Business Intelligence based on PI-Systems at BWB

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Agenda

- BWB - who we are

- Using PI at BWB now

- The Business Intelligence project

- How to connect BI to PI?

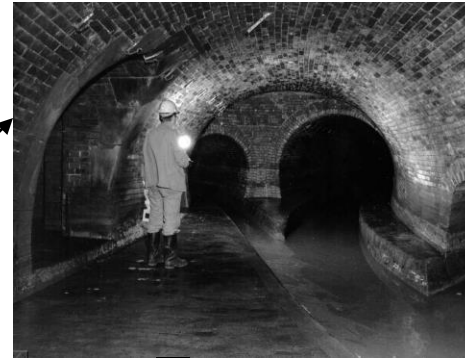- Using PI at BWB in the future

BWB - The core business

"Make" water

Collect wastewater + rain

rain

Supply water

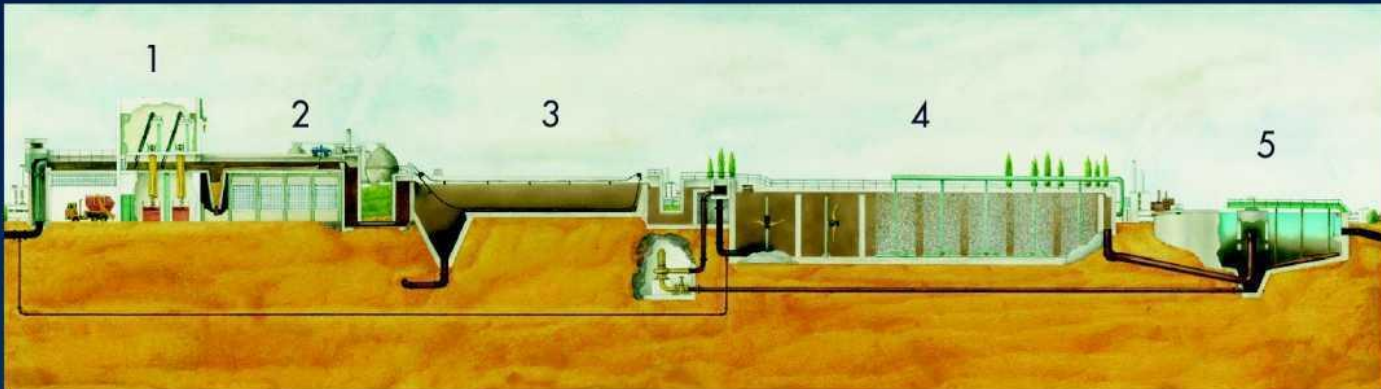Customer

Clean wastewater + rain

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The drinking water process

Process steps - water works

1. Well
2. Aeration
3. Reaction tank
4. Rapid sand filtration
5. Storage tank
6. Pumping stations

Sewerage treatment

Process steps - sewage treatment plants

1. Screens   2. Grit chamber   3. Primary sedimentation tank   4. Activated sludge tank   5. Final clarifier

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BWB - a brief outline (2000)

Drinking water
- 222 M m^3/year
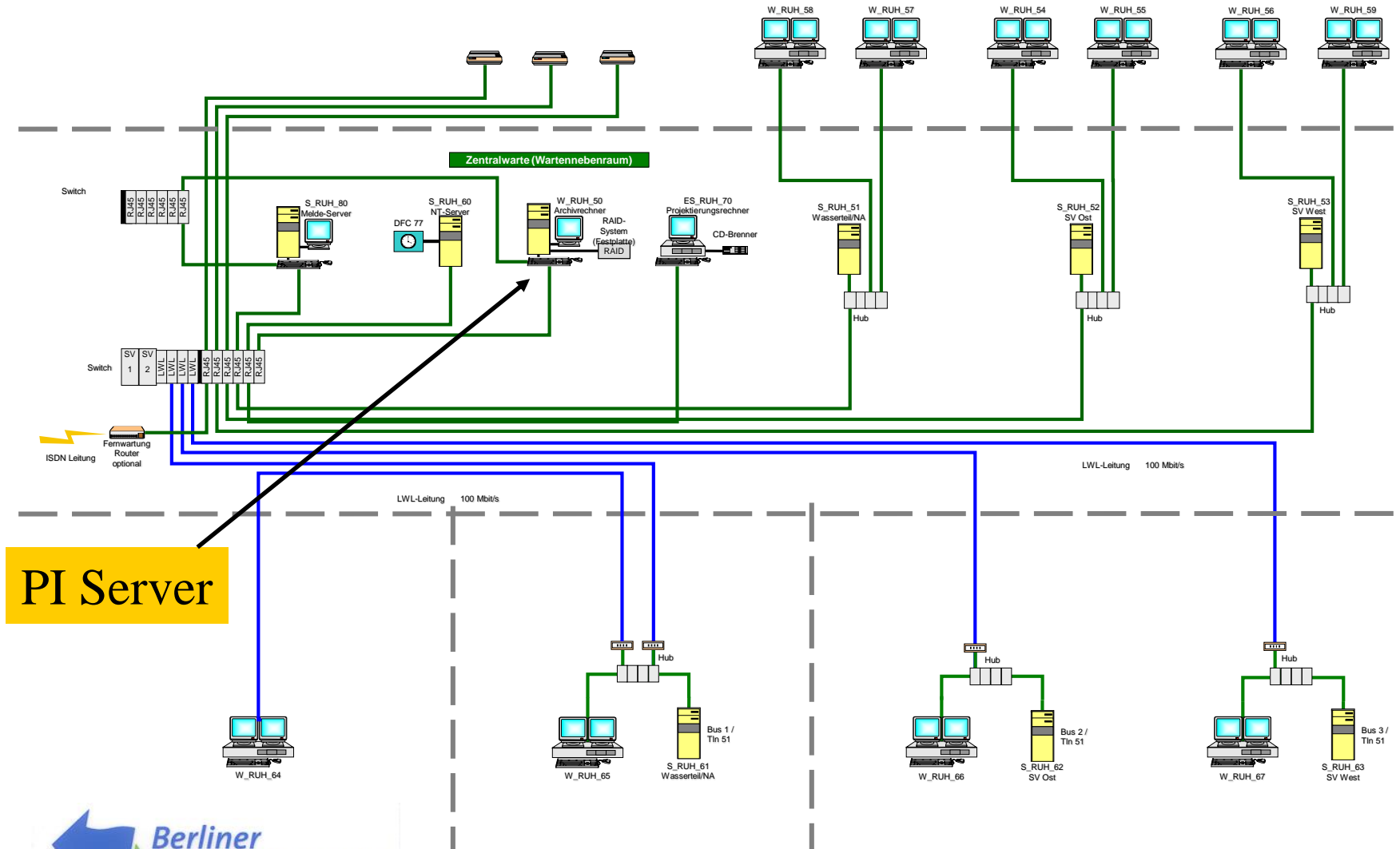- 7787 km supply lines

- 11 waterworks
- 978 wells

Waste water
- 241 M m^3/year
- 9093 km sewers
- 1035 km pressure pipe-lines
- 7 purification plants
- 145 pumping stations

5900 employees; turnover 1,9 billion DM

PI System at BWB now

- Many differnet DCS in the plants
- First PI installation in 2 purification plants 1997 - 1999
- Good acceptence of PI Processbook and PI DataLink to perform local reports
- Full integration of display functions in the DCS via Active X

