E 71

IMS and BUSINESS INTELLIGENCE
What Every IMS Technical Professional Needs to Know

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  - DataPropagator
  - DB2
  - DRDA
  - ESA
  - IMS/ESA
  - IBM
  - MVS, MVS/ESA
  - OS/2
  - OS/400
  - Parallel Edition
  - RS/6000
  - SQL/DS
  - Visualizer
  - VM
  - VSE

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  - SQL∗Net   Oracle Corporation
  - Sybase   Sybase, Inc.
  - UNIX   AT&T Corporation
  - VisualBasic   Microsoft Corporation
  - Windows   Microsoft Corporation
  - ETI   Evolutionary Technologies Incorporated

Agenda

Business Intelligence from DL/I Data
   Direct access to IMS data
   Data Propagation and Replication
   **Building and Maintaining DataMarts**
   Using OLAP and Data Mining

Objective
   Show new ways of exploiting IMS data

Data - to - Information Process

Transformation Tools

Operational Data

External Data

Data Warehouse

- Business Subject Areas

Metadata
- Elements
- Mappings
- Business Views

Administration

Business Views

Business Information

Torture the data until it confesses!

IMS

The world depends on it

IBM.

Business Intelligence Architecture

IMS

The world depends on it

Operational and External Data

VSAM · Flat files · IMS · Informix · DB2 · Oracle · Sybase · SQL Server · FTP, NFS

Extract
- Operational and External Data

Transform
- Cleanse
- Reconcile
- Enhance
- Summarise
- Aggregate

Distribute
- Stage
- Join Multiple Sources
- Populate On-Demand

Store
- Relational Data
- Specialised Caches
- Multiple Platforms and Hardware

Find & Understand
- Information Catalog
- Business Views
- Models

Display, Analyse, Discover
- Query and Reporting
- Multi-Dimensional Analysis
- Data Mining

Automate & Manage
- Data Flows
- Process Tasks
- Data Archival/Retrieval

Open Interfaces
- Multi-Vendor Support
- Standards

Consulting Services
- Plan - Design - Implement

Enabling the Solution

Business Intelligence Products

IMS

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Operational and External Data

VSAM Flat files IMS Informix DB2 Oracle Sybase SQL Server FTP, NFS

Extract	Transform	Distribute	Store	Find & Understand	Display, Analyse, Discover
SQL APIs DataJoiner DataPropagator DataRefresher Visual Warehouse *ETI*	DataJoiner DataPropagator Visual Warehouse *ETI* *Vality Technology*	DataJoiner DataPropagator Visual Warehouse *ETI*	DB2 Family *Arbor Software*	DataGuide	Approach Intelligent Decision Server Intelligent Miner QMF / AS / . . . *Andyne* *Brio* *Business Objects* *Cognos* *Information Advantage*

Automate & Manage

Visual Warehouse   AdStar Distributed Storage Manager
                                    FlowMark

Open Interfaces

IBM Information Warehouse Architecture   IBM Open Blueprint

Consulting Services - including.....

IBM Global Services IBM Global BI Solutions *The Indica Group* *IMI Systems* *SHL Systemhouse*	*Price Waterhouse LLP* *Questra Consulting* *The BMS Group* *X Systems*	*The Praxium Group* *EDS* *Cap Gemini* *Volt Information Sciences*	*PSR* *Indotronix* *The Fillmore Group* *Analysts International (AIC)*

Comprehensive Products and Services   Flexible Implementation Alternatives

*An Open Solution Environment*

Business intelligence Components

Data Mining
- Clustering
- Classification
- Association Discovery
- Sequential Pattern Discovery
- Time Sequence Discovery
- Value Prediction

Decision Support
- Information delivery
- Statistical analysis
- Result visualisation
- Multidimensional analysis

Data Warehouse
- Architecture
- Distribution
- Consolidation
- Cleansing
- Management

Business Intelligence Products

Data Mining
- Intelligent Miner
- Text Miner

Decision Support
- Intelligent Decision Server
- DB2 OLAP Server
- Query Management Facility (QMF)

Data Warehouse
- Visual Warehouse
- DB2 and DL/I
- DPropR
- DPropNR
- DataRefresher
- ETI*Extract

OLTP compared with OLAP

- ## OnLine Transaction Processing
  - OLTP workloads are characterised by many users creating, updating and retrieving individual DB record
  - Focus is high volumes: hundreds or thousands of transactions per section.
  - Speed is everything.
  - Time element is not stored with data
  - Runs the enterprise.
  - Examples: Bank Transactions, Check out lines, etc.

- ## OnLine Analytical Processing
  - OLAP workloads are characterised by few users running large/complex aggregation queries.
  - Low volumes.
  - Long processing time: hours or days.
  - Time element stored with data - needed for historical perspective.
  - Answers analytical questions: Why, How Much, When, etc.
  - Examples: Market analysis, Trend detection, etc.

OLAP Characteristics

- **Defined by Dr. E. F. Codd & widely adopted throughout the industry**

- **Software Optimised for Planning and Analysis**
  - Multidimensional view
  - Drill-down
  - "Slice & Dice"

- **Driven by End Users Need**

- **Complements RDBMS and Data Warehouses**

- **Leverages existing investments**
  - Back-end transaction systems
  - Front-end reporting systems

3-Dimensional Example

	REGION	STATE	CITY
GEOGRAPHY	MID-ATLANTIC	VA	Fairfax Richmond Norfolk
		MD	Annapolis Baltimore Potomac
	SOUTHEAST	NC	Raleigh Charlotte Durham
		GA	Atlanta Augusta Norcross

X FACT

GEOGRAPHY

PRODUCT

TIME
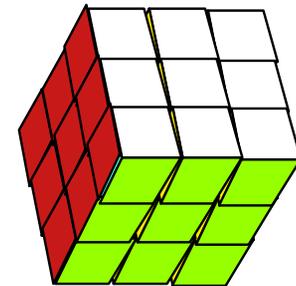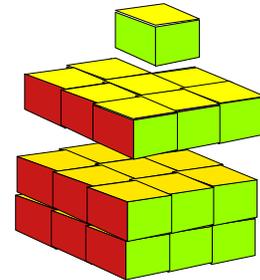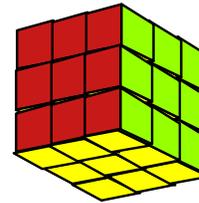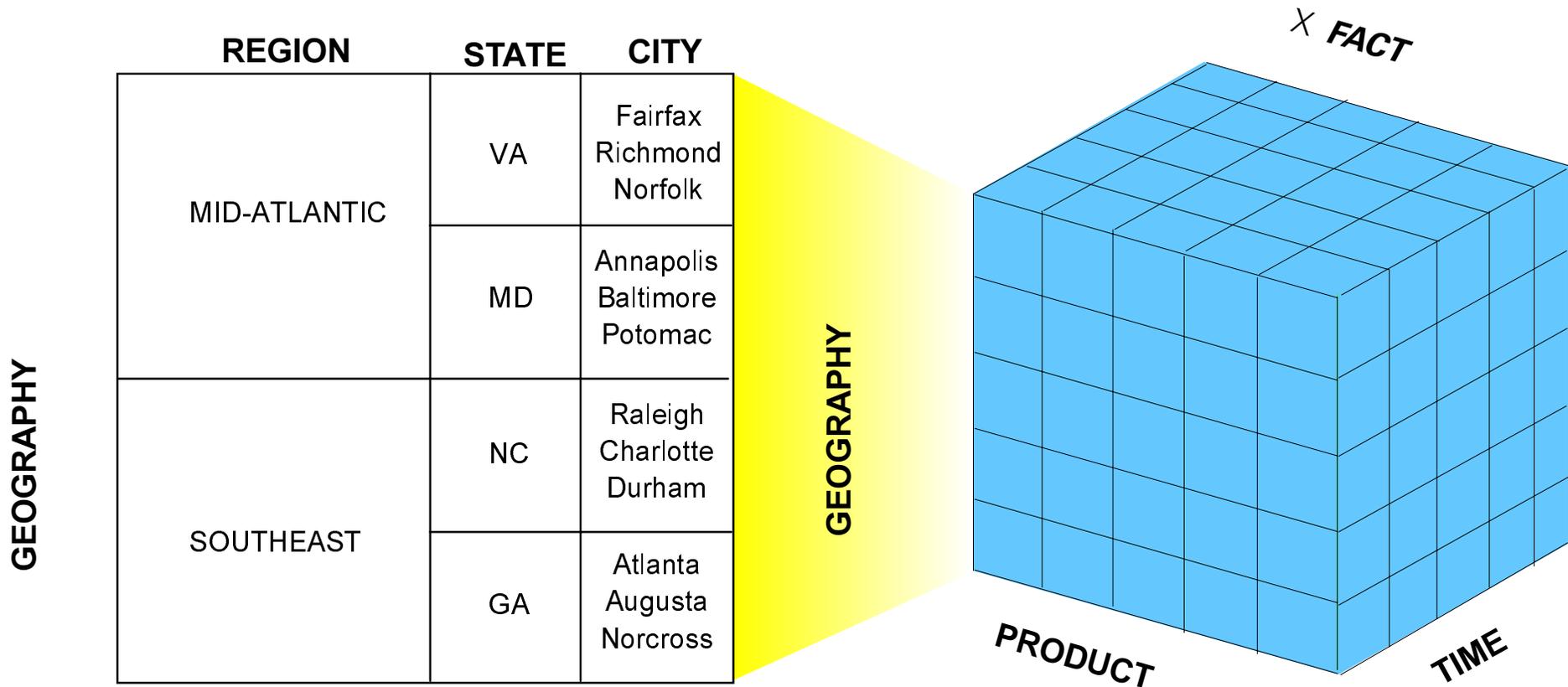
Multi-dimensional Example

Sales Table

Sales Units	Period Key	Product Key	Geography Key
20	1	1	1
25	1	2	2
25	2	2	3
100	3	3	3
100	4	4	4

Geography Table

Key	Desc	Region	Level
1	NW R	E	48
2	SE R	N	46
3	NW E	S	48
4	NW S	S	56

Product Table

Key	Desc	Type	Category
1	Food	Grocer	A
2	Sports	Ball	A
3	Hardwa	Tool	B
4	Rec	Pool	C

Period Table

Key	Year	Month	Quarter
1	1996	Jan	1
2	1996	Apr	2
3	1997	Jul	3
	1997	Dec	4

Drill Down......

★ **Looks at components in greater detail down same dimension**

Time	Market		Measures	Product
Year	Country		Profit	Category
Quarter	Region		Sales	Brand
Month	District		COGS	Package
Week	Town		Expense	Size
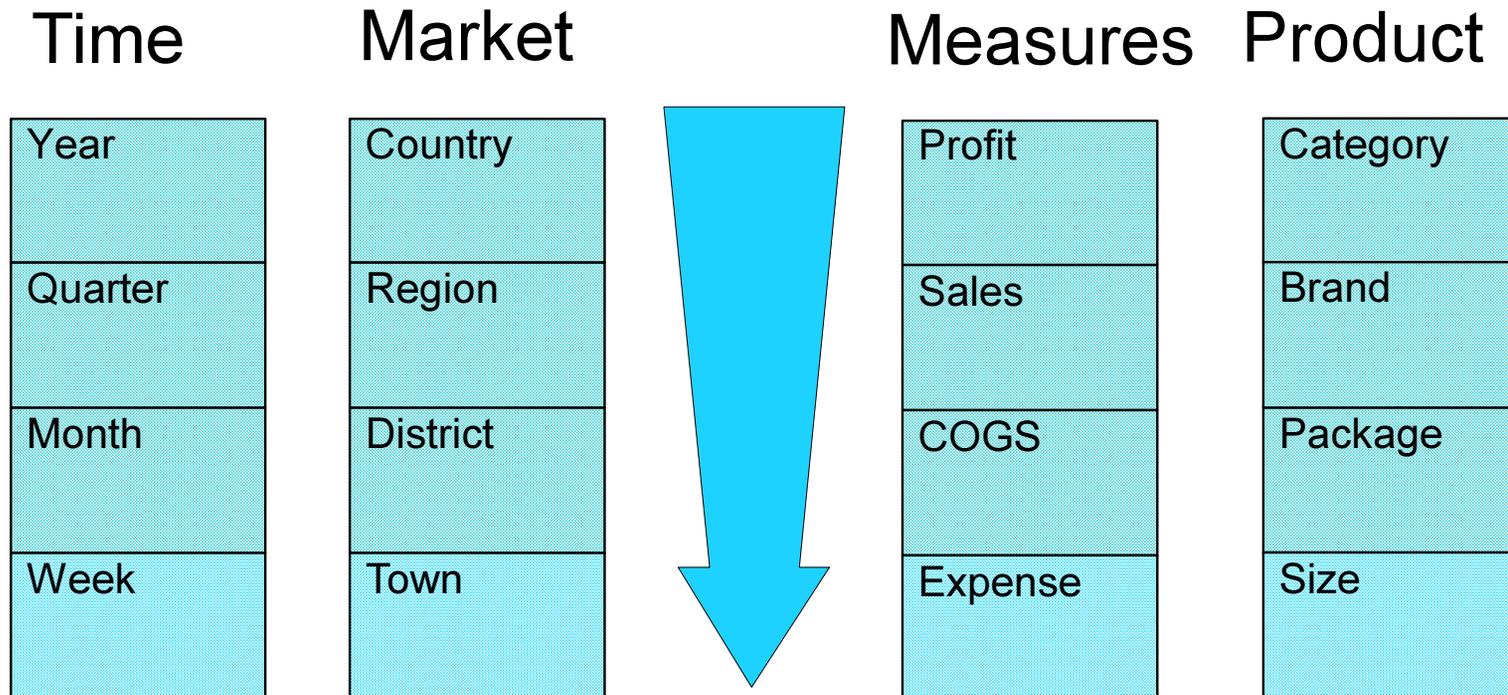
Rotate the Cube.....

