications and much more

# Business Scenario

Users need to generate views of the data in SAS Enterprise Guide such as shown below:

Gender, Country Hierarchy > All GenderCntry

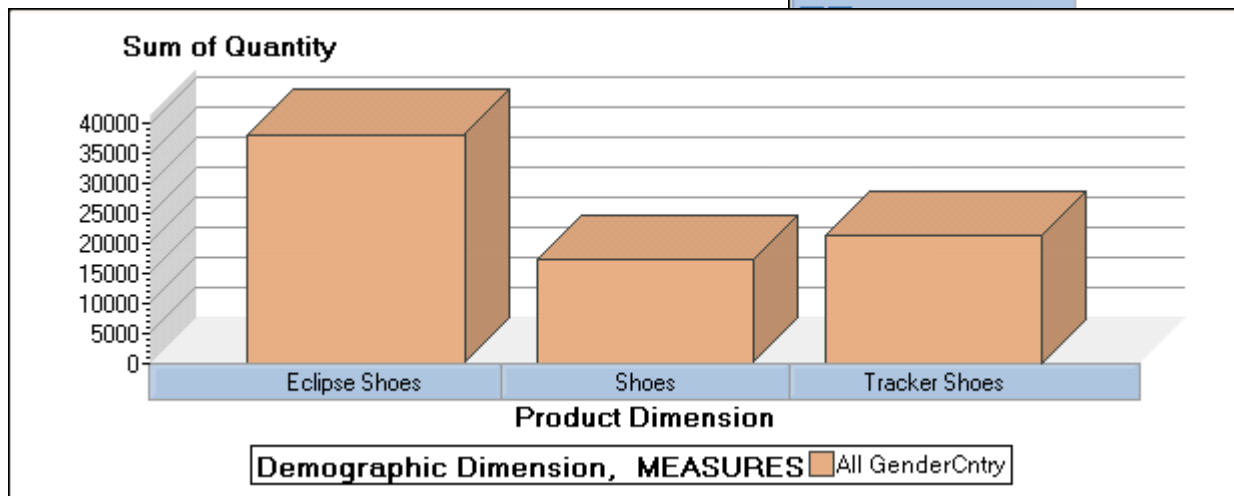
Product Hierarchy > All Product > Clothes Shoes > Shoes

Customer Gender	+ Female	+ Male
MeasuresLevel	Sum of Quantity	Sum of Quantity
Product Group		
+ Eclipse Shoes	19748	18371
+ Shoes	8840	8317
+ Tracker Shoes	9080	12152

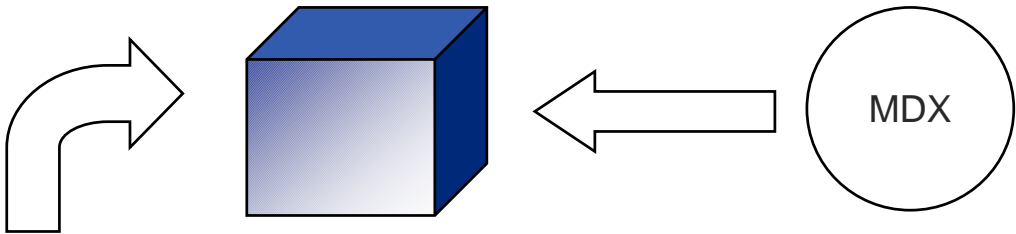
Country, Age Grp, Gender Hierarchy > All CntryAgeGender