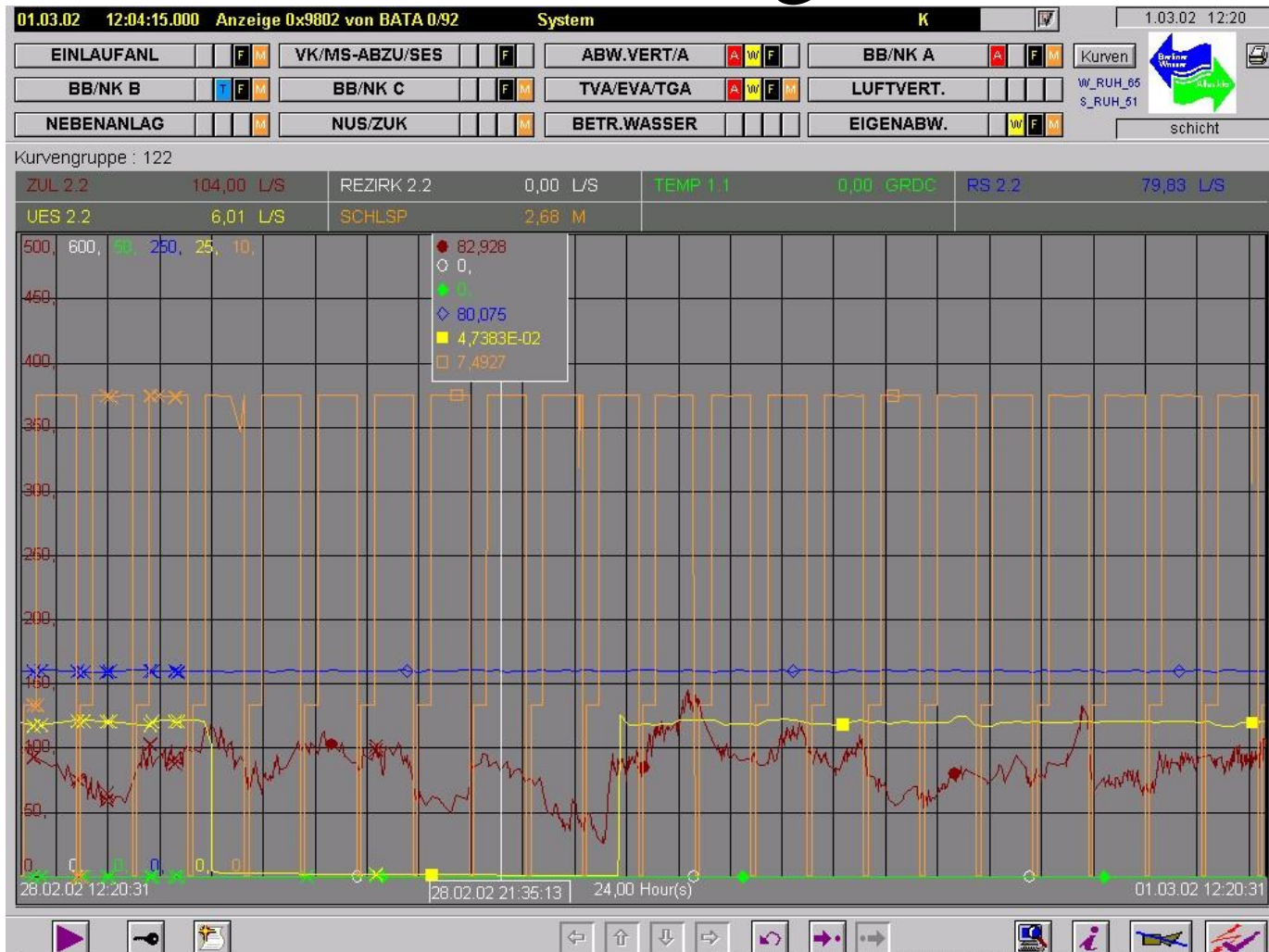# Example Configuration

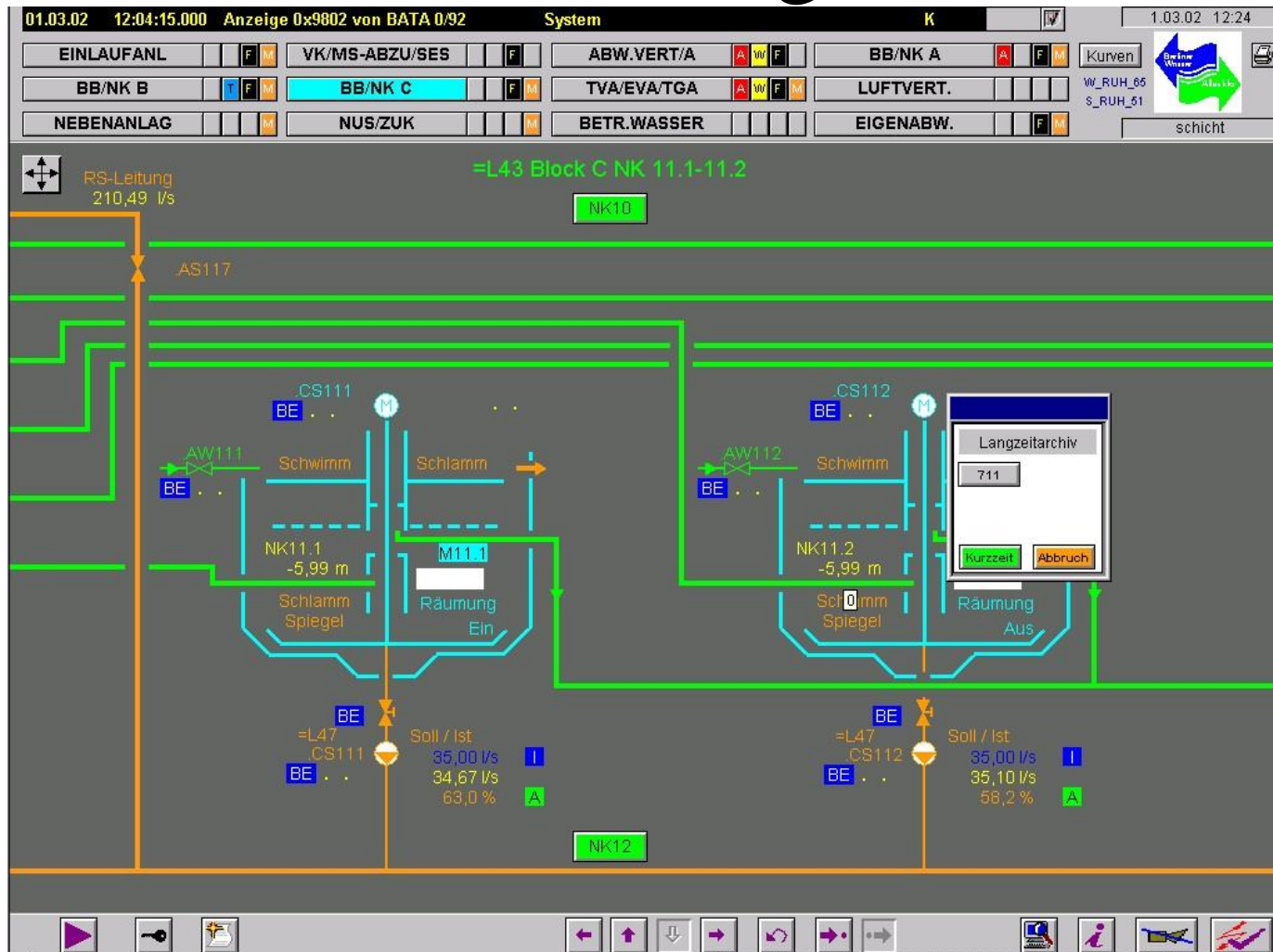# DCS Picture Select

DCS Plot

PI - Picture Select within DCS
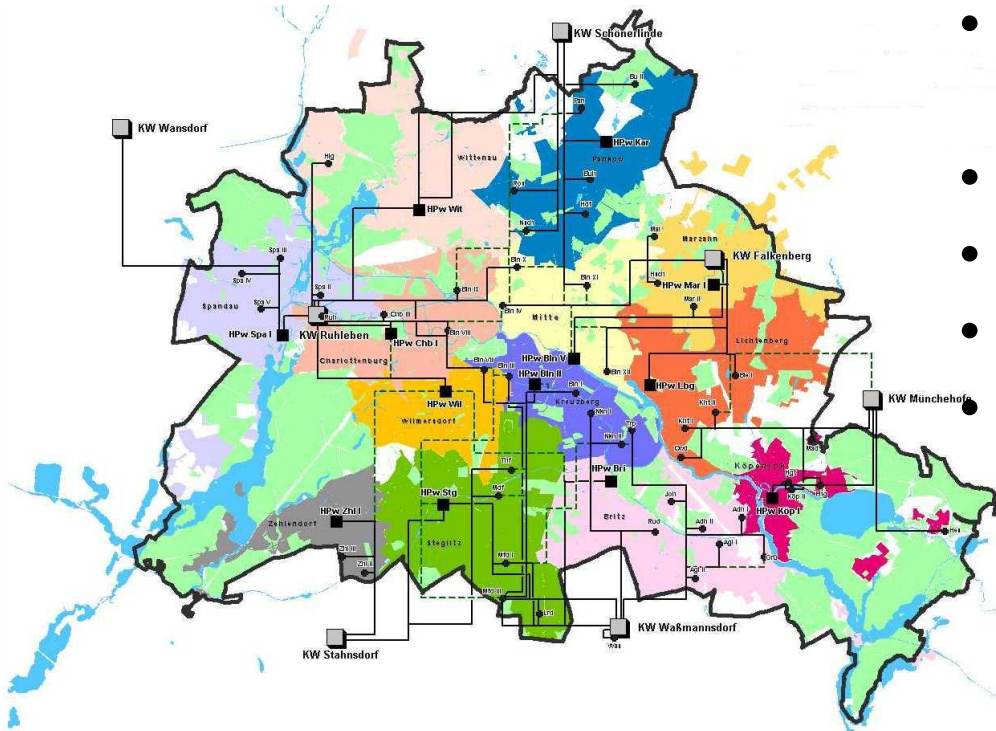
PI - DCS Integration