★ **Changed dimensions which are breaking down values**

		Bud	Act	Bud	Act
1997	East				
	West				
1996	East				
	West				
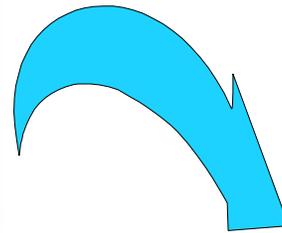
		1994	1995	1996	1997
East	Food				
	Drink				
West	Food				
	Drink				

Role of OLAP

Monitor

Analyse ★ Why?

Plan

★ What do we do to improve?

Model

★ What if changed ... ?

IMS Technical Conference
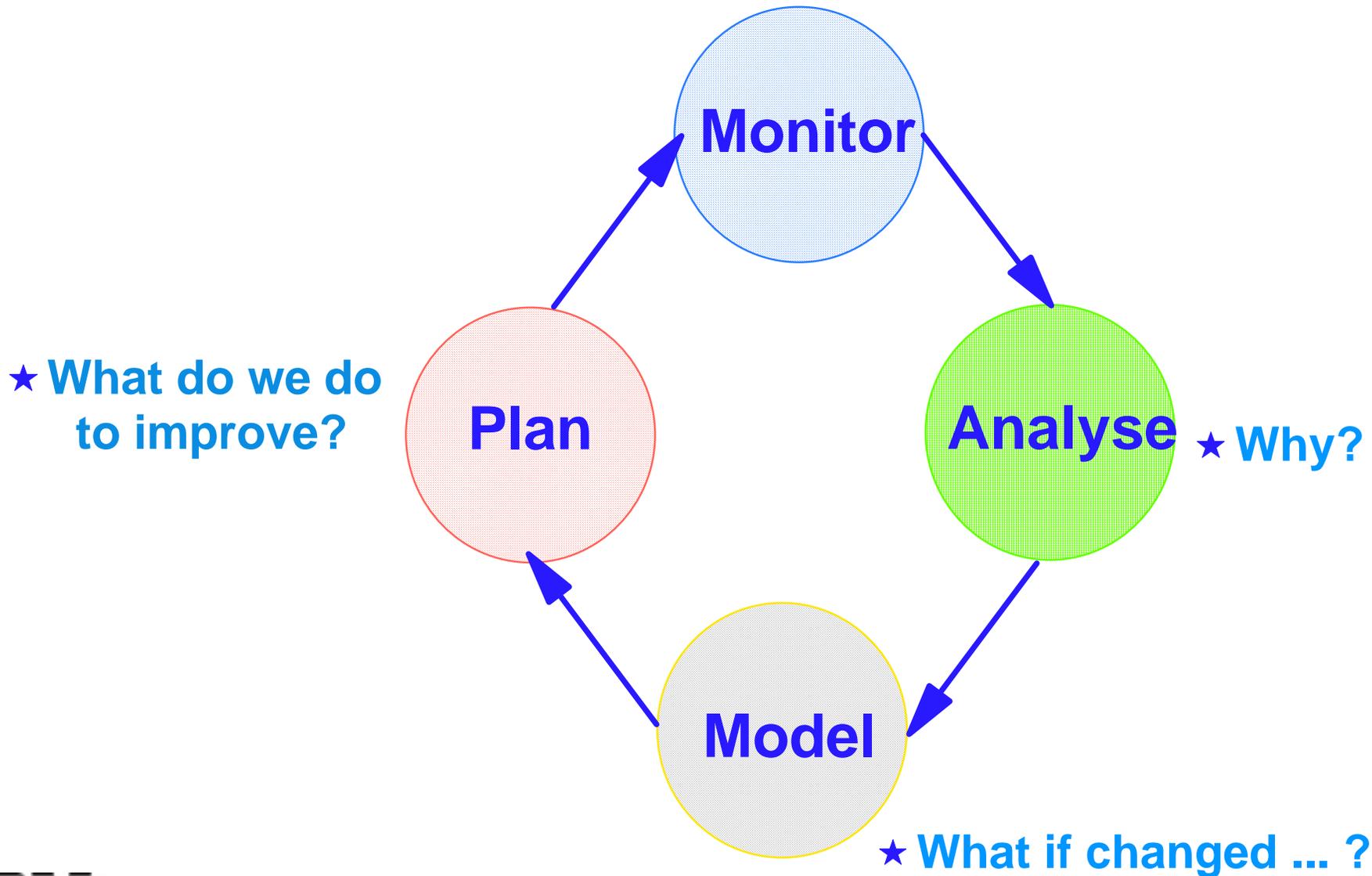
Role of OLAP

Goal: manage business better
- reduce cycle time
- more line participation
- more detail
- continuous improvement

Monitor
- ★ reporting
- ★ navigation
- ★ EIS
- ★ key indicators

Plan
- ★ strategic plan
- ★ revenue forecast

Analyse
- ★ filter
- ★ rank
- ★ sort
- ★ attributes
- ★ calculation

Model
- ★ calculation
- ★ allocations
- ★ what-if
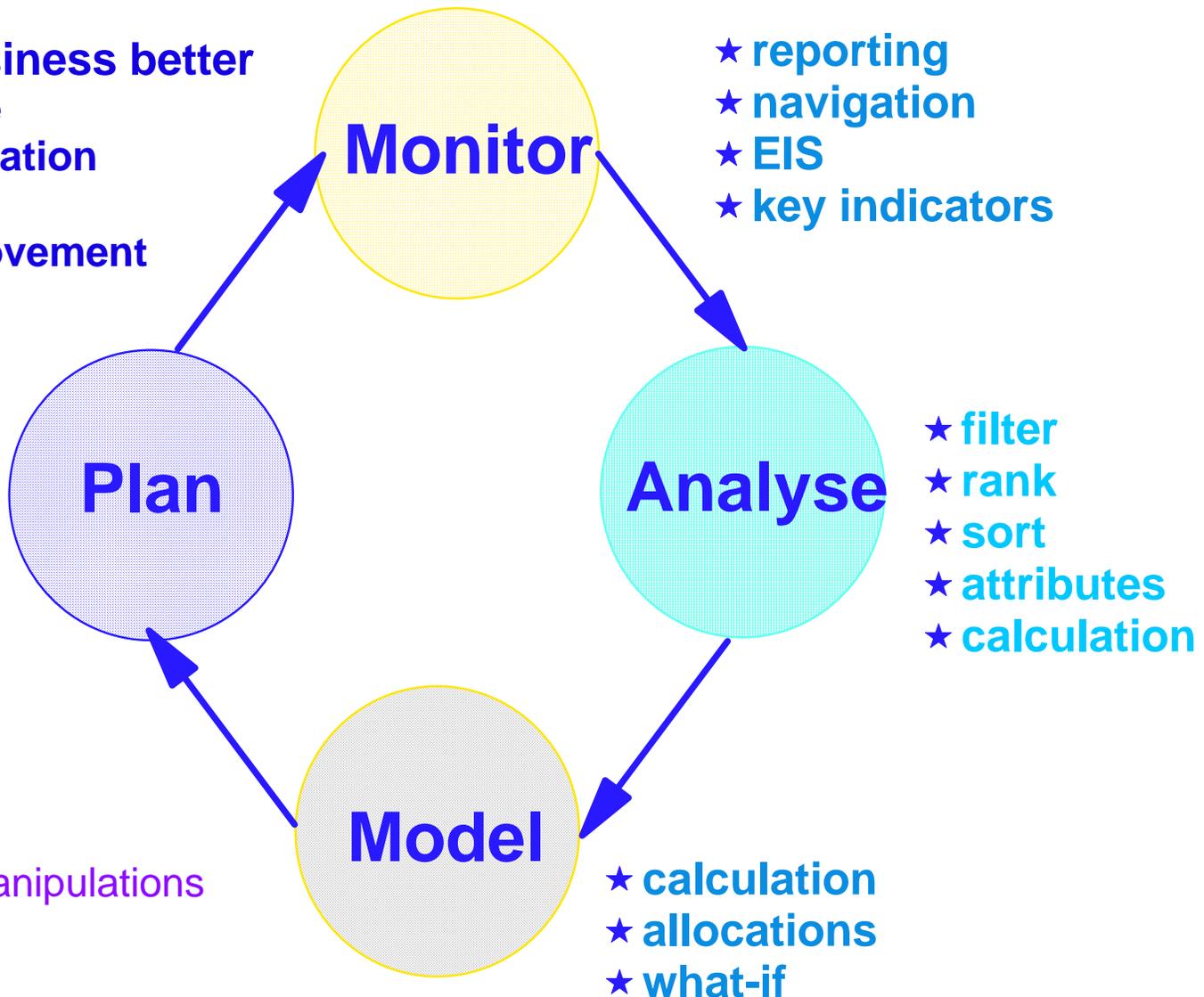
Examples of OLAP manipulations follow

Role of OLAP

Finance Industry Example

Monitor
- ★ **consolidations**
- ★ **Briefing Book**

Plan
- ★ **capital budget**
- ★ **operating budget**
- ★ **sales forecast**

Analyze
- ★ **profitability**
- ★ **price/volume mix**
- ★ **contributions**
- ★ **sales**

Model
- ★ **forecasting**
- ★ **scenarios**
- ★ **goal seeking**

source: Arbor Software
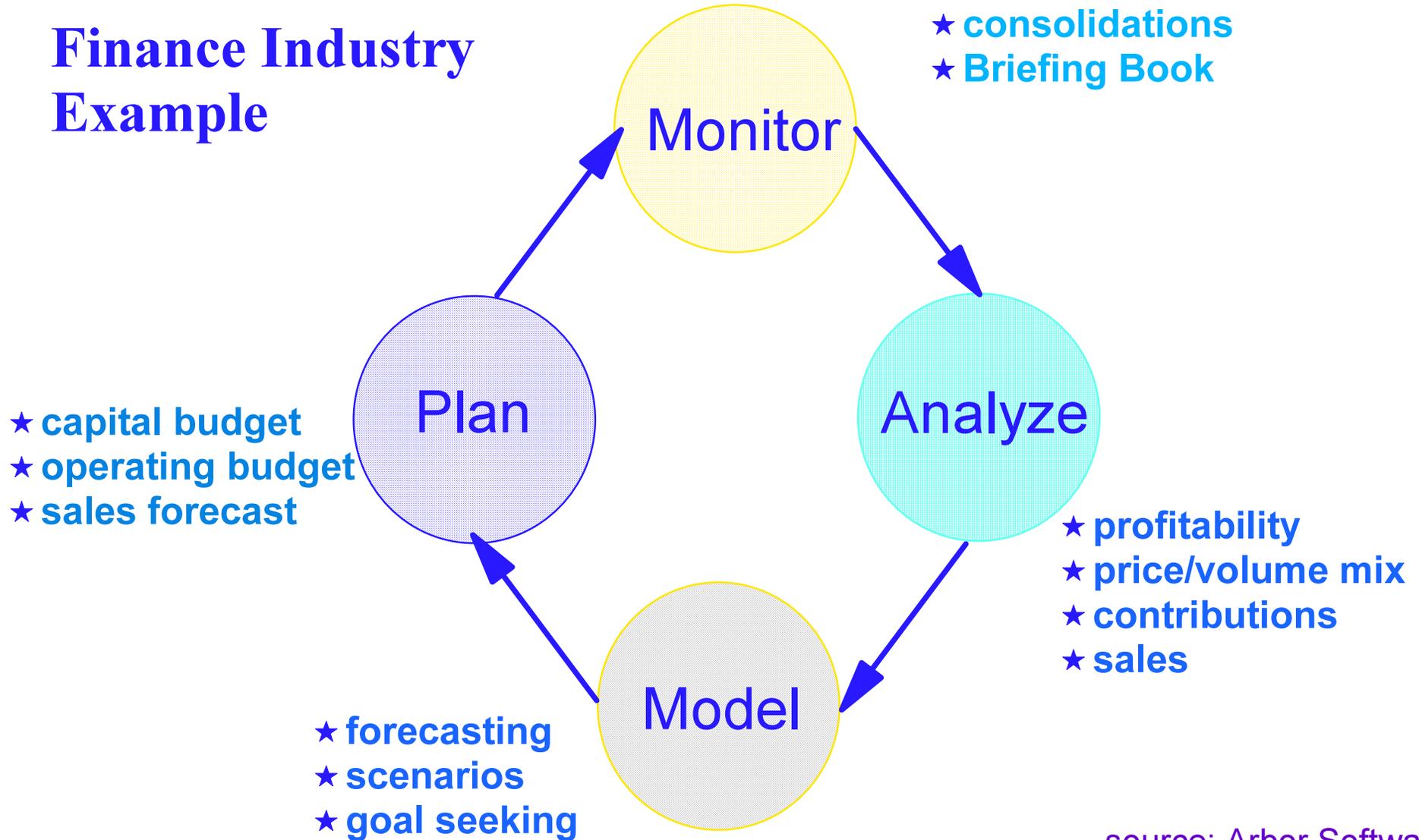
The Data Mining Process

