

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

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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. “

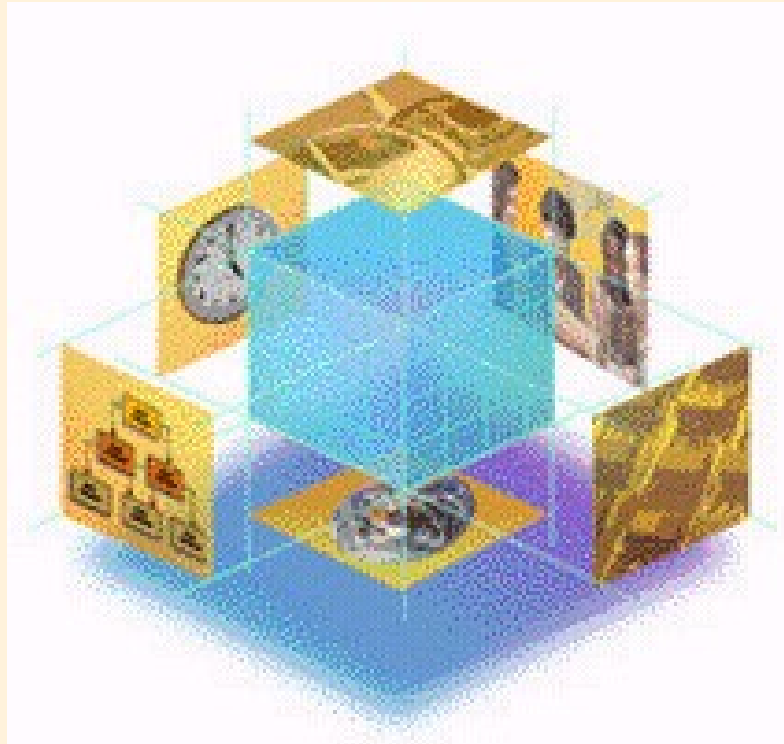
Introduction to OLAP

- 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

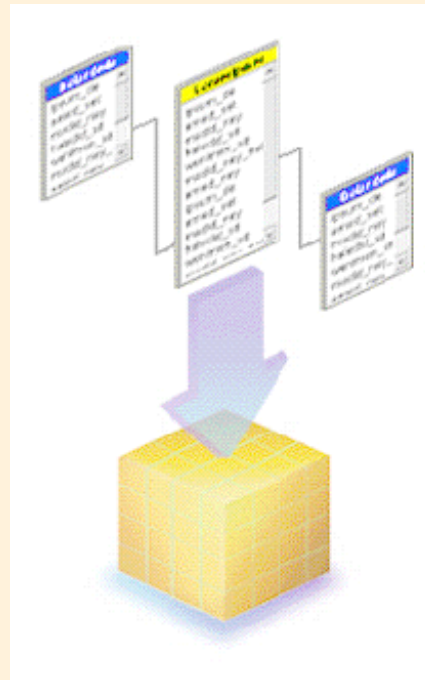
- Organizational functions
 - Finance
 - Budgeting
 - Performance analysis
 - Sales
 - Sales analysis and forecasting
 - Marketing
 - Market research analysis
 - Market/customer segmentation
 - Purchase
 - Cost of materials
 - Production
 - Cost of conversion
 - Distribution
 - Cost of shipping
 - etc