PI - DCS Integration

The business itelligence project

- A new reporting system for the wastewater process
- including all relevant plants
- including business data
- including Laboratory data
- easy to use (one click), scalable, no client administration, intranet application, etc. ...
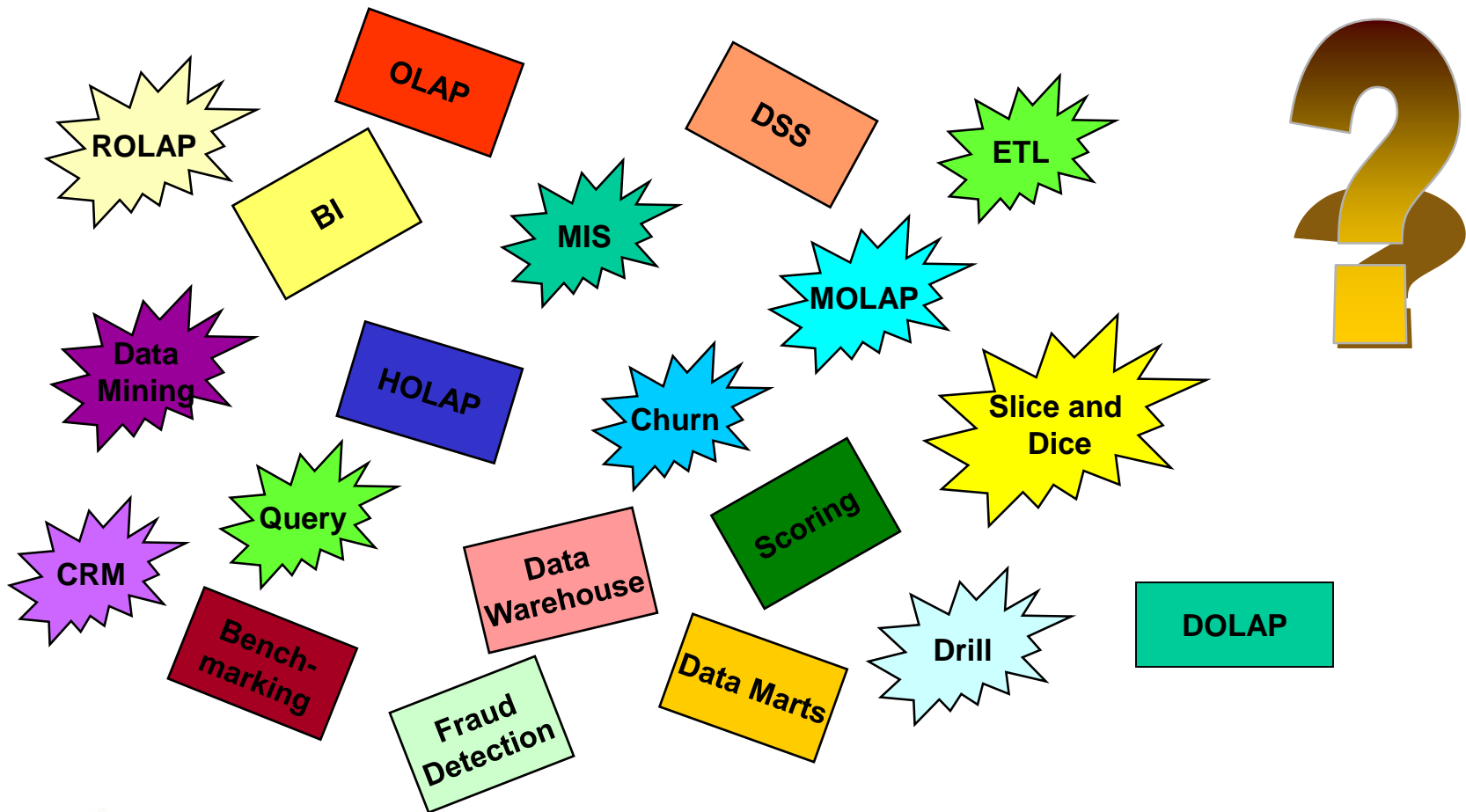
BI - the requirement
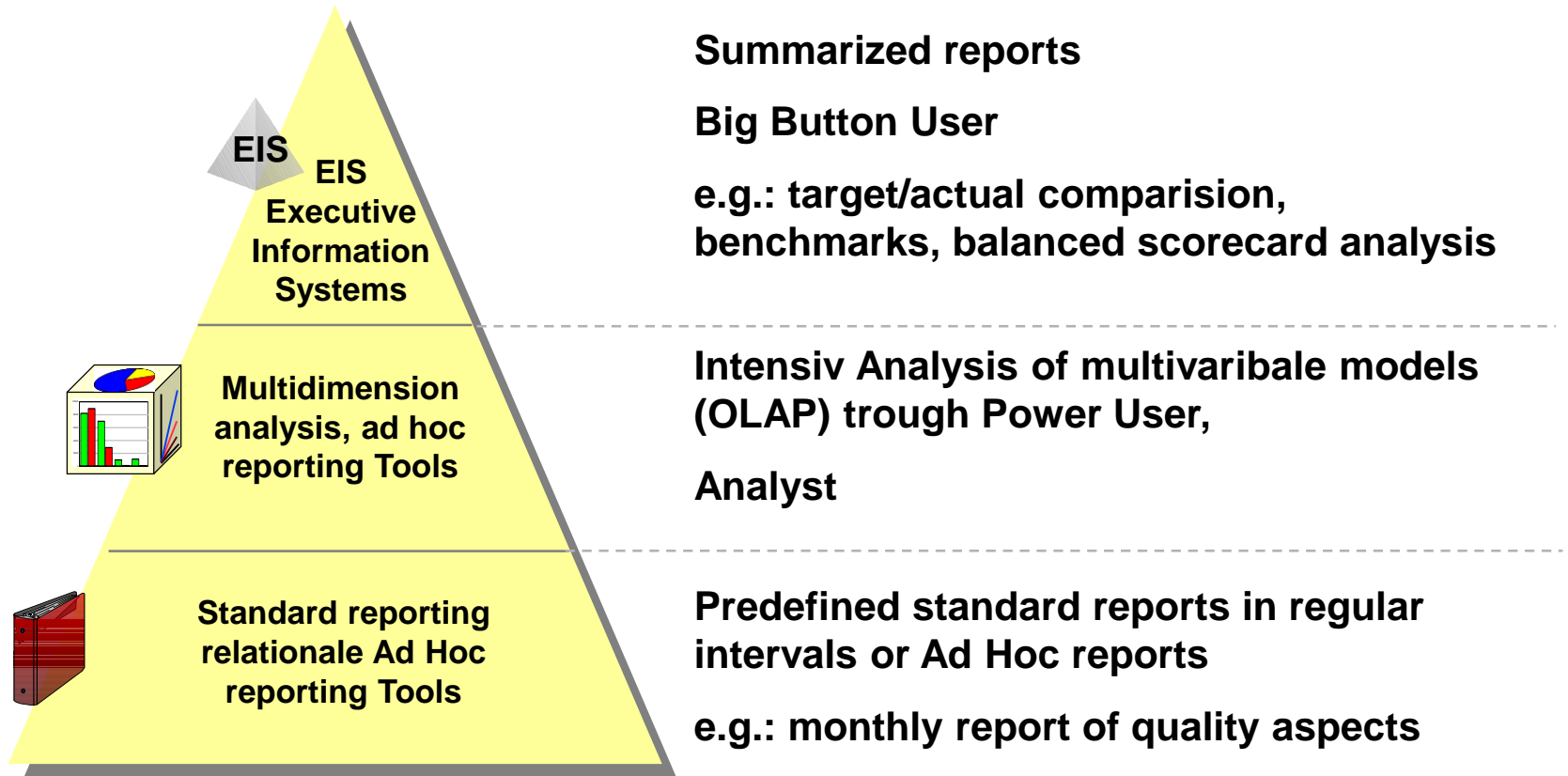
current situation → objective

current situation	objective
• Different systems for data storage	• One Database for the storage of relevant data
• Different security concepts	• One security concept
• Different isolated reporting solutions	• One reporting solution
• Every new report leads to stress of the operative staff	• independent from operative systems