Transformed Data

Assimilated Information

Extracted Information

Data Warehouse

Selected Data

Select

Transform

Mine

Assimilate
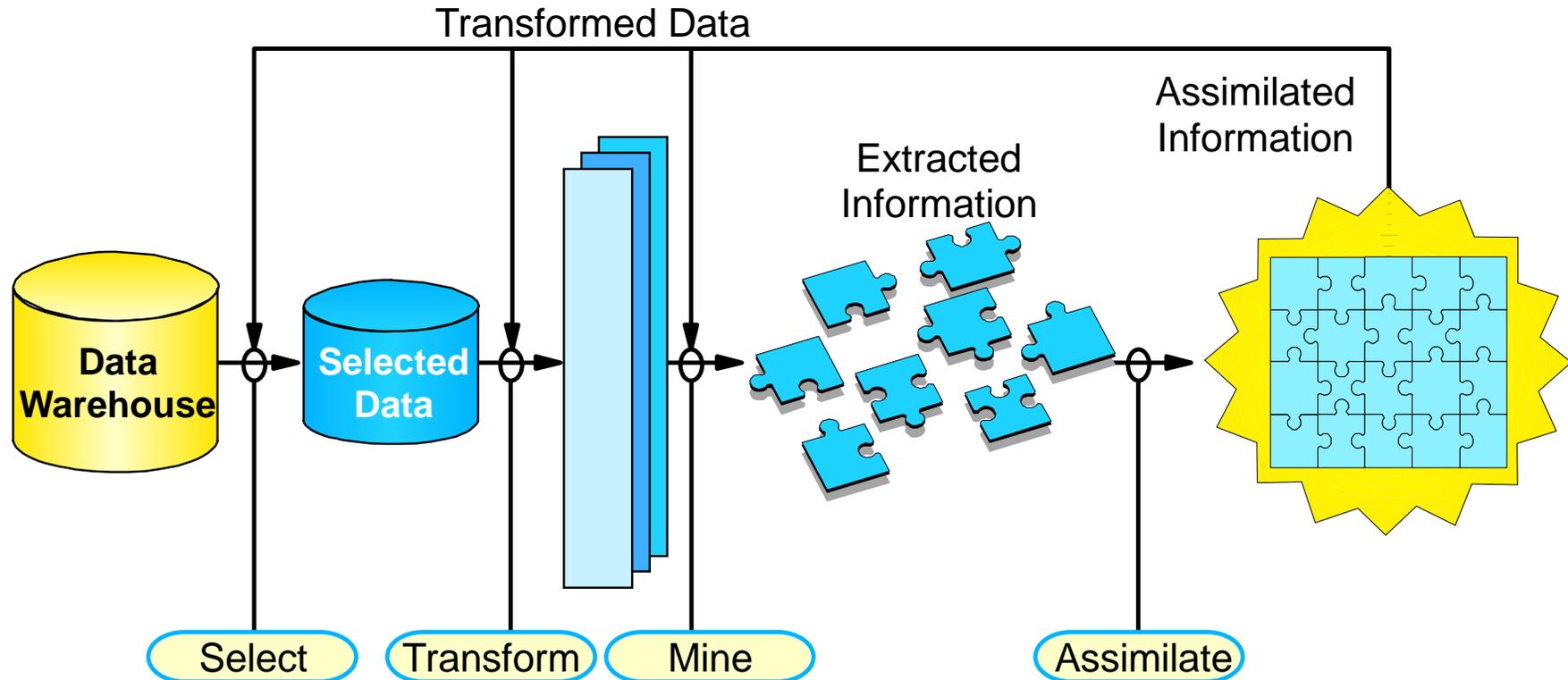
. . . . the process of extracting ***previously unknown***, ***comprehensible***, and ***actionable*** information from large databases and using it to make crucial business decisions.

Mining Techniques

Intelligent Miner

- Promotion effectiveness
- Subscriber analysis
- Demand forecasting

- Customer retention
- Targeted marketing
- Cross selling
- Customer segment

Applications

Predictive Modelling

Database Segmentation

Link Analysis

Deviation Detection

Data Mining Operations

Symbolic Induction Methods

Neural Network Methods

Clustering Methods

Viz Methods

Assoc & Sequen Discovery Methods

Statistical Methods

Data Mining Techniques
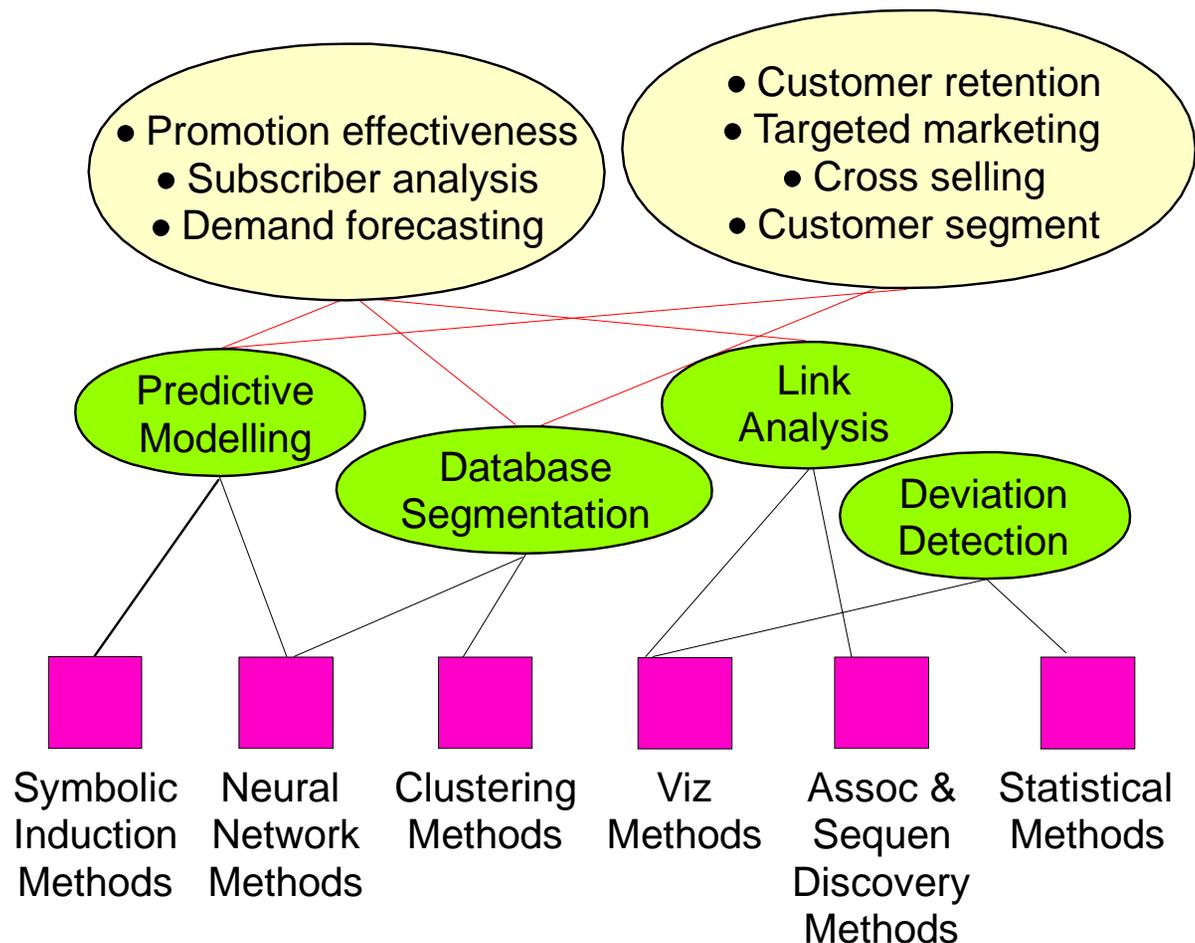
Direct SQL Access to Data

DataJoiner

Single-DBMS Image

- OS/2
- AIX
- DOS
- Windows
- HP-UX
- Solaris

- Network, Location, ... Transparency
- Enable new DSS applications
- Optimised performance
- DB vendor independence
- Simpler application environments
- Aid database migration
- DB2 access

DataJoiner

AIX/NT

- Preserve local autonomy
  - DML vs. DDL
- Transaction Support
- Join across sources

- DB2 for MVS, DB2 for VSE & VM or DB2 for OS/400
- DB2 for OS/2 DB2 for AIX
- DB2 Parallel Edition
- DB2 for HP-UX or DB2 for Solaris
- Oracle
- Sybase
- Relational DB
- Non-Relational DB ► **IMS DB**

DataJoiner Server Support

IMS
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DRDA Driver

DB2 LAN Driver

Oracle
SQL* Net

Sybase
Open Client

CLI
Driver

Relational
Gateway

DB2 for MVS,
DB2 for VSE & VM
or DB2 for OS/400

DB2 for OS/2 or
DB2 for AIX

DB2 Parallel
Edition

DB2 for HP-UX
or DB2 for Solaris

Oracle

Sybase

Relational DB

Non-Relational
DB

IMS DB
VSAM

Classic
Connect
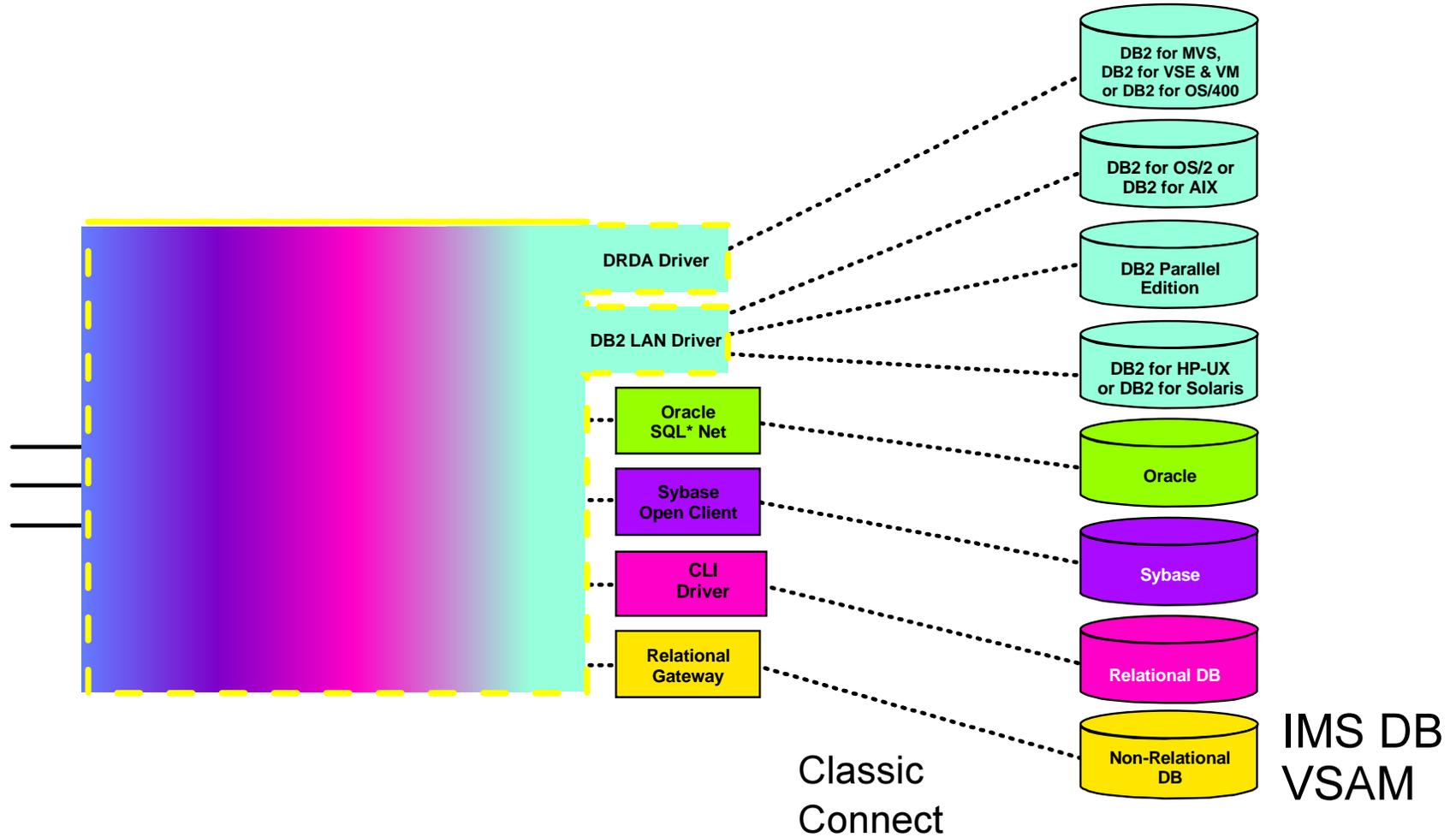
Direct Data Access Characteristics

Operational Data

- Current data values
  Single value only
- Single copy of data
  Simpler management

- Current data values
  Erratic repeatability of query
- Encoded data
  e.g. M/F, 53 (colour), W29 (location)
- Impact on Operational system
  Unpredictable workload
- Network volumes
  Multiple segments, not summarised result

Data Characteristics
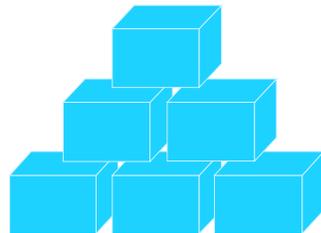
Operational Data

Application Oriented
Limited Integration
Constantly Updated
Current Values Only
Supports Daily Opns

Informational Data
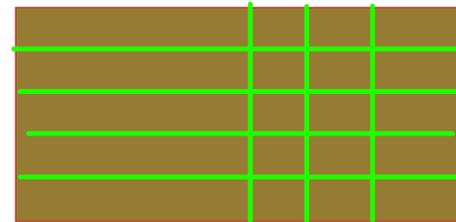
Subject Oriented
Integrated
Non-volatile
Values Over Time
Supports Decision Making