OLAP Terms and Concepts



OLAP Terms and Concepts

- Relational database
- Multidimensional database



Relational
database

Multidimensional
database

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

Address 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

General Communication Warehouse Bins Bin Policies

Receipt

Receipt Bin Code W-08-0001

Client

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

Bins Tab

General Communication Warehouse Bins Bin Policies

Receipt

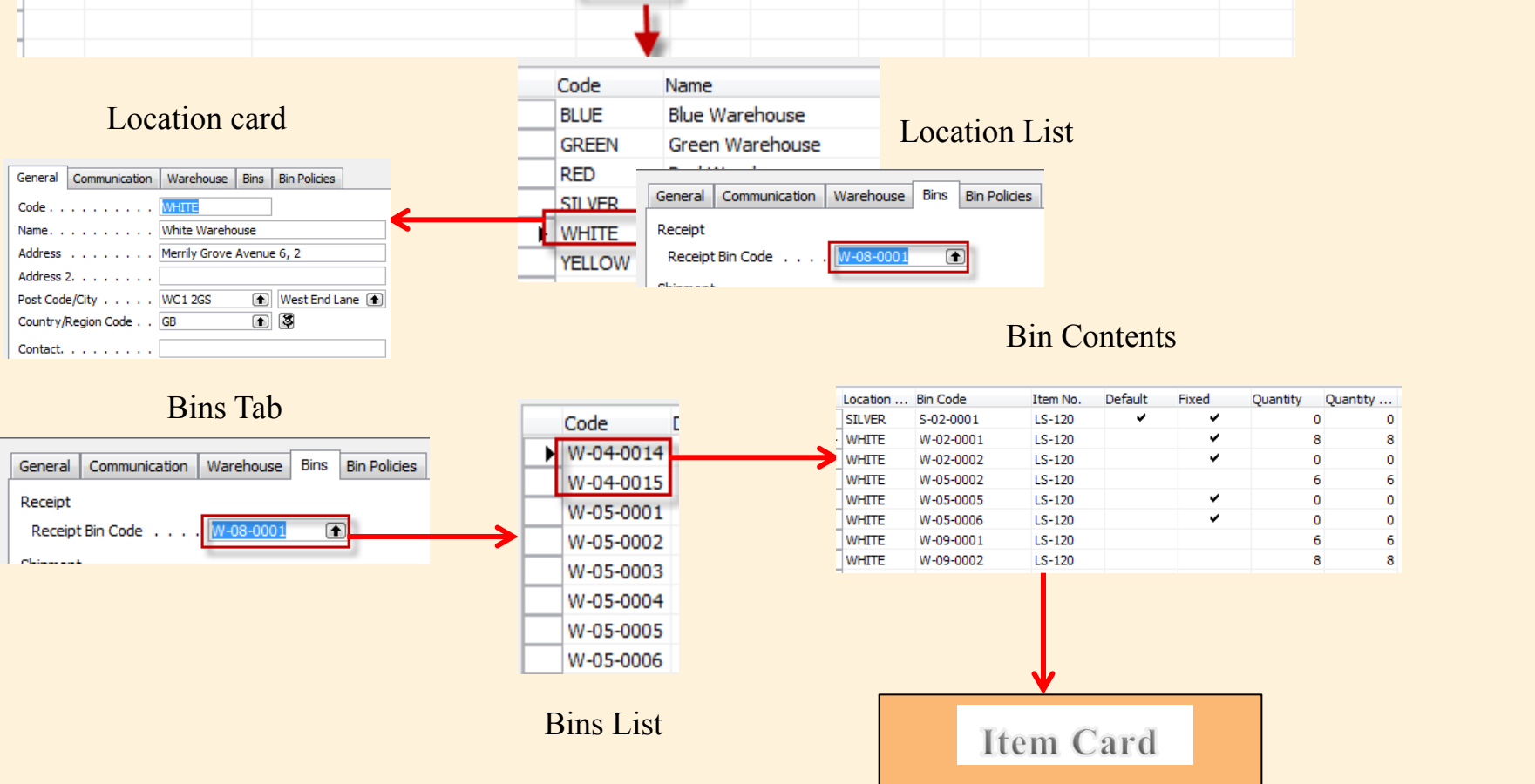
Receipt Bin Code W-08-0001

Client

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

Item Card



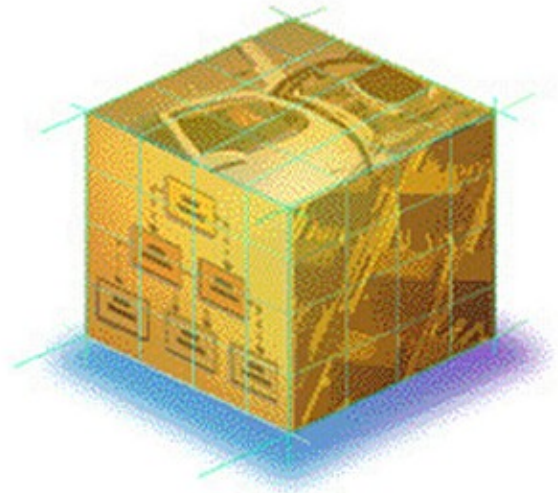
MS Dynamics NAV Analysis by Dimensions

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

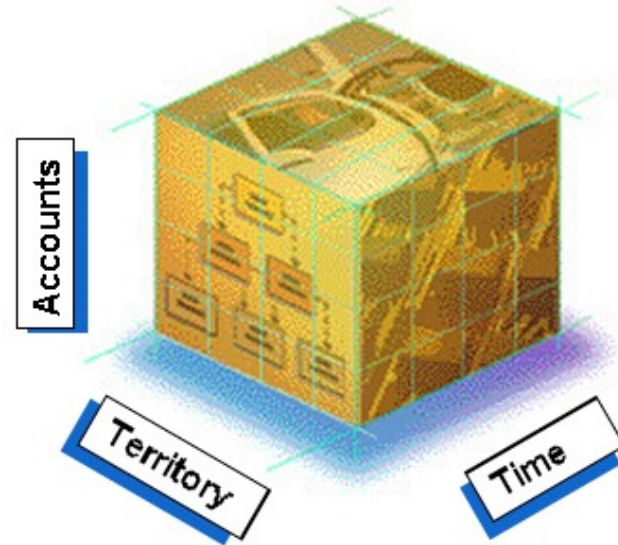
OLAP Terms and Concepts

- Cube
 - Information Is conceptually viewed as cubes.



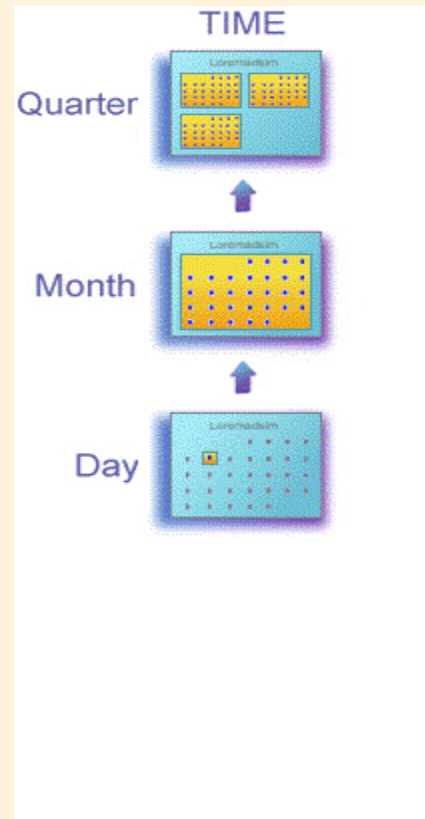
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- Cube
 - Information is conceptually viewed as cubes.
- Dimension
 - Distinct categories for business data.