At the beginning

Different BI Tools

EIS

EIS Executive Information Systems

Summarized reports

Big Button User

e.g.: target/actual comparision, benchmarks, balanced scorecard analysis

Multidimension analysis, ad hoc reporting Tools

Intensiv Analysis of multivaribale models (OLAP) trough Power User,

Analyst

Standard reporting relationale Ad Hoc reporting Tools

Predefined standard reports in regular intervals or Ad Hoc reports

e.g.: monthly report of quality aspects

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Different Users

Web User

Specialist

Database

Sources
(PI System, LIMS, SAP, Other...)

classification of users

complexity

Aggregated data,
charcteristics

management

Business-Analyst
(e.g. controller)

Detailed data,
reports

Process
responsables

Detail-Analyst
(e.g. statistician)

Dynamic of request

static   interactiv dynamic

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Classification of BI Tools

complexity

EIS

OLAP Tools (MOLAP/HOLAP)

Desktop OLAP

Relational OLAP

Relational Query Tools

Dynamic of request
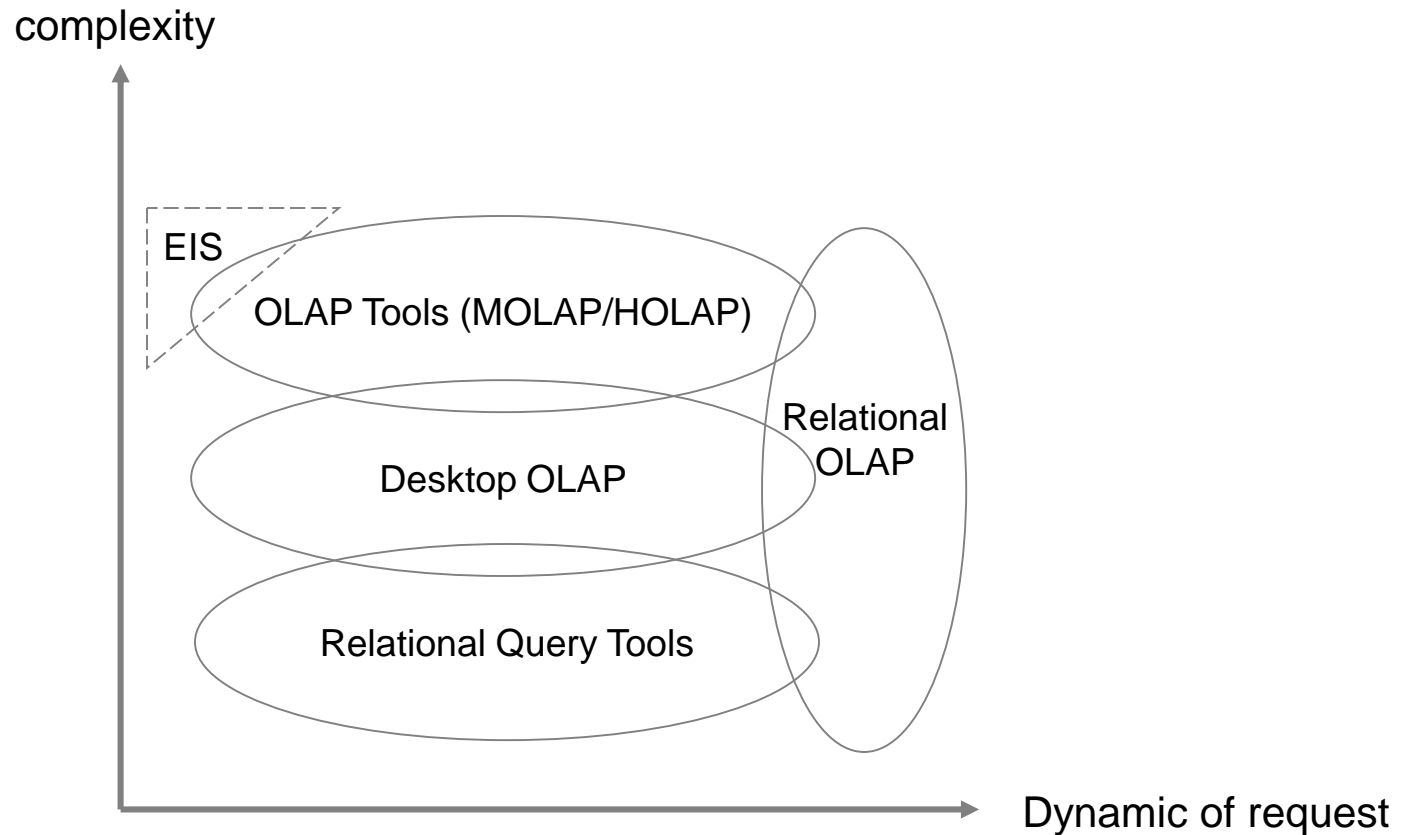
Requests to the reporting tool

- Drill, e.g. drill through monthly reports
- filter by location, e.g. treatment plant or effluent
- calculate new data, e.g. load = flow(PI Data) * concentration (LIMS Data)
- monthly broadcasting of reports (*.pdf-format)
- user specific profiles and security related to the report
- prompting

The decision

- Consolidation of process data with PI, this means to build up the PI System in all plants

- Build up an ETL process

- „Business Objects" as reporting tool

Structure

Secialist	Sources	ETL	Database	Publication

SAP R/3

local middleware

PI-Client

PI System

LIMS

Extract

Trans-form

Load

(ETL)