Operational and Informational Data are Fundamentally Different

Building the Warehouse
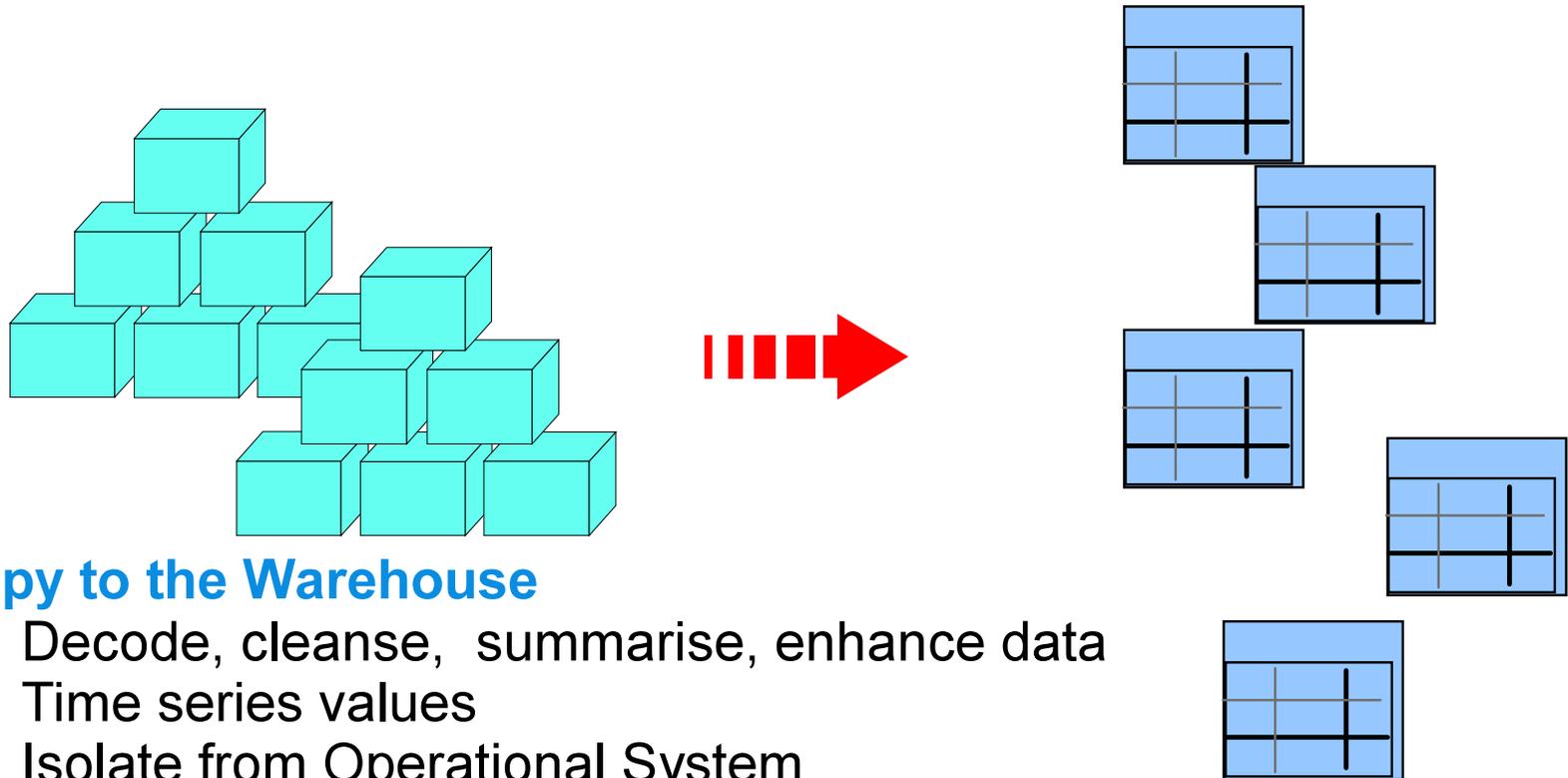
Copy to the Warehouse

Decode, cleanse, summarise, enhance data

Time series values

Isolate from Operational System

Cyclic Update - reproducible results

How?

DataRefresher or ETI*Extract - mass extract

IMS DataPropagator - for changes

IMS Technical Conference

What, and Where, is the Data?

Visual Warehouse Information Catalog

- Metadata store for business end users
- Contains technical and business metadata

Metadata

- Decision Support
  - Query
  - Analysis

Launch

Information Catalog
  - Locate
  - Understand

Data Access

Data

Operational Data

- Warehouse Tools
  - Extract
  - Transform
  - Replicate

Informational Data

MultiDimensionalDB

Administrator
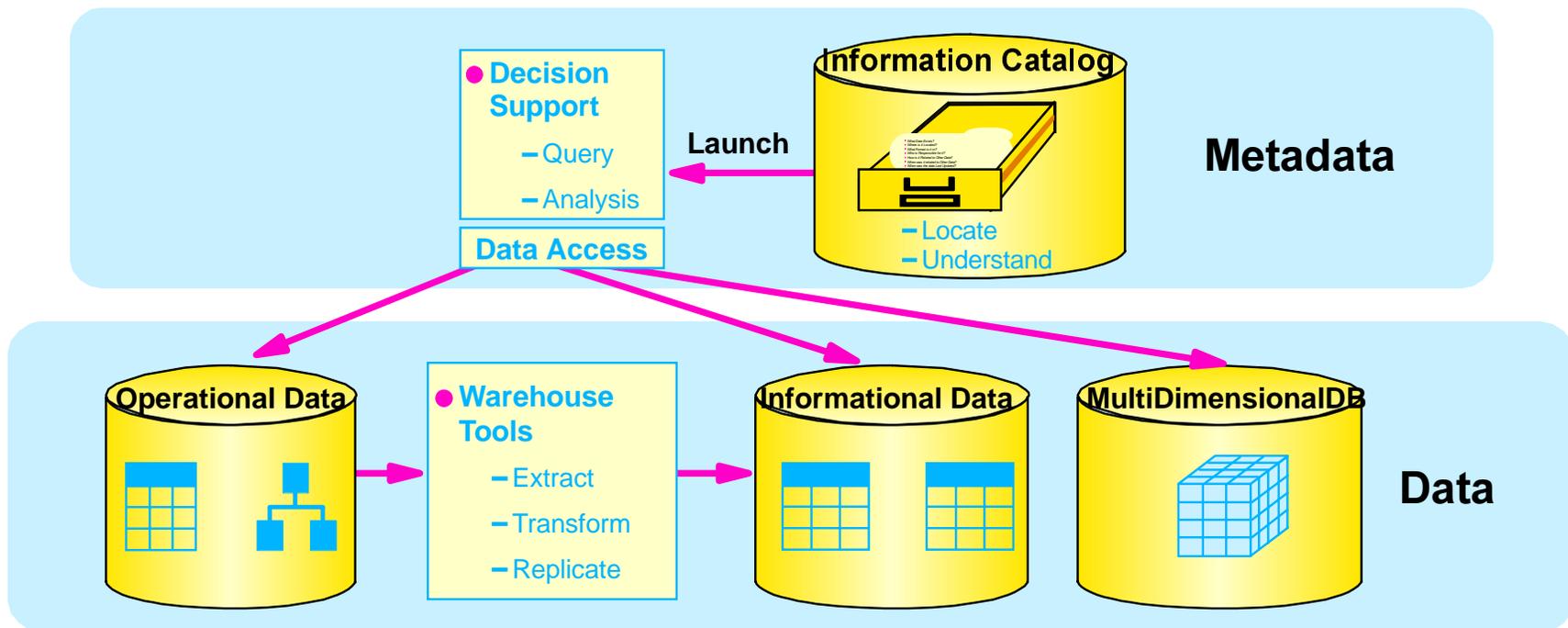
Mass Extract - DataRefresher

- **Build informational databases on the DB2 family**
  - From any data source on MVS and from DB2/VM
  - Heterogeneous join across sources
  - Eliminate extract application development and maintenance
  - Data enhancement
 - Client/Server implementations

Legacy Sources → **Refresh** → **DataRefresher** → **Refresh** → **DB2 Family Databases**
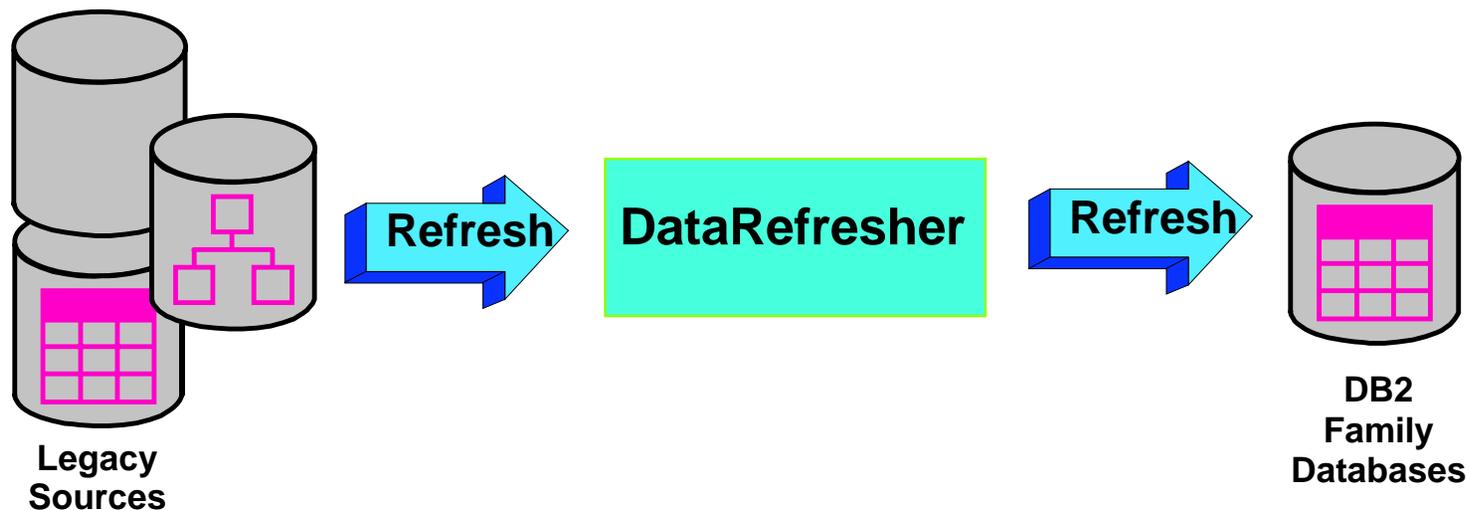
Capturing Changes - DR and IMS DProp

● **Build informational databases on the DB2 family**
  - **From any data source on MVS**
  - **Heterogeneous join across sources**
  - **Eliminate extract application development and maintenance**
  - **Data enhancement**
  - **Client/Server implementations**

DataRefresher

Full Copy

Refresh

COMMON:-
External meta data
User written Exits

Change Data

IMS DataPropagator
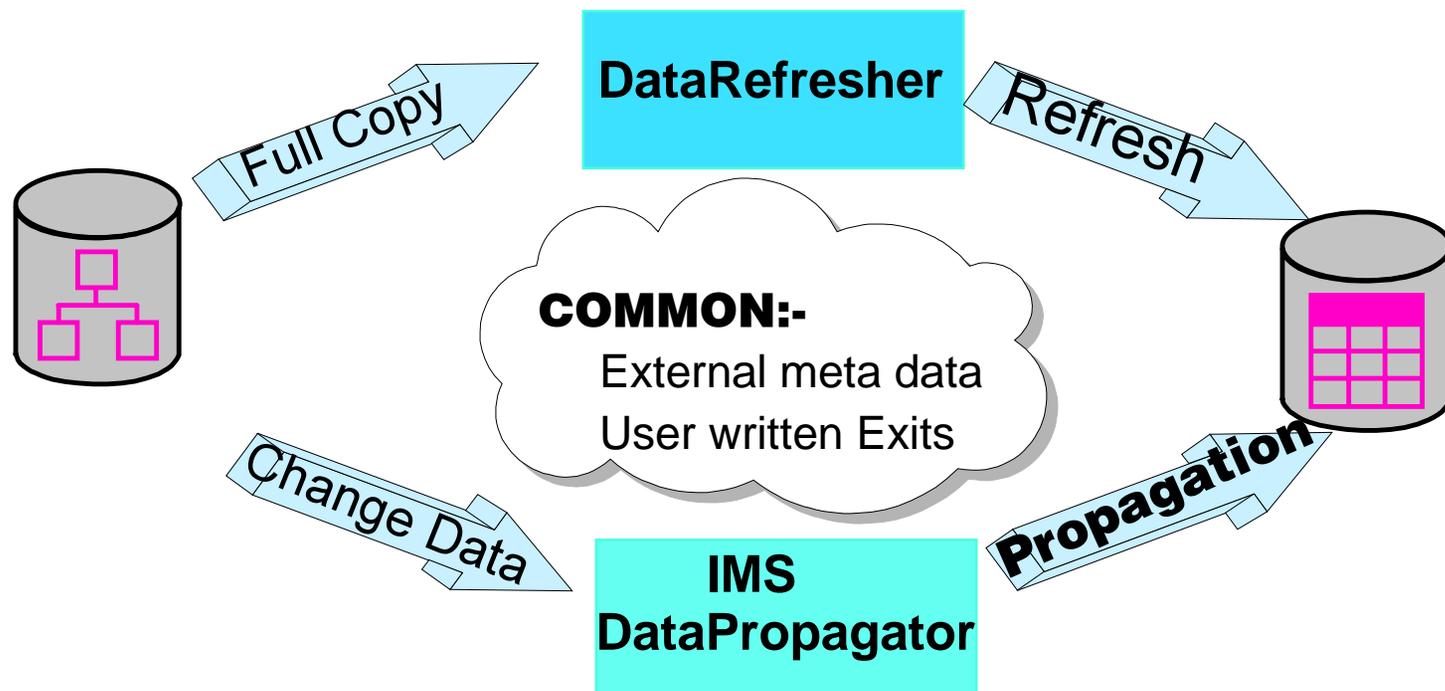
Propagation

Capturing Changes - ETI EXTRACT and IMS DProp

● **Build informational databases on the DB2 family**
  - **Prepare Meta Data**
  - **Generate extract application**
 - **Enable Data Enhancement**
  - **Also Invoked via DPNR Propagation Exit**