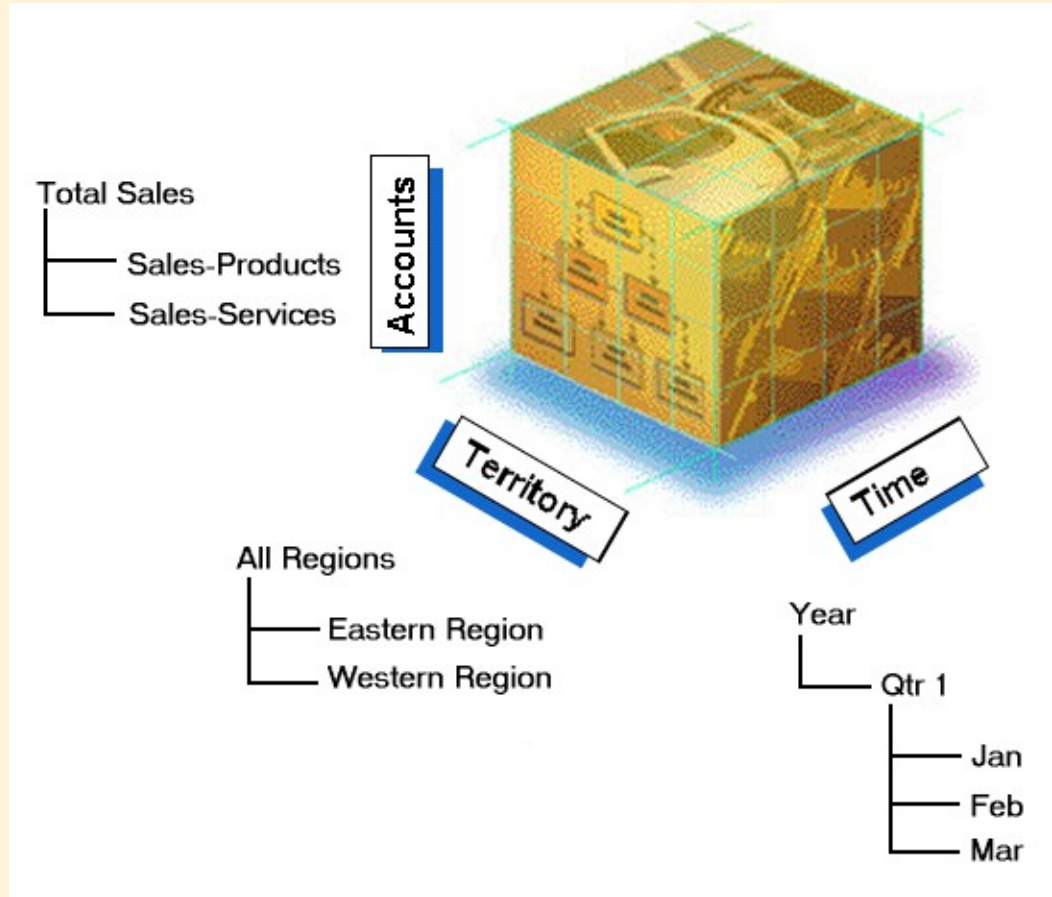
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 - Distinct categories for business data.
- Hierarchy
 - Levels of details on the data.



