Reengineering - Experiences and Some Lessons Learned

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WCRE 2001

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Own Background

• SDS: CEO	2001 -
• sd&m: CTO, ...	1994 - 2001
• Computer Science	1981 - 1994

Company Profile

Core competency: Securities & Derivatives

Location: Vienna
Team: roughly 400 people; SW and banking specialists

Software development focus:
STP real-time software products for private & retail banking services
Front-, middle- & back office functionality ECN connectivity

Vision: Expand from Austria, Germany, Switzerland via partnerships with leading global players and international consulting firms to pan-European platform

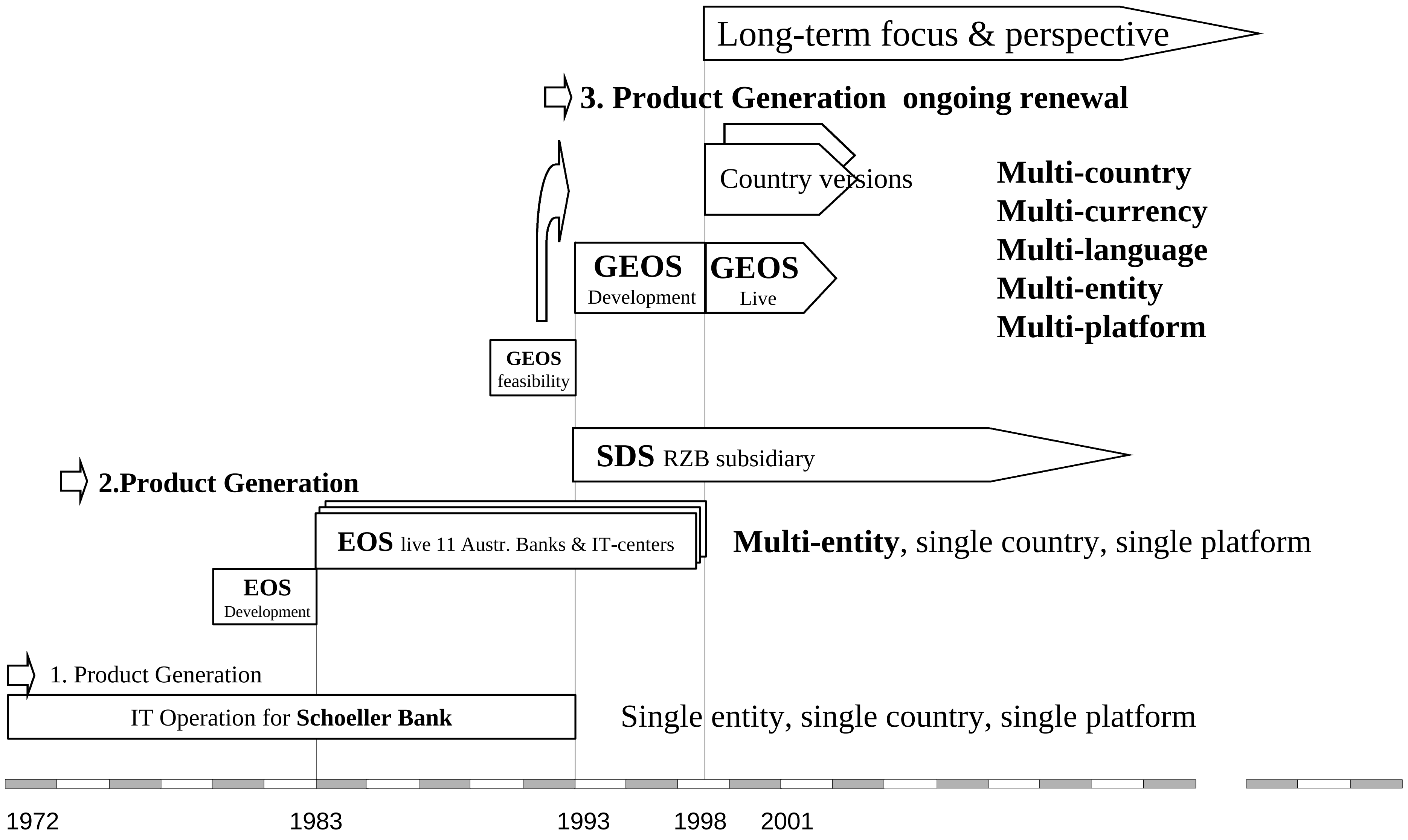
Acknowledgements:

GEOS: Highlights

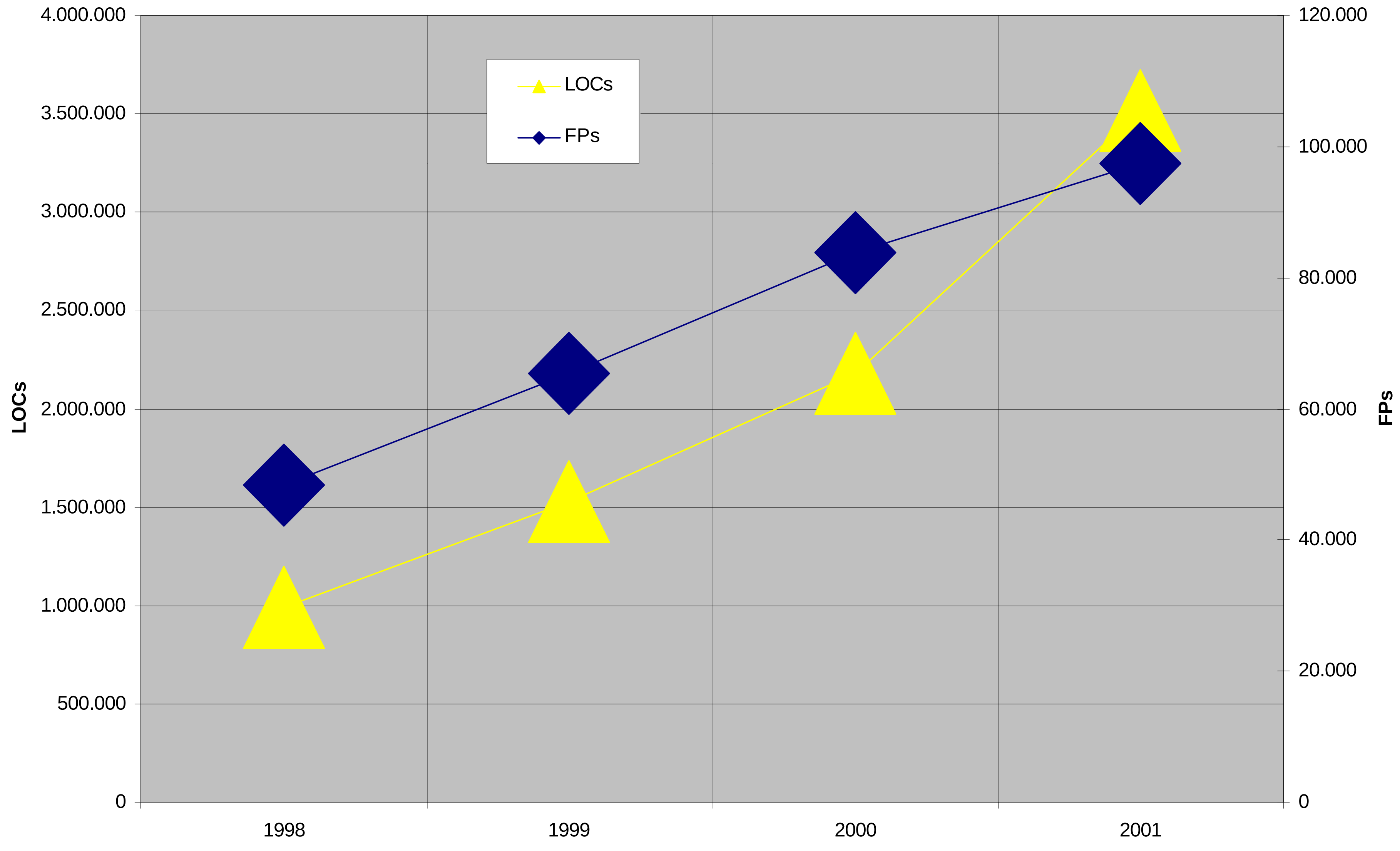
- **Straight-through processing (STP Award, S.W.I.F.T Gold Label)**
- **Proven successful operation (4 IT centres with 350 banks in Austria)**
- **Scalable and platform-independent (NT, OS/2, Unix, MVS)**
- **Streamlined, multi-level-client design**
- **Transaction banking & insourcing (of other client institutions) capability**
- **Multiple legal entities, currencies, languages, ...**
- **7 x 24 operation**
- **high performance**

