

***OLAP Theory-English version***  
***On-Line Analytical processing (Business Intelligence)***

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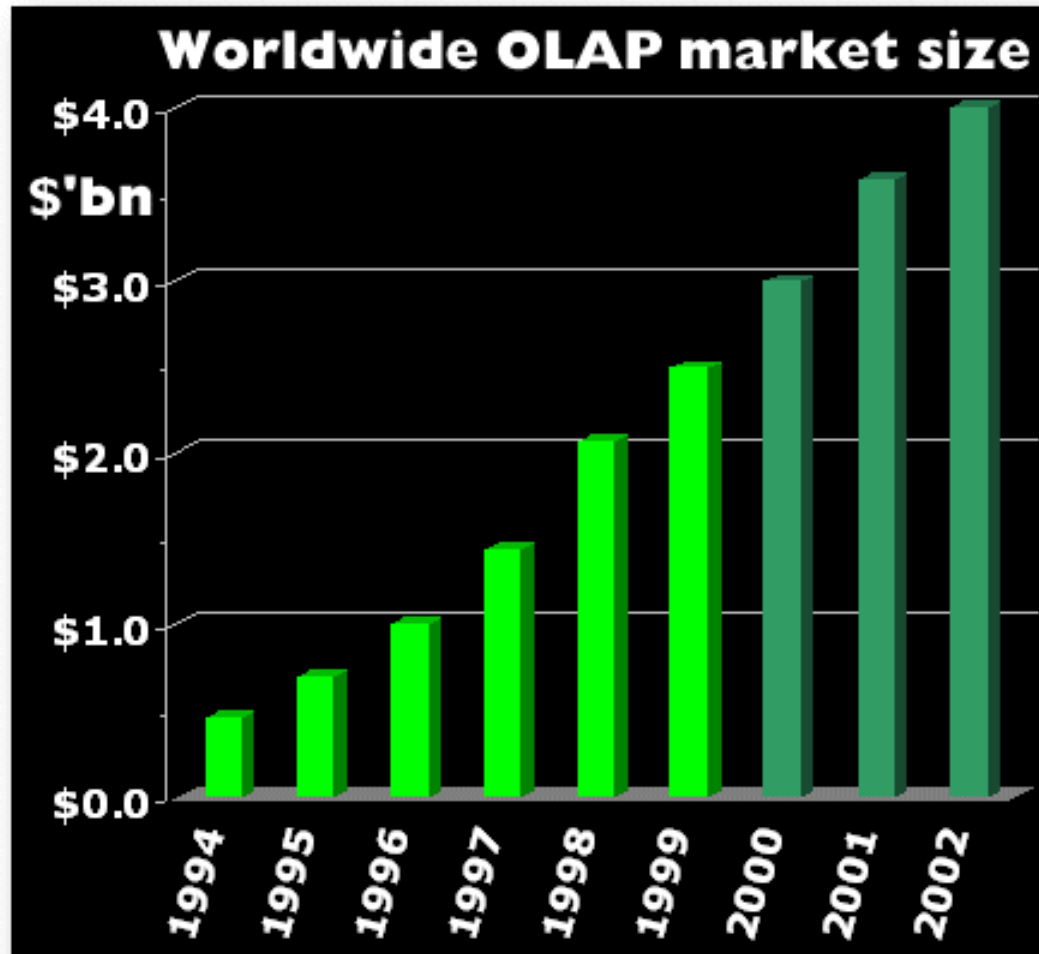
Masaryk University Brno

Czech Republic

# ***Agenda***

- The Market
- Why OLAP
- Introduction to OLAP
- OLAP Terms and Concepts
- Summary

# ***OLAP market size***



# ***Why OLAP***

- **The Right Information In The Right Place  
At The Right Time**
- **Why**
  - More self-sufficient Business users
  - Keep the integrity of the data
  - Reduces the query drag(burden) and network traffic
  - Organization can respond more quickly to market demands

# ***Introduction to OLAP***

“OLAP enables analysts, managers, and executives to gain insight into data through fast, consistent, interactive access to a wide variety of possible views of information. OLAP transforms raw data so that it reflects the real dimensionality of the enterprise as understood by the user. “

# ***Introduction to OLAP***

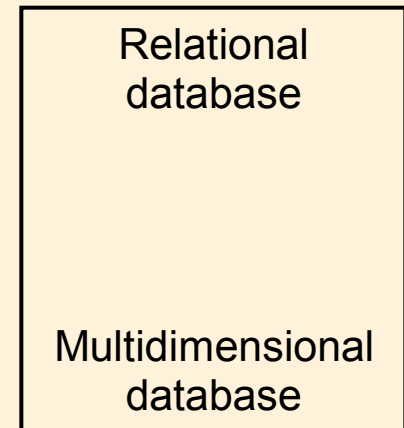
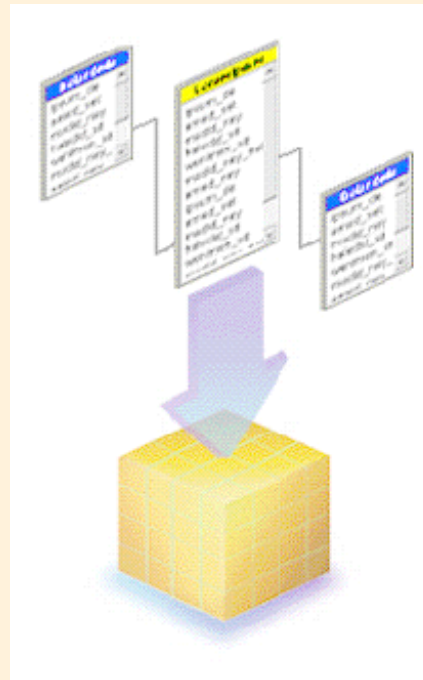
- Users
  - Analysts, managers and executive managers
- Access
  - Fast consistent, interactive
  - Wide variety of possible views
- Transformation
  - Raw data
  - Real dimensionality of enterprise

# ***Introduction to OLAP***

- Organizational functions
  - Finance
    - Budgeting
    - Performance analysis
  - Sales
    - Sales analysis and forecasting
  - Marketing
    - Market research analysis
    - Market/customer segmentation
  - Purchase
    - Cost of materials
  - Production
    - Cost of conversion
  - Distribution
    - Cost of shipping
  - etc