Product Hierarchy > All Product > Clothes Shoes > Clothes

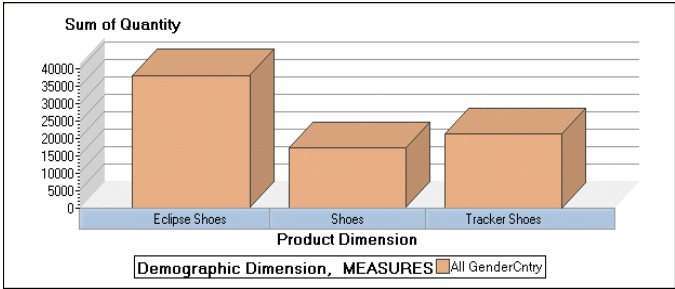
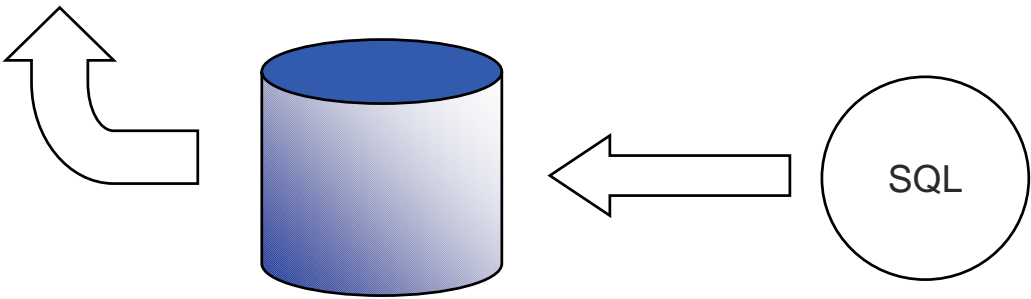
Customer Country	+ France	
MeasuresLevel	Sum of Total_Retail_Price	Average Total_Retail_Price
Product Group		
+ Eclipse Clothing	\$204,970.99	\$93.64
+ Green Tomato	\$10,448.56	\$81.00
+ Knitwear	\$65,213.10	\$140.85
+ LSF	\$37,721.00	\$166.91
+ Leisure	\$31,798.40	\$126.18
	\$15,565.70	\$486.43
	\$92,927.52	\$150.86
	\$31,844.03	\$89.45
	\$17,131.18	\$91.12
	\$4,062.21	\$42.31
	\$4,723.73	\$23.38
	\$32,669.68	\$110.37
	\$9,930.80	\$43.37
	44,922.63	\$83.48
	\$18,336.83	\$407.49



# Structure of OLAP Data



SAS OLAP  
Cube Studio



Category	Group	Year	Quarter	Quantity
Clothes	Eclipse Clothing	2002	1	881
Clothes	Eclipse Clothing	2002	2	2015
Clothes	Eclipse Clothing	2002	3	2454
Clothes	Eclipse Clothing	2002	4	2124
Clothes	Green Tomato	2002	1	53
Clothes	Green Tomato	2002	2	131
Clothes	Green Tomato	2002	3	162
Clothes	Green Tomato	2002	4	134
Shoes	Eclipse Shoes	2002	1	1508

# Base Table

The *base table* is the original detail data.

Category	Group	Year	Quarter	Quantity
Clothes	Eclipse Clothing	2002	1	881
Clothes	Eclipse Clothing	2002	2	2015
Clothes	Eclipse Clothing	2002	3	2454
Clothes	Eclipse Clothing	2002	4	2124
Clothes	Green Tomato	2002	1	53
Clothes	Green Tomato	2002	2	131
Clothes	Green Tomato	2002	3	162
Clothes	Green Tomato	2002	4	134
Shoes	Eclipse Shoes	2002	1	1508
Shoes	Eclipse Shoes	2002	2	2421
Shoes	Eclipse Shoes	2002	3	2498
Shoes	Eclipse Shoes	2002	4	1857
Shoes	Tracker Shoes	2002	1	814
Shoes	Tracker Shoes	2002	2	1375
Shoes	Tracker Shoes	2002	3	1406
Shoes	Tracker Shoes	2002	4	1097

# Aggregation

An **aggregation** is the summarization of one or more levels.