1.100.000	queries / h
100.000	settlements / h
130.000	orders / h

GEOS Development


Long-term focus & perspective
3. Product Generation ongoing renewal
Country versions
Multi-country
Multi-currency
Multi-language
Multi-entity
Multi-platform
GEOS Development
GEOS Live
GEOS feasibility
SDS RZB subsidiary
2.Product Generation
EOS live 11 Austr. Banks & IT-centers
Multi-entity, single country, single platform
EOS Development
1. Product Generation
IT Operation for Schoeller Bank
Single entity, single country, single platform
1972
1983
1993
1998
2001

GEOS Metrics



meassured by Harry Sneed

Theses

1) Software reengineering is necessary
2) Software reengineering projects are not popular and do not “sell“ well
3) Long-life software is accompanied by reengineering through its entire life cycle
4) Software reengineering is often carried out in an unprofessional way: technical, organisational, psychological
5) The gap between research and business practice is too wide

Software Reengineering

- Software reengineering =
  - + Analysis of existing (legacy) system: conceptual and technical
  - + Changes in software design
  - + Re-implementation
  - + Forward engineering: conceptual and technical
- is often associated with “poor quality” software (maintenance is not efficient)
- is usually akin to archaeology than a methodical, engineering-like process

“Reengineering is like looking at a Picasso and trying to come up with a photograph of the subject.”
(Vaughan Merlyn)

Software Reengineering is necessary

- What are the alternatives for the large number of existing software systems meant to be?
  - Abandon old systems when design is not up-to-date or maintenance becomes too difficult?
  - Stick to old systems and constantly loose quality while treating symptoms and increase costs?
  - Design utterly perfect software („design for the future")?

NO!

Software Reengineering takes place

- Almost every large and complex software system that has been in development for a long time is renovated from time to time
- Design mistakes are not necessarily the reason for this kind of reengineering. It is a continuous process of improvement and adaptation
- Of course there is a difference in quality in the sense of how often and for which reasons renovation becomes necessary

Software Reengineering is not popular

- Management does not want to invest money because
  - ROI is difficult to calculate
  - There are no guarantees that the life cycle of a software application can be extended sufficiently through reengineering
  - Reengineering has an air of trying to be perfect (“the application is running, what more do you want?”)
  - Budgets are not set aside in advance or made available for reengineering
  - Reengineering confronts the team with mistakes and omissions of the past
  - Crucial staff with know-how in the legacy system become worried (“will we still be needed after the reengineering?”)

Software Reengineering does not sell well

- Management (customer side) does not want to invest in reengineering
- Developing new systems wins far more prestige than reengineering old systems
- Developers prefer to work on new developments (“it’s more fun …”)
- Risks are difficult to asses
- Few software houses are well positioned in this market and bring know-how, tools and responsibility

Software reengineering takes place anyway

- Software systems with a life cycle of 10, 20 or more years **always** encounter:
  - Multiple technological enhancements
  - Multitude of modifications and replacements in co-existing systems
  - Continuous flow of new new conceptual requirements
  - New user groups
  - New development teams (loss of know-how!)
  - New development paradigms
  - New business organisations!
- All of this is not possible without reengineering; Software reengineering does take place!!!

Major obstacles associated with reengineering projects

- Lack of know-how and awareness for reengineering
- Reengineering is often understood as “emergency surgery” instead of a continuous process in long-term software development
- Reengineering needs top specialists for redesign … but where do you find them?
- A pure technical analysis is not sufficient. For design recovery a number of top specialists in the old system are necessary … but where do you find them?
- Reengineering technology leaves a lot to be desired and existing tools are not very widespread yet

Implementation of standard software

- The implementation of large standard software packages often implies complete or partial reengineering of existing neighbour systems systems
  - Poorly or undocumented interfaces have to be used
  - All processes have to be analysed and - if necessary- to be reengineered
  - existing systems have to be modified that nobody wants to touch any more
  - Even if old systems are replaced by standard software they have to be analysed and documented beforehand
- Awareness of these aspects rarely exists!!