Database

Reporting
business objects

Web-Server
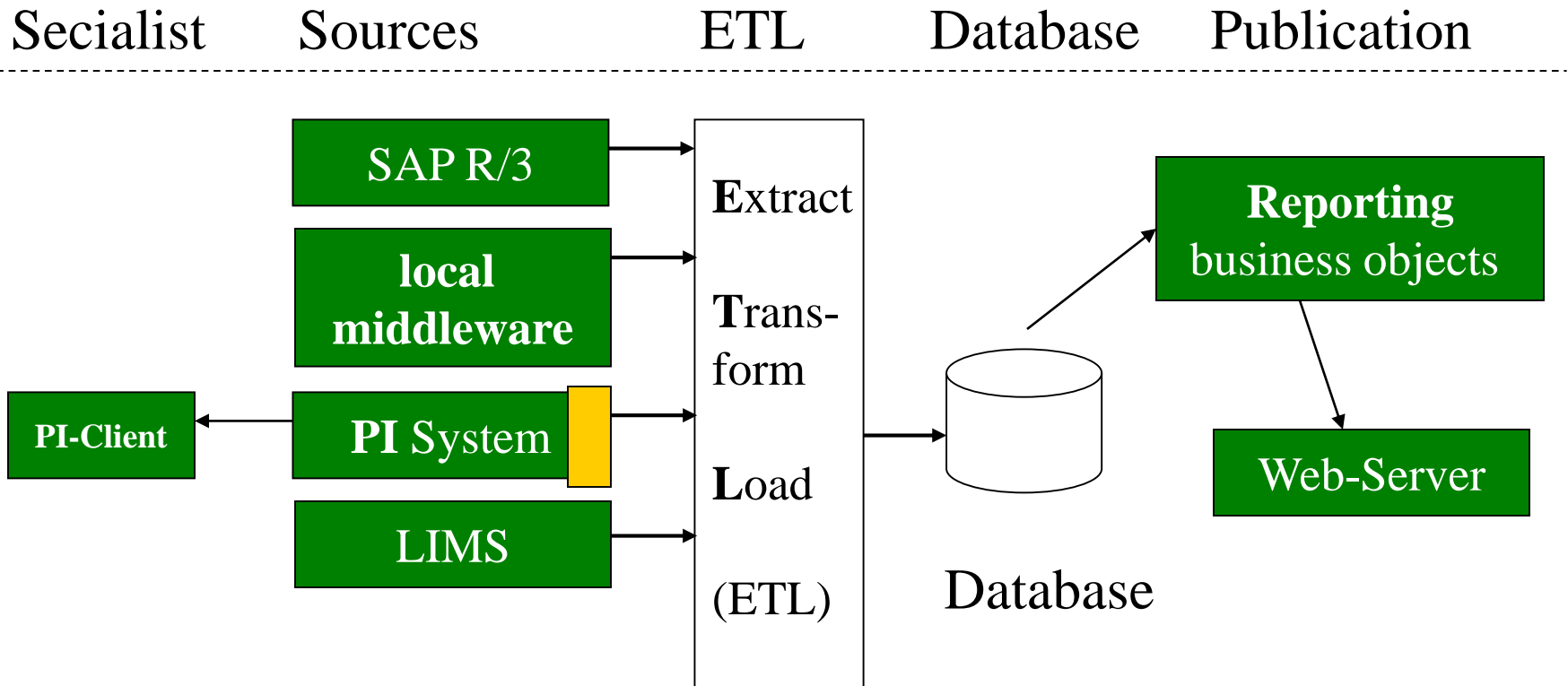
Business Intelligence
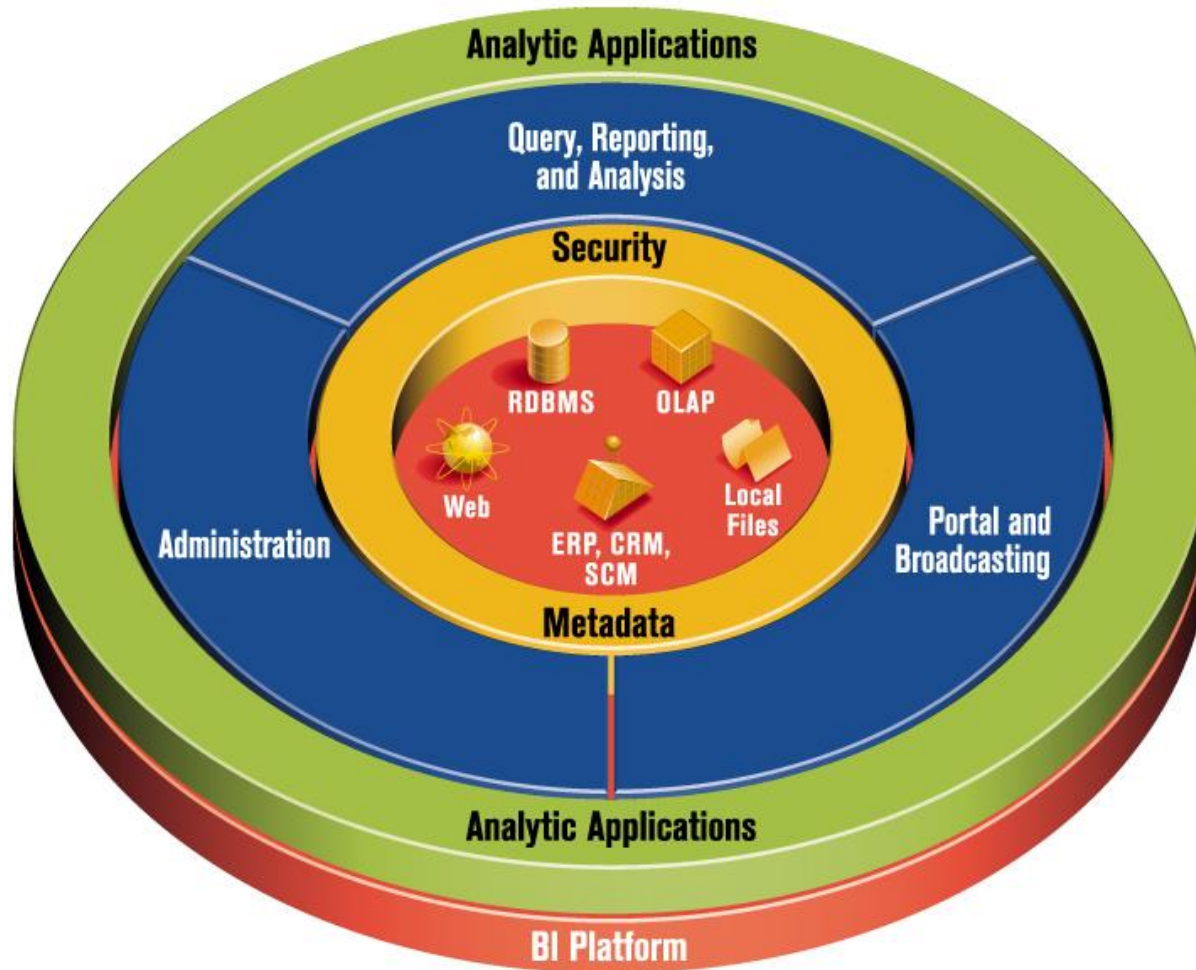
Query, Reporting, and Analysis
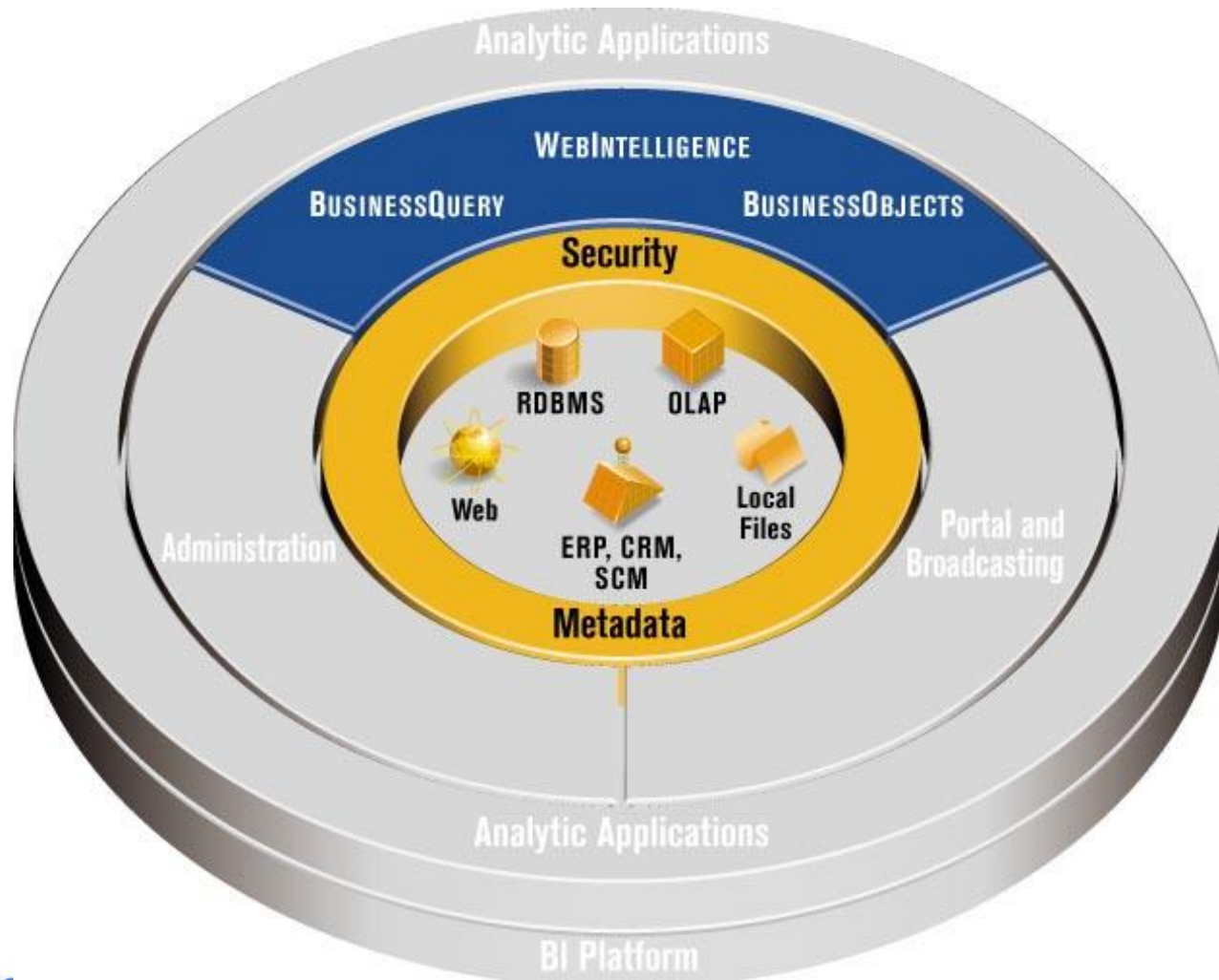
BusinessObjects
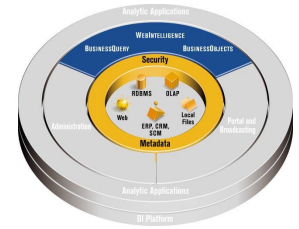
- **Easy to use**
  - Single interface for query, reporting, and analysis
  - Use your own business terms
  - Drag and drop report creation
- **Powerful**
  - Powerful one-click functions (pivot, variance, ranking, alerts)
  - Multiple data sources (DW, ERP, OLAP, Excel, internet…)
  - Highly customizable through open object model
- **Deployable**
  - "Zero admin" (self-install & update, no client middleware)
  - C/S or 3-tier web mode with component-based architecture