Full Copy

ETI* Extract Application

Refresh

ETI COBOL Meta Data Conversions

Change Data

IMS DataPropagator

Propagation

IBM.
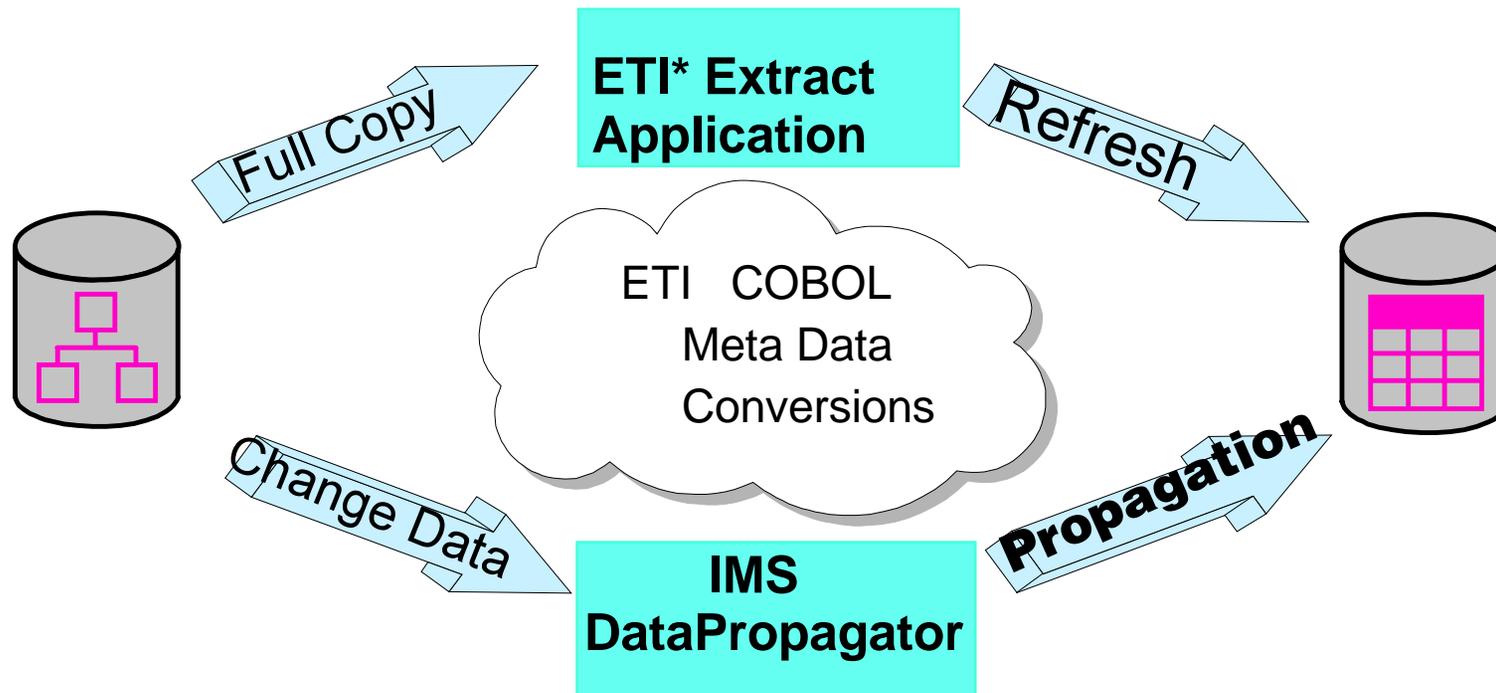
ETI-EXTRACT Tool Suite

Automating Data Movement:

**Collection
Cleansing
Conversion
Transformation
Migration**

**Any
Computer
Platform**

**Any
Programming
Language**

**Any
Application**

**Any
Database**

**Any
Metadata**
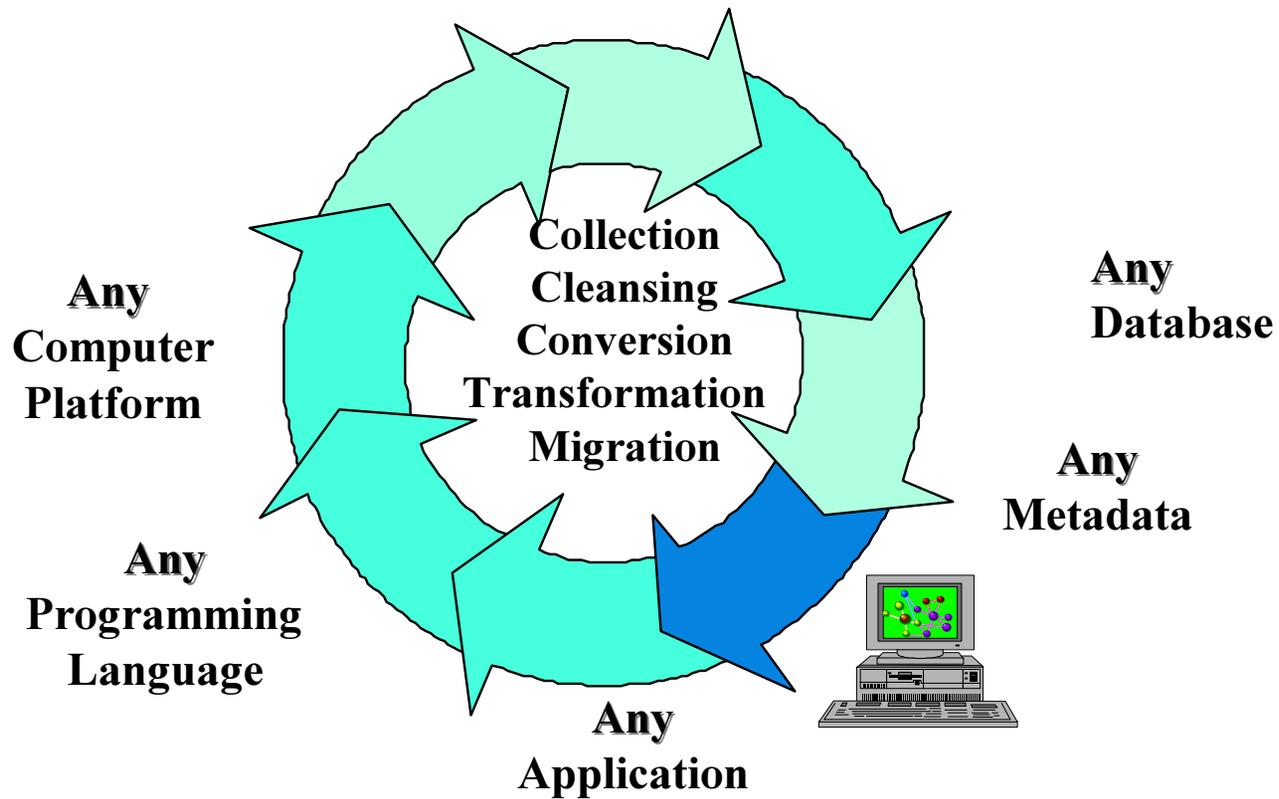
ETI-EXTRACT Unique Process

Source(s)   ETI-EXTRACT Workstation   **Target(s)**

DB2
Teradata
IMS
ADABAS

Informix
SAP
DB2
Oracle
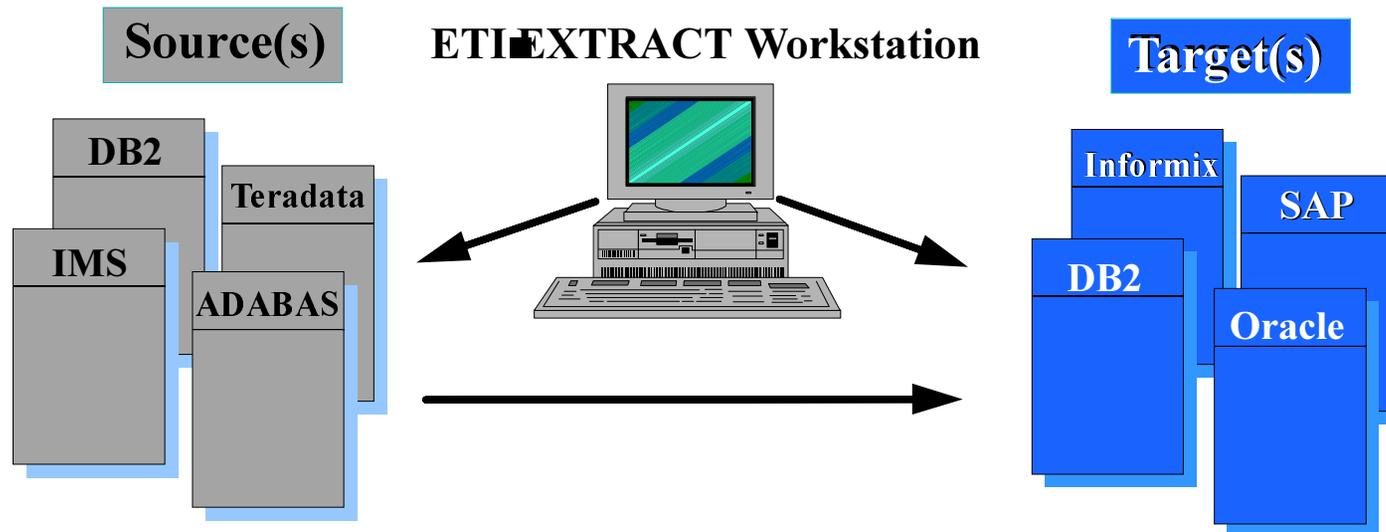
❖ Programs generate on ETI-EXTRACT workstation

❖ Executive transfers programs to source and target platforms

❖ Programs run on source and target systems

❖ Data moves directly between source and target systems

IMS DataPropagator

- **Decision Support**
  - User access to stable data
  - Propagate only the data of interest
 - Exploit relational technology for query

- **Application Migration**
 - Gradual, orderly migration
  - Minimal risk

- **Application co-existence**
  - Two masters
  - Data in both systems synchronised

- **No Change to Existing Applications**

IMS Operational Applications

IMS Display/Inquiry Applications

IMS Database Groups

IMS to DB2

IMS to DB2

Two Way

DB2 to IMS

DB2 Database Groups

Relational Decision Support Applications

Relational Operational Applications

IMS Change Data Capture

Update Call

DL/I

Exit processes
DL/I changes

CDC Exit

IMS defaults to 9904 records on Log (CICS/DBCTL support)

DPropNR applies changes to DB2

? **User can create own exit**

The world depends on it
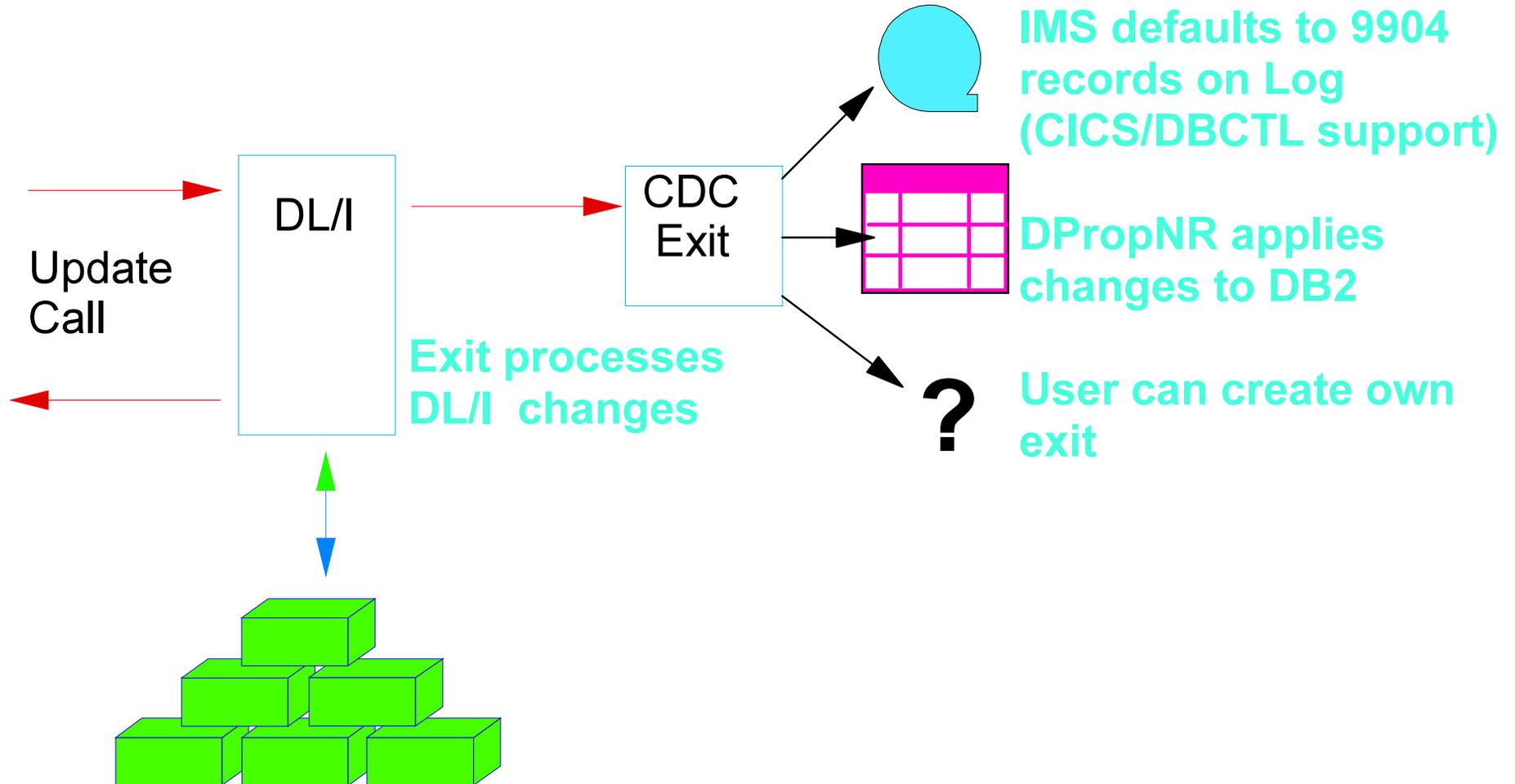
Asynchronous Propagation IMS to DB2