Organisational aspects of Software Reengineering

- An isolated reengineering team alongside the development team (project) often fails
- Reengineering activities have to be included in project planning and therefore belong to the overall project management
- Specialists in the old system have to be closely involved in reengineering activities
- Reengineering needs good project management, good design and good developers … just like a new development!

Product Evolution and Reengineering

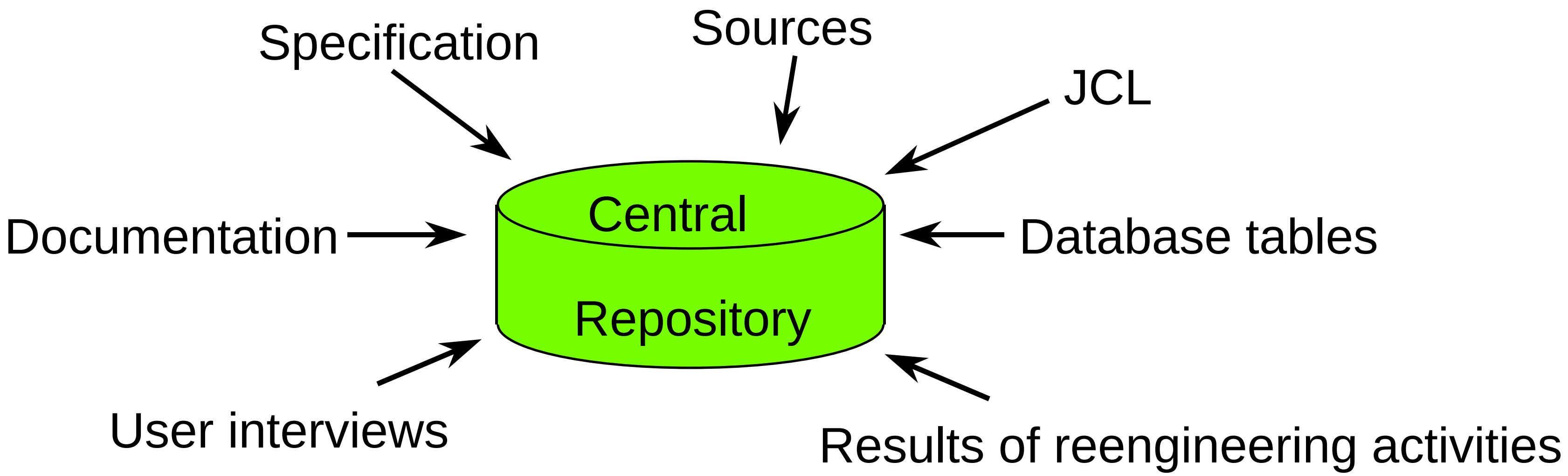
- Long-term product evolution means multiple (or even continuous) software reengineering
- Example: GEOS
- Additional complexity: Release compliancy, release management and reengineering at the same time

Tools

- Good reengineering technology is badly needed but rare
- Good reengineering tools are often also good development tools
- Example: Repositories, e.g. SHORE by sd&m

Tools: Analysis and Documentation

- *Central storage of all relevant documents for SW development or reengineering projects*