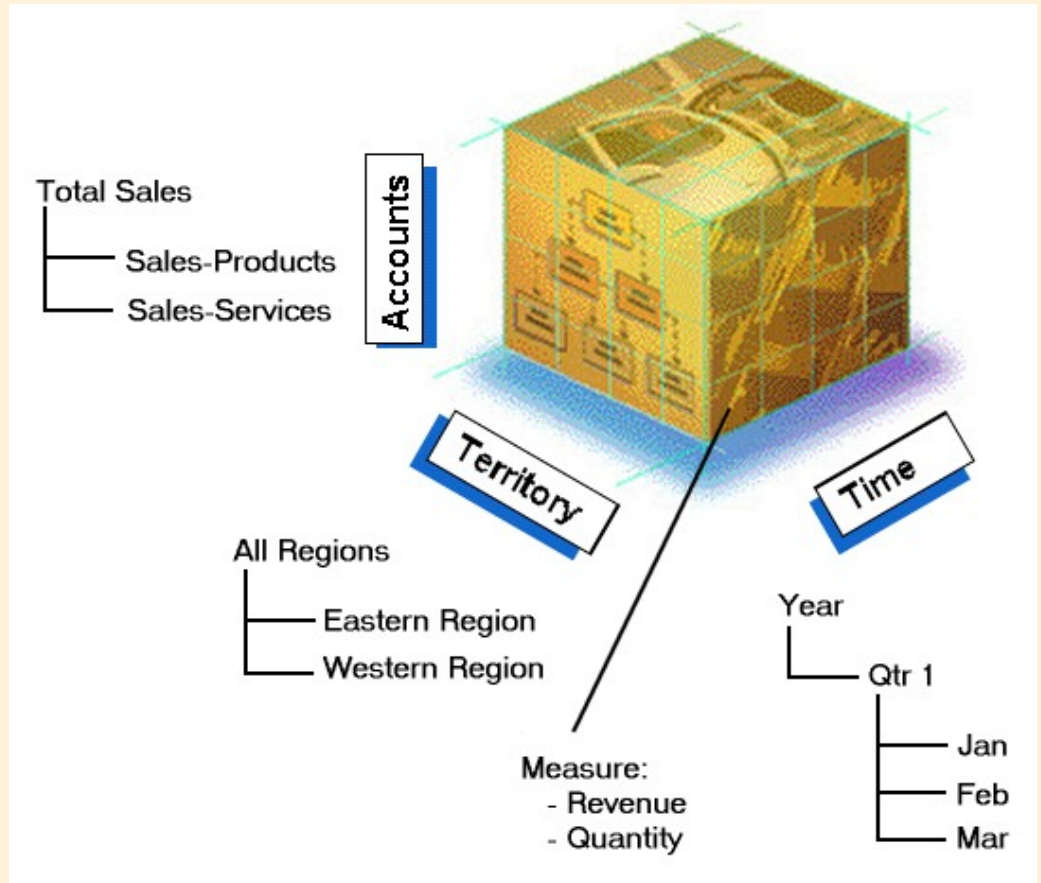
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OLAP Terms and Concepts

- **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

Cube

Information Is conceptually viewed as cubes.

Dimension

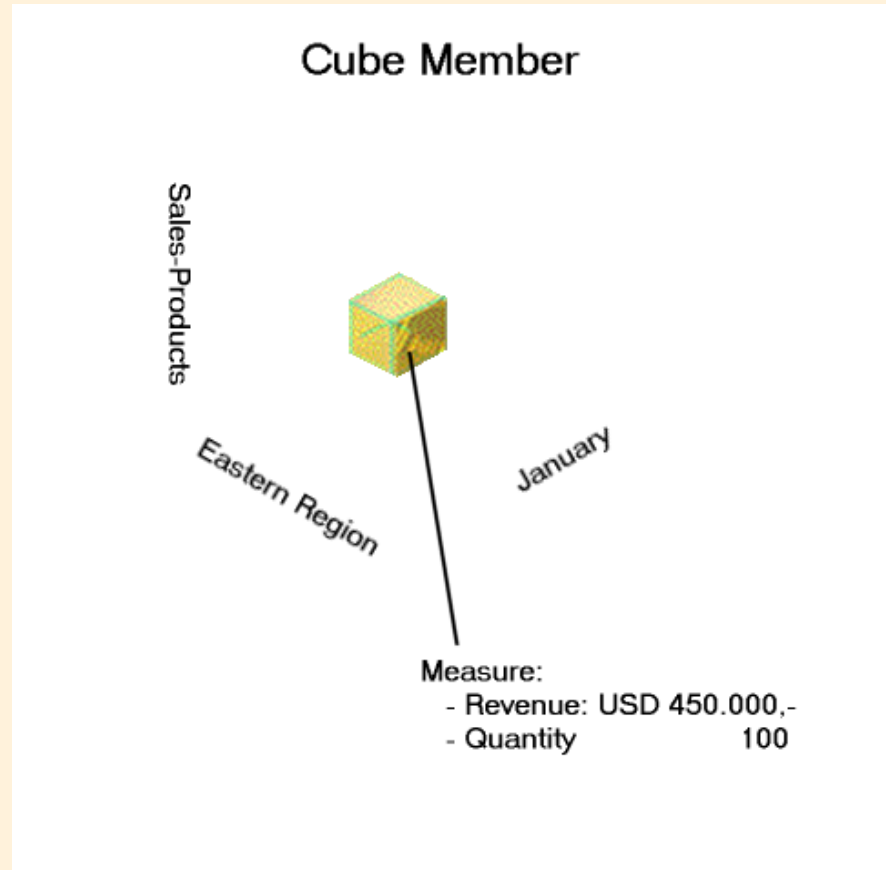
Distinct categories for business data.

Hierarchy

Levels of details on the data.

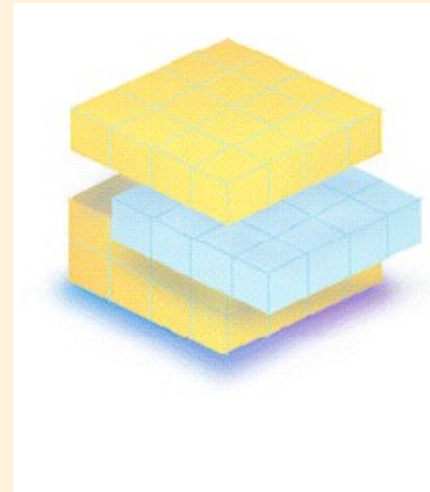
Measure

Quantitative values.