- **Updates applied at customer determined intervals**

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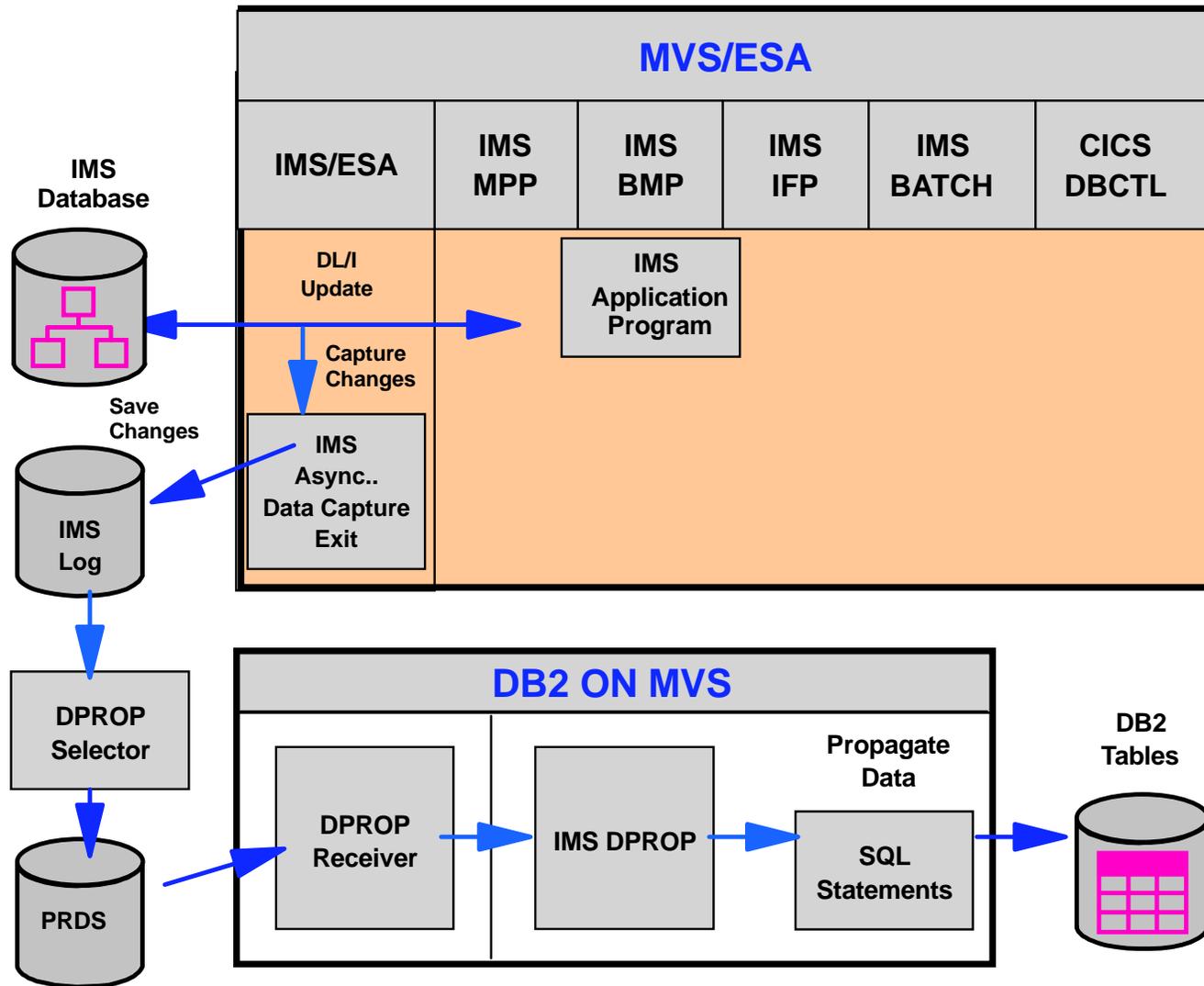
Supplying Users

Single Coherent Source, Multiple Distinct Users

Warehouse
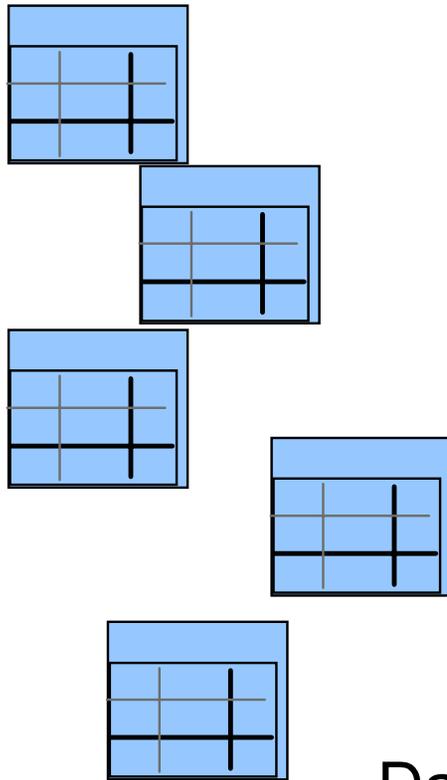
Datamarts
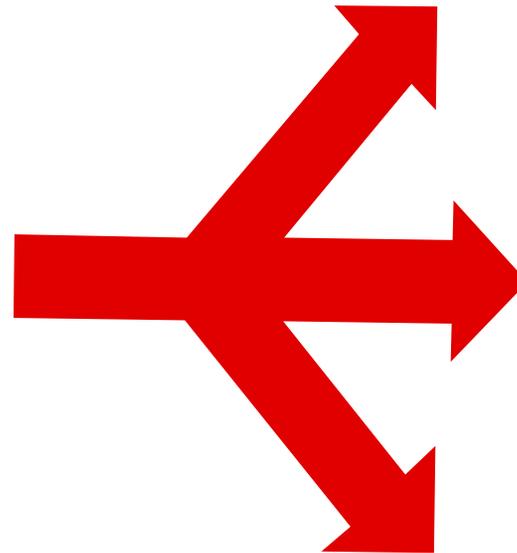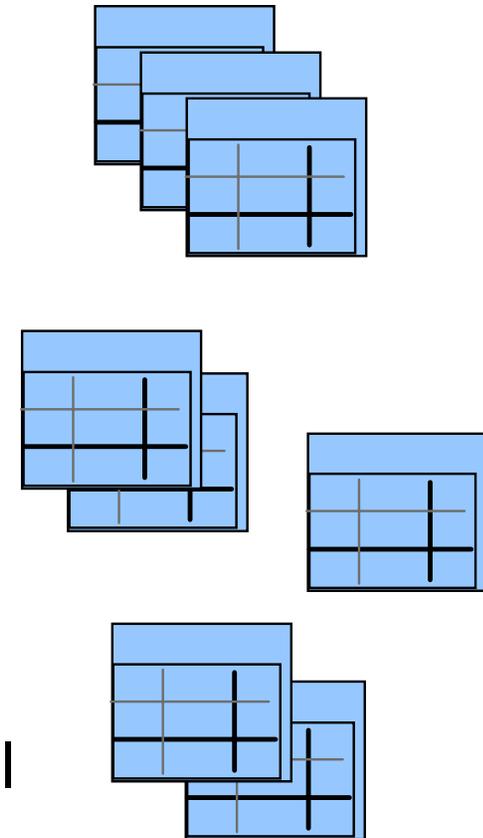
DataPropagator Relational
DataHub for control

IMS Technical Conference

Capture, Staging and Apply

IMS
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SOURCE

- Base and Copy Tables
- Interval and Repetition
- Column and Row Selection
- Computed Columns
- Aggregations
- Dynamic SQL
- Append or Replace

BASE

UNIT OF WORK

CHANGES

- **Full Row Logging**

Active Log

CONTROL

CAPTURE

IMS DPROP

CONTROL

APPLY

GLOBAL CATALOG

TARGET

DataJoiner Multi-vendor Replication

COPY

ADMINISTRATION

Examples
- Apply/MVS
- Apply/OS2
- Apply/AIX
- Apply/HP-UX

Data Propagator Relational

IBM.
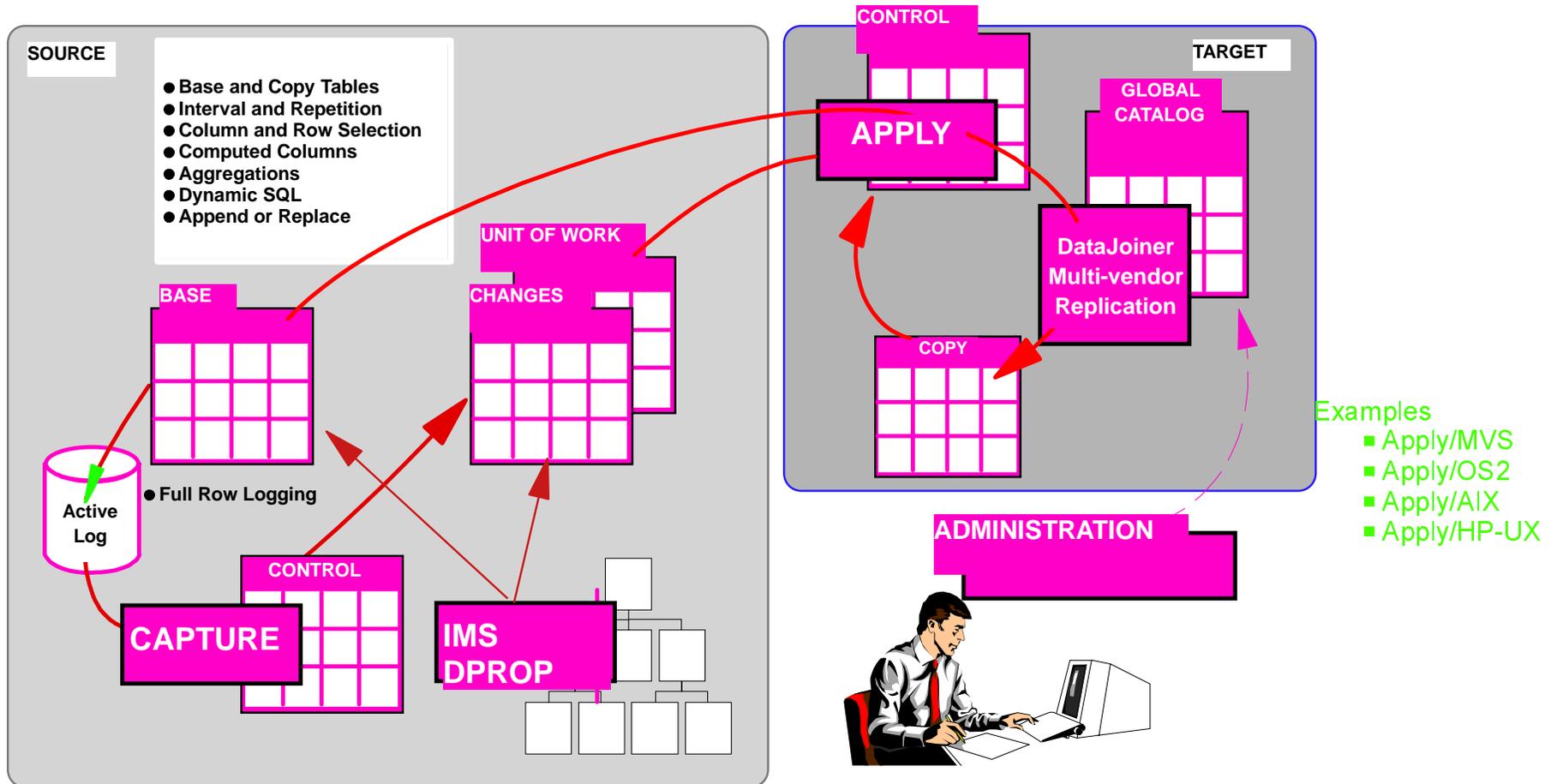
DataPropagator Relational : Features

IMS
The world depends on it

- **Automated Data Copy**
  - Automated operation
  - User specified or event driven synchronisation

- **Refresh and Update**
  - System resource management
  - Historical data

- **Enhancement**
  - Full SQL support
    - ► Subset
    - ► Aggregate
    - ► Derive
  - Leverage existing SQL skills

- **Data Staging**
  - Copy consistency
  - Reduced table contention
  - System autonomy

- **Administration**
 - DataHub control point
  - GUI
  - Initialisation tasks automated

- **Open Architecture**
  - DRDA
  - SQL
  - Architected interface

Application Staging Tables
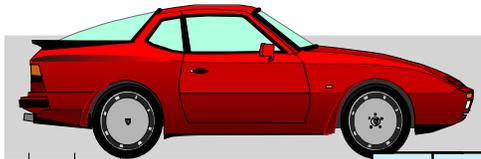
3rd Nov Sells the Corvette
23rd Nov Buys a second BMW
1st Dec Buys a Ferrari
25th Dec Buys another Ferrari
26th Dec Buys a Jaguar

- **Delete row**
- **Update # of cars**
- **Insert new rows**
- **Update # of cars**
- **Insert new row**

1	A
1	B
1	C

Corvette 1
BMW 1
Alfa Romeo 1

BASE

CAR	#
A	1
B	2
F	3
J	4

Current view

CONDENSED

DATE	Action	CAR	#
1/1	I	A	1
23/11	U	B	2
3/11	D	C	1
25/12	U	F	2
26/12	I	J	1

Good for further propagation
- Remove Hotspots
Useful for current view
(Must disregard deleted rows)

NON-CONDENSED

DATE	Action	CAR	#
1/1	I	A	1
1/1	I	B	1
1/1	I	C	1
3/11	D	C	1
23/11	U	B	2
1/12	I	F	1
25/12	U	F	2
26/12	I	J	1

Good for further propagation
Audit trail
Historical analysis
Time series

Legacy Data - the Problems....

Five Legacy Contaminants Encountered in Migrations

1. **Lack of legacy standards**

2. **Data surprises in individual fields**

3. **Legacy information buried in free-form fields**

4. **Legacy myopia**
   - Multiple account numbers block consolidated view

5. **The anomalies nightmare**
   - Complex matching and consolidation

Examples follow.....