Tools: SHORE

SHORE® stands for

s d & m

H ypertext

O bjekt

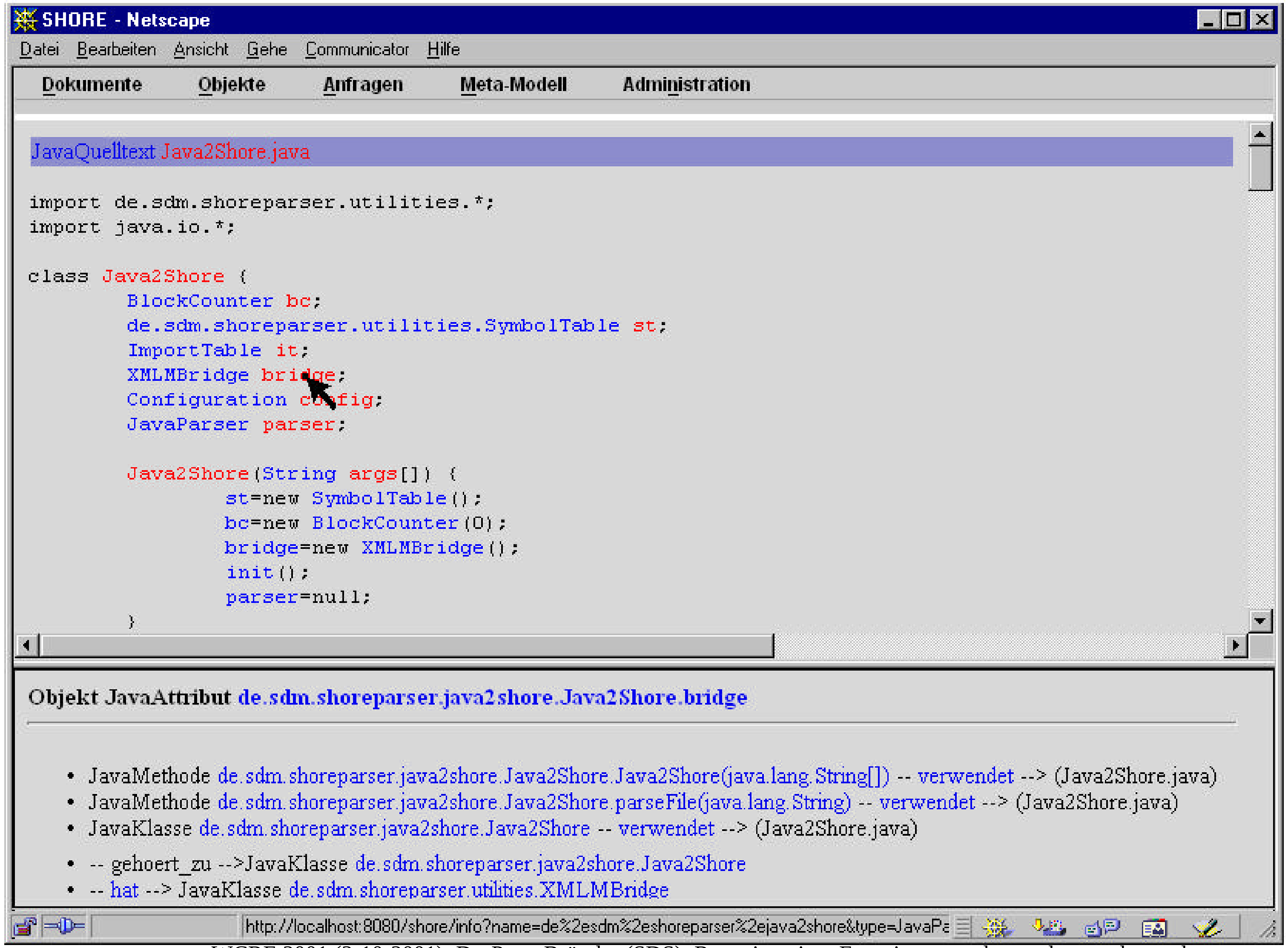
Re pository

® registered Trademark of sd&m AG

SHORE: Objectives

- Document management
  - Easy access to project documents
  - No restrictions for developers
- Navigation between “objects”
- Comprehensive query possibilities
- Flexibility and adaptability through meta-model and parsers (e.g. for Cobol and Java, also UML)
- Management and evaluation of a large amount of documents (> 10.000) in large projects

SHORE at work



SHORE - Netscape
Datei Bearbeiten Ansicht Gehe Communicator Hilfe
Dokumente Objekte Anfragen Meta-Modell Administration

