

Digital Geoscience

Transforming the use of NDR's and subsurface
databases in teaching and research

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... is a Norwegian Centre for Research-based Innovation (SFI)

... addresses the problems of scalable data access in the oil & gas industry

... it conducts interdisciplinary research leading to innovations that will advance and support digitilisation in the oil and gas industry

... combines public funding for basic research (through NRC) with funding from its industry partners

The SIRIUS Centre

Eight years' financing

11 Industrial Partners

3 Leading Academic Institutions

Funding for 20 Ph.D. students

Innovation through prototypes & pilots

45 affiliated researchers



UiO : **University of Oslo**

[**simula** . research laboratory]



UiO : **Department of Geosciences**
University of Oslo



Statoil



KADME 
Knowledge and data management expertise


fluidOps



Norwegian University of
Science and Technology

Schlumberger



NUMA  **SCALE**
BIGGER DATA ANALYTICS



computas 



DEPARTMENT OF
**COMPUTER
SCIENCE**

We all need data to make decisions

... but that data is difficult to get at

Different formats

Old software

Poor-quality data

Missing data

Manual work processes

Unstructured data

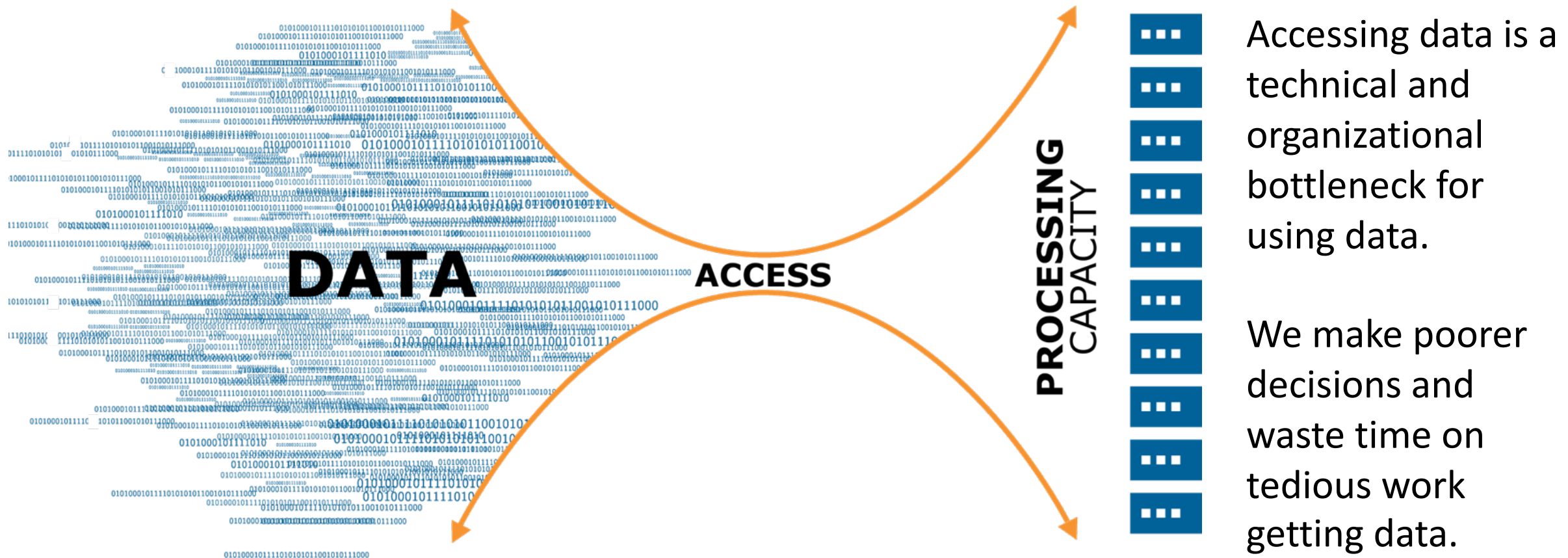
Too much data

Complex, inconsistent data models

Access and security problems

Inefficient access methods