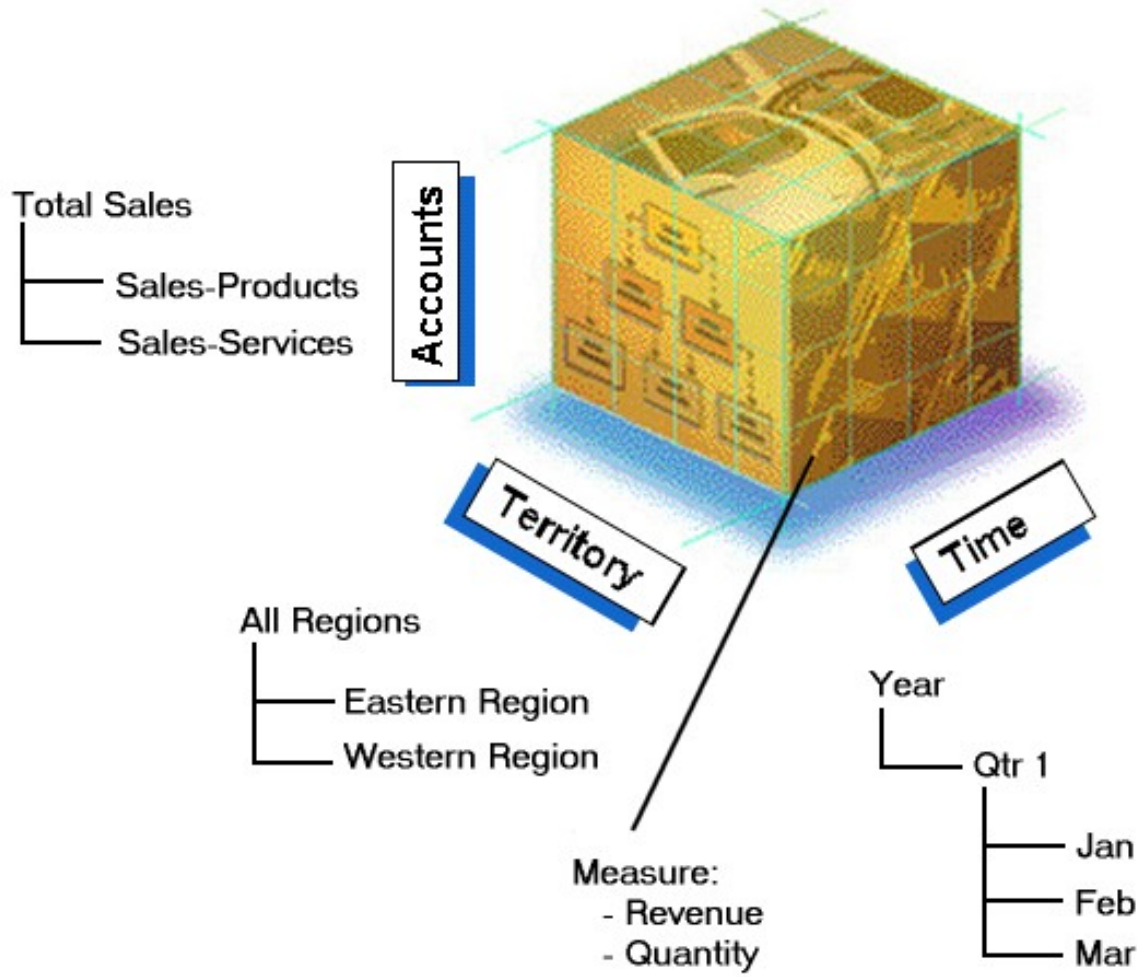


OLAP Terms and Concepts

- **Cube**
 - Information is conceptually viewed as cubes.
- **Dimension**
 - Distinct categories for business data.
- **Hierarchy**
 - Levels of details on the data.
- **Measure**
 - Quantitative values.
- **Data slice**
 - A subset of the data in a partition.