# ***OLAP Terms and Concepts***

- Relational database
- Multidimensional database



**For MPH\_AOMA not mandatory**



# MS Dynamics NAV Relationships

Type	No.	Description	Location Code	Quantity	Reserved Quantity	Unit of Measu...	S... P...	Unit Price Excl. VAT	Line Amount Excl. VAT	Line Disco...
Item	LS-MAN-10	Manual for Loudspeakers	WHITE	4		PCS				

Sales Line Order

Location card

General Communication Warehouse Bins Bin Policies

Code: WHITE

Name: White Warehouse

Address: Merrily Grove Avenue 6, 2

Post Code/City: WC1 2GS West End Lane

Country/Region Code: GB

Contact:

Code	Name
BLUE	Blue Warehouse
GREEN	Green Warehouse
RED	Red Warehouse
SILVER	Silver Warehouse
WHITE	White Warehouse
YELLOW	Yellow Warehouse

Location List

Bins Tab

General Communication Warehouse Bins Bin Policies

Receipt

Receipt Bin Code: W-08-0001

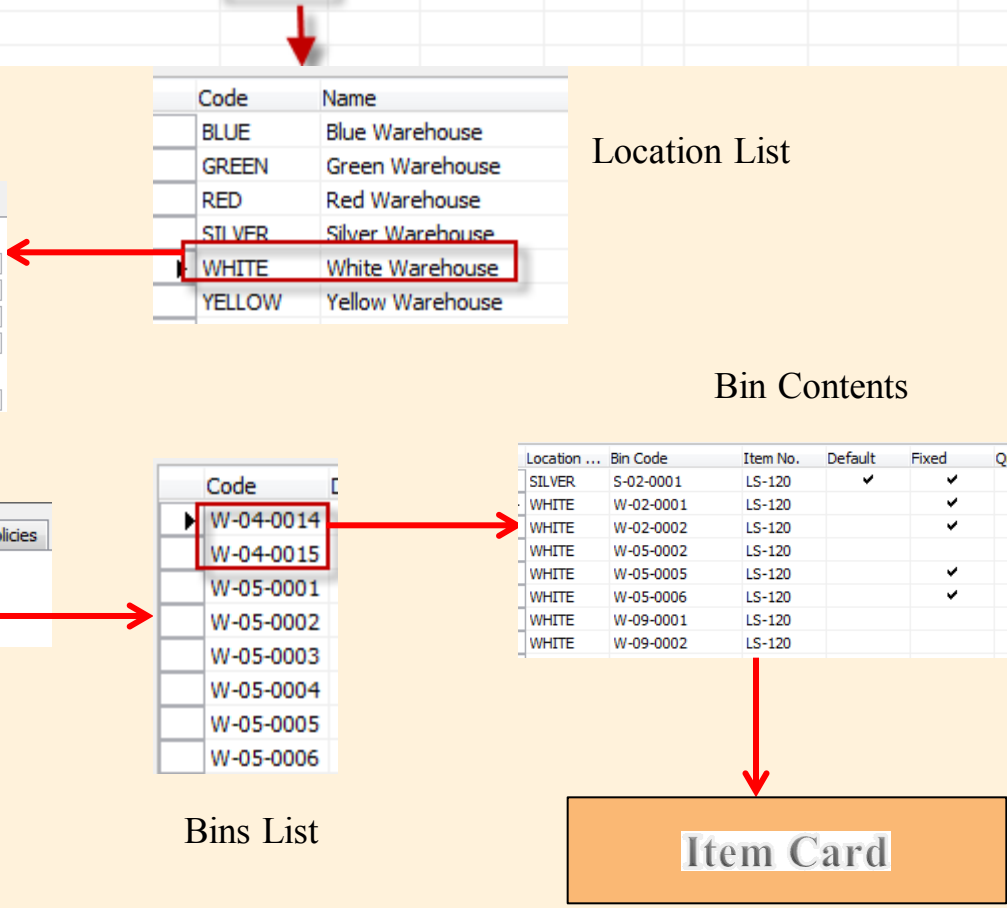
Code
W-04-0014
W-04-0015
W-05-0001
W-05-0002
W-05-0003
W-05-0004
W-05-0005
W-05-0006

Bins List

Bin Contents

Location ...	Bin Code	Item No.	Default	Fixed	Quantity	Quantity ...
SILVER	S-02-0001	LS-120	✓	✓	0	0
WHITE	W-02-0001	LS-120		✓	8	8
WHITE	W-02-0002	LS-120		✓	0	0
WHITE	W-05-0002	LS-120			6	6
WHITE	W-05-0005	LS-120		✓	0	0
WHITE	W-05-0006	LS-120		✓	0	0
WHITE	W-09-0001	LS-120			6	6
WHITE	W-09-0002	LS-120			8	8

Item Card



# MS Dynamics NAV Analysis by Dimensions

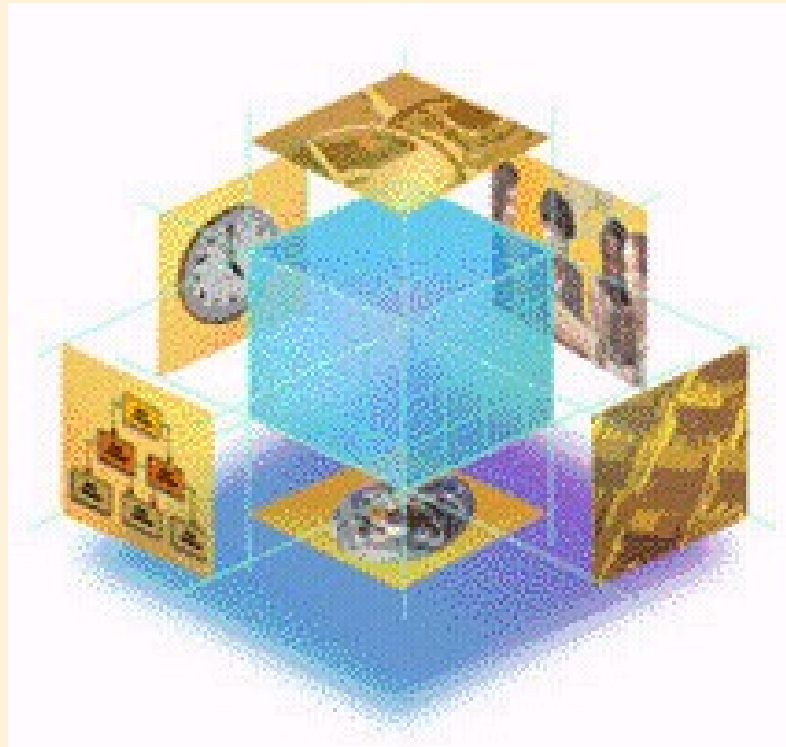
General		Filters	Options			
Date Filter . . . . .	01.01.11..C31.1...		Area Filter . . . . .	<input type="text"/> ↑		
G/L Account Filter . . . . .	5100..6995 ↑		Department Filter . . . . .	<input type="text"/> ↑		
Business Unit Filter . . . . .	<input type="text"/> ↑		Project Filter . . . . .	<input type="text"/> ↑		
Budget Filter . . . . .	<input type="text"/> ↑		Dimension 4 Filter . . . . .	<input type="text"/> ↑		