BusinessObjects C/S
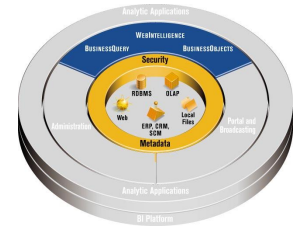
Toolbar functions

Mix tables, graphics, and charts

Several reports in one document

Web-mode
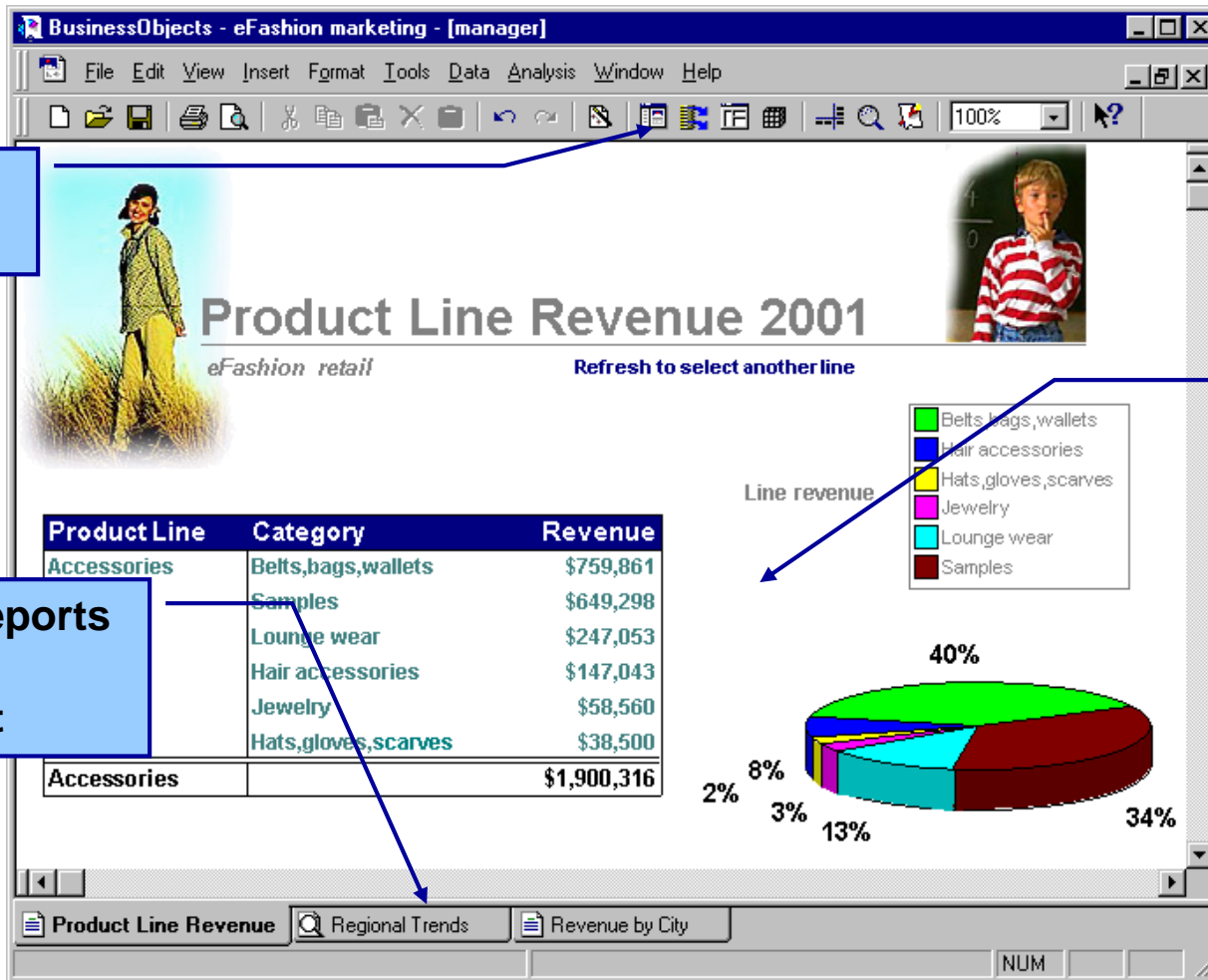
Save and publish documents
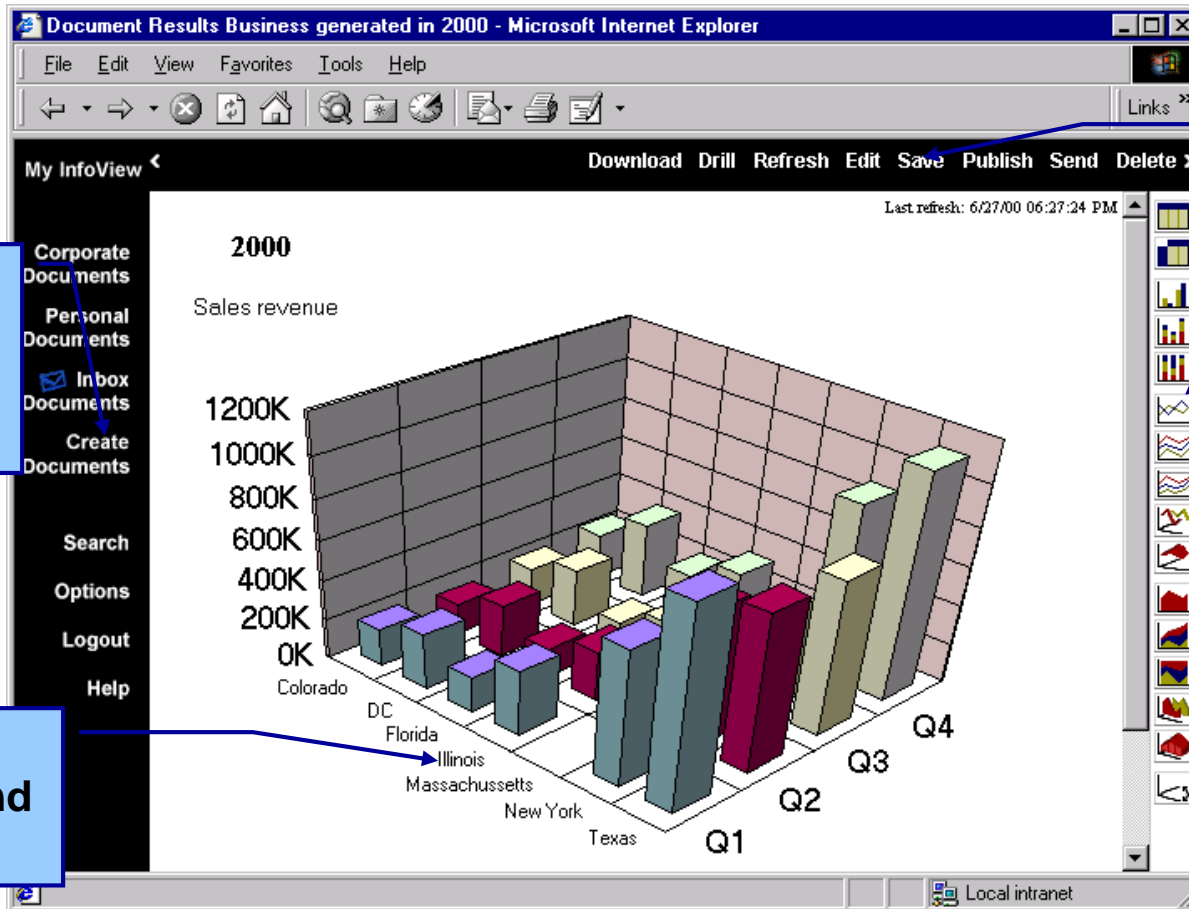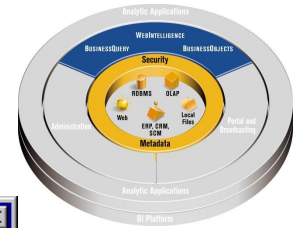
Create new documents from within the browser