Category	Group	Year	Quarter	Quantity
Clothes	Eclipse Clothing	2002	1	881
Clothes	Eclipse Clothing	2002	2	2015
Clothes	Eclipse Clothing	2002	3	2454
Clothes	Eclipse Clothing	2002	4	2124
Clothes	Green Tomato	2002	1	53
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Shoes	Eclipse Shoes	2002	1	1508
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Shoes	Tracker Shoes	2002	1	814
Shoes	Tracker Shoes	2002	2	1375
Shoes	Tracker Shoes	2002	3	1406
Shoes	Tracker Shoes	2002	4	1097

Category	Group	Year	Quantity
Clothes	Eclipse Clothing	2002	7474
Clothes	Green Tomato	2002	480
Shoes	Eclipse Shoes	2002	8284
Shoes	Tracker Shoes	2002	4692

# Dimensions and Levels

<b>TIME</b>	<b>LOCATION</b>	<b>PRODUCTS</b>	<b>SALES</b>	<b>ORDERS</b>
Year	Region	Product Line	Sales Region	Order Method
Quarter	Country	Product Group	Office	
Month	Prov/State	Product	Sales Rep	
	City			

## Measures

Total Revenue

Avg Discount %

Total Quantity

# of Orders

Avg Cost

Avg Time

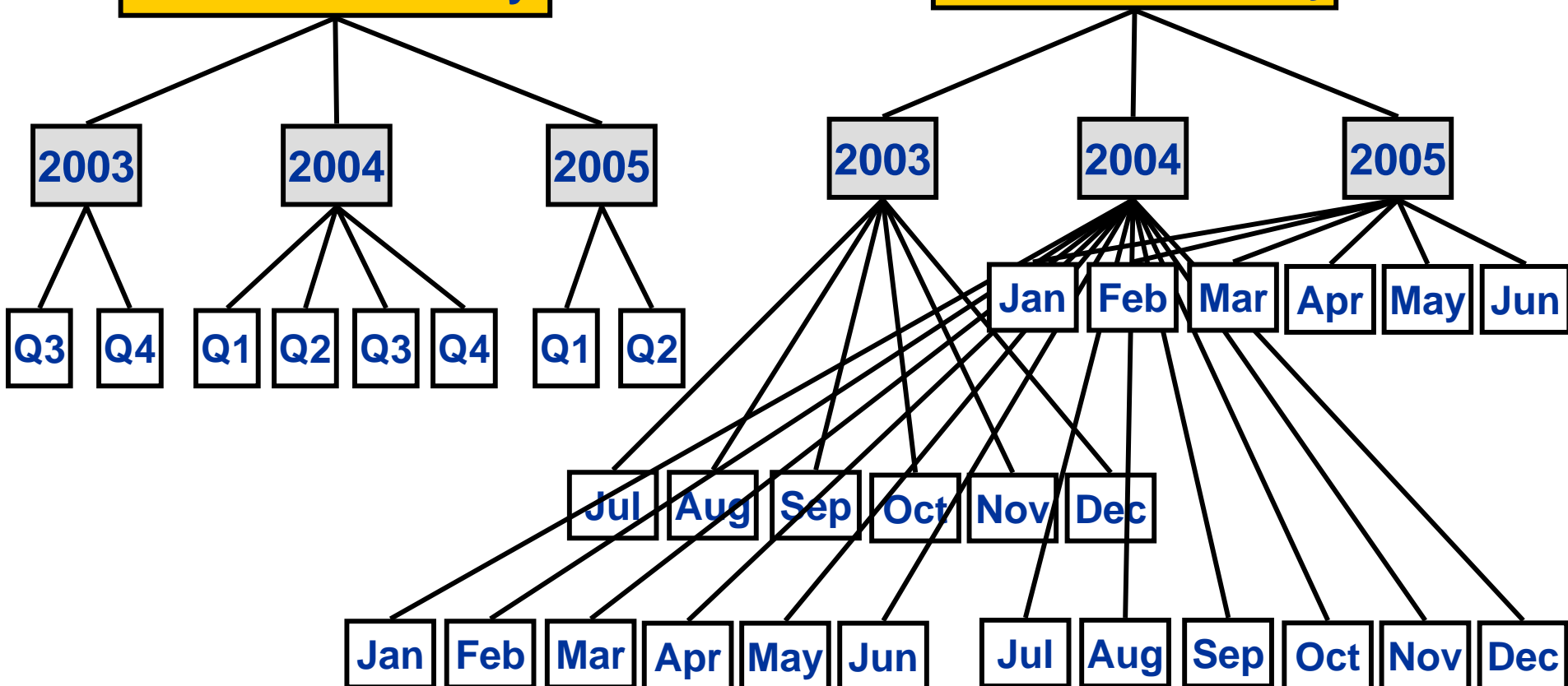
# Dimensions and Hierarchies

A dimension can have multiple hierarchies.