Code	Name	Total Amount	ADM	PROD	SALES
▶	<b>10 Europe</b>				
	<b>20 Europe North</b>				
	30 Europe North (EU)	-5 886 999,97			-5 886 999,97
	40 Europe North (Non EU)	-20 882,66			-20 882,66
	<b>45 Europe North, Total</b>	<b>-5 907 882,63</b>			<b>-5 907 882,63</b>
	50 Europe South	-371 995,41			-371 995,41
	<b>55 Europe, Total</b>	<b>-6 279 878,04</b>			<b>-6 279 878,04</b>
	<b>60 America</b>				
	70 America North	-299 415,68			-299 415,68
	80 America South	-212 009,49			-212 009,49
	<b>85 America, Total</b>	<b>-511 425,17</b>			<b>-511 425,17</b>

**Will be presented by teacher**

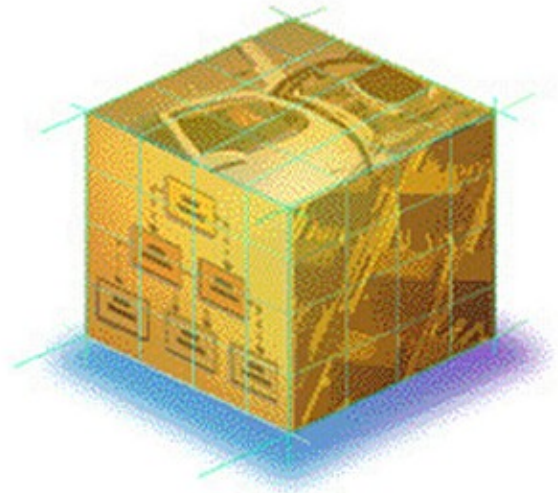
# ***OLAP Terms and Concepts***



**N-dimensional Cube**

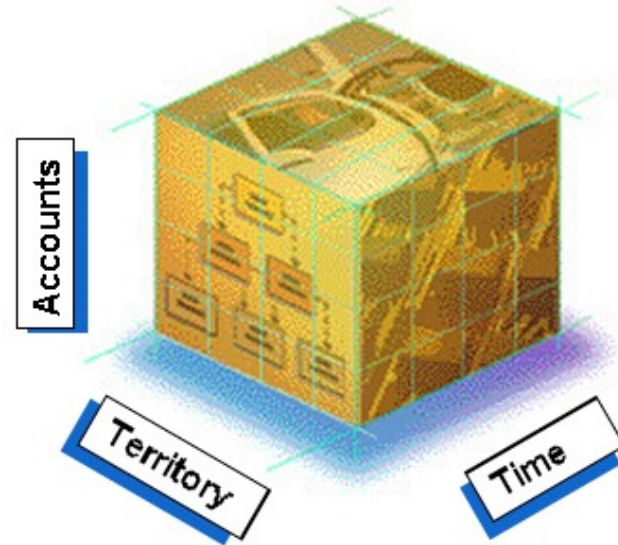
# ***OLAP Terms and Concepts***

- Cube
  - Information Is conceptually viewed as cubes.



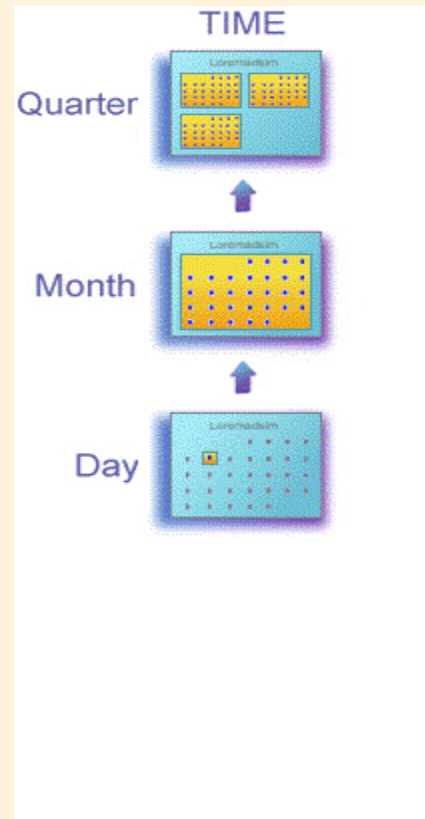
# ***OLAP Terms and Concepts***

- Cube
  - Information is conceptually viewed as cubes.
- Dimension
  - Distinct categories for business data.