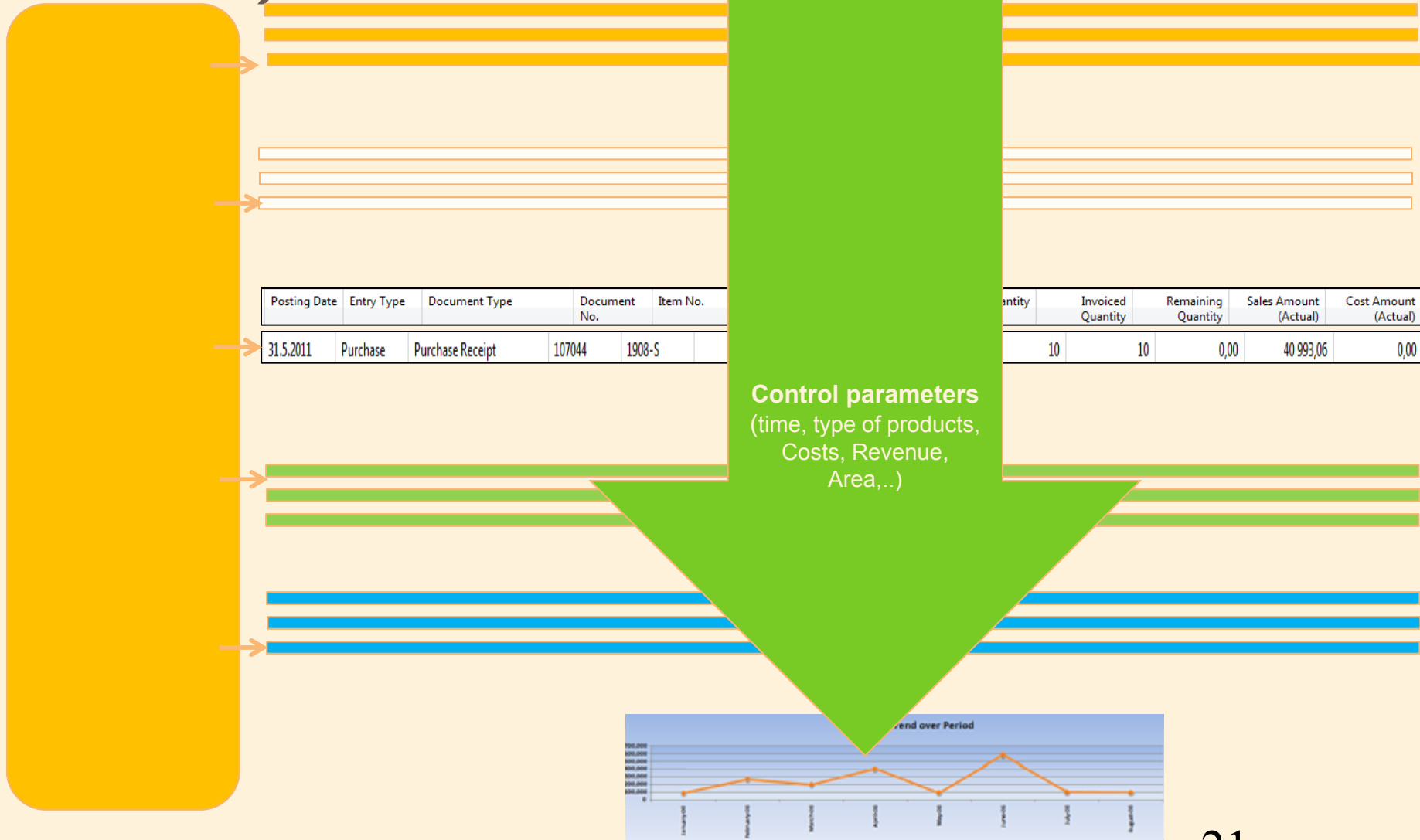
OLAP Cube



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 – setup of the accounting schedule from NAV

WC Working Capital Analysis - Účetní schéma

Název WC

Číslo řady	Popis	Typ s...	Součet	Typ řady	T... Z...	Tučně	Nová strana
		Účty		Pohyb	Č.. A..		
	Working Capital Analysis	Účty		Pohyb	Č.. A..	✓	
1	Goods all	Součty	139995	Pohyb	Č.. A..		
2	Receivables	Součty	315995	Pohyb	Č.. A..		
3	Cash total	Součty	211995	Pohyb	Č.. A..		
4	Banks all	Součty	221995	Pohyb	Č.. A..		
TR	Receivables	Vzorec	1+2+3+4+5	Pohyb	Č.. A..	✓	
		Účty		Pohyb	Č.. A..		
5	Short bank credits	Účty	231000	Pohyb	Č.. A..		
6	Splatné závazky, celkem	Součty	321995	Pohyb	Č.. A..		
7	Prepayments	Účty	324100	Pohyb	Č.. A..		
8	Associate liabilities	Součty	368995	Pohyb	Č.. A..		
TP	Payables	Vzorec	5+6+7+8	Pohyb	Č.. A..	✓	
		Účty		Pohyb	Č.. A..		
▶	Working capital	Vzorec	TR TP	Pohyb	Č.. A..	✓	

Účetní sc... Funkce Tisk Nápověda

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

- Working capital – Show of the results from NAV

WC - WC - Náhled účetního schéma

Obecné | Filtry dimenzí | Možnosti

Název účetního schém... WC Filtr data 01.01.08..31.03.08
 Název rozložení sloupce . WC Filtr rozpočtu

Číslo řady	Popis	Net change (0)	Net change (-3M)	Net change (-6M)	Net change (-9M)
	Working Capital Analysis				
1	Goods all	22 734 286,66	22 868 622,95	35 133 928,96	34 203 102,87
2	Receivables	8 896 962,33	15 620 590,10	13 095 293,10	-2 424 454,90
3	Cash total	-28 167,60	36 920,70		
4	Banks all	7 249 513,07	-161 688,80		-2 694 006,24
TR	Receivables	30 460 492,90	57 101 259,84	34 005 343,10	25 923 710,64
5	Short bank credits	-8 392 101,56	18 736 814,89	-14 223 878,96	-3 160 931,09
6	Splatné závazky, celkem	-12 766 412,03	-9 171 504,29	-3 876 790,60	295 083,40
7	Prepayments				
8	Associate liabilities				
TP	Payables	-21 158 513,59	9 565 310,60	-18 100 669,56	-2 865 847,69
	Working capital	9 301 979,31	66 666 570,44	15 904 673,54	23 057 862,95