JavaQuelltext Java2Shore.java

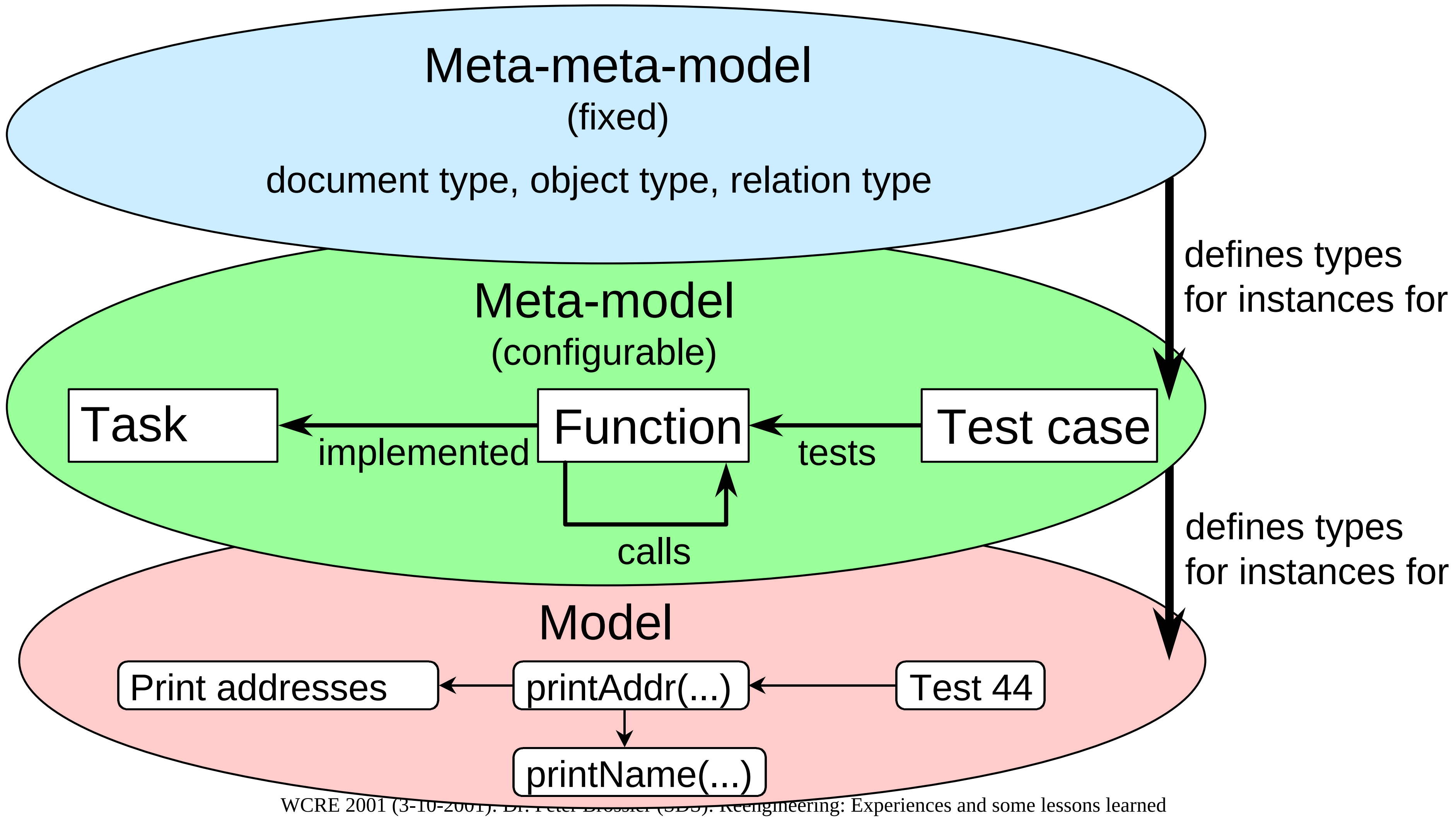
```
import de.sdm.shoreparser.utilities.*;
import java.io.*;

class Java2Shore {
        BlockCounter bc;
        de.sdm.shoreparser.utilities.SymbolTable st;
        ImportTable it;
        XMLMBridge bridge;
        Configuration config;
        JavaParser parser;

        Java2Shore(String args[]) {
                st=new SymbolTable();
                bc=new BlockCounter(0);
                bridge=new XMLMBridge();
                init();
                parser=null;
        }
```