Drill directly on charts and tables

Reformat chart with a single click

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Portal and Broadcasting
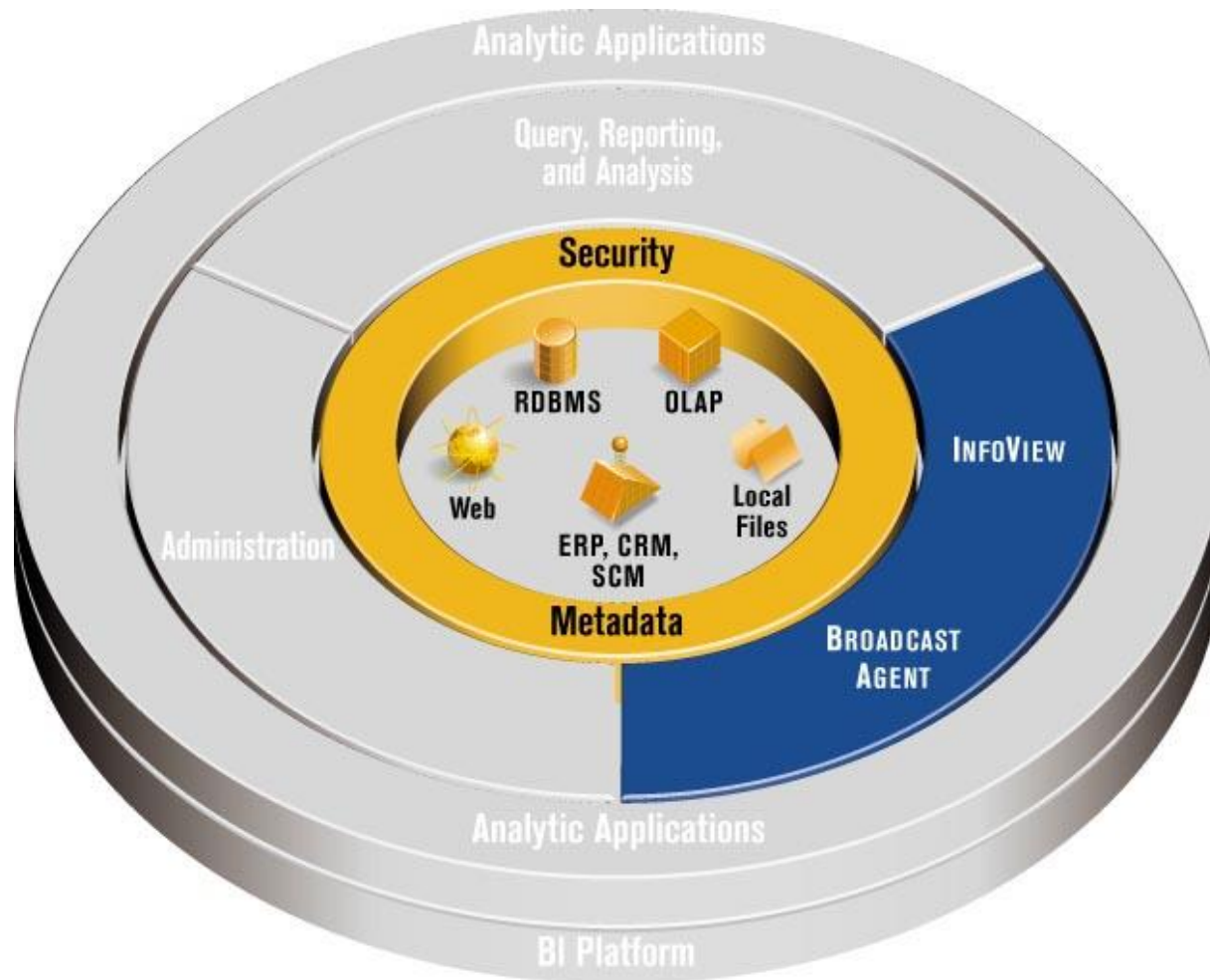
BusinessObjects InfoView
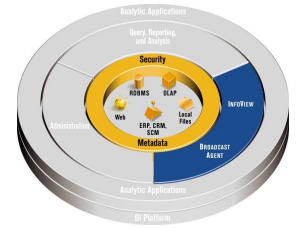
- **A centralized point for all BI information**
  - Including non-Business Objects documents
- **Personalized interface**
  - Users can define their own environment
- **Fully integrated into the BusinessObjects suite**
  - Leverages the WebIntelligence infrastructure
  - Shares the Business Objects repository
- **Also a BI content provider to EIPs**
  - Partnerships with major Enterprise Information Portal vendors

InfoView
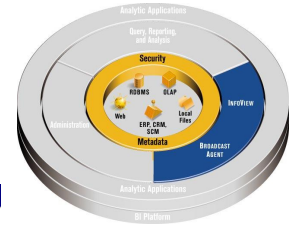
Multiple document types

Favorite report

Excel, or other file

Broadcast Agent

Serve web and Windows users

PUBLISH

SCHEDULE

Web

DISTRIBUTE

BROADCAST AGENT

Distribute to multiple device types

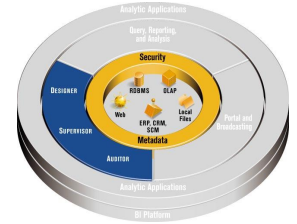**Access multiple data sources**
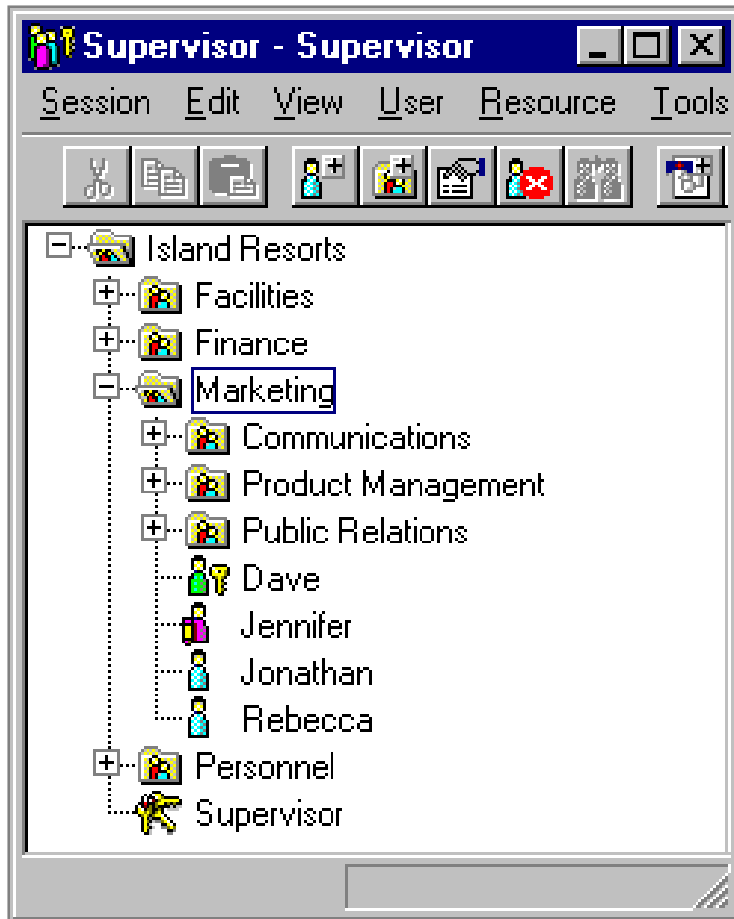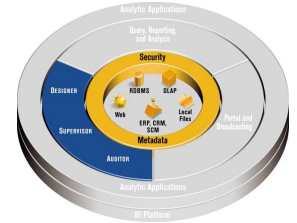
![Berliner Wasserbetriebe logo]