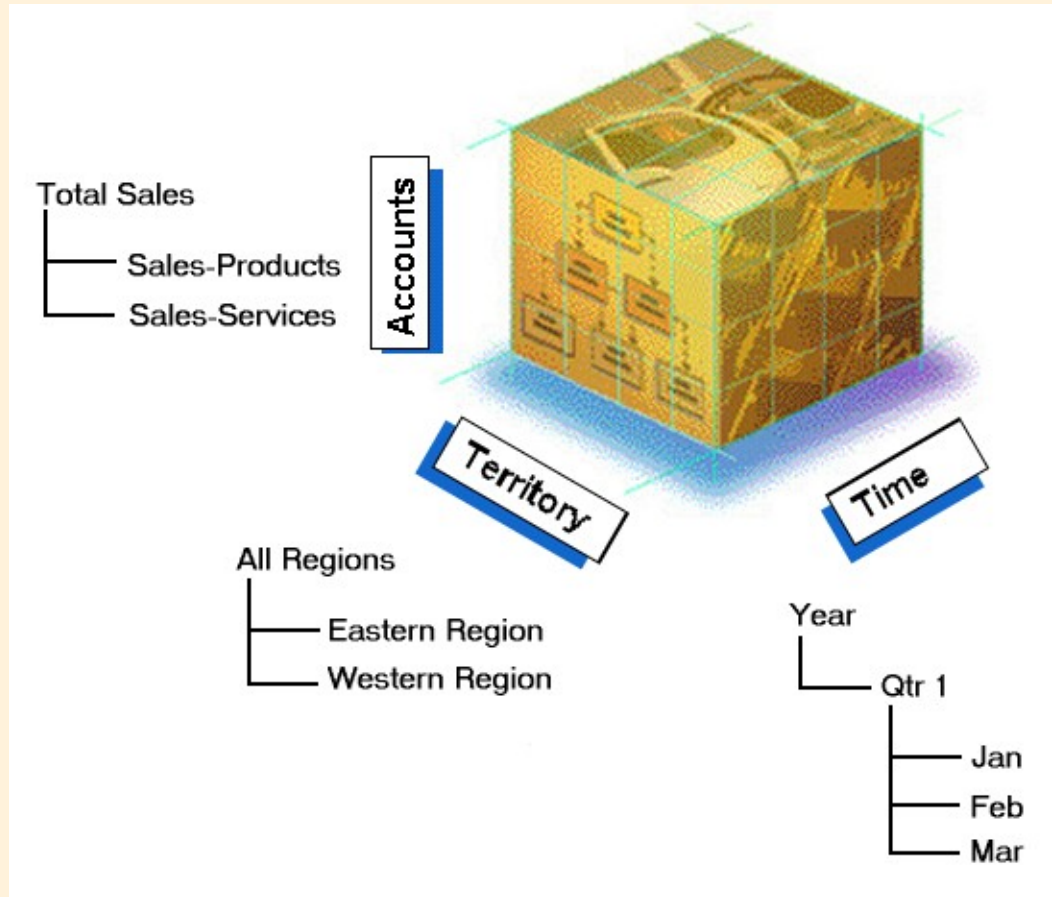
# ***OLAP Terms and Concepts***

- Cube
  - Information is conceptually viewed as cubes.
- Dimension
  - Distinct categories for business data.
- Hierarchy
  - Levels of details on the data.



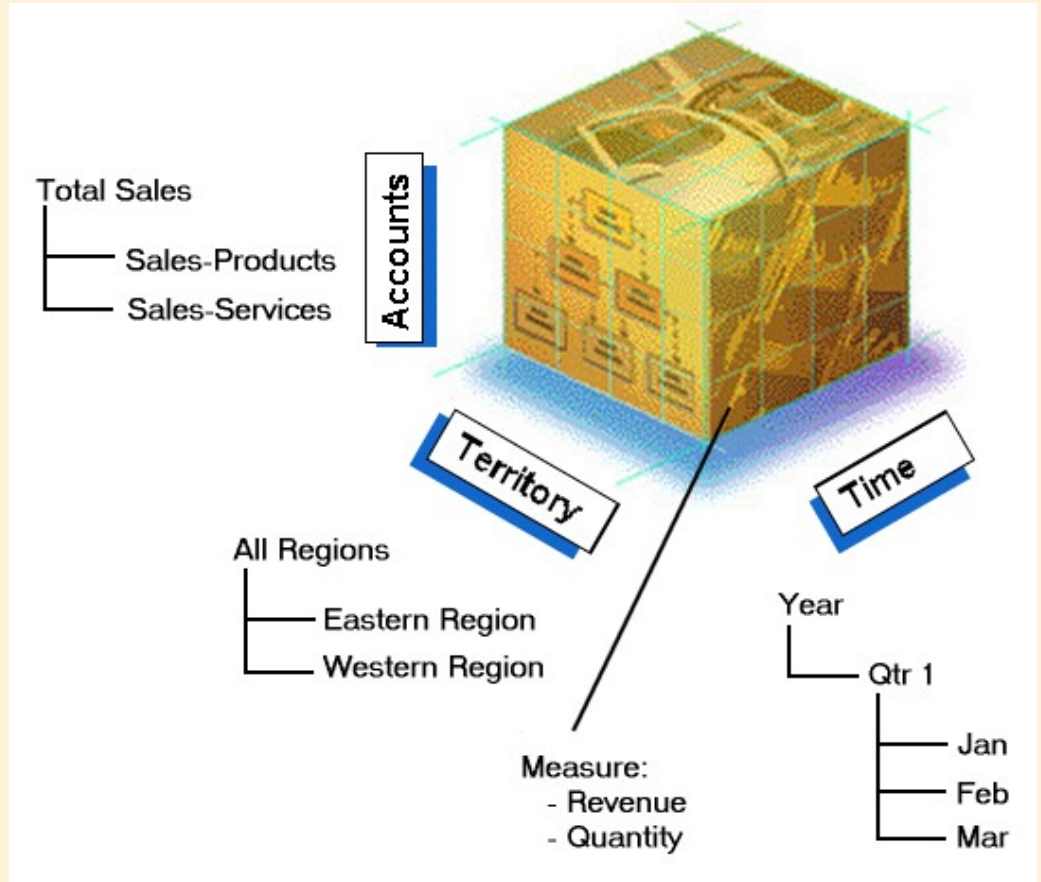
# ***OLAP Terms and Concepts***

- **Cube**
  - Information is conceptually viewed as cubes.
- **Dimension**
  - Distinct categories for business data.
- **Hierarchy**
  - Levels of details on the data.



# ***OLAP Terms and Concepts I.***

- Cube
  - Information is conceptually viewed as cubes.
- Dimension
  - Distinct categories for business data.
- Hierarchy
  - Levels of details on the data.
- Measure
  - Quantitative values.





# ***OLAP Terms and Concepts II.***

## **Cube**

Information Is conceptually viewed as cubes.