Objekt JavaAttribut de.sdm.shoreparser.java2shore.Java2Shore.bridge

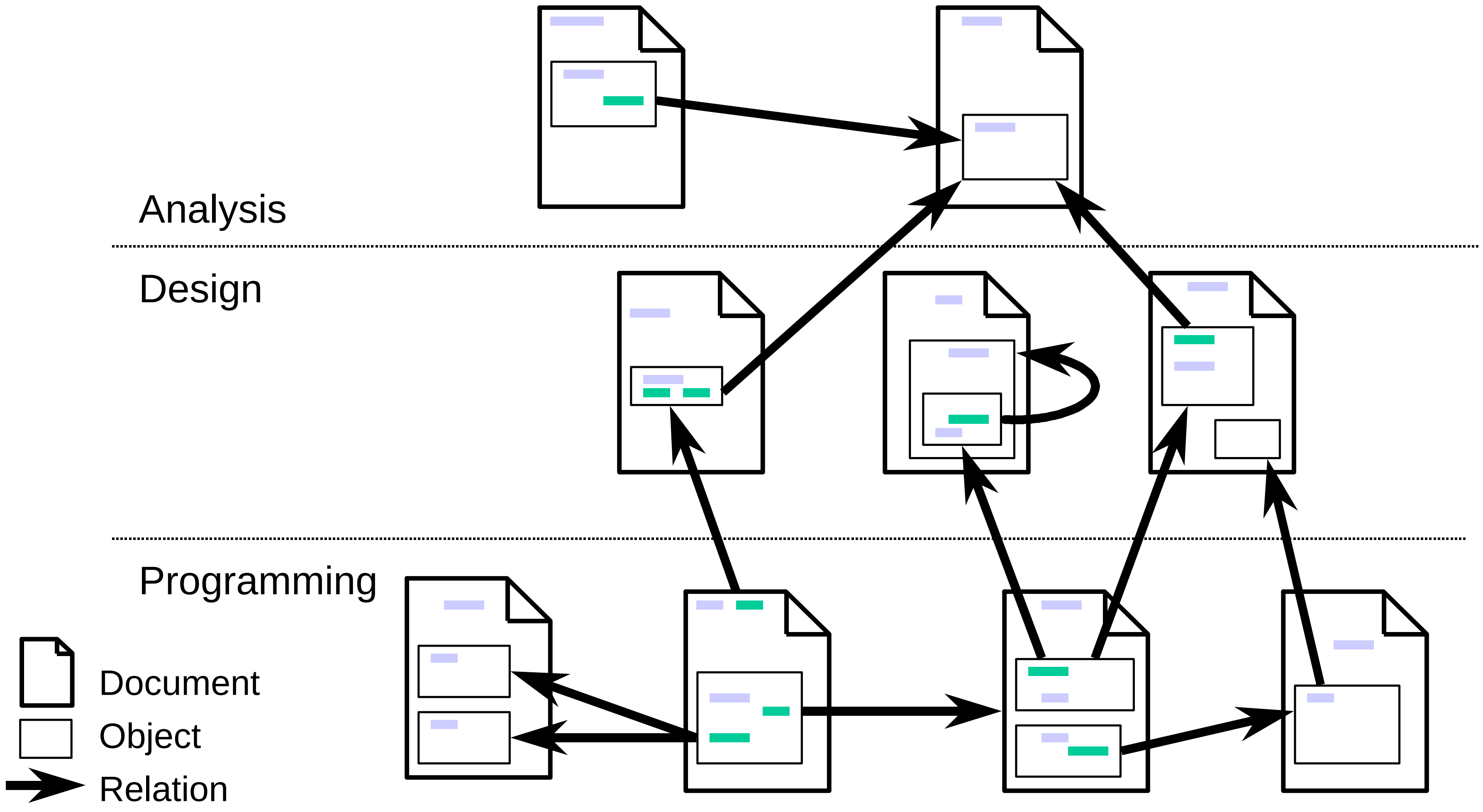
- JavaMethode de.sdm.shoreparser.java2shore.Java2Shore.Java2Shore(java.lang.String[]) -- verwendet --> (Java2Shore.java)
- JavaMethode de.sdm.shoreparser.java2shore.Java2Shore.parseFile(java.lang.String) -- verwendet --> (Java2Shore.java)
- JavaKlasse de.sdm.shoreparser.java2shore.Java2Shore -- verwendet --> (Java2Shore.java)
- -- gehoert_zu -->JavaKlasse de.sdm.shoreparser.java2shore.Java2Shore
- -- hat --> JavaKlasse de.sdm.shoreparser.utilities.XMLMBridge

http://localhost:8080/shore/info?name=de%2esdm%2eshoreparser%2ejava2shore&type=JavaPa