## The Time Dimension

### YQ Time Hierarchy

### YM Time Hierarchy

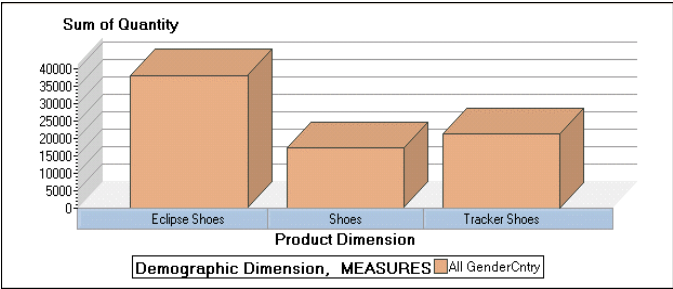
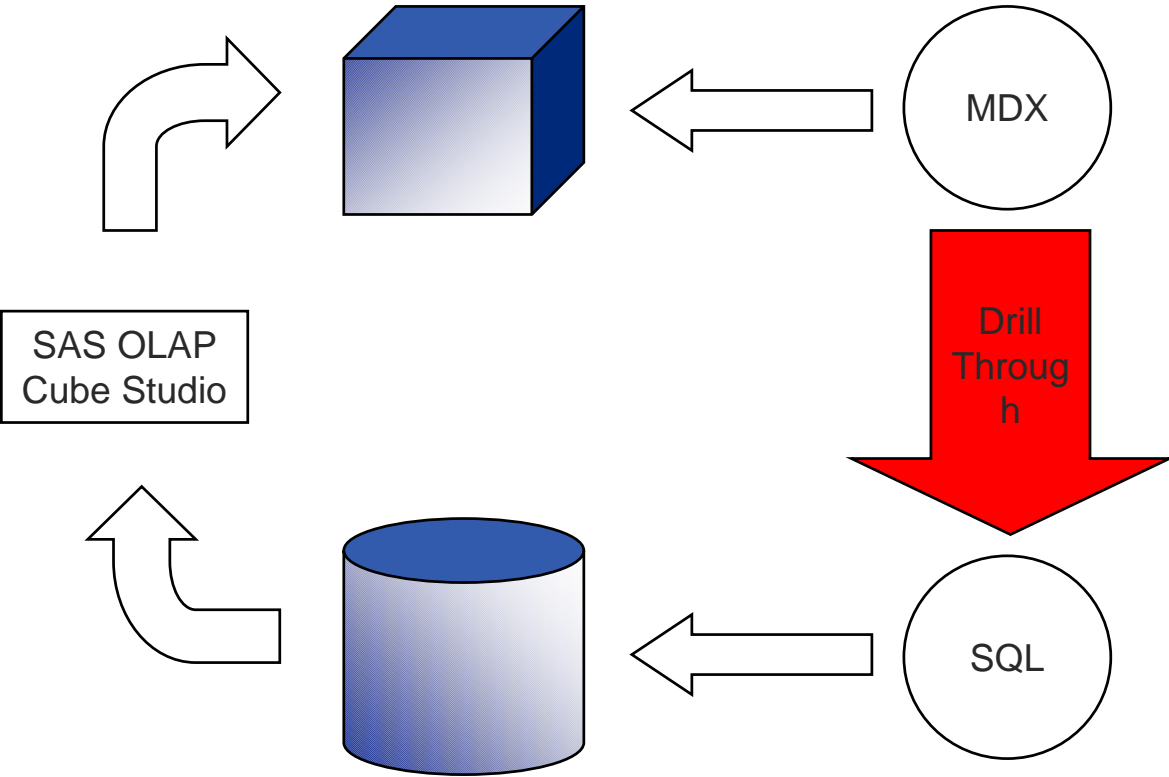