Administration

BusinessObjects Designer

- **Universe creation**
  - In a few mouse clicks
- **Leverage existing metadata**
  - Dynamic access to Informatica, Ardent, and others
  - Universe linking
- **Exploit DW power**
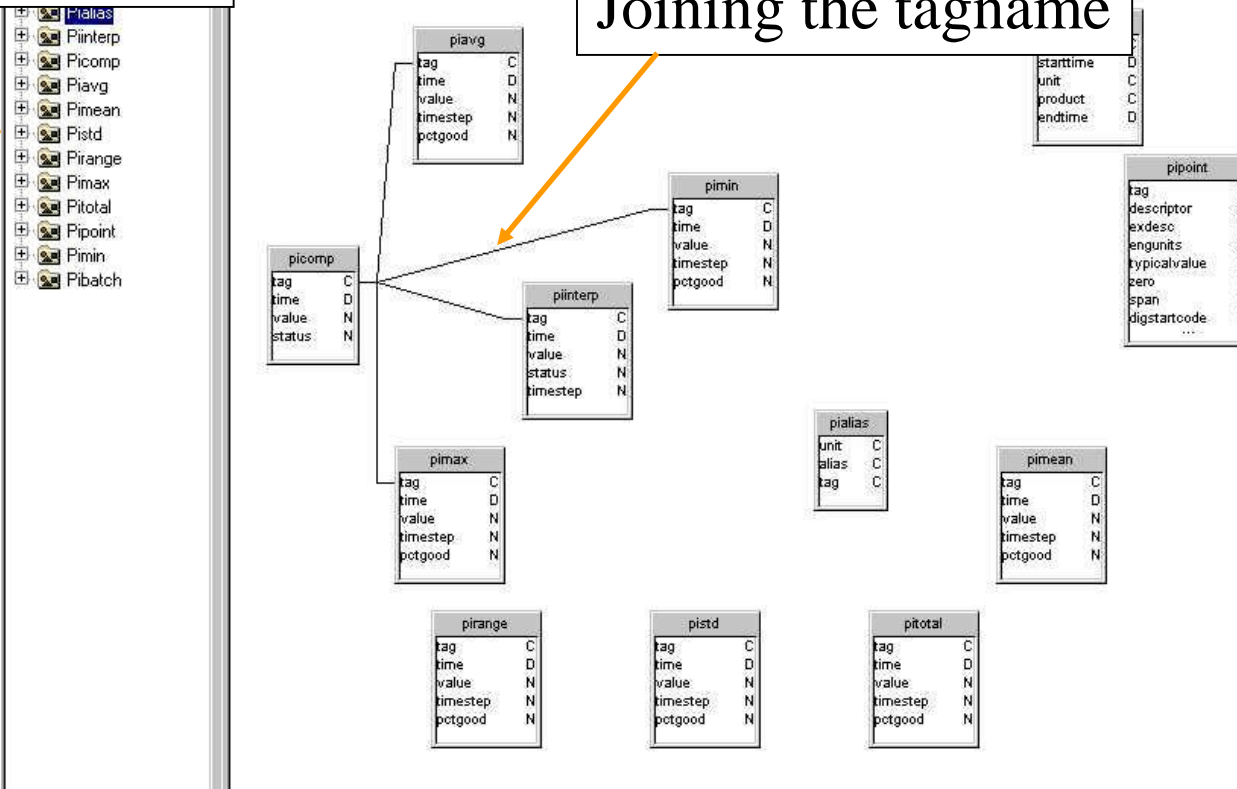 - Aggregate awareness

Supervisor

- **Protect information resources**
  - Data access (row-level)
  - Resource utilization
  - Product functions
- **Streamline user administration**
  - User profile inheritance
  - Nested groups of users
  - Reuse NT authentication
- **Maintain resources easily**
  - Central repository

PI tables in the semantic layer

PI ODBC tables

Joining the tagname

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Direct connection BI-PI
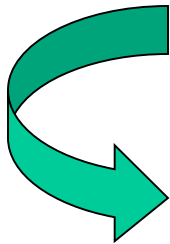
PI ODBC tables

SQL Editor

The result

Pretty nice, but ....

can I trust the
results ?
and what is that ?

Connecting BI to PI directly

- Action of the user causes in uncontrolled SQL-statements

- It is possible to shut down the PI SQL Server by „select * from *"-statement

- Data are not validated

PI Datalink for Data consolidation, used by the „data responsibles" (Excel User)
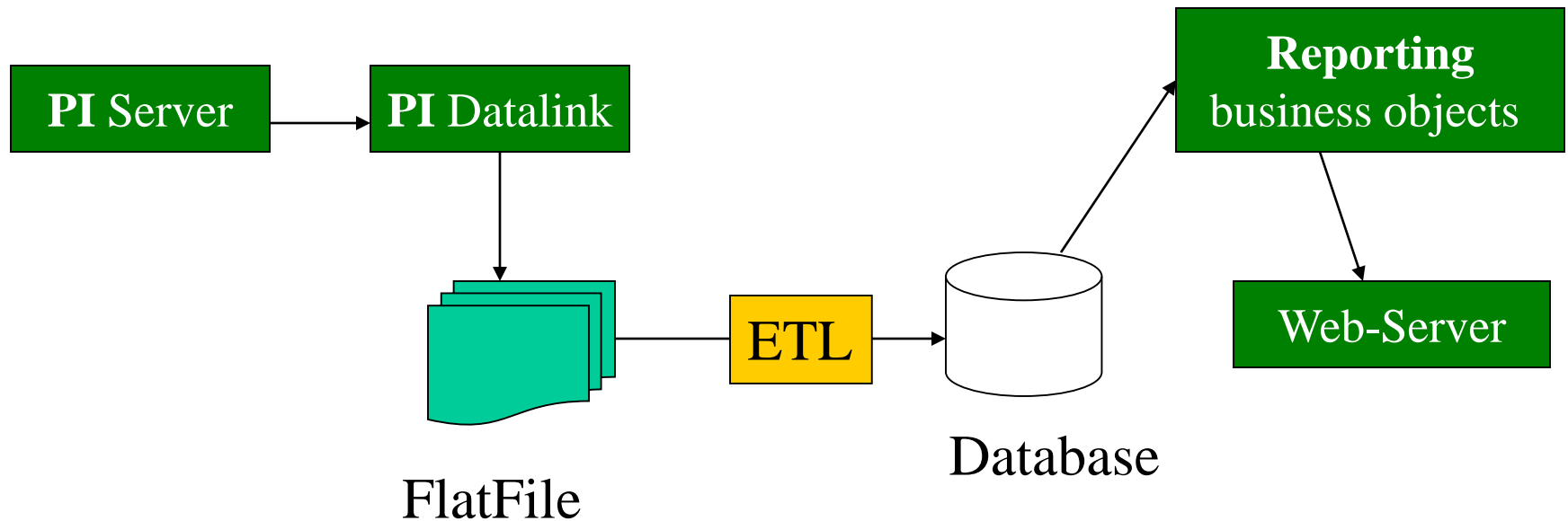
The PI-Datastream

Questions ?