## **Dimension**

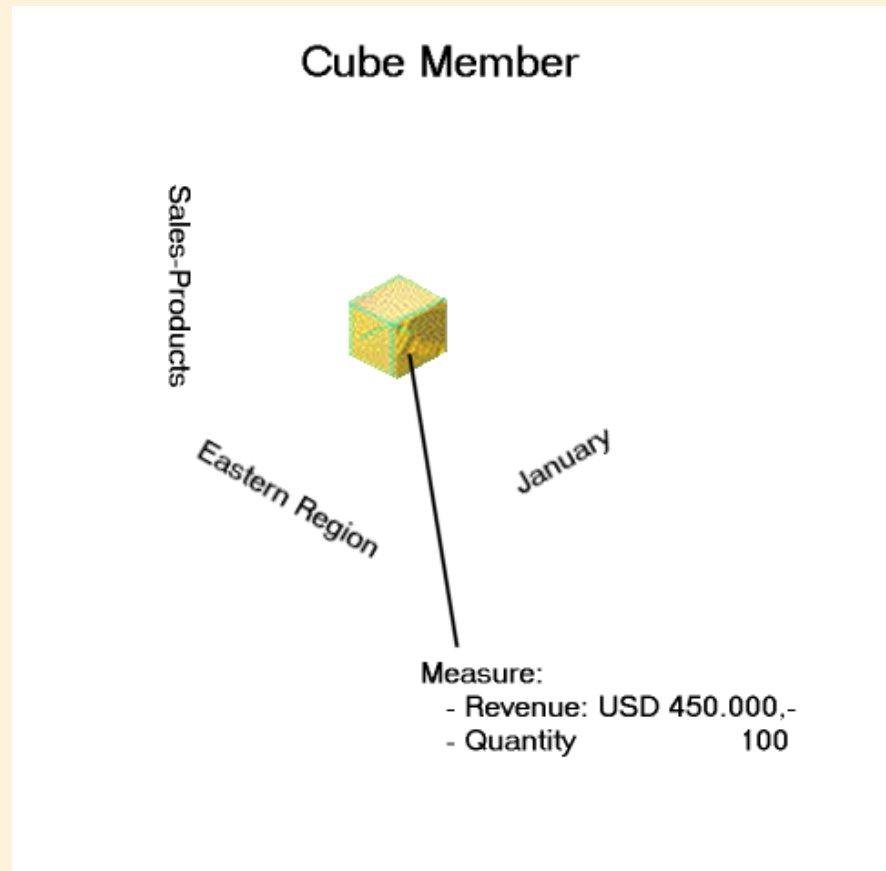
Distinct categories for business data.

## **Hierarchy**

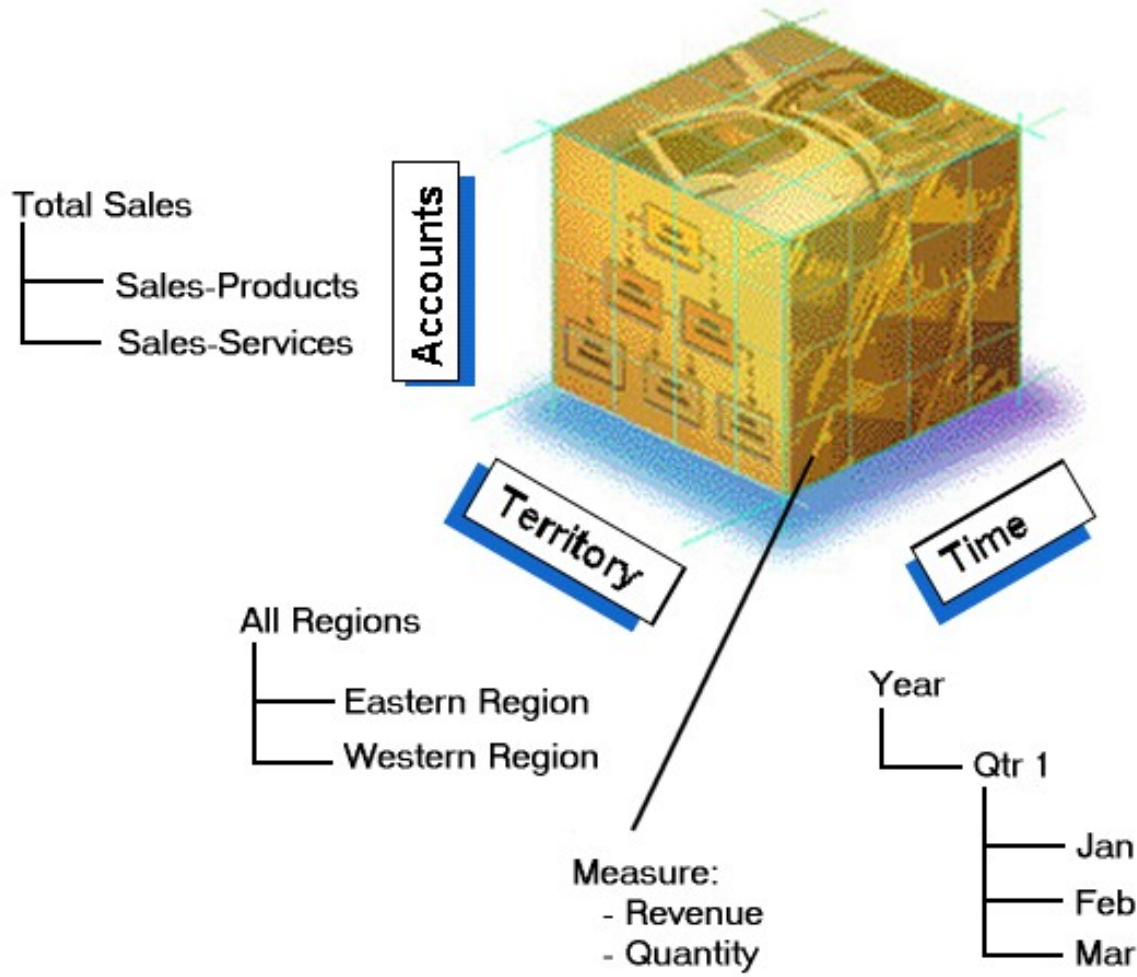
Levels of details on the data.

## **Measure**

Quantitative values.