IMS Technical Conference

1. Lack of Legacy Standards

- **Unlimited:**
  - formats
  - structures
  - attributes
  - code sets

- **all within fields with the same meta labels!**

	Name Field	Location
File1	MARK DI LORENZO ⬅	MA93
	DENIS E. MARIO	CT15
	TOM & MARY ROBERTS	IL21
File 2	DILORENZO, MARK ⬅	6793
	MARIO, DENISE	0215
	ROBERTS, TOM & MARY	8731
File 3	MARC DILORENZO ESQ ⬅	BOSTON
	MRS DENNIS MARIO	HARTFORD
	MR & MRS THOMAS ROBERTS	CHICAGO

2. Data Surprises in Individual Fields

Metadata--"What you wish you had in your data values"
                                                        --Ken Orr

Meta

Actual Data Values
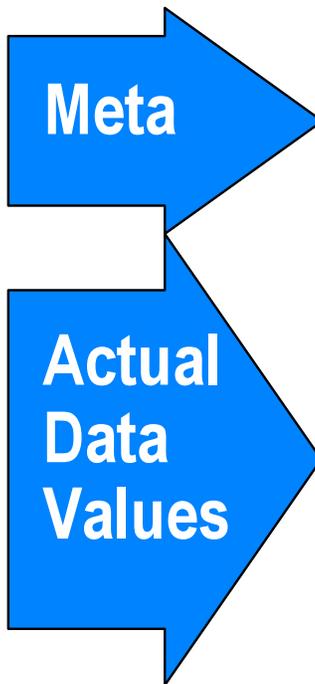
NAME	SOC. SEC. #	TELEPHONE
Denise Mario DBA	228-02-1975	6173380300
Marc Di Lorenzo ETAL	999999999	3380321
Tom & Mary Roberts	025-37-1888	
First Natl Provident	34-2671434	415-392-2000
Digital 15 State St.	101010101	508-466-1200
Astorial Fedrl Savings	LN#12-756	212-235-1000
Kevin Cooke, Receiver	18-7534216	FAX 528-9825
John Doe Trustee for K	111111111	5436

3. Legacy Information Buried - in Free-Form Fields

How will you determine and extract entity relationships?

Name-Addr1 Name-Addr2 Name-Addr3 Name Addr4	MDRT&S C/F MARY KERR RO IRA FBO MARY KERR C/O RF KERR 210 ONEIDA BL KATONAH NY 10536	NEW HAVEN SAVINGS BK TTEE FBO JACK LOWELL TRUST DTD 12/20/75 ACCT#3172 BOX 20 ATTN J. GARCIA NEW HAVEN CT 06502

ACCOUNT POSITION

PRODUCT

Relationship

LOCATION

Relationship

PERSON

Relationship
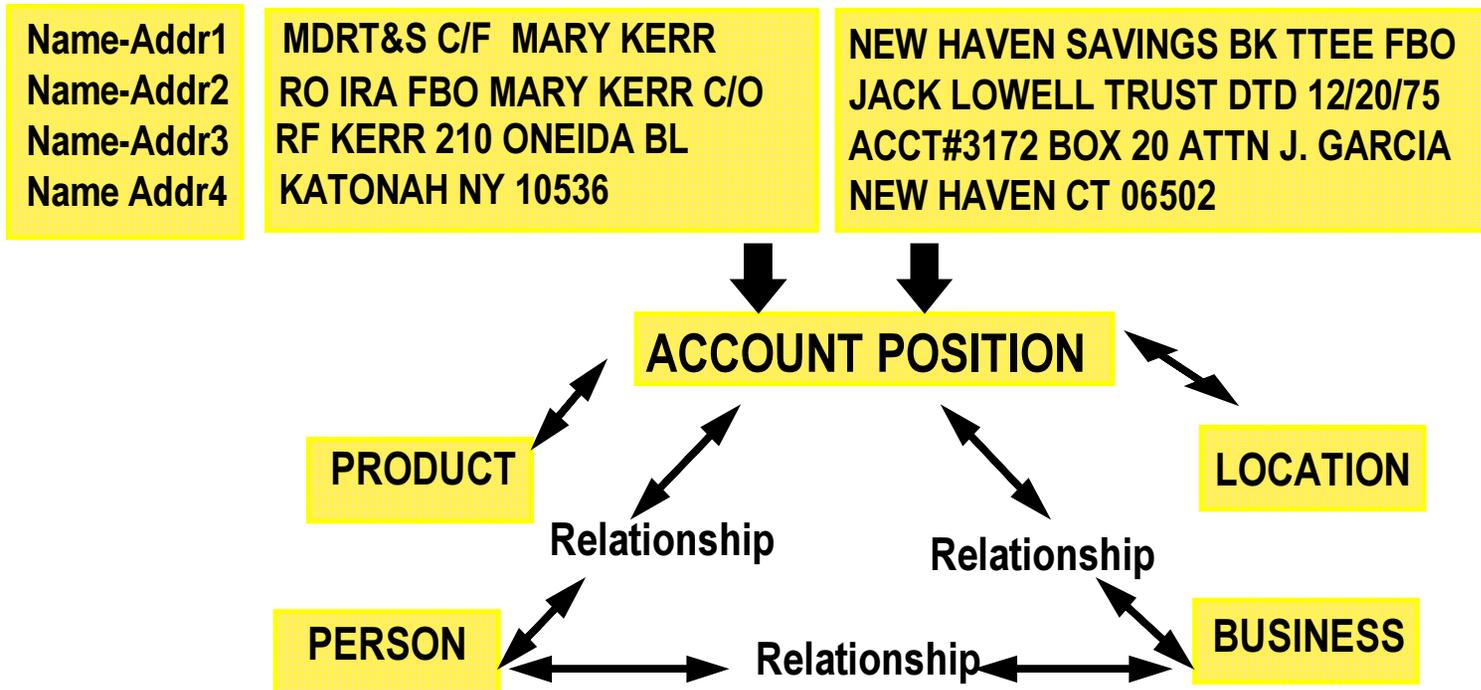
BUSINESS

4. Legacy Myopia
- No Consolidated View

How will your business identify the customer when account numbers block your view?

Legacy data refers to 3 accounts under different numbers.

IBM   A2R-132-867

IBM   C8P-435-916

IBM   Q9O-211-803

5. The Anomalies Nightmare

How are you going to correctly identify and consolidate anomalies from millions of records?

CUSNUM	NAME	ADDRESS	SALES $
90328574	IBM Corporation	187 N.Pk. St. Salem NH01456	8,494.00
90328575	IBM	187 N.Pk. St. Sarem NH 01456	3,432.00
90238495	Int. Bus Mach	187 N. Park StSalem NH 04156	2,243.00
90233479	IBM Corp	187 Park Ave Salem NH04156	5,900.00
90233489	IBM Consulting	15 Main St. Andover MA 02341	6,800.00
90234889	IBM ISSC	PO Box 9 Boston MA 02210	10,243.00
90345672	IBM Integration	Park Blvd. Boston MA 04106	15,999.00

No unique key   **No standardising**   **Spelling**

Anomalies

IMS Technical Conference

5. No Consolidated View

The world depends on it

How are you going to consolidate records across multiple files?

Customer File

CUSNUM	NAME	ADDRESS
9035769	IBM Corporation	187 N.Park St. Salem NH 01456
90342		
90211		
90237		
9021		
9028		
9034		

Order File

ORDER #	NAME	STREET	CITY	ST	ZIP	SALES $
XA-6701	IBM Corporation	187 N.Park St.	Salem	NH	01456	8,494.00
TA-8574	IBM	187 N.Pk. St.	Sarem	NH	01456	3,432.00
PO-8495	Inter. Bus. Mach.	187 N. Park St	Salem	NH	04156	2,243.00
SD-2363	IBM Corp	187 Park Ave	Salem	NH	04156	5,900.00
YU-4889	IBM Consulting	15 Main St.	Andover	MA	02341	6,800.00
BN-3489	IBM ISSC	PO Box 9	Boston	MA	02210	10,243.00
CV-5672	IBM Integration	Park Blvd.	Boston	MA	04106	15,999.00

Data Re-engineering with Integrity

IMS
The world depends on it

VALITY -
A proven technology and methodology for data cleansing

- **Offers architecture and toolkit specifically designed to investigate, re-engineer and consolidate data**

- **Provides data investigative and matching functions that extend well beyond the capabilities of data scrubbing**

- **Enables fast and effective migration of high-quality information to new Data Warehouses, CISs & Client/Server applications**

- **Recovers buried but essential metadata**

- **Transforms large volumes of legacy data into consolidated business views**

Manage the Warehouse and Datamarts

DataHub - Tivoli Environment

Central point of control

Suite of tools for database administration

Automated operations

Launch platform for tools

DB2 for OS/2

DB2 for NT

DB2 for AIX

DB2 for HP-UX

DB2 for Solaris

DB2 for MVS

Enterprise Control Centre DataHub

DB2 Parallel Edition

Tivoli Management Environment

Other DB2 family members
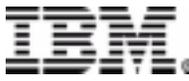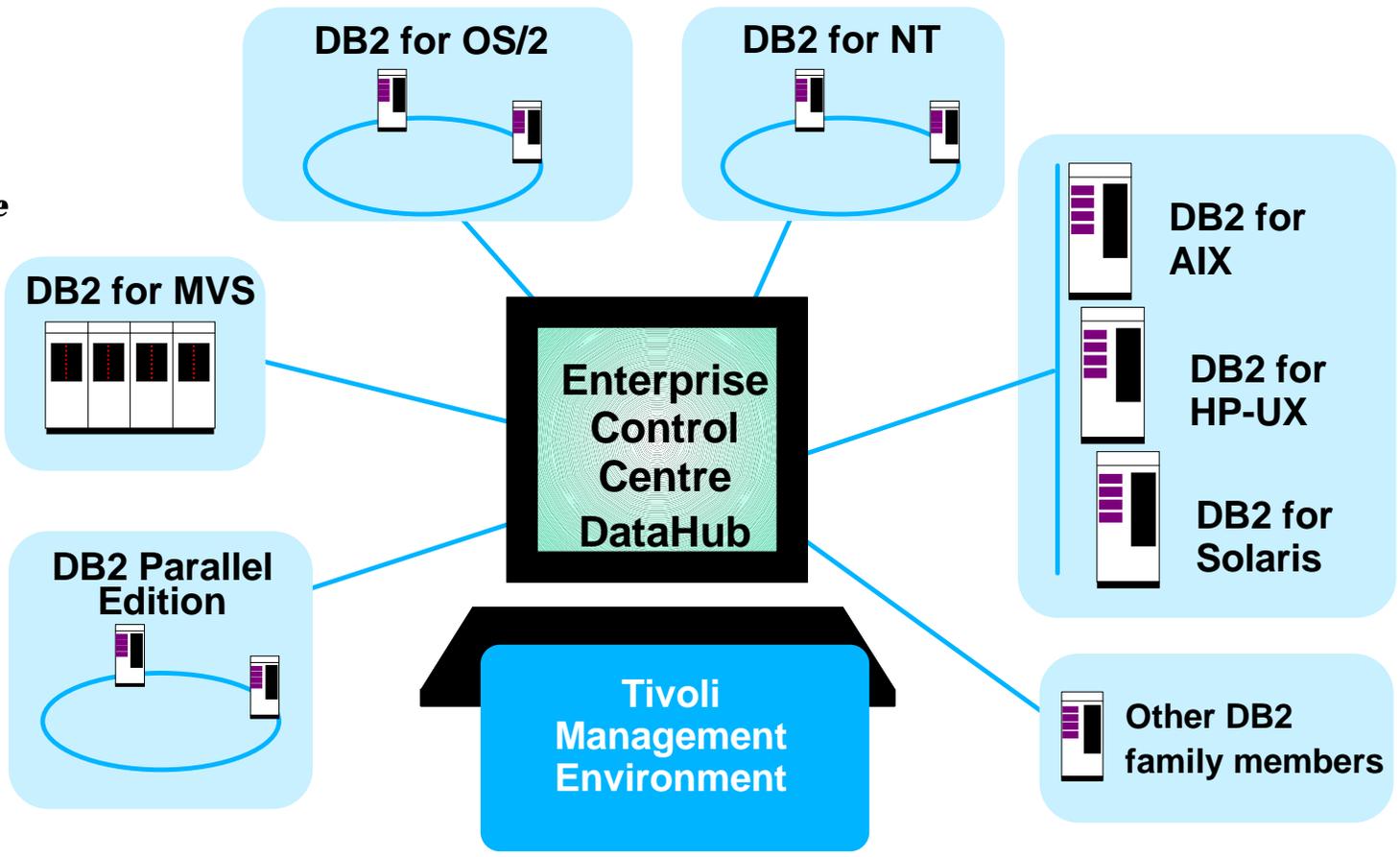
Visual Warehouse Overview

Visual Warehouse Administrative Client

Visual Warehouse Manager

Visual Warehouse
Extract - Transform - Distribute

Data Sources

Visual Warehouse Agents

Windows NT

Metadata

Windows NT
OS/2
AIX
OS/400

Information Catalog Data Access Tools

Cognos
BusinessObjects
1-2-3, EXCEL
Web Browsers
…hundreds more…

DB2 FAMILY

ORACLE

SYBASE

INFORMIX

SQL SERVER

Files

IMS/VSAM Adapters

IMS & VSAM

DB2

Data Warehouses

DataJoiner

Other Sources

IMS Technical Conference

Coverage of Visual Warehouse

IMS

The world depends on it

Operational and External Data

VSAM Flat files IMS Informix DB2 Oracle Sybase SQL Server FTP, NFS

Access	Transform	Distribute	Store	Find & Understand	Display, Analyze, Discover

DataJoiner
SQL APIs
Visual
   Warehouse
	DataPropagator
	   Relational
	DataPropagator
	   NonRelational
	DataRefresher
	Visual Warehouse
	
	Vality Technology
		DataPropagator
		   Relational
		DataJoiner
		Visual
		   Warehouse
			DB2 Family
			
			Arbor Essbase
			Pilot LightShip
				DataGuide	Visualizer
					DIS
					AS
					QMF
					Other
					
					Information Advantage
					Business Objects
					Cognos

Automate & Manage

DataHub   AdStar Distributed Storage Manager
FlowMark   Visual Warehouse

Open Interfaces

IBM Information Warehouse Architecture

Consulting Services

| IBM Competency Centers | The Indica Group | SHL Systems House | Price Waterhouse LLP |
| IBM Consulting | IMI Systems | Syllogic | Data Base Associates |

- **Comprehensive Products and Services**
- **Flexible Implementation Alternatives**
- **An Open Solution Environment**

