



PARASUITE - Product Analysis and Reporting Application SUITE

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Background



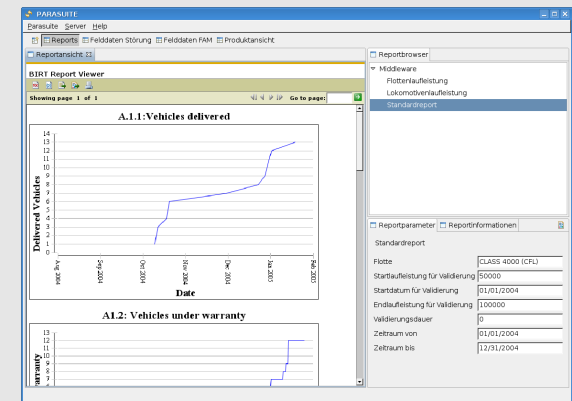
- Producers of industrial goods and users of industrial plants try to **reduce** their **development and operating costs** by the use of smart sensors.
- **Industrial goods and plants** will be **equipped with smart sensors** at the most informative locations and **continuously monitored**.
- Using the collected data together with general product data one can **run a variety of analyses**. Prominent examples are:
 - Identification of design errors
 - Breakdown forecast
 - Residual lifetime analysis
 - Optimal decommissioning of products

Overview

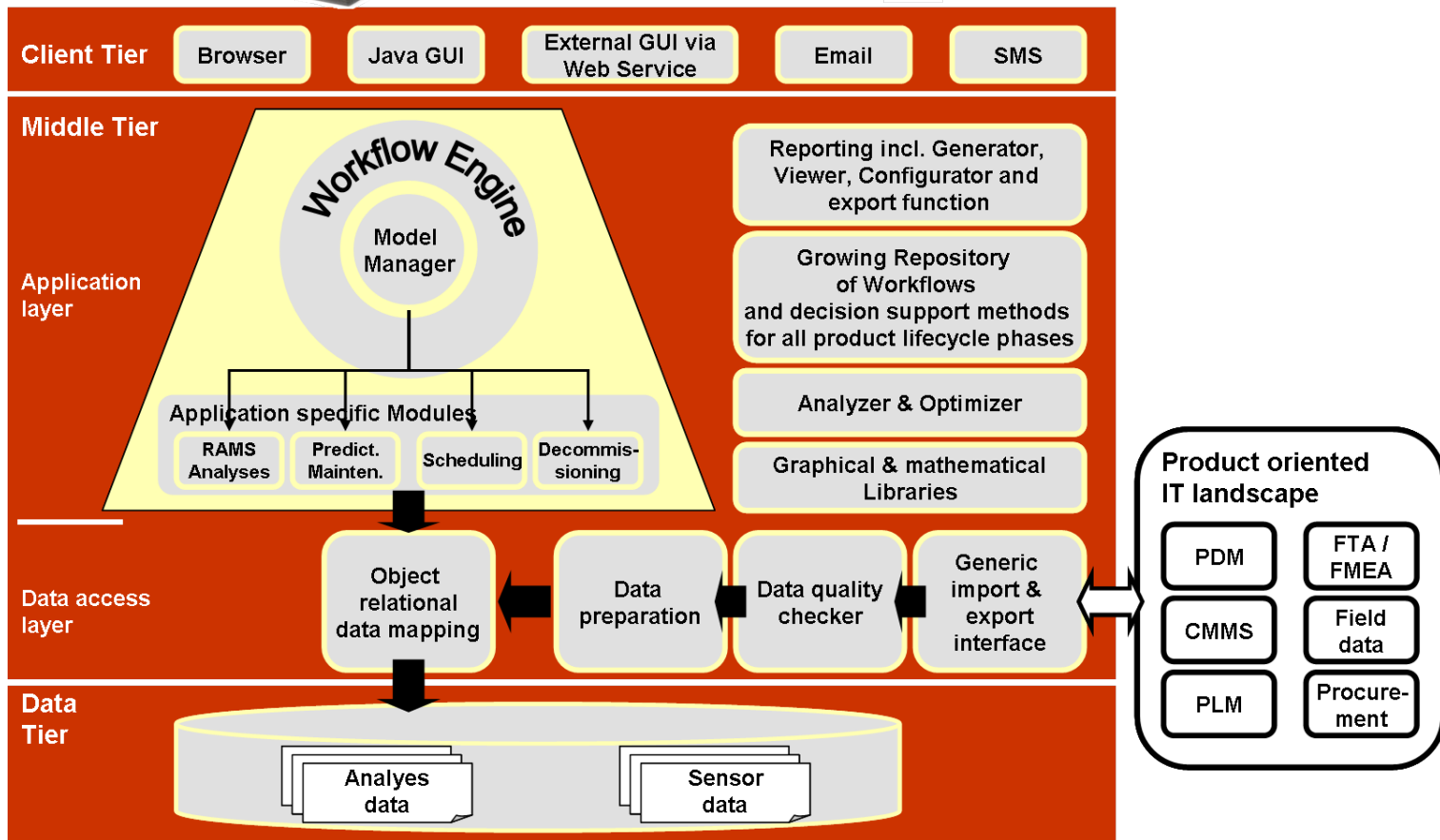
PARASUITE is **framework for analyzing the behavior of industrial products and production plants**. The basic framework consists of:

- A **database** to store large amounts of various product related data
- Generic **import and export** components for connecting to the surrounding IT systems
- A flexible **reporting** builder
- Automatically invoked computations
- Automatic **alarm** functionality
- The disconnection of the DB server in order to **work off-line** with a subset of the data

PARASUITE reporting perspective



Core Technology

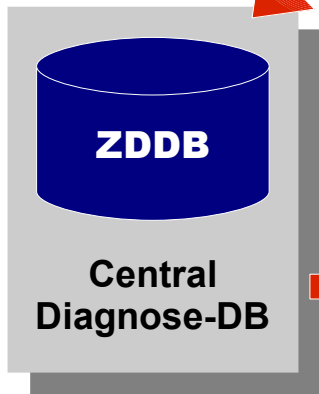


Bombardier (BT)

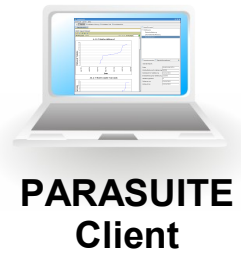
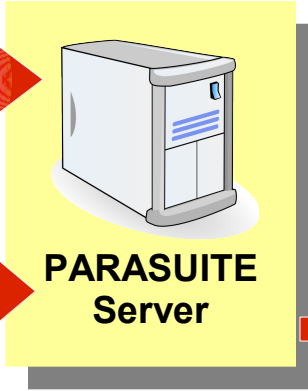
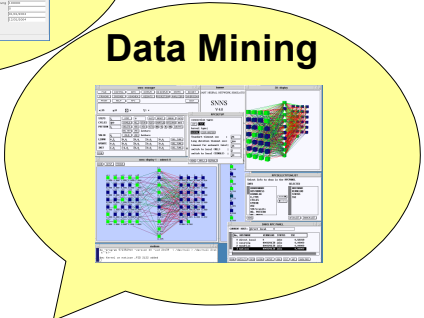
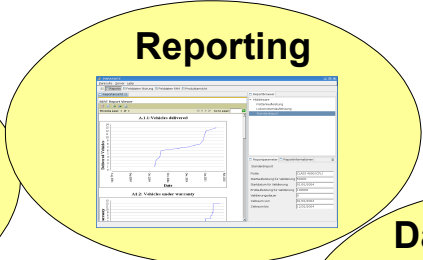
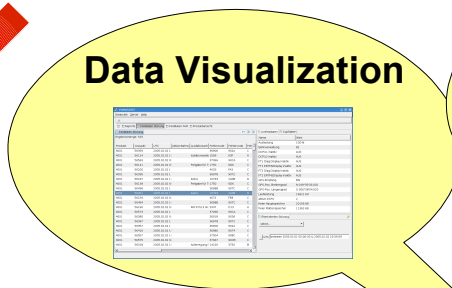
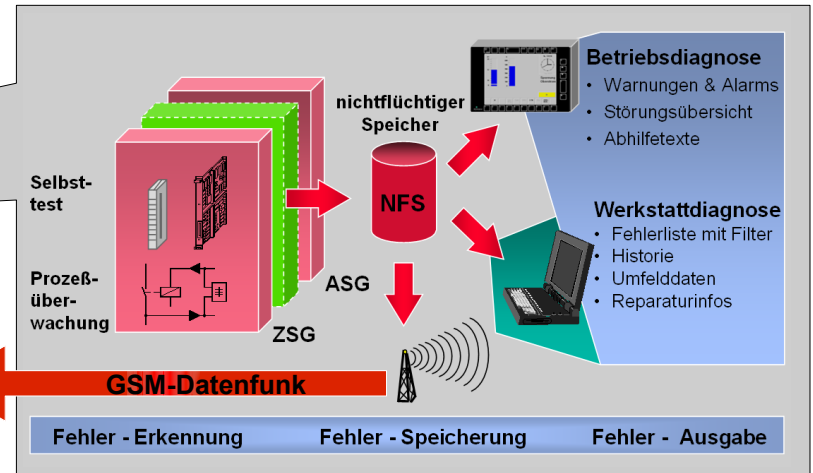


Maintenance Actions:

- Work Order
- Spare-Part information
- Labour- / Material effort
- Replace time
- Logistics
- Mileage
- ...



GSM-Manager

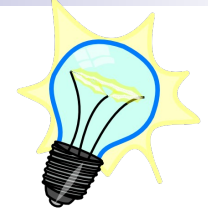


Bombardier (BT)



- Data:
 - **Diagnosis data** and **maintenance reports** for 512 locomotives over a period of 6 years.
 - Approximately **5 billions data records** (1.2 terrabyte)
- Requirements:
 - **Data cleaning** (e.g. consistency checks)
 - Advanced graphical **data visualization** (e.g. combined visualization of maintenance reports and corresponding diagnosis data)
 - **Reporting** (e.g. MDBF, failure rates, failure ranking)
 - BT specific **data mining** solutions (e.g. root cause analyses using methods of the rare event statistic)

Future plans



- On top of the basic framework customers can run their application specific product analyses. Possible scenarios are:
 - For the design engineer in the BOL phase:
 - By applying methods of data mining (e.g. neural networks, decision trees, rare event statistic) on field-, diagnosis- and environmental data PARASUITE provides **information on root causes** of failures and faults and can support the design engineer to improve the product.
 - For the maintenance personal during the MOL phase:
 - By using **predictive maintenance** algorithms (e.g. case based reasoning) PARASUITE evaluates the current state of deterioration or upcoming breakdowns.
 - For the recycling specialists in the EOL phase:
 - Using a Bayesian Network PARASUITE helps the service personal to judge whether it is **cost efficient to dismantle and refurbish** individual components or not.

Conclusion



- PARASUITE **supports the decision makers** in different life-cycle phases of the product by transferring knowledge between the phases.
- It is a **flexible framework** which allows to **incrementally include new functionalities** without changing the underlying system.
- PARASUITE is not a standard reporting or data mining solution. It is the **basis for custom-tailored developments** where common products are not sufficient or too expensive.
- It is a lightweight yet powerful framework which can easily **handle a large amount of data**.
- Depending on the customer's needs the system can be expanded with new GUI clients (e.g. browser based, pocket PC)