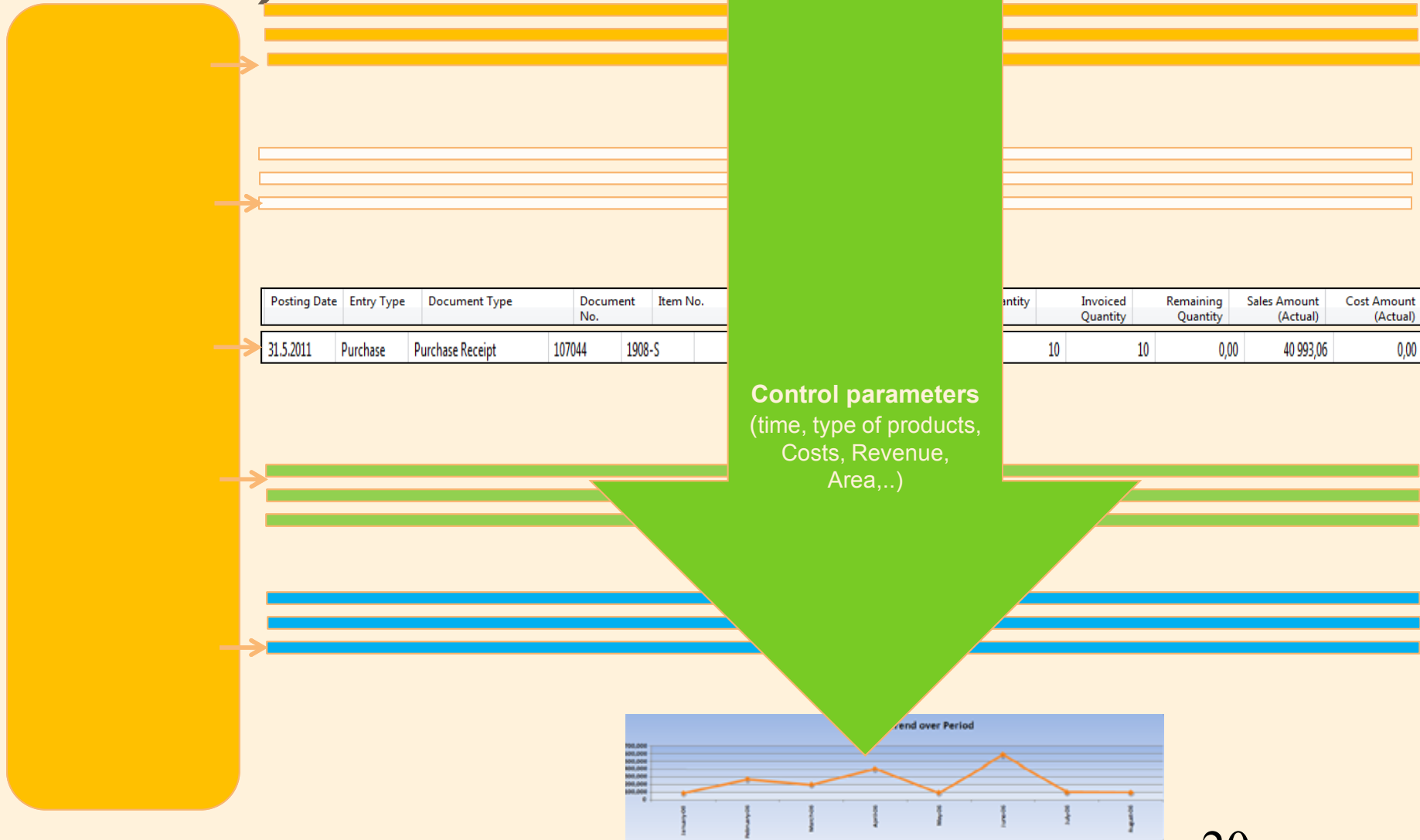
# ***OLAP Cube***



# ***Reporting (NAV tools or JETs)***



# Main principles (source tables and their entries)



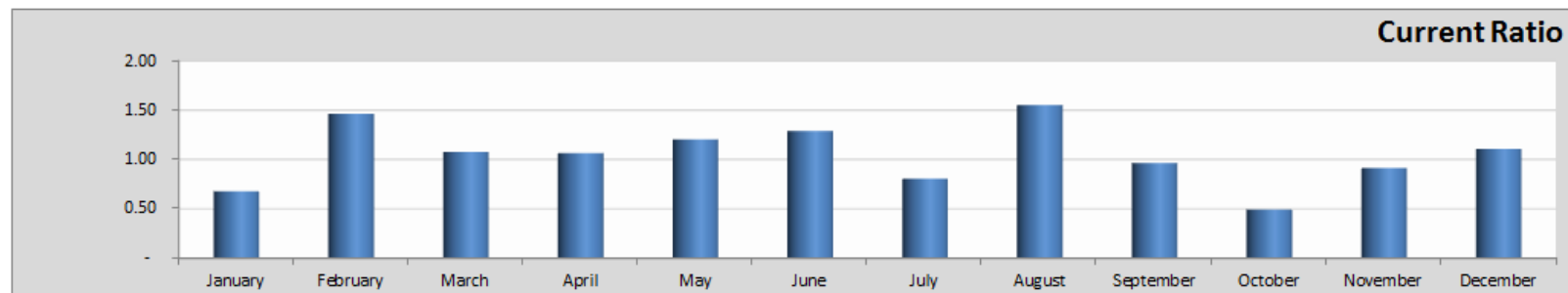
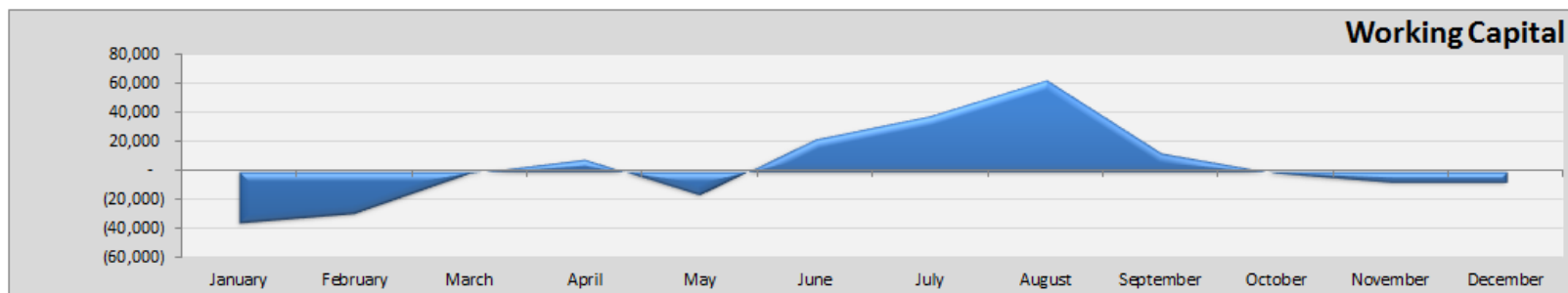
# *Some chosen analysis asked by CFO of company X in Czech Republic*