Visual Warehouse Family

Visual Warehouse OLAP
- Multidimensional designer
- Star schema generation
- Star schema population and pre-calculation
- Full OLAP Essbase V5 calculation engine
- Application partitioning

Arbor Essbase

DB2 OLAP Server

ETI*Extract
- Broad legacy sources
- Transformation generation
- Parallel DB2 loading

IDMS   DLI

Vality Integrity
- Data cleansing
- Fuzzy matching
- Value/metadata discovery

ADABAS   SAP
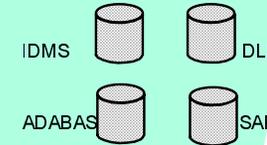
Visual Warehouse
- Extract
- Transform
- Move
- Load
- Automate
- Monitor
- Query/report
- Metadata

Administrator

DSS tool or application

Data Sources

DB2 FAMILY

ORACLE

SYBASE

INFORMIX

SQL SERVER

IMS & VSAM

Files

DB2   Metadata
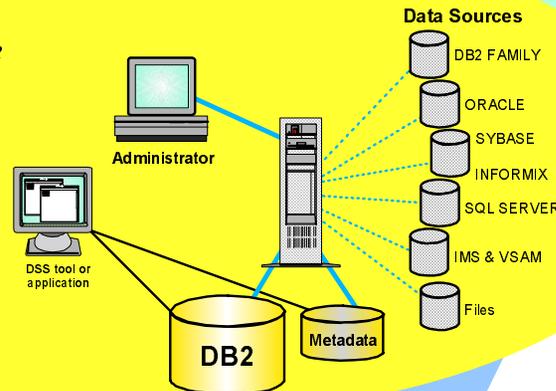
DataJoiner
- Heterogeneous stores
- Federated warehouses
- Optimised database access

Oracle
Microsoft
Informix
Sybase

IMS

The world depends on it

# Data Enhancement with VW

Customise source data for specific target use

- **Enhances data usability**
- **Supports unique application needs**

Source

Target   Target   Target

Join   Aggregate   Derive
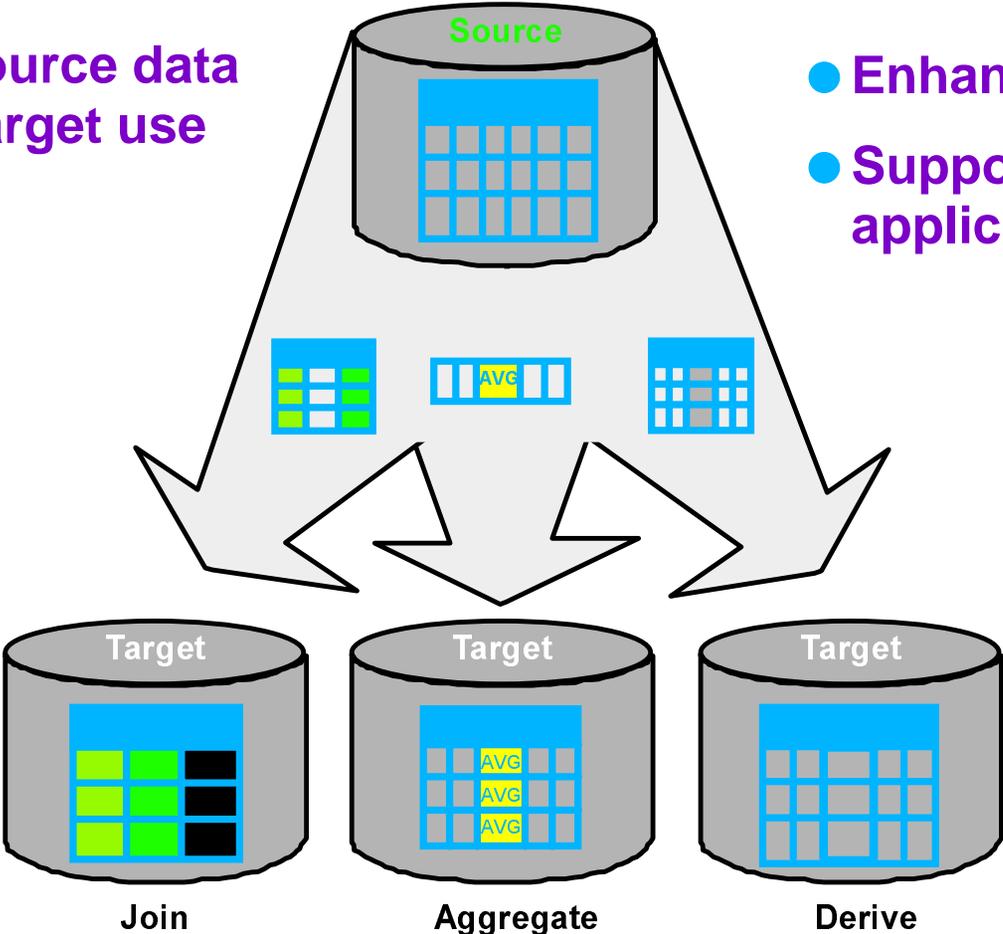
Visual Warehouse OLAP Processes

Publish
- ★ **Databases, Cubes**
- ★ **Spreadsheets, Reports**

Information Catalog

Define
- ★ **MD Models**
- ★ **Load Rules**
- ★ **Calc Scripts**

Application Manager

ODBC

Data Joiner

Extract/ Transform

Metadata

Relational Datamart

Scheduled Load/ Update/Calc

Drill Through

Operational Sources

Visual Warehouse

DB2 OLAP Server
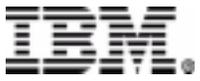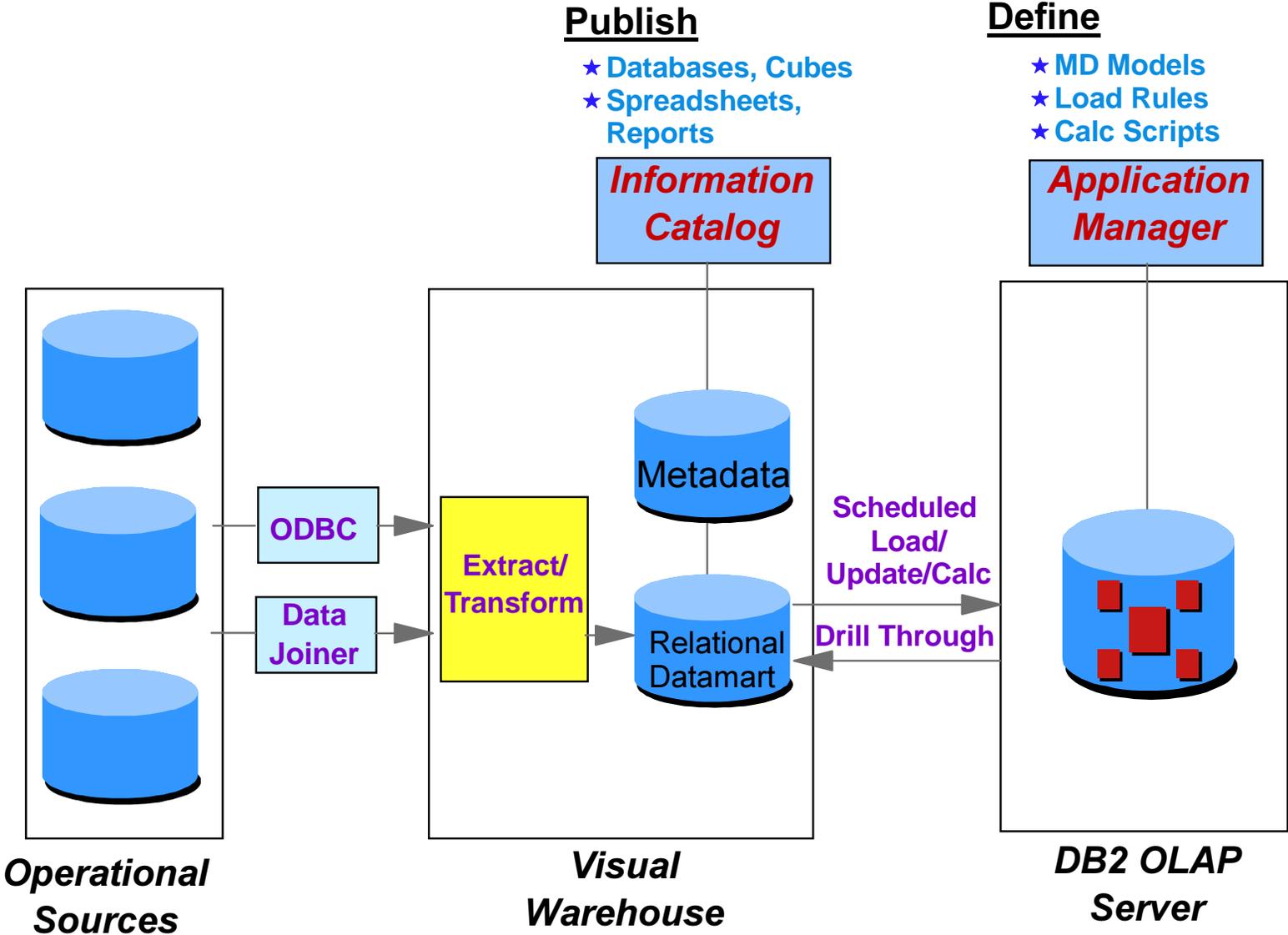
Visual Warehouse Characteristics

Operational Sources

Visual Warehouse

DB2 OLAP Server

★ Many Sources
★ Heterogeneous
★ Dirty & Inconsistent
★ Volatile
★ Detailed & Voluminous

★ Identify
★ Access & Extract
★ Transform
★ Create Snapshot with Scheduled Update
★ Summarise
★ Distribute

★ Multidimensional

★ Multi Level of Detail

★ Interactive, Analytical

★ Accessible by OLAP and SQL Tools
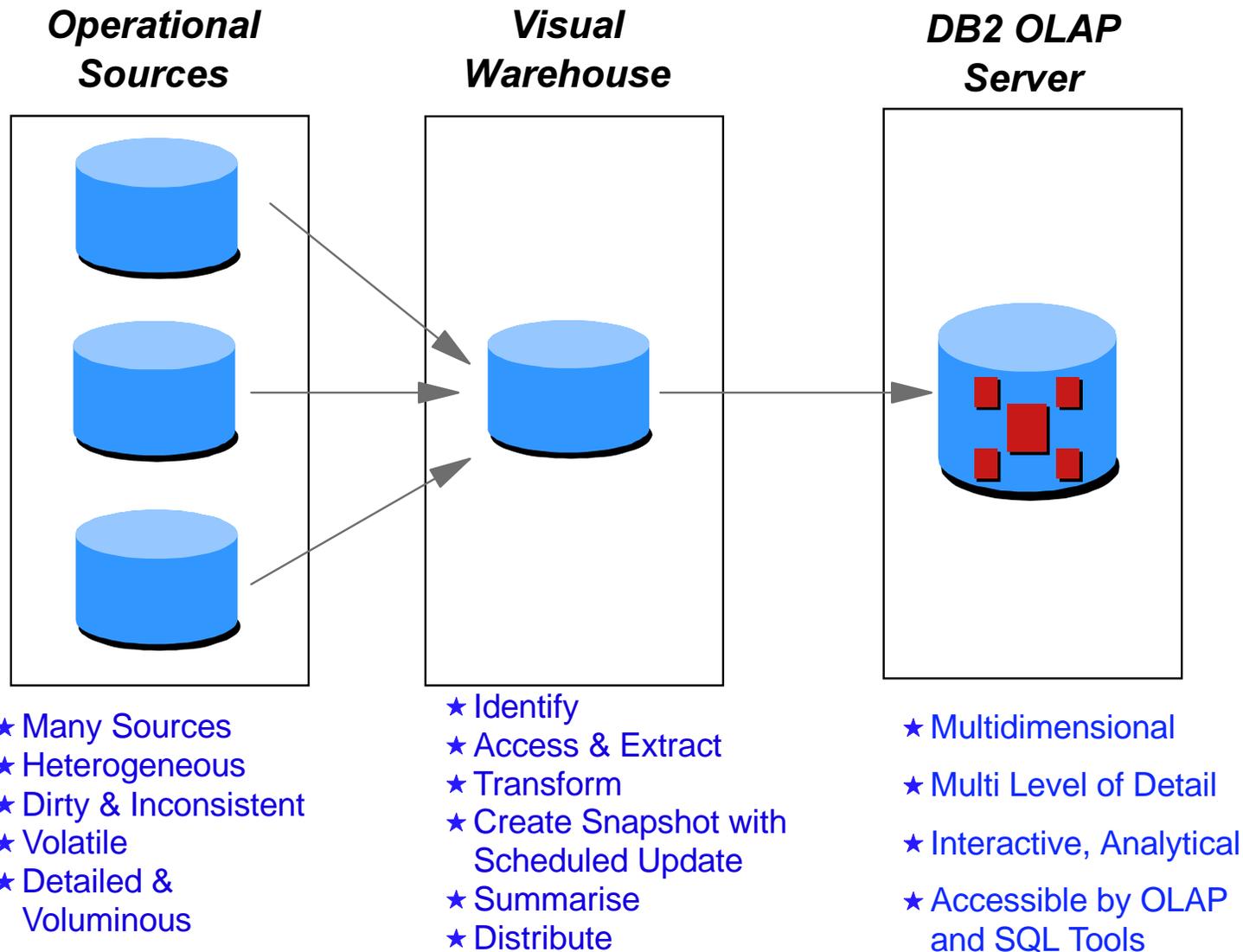
Summary

IMS
The world depends on it

Business Intelligence from DL/I Data

Refresh

Staging Tables

Apply DB2

DataPropagator Relational

Capture DB2

Update

DataJoiner

Multi-vendor Access

Copies

DB2 Family

Source Data

NotesPump

Apply Notes

Capture Triggers

Multi-vendor

IMS DataPropagator

Capture IMS

Update

Refresh

Lotus Notes

DB2 Family Multi-vendor

Business Views

DataRefresher

IMS, VSAM, Flat Files, Other

Business Information

IBM.