SHORE: Model levels



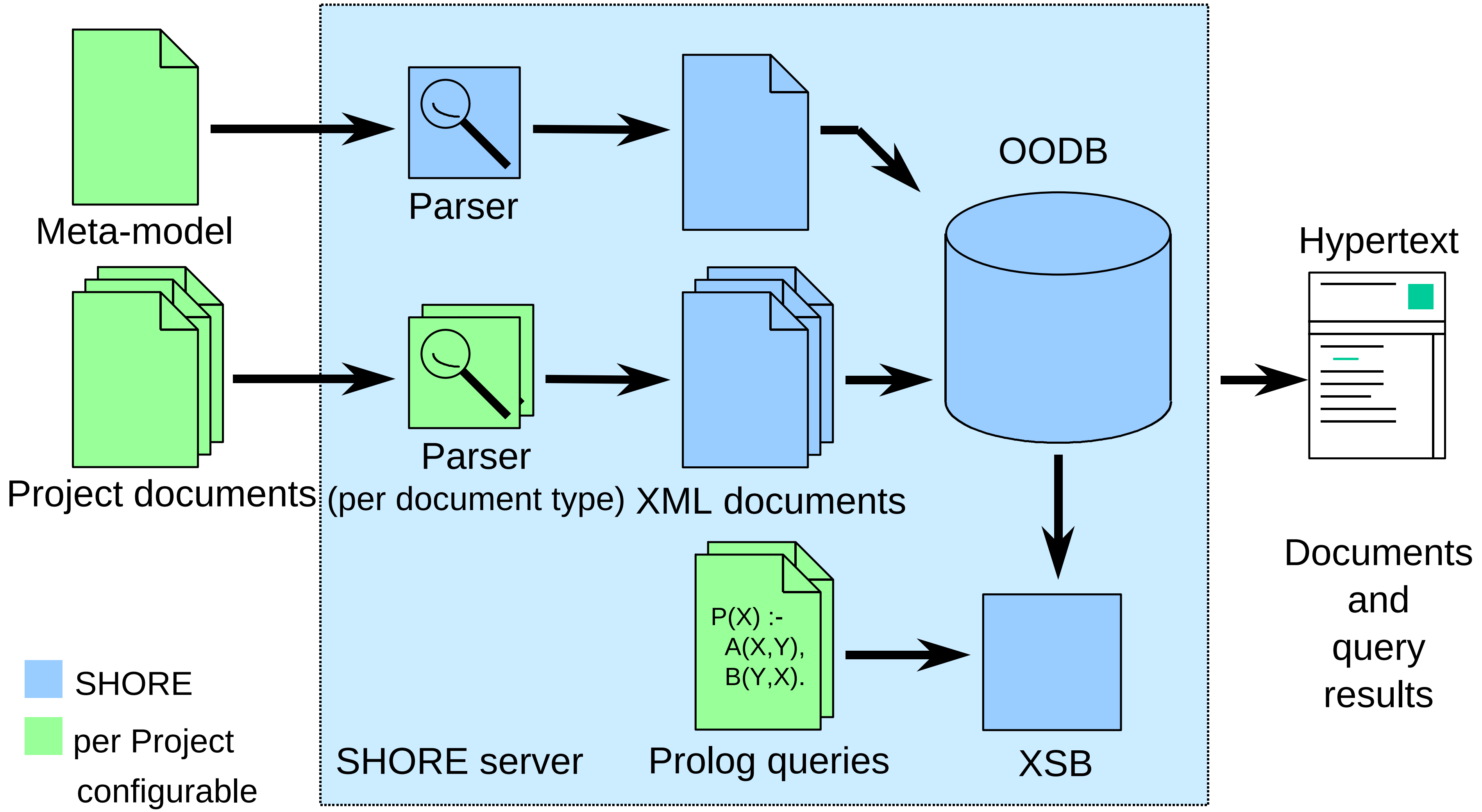
SHORE: Document links



🟩 Cross-reference (Hyperlink)

🟪 Hotspot (Hyperlink)

SHORE: Functionality



SHORE: Further information

- In-house development of SHORE was necessary because there is no comparable product on the market
- Used in sd&m projects and by selected customers
- Further information:
  - OBJEKTspektrum march/april 2000
  - mailto:olaf@sdm.de (Olaf Deterding)

Research and business practice

- Some questions:
  - How many presentations address subjects covered in this presentations and actually offer solutions?
  - How many universities deal with software reengineering?
  - How many software reengineering cooperation projects exist between universities and industry?