# BI Tools – Demonstration

- Access and analyze OLAP data from different Applications

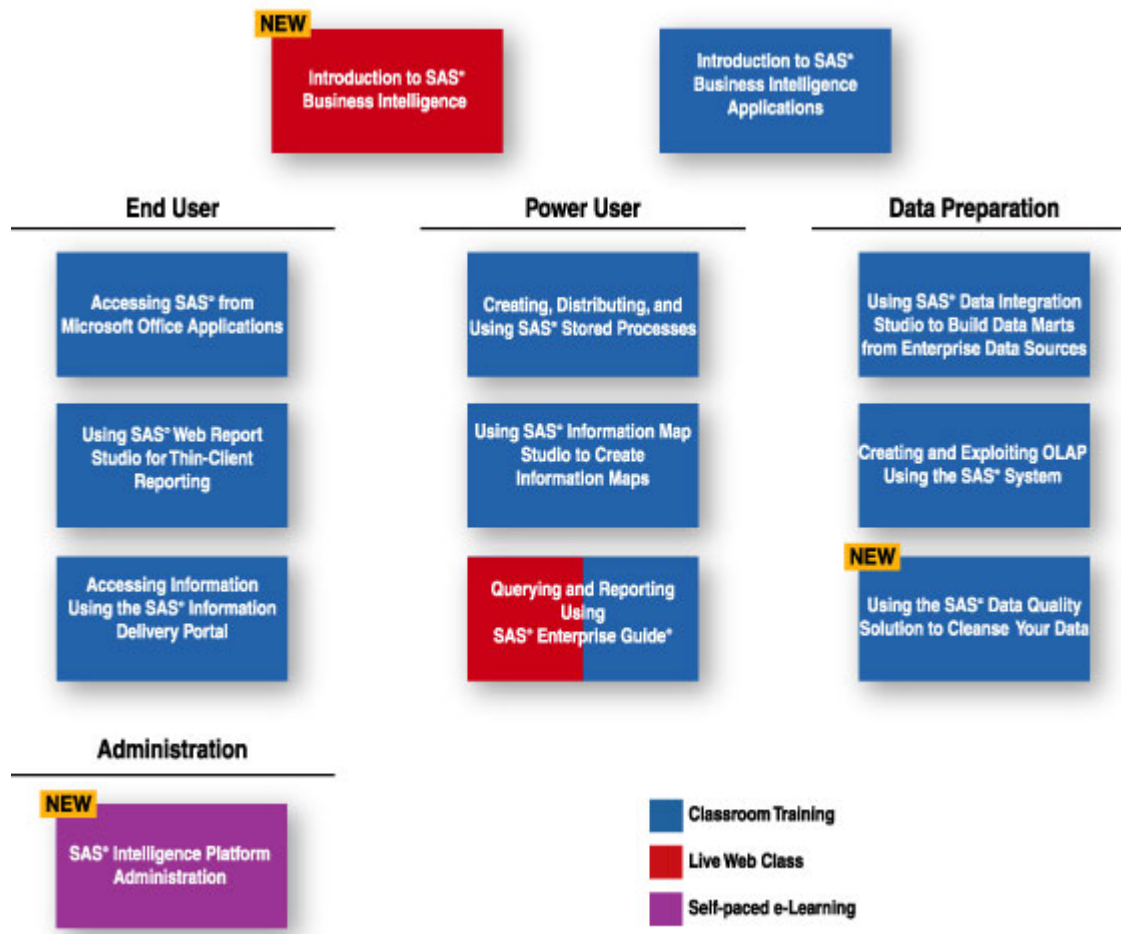


# Structure of OLAP Data



Category	Group	Year	Quarter	Quantity
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Clothes	Green Tomato	2002	3	162
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Shoes	Eclipse Shoes	2002	1	1508

# SAS Education – BI Curriculum Path



<http://support.sas.com/training/canada/paths/bi.html>



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## Q&A

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