1 7 31 3 12 < > Funkce nápověda

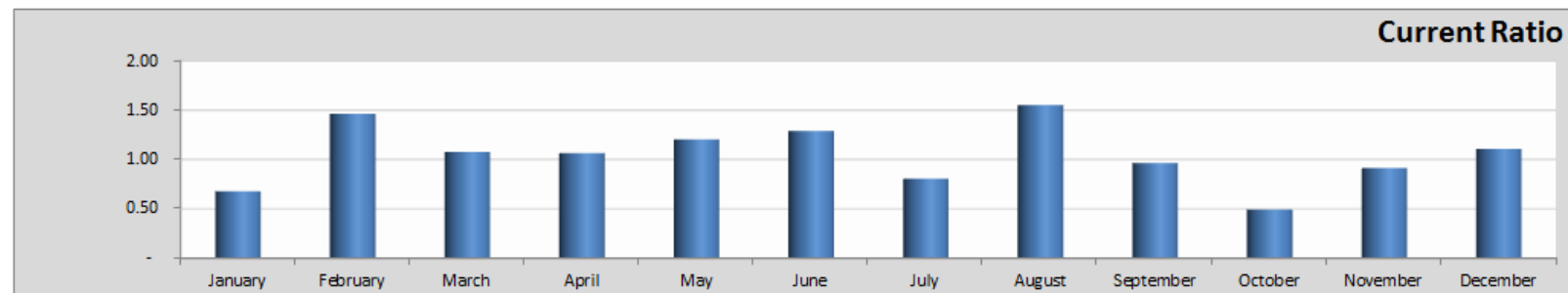
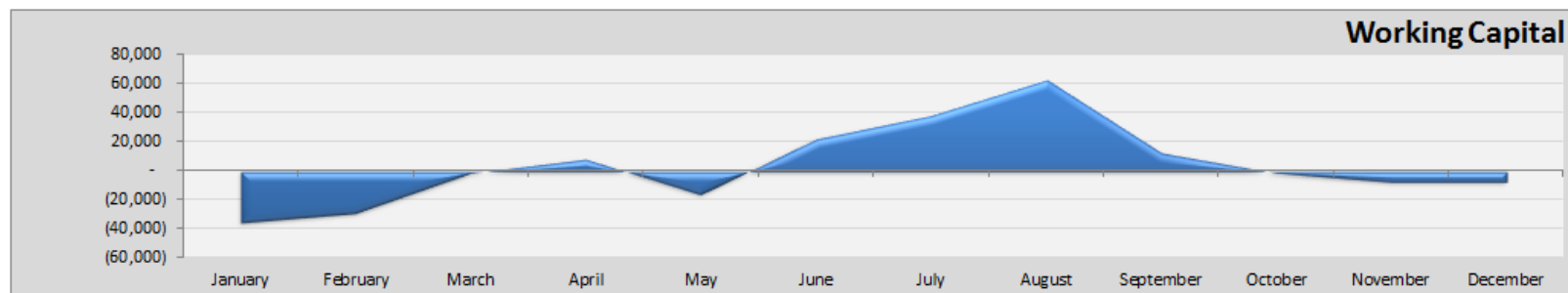
Some chosen analysis asked by CFO of company X in Czech Republic

- 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
Current Assets	74,405	(90,939)	(16,110)	136,096	(92,528)	101,144	(155,777)	174,615	(363,170)	1,015	72,525	(72,789)
Current Liabilities	109,902	(62,118)	(14,989)	127,587	(76,890)	78,566	(193,757)	112,467	(376,168)	2,070	79,494	(65,841)
Working Capital	(35,497)	(28,821)	(1,121)	8,508	(15,638)	22,579	37,980	62,148	12,998	(1,055)	(6,969)	(6,948)
Current Ratio	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

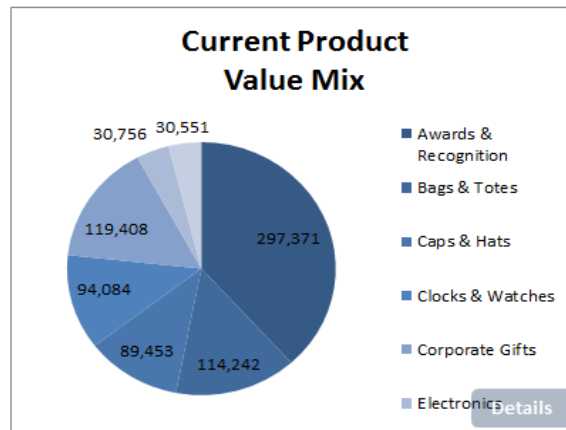
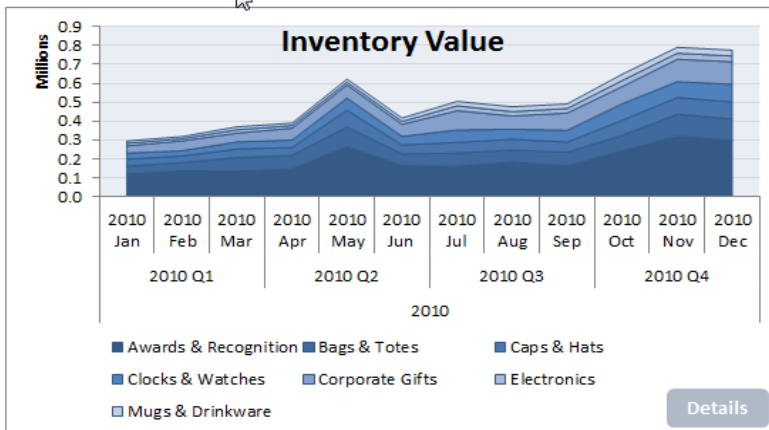
- 2007
- 2008
- 2009
- 2010