- Working capital – Show of the results from JETs

## Working Capital & Current Ratio

Report Date 8/23/2011

2011												
	January	February	March	April	May	June	July	August	September	October	November	December
<b>Current Assets</b>	74,405	(90,939)	(16,110)	136,096	(92,528)	101,144	(155,777)	174,615	(363,170)	1,015	72,525	(72,789)
<b>Current Liabilities</b>	109,902	(62,118)	(14,989)	127,587	(76,890)	78,566	(193,757)	112,467	(376,168)	2,070	79,494	(65,841)
<b>Working Capital</b>	(35,497)	(28,821)	(1,121)	8,508	(15,638)	22,579	37,980	62,148	12,998	(1,055)	(6,969)	(6,948)
<b>Current Ratio</b>	0.68	1.46	1.07	1.07	1.20	1.29	0.80	1.55	0.97	0.49	0.91	1.11



# Some chosen analysis asked by CFO of company X in Czech Republic

## Inventory - Dashboard

**Company**

- JetCorp, Belgium
- JetCorp, North America

**Location**

- Amsterdam Warehouse 1
- Amsterdam Warehouse 2

**Item Category**

- Awards & Recognition
- Bags & Totes

**Product Group**

- Flashlights
- USB Drives

**Year**

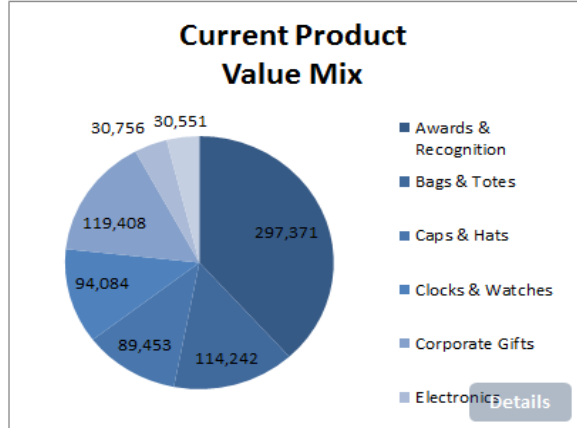
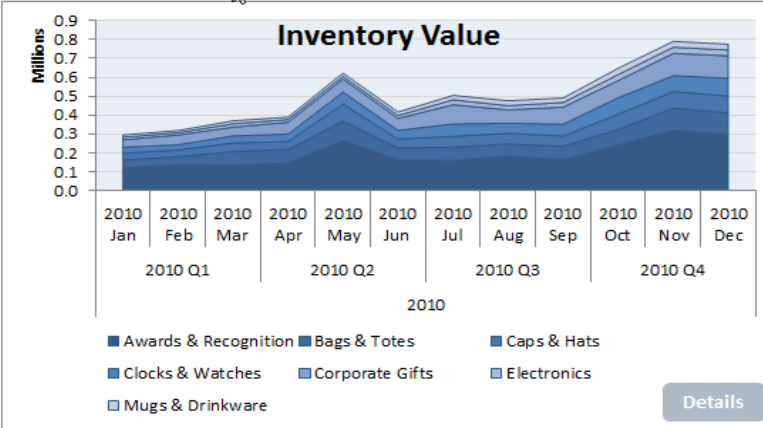
- 2007
- 2008
- 2009
- 2010