Quarter

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

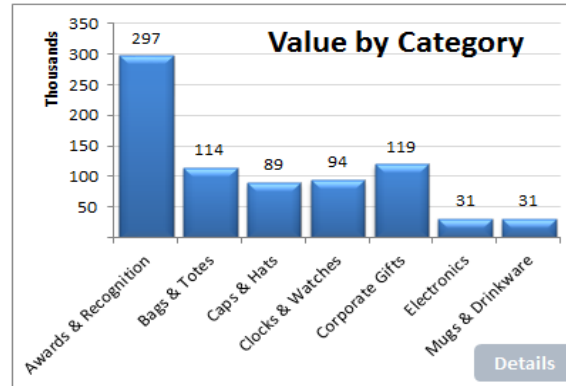
Month

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

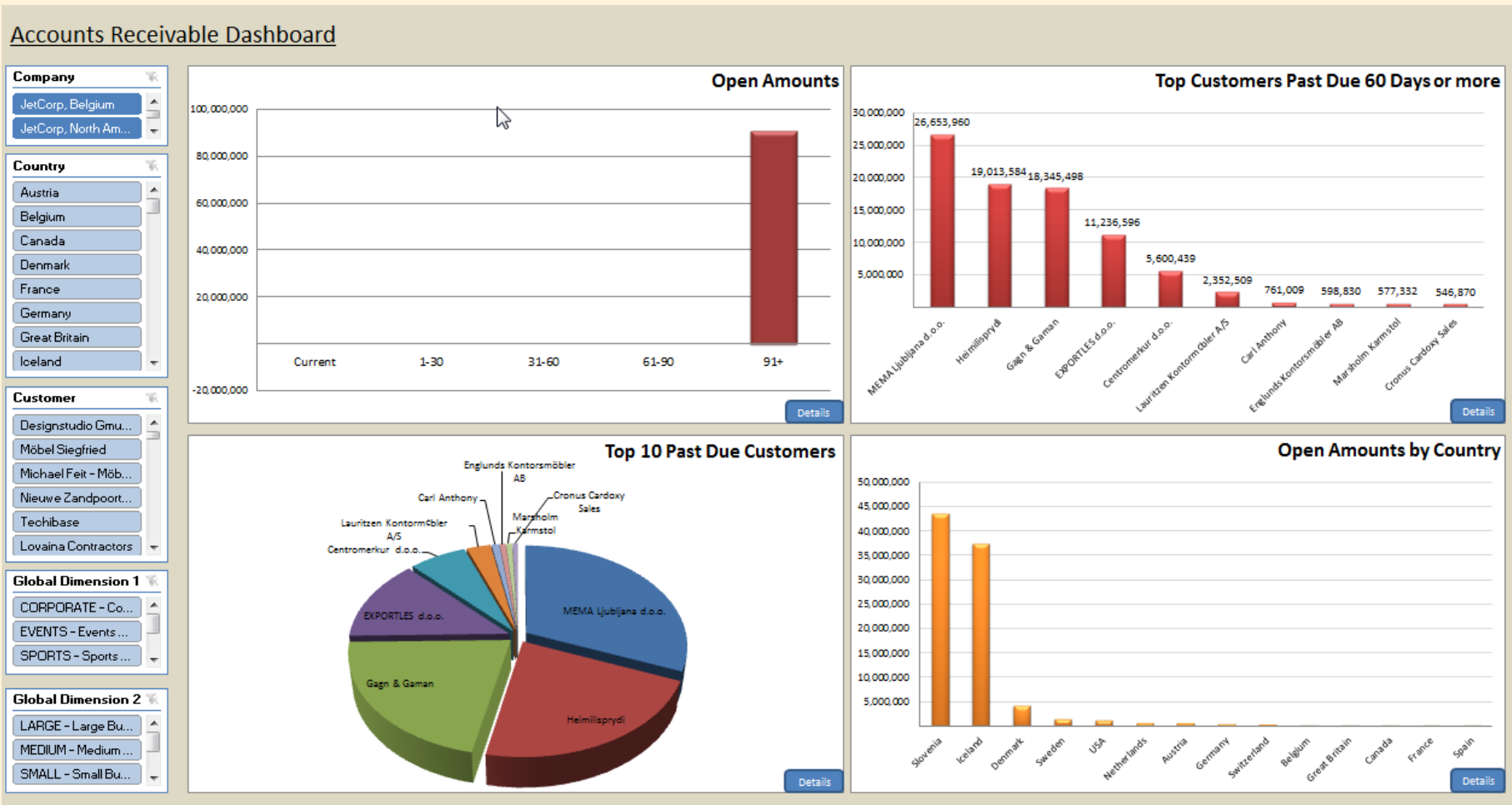


Average Inventory Value

	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

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