**Quarter**

- 2010 Q1
- 2010 Q2
- 2010 Q3
- 2010 Q4

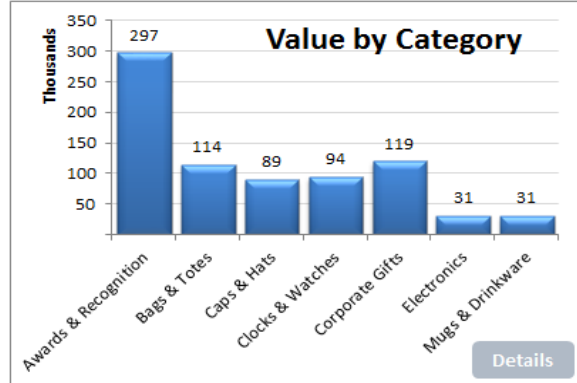
**Month**

- 2010 May
- 2010 Jun
- 2010 Jul
- 2010 Aug

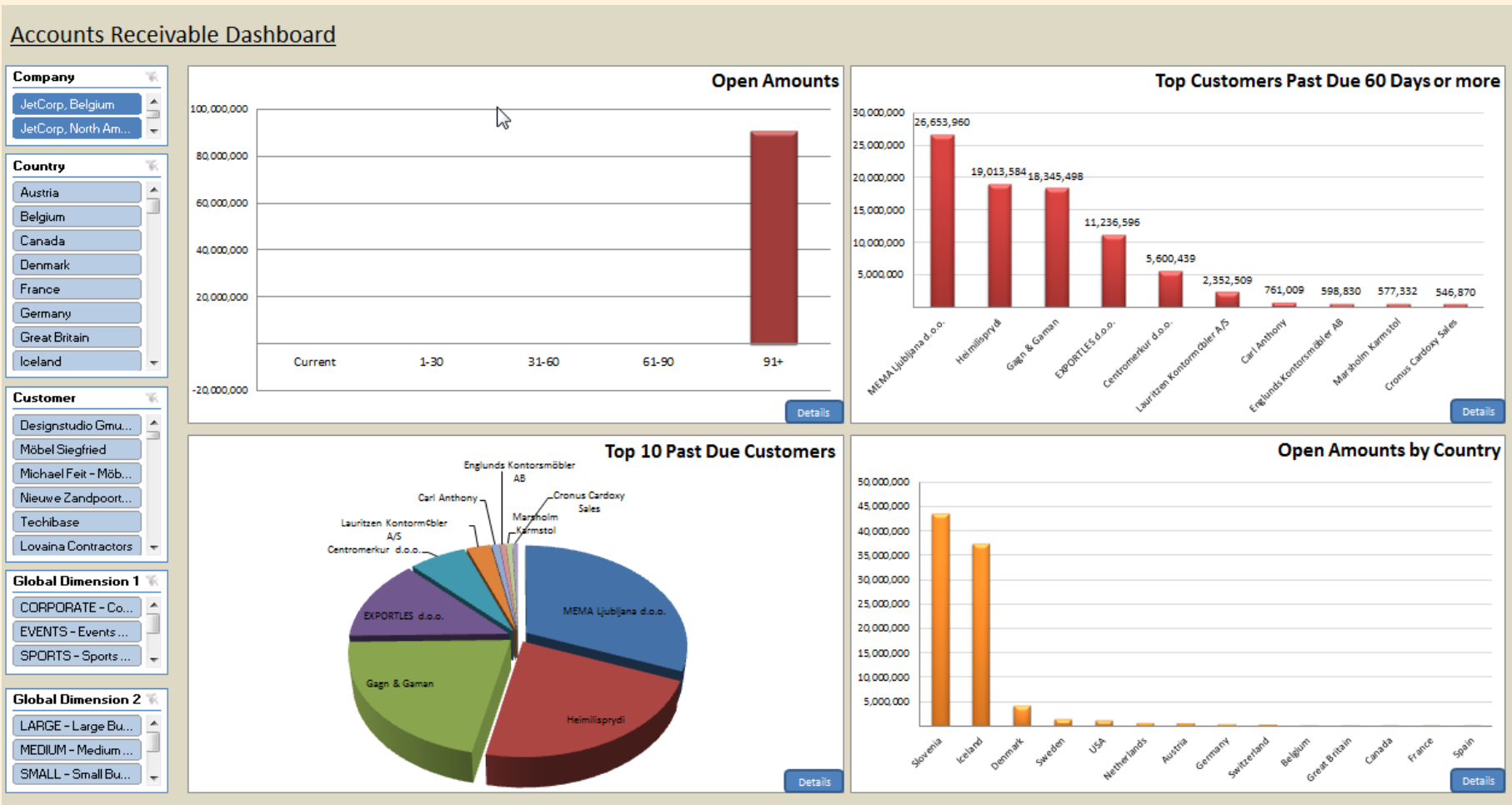


**Average Inventory Value**

	Period	Prev. Yr	Variance	%	Grand Total
Awards & Recognition	188,840	200,797	-11,957	-5.95%	188,840
Bags & Totes	72,551	83,459	-10,908	-13.07%	72,551
Caps & Hats	56,765	63,983	-7,218	-11.28%	56,765
Clocks & Watches	57,043	63,353	-6,310	-9.96%	57,043
Corporate Gifts	73,856	81,520	-7,664	-9.40%	73,856
Electronics	19,293	18,451	842	4.56%	19,293
Mugs & Drinkware	19,052	16,732	2,320	13.86%	19,052



# Some chosen analysis examples (JETs)



# *On-line Transaction Processing and OLAP*

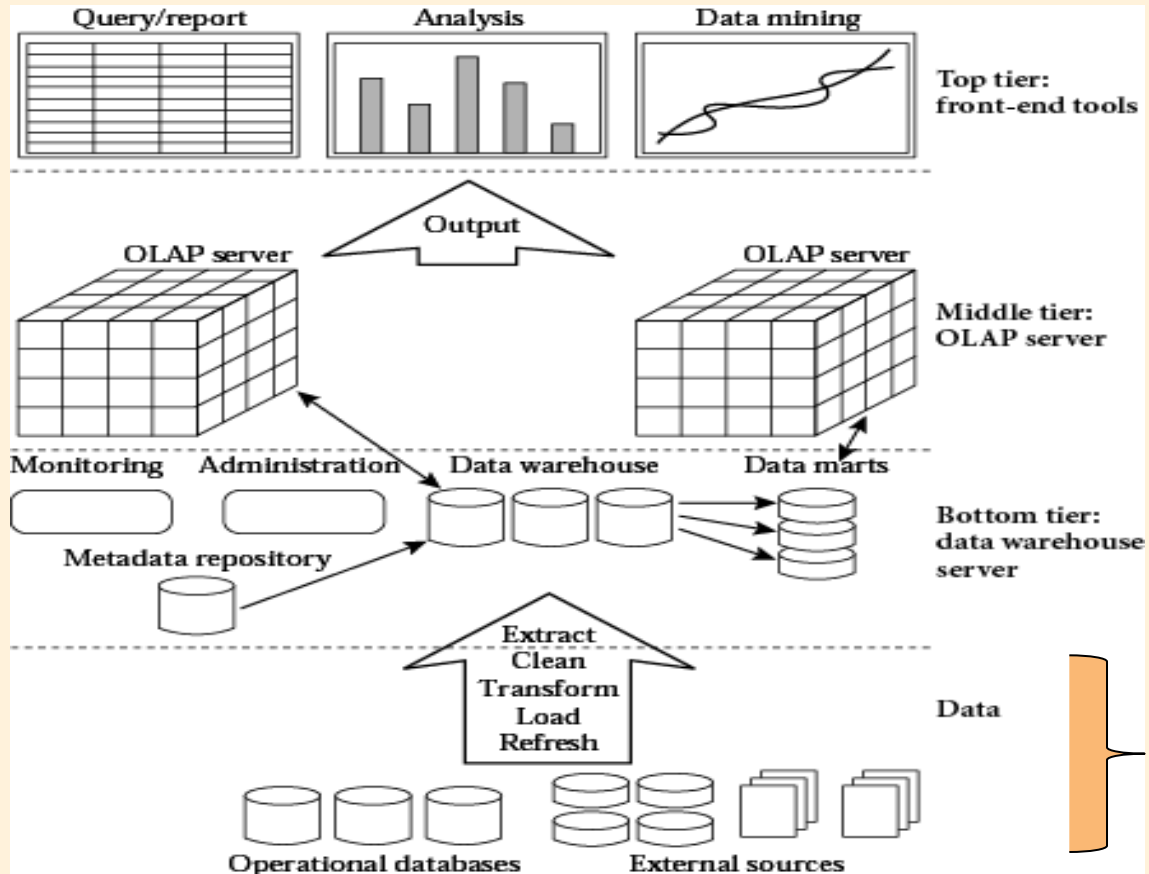
	<b>OLTP</b>	<b>OLAP</b>
<b>users</b>	clerk, IT professional	knowledge worker
<b>function</b>	day to day operations	decision support
<b>DB design</b>	application-oriented	subject-oriented
<b>data</b>	current, up-to-date detailed	historical, summarized, multidimensional integrated, consolidated
<b>usage</b>	repetitive	ad-hoc
<b>access</b>	read/write index/hash on primary key	lots of scans
<b>unit of work</b>	short, simple transaction	complex query
<b># records accessed</b>	tens	millions
<b>#users</b>	thousands	hundreds
<b>DB size</b>	100MB-GB	100GB-TB
<b>metric</b>	transaction throughput	query throughput, response



## ***Terminology - metadata***

- ◉ Meta data is the data defining warehouse objects. It has the following kinds
  - ◉ Description of the structure of the warehouse (location, dimension, used schema..)
  - ◉ The algorithms used for summarization
  - ◉ Business data ( business terms and definitions, ownership of data)

# Business Intelligence Architecture



Database → Data Warehouse → OLAP server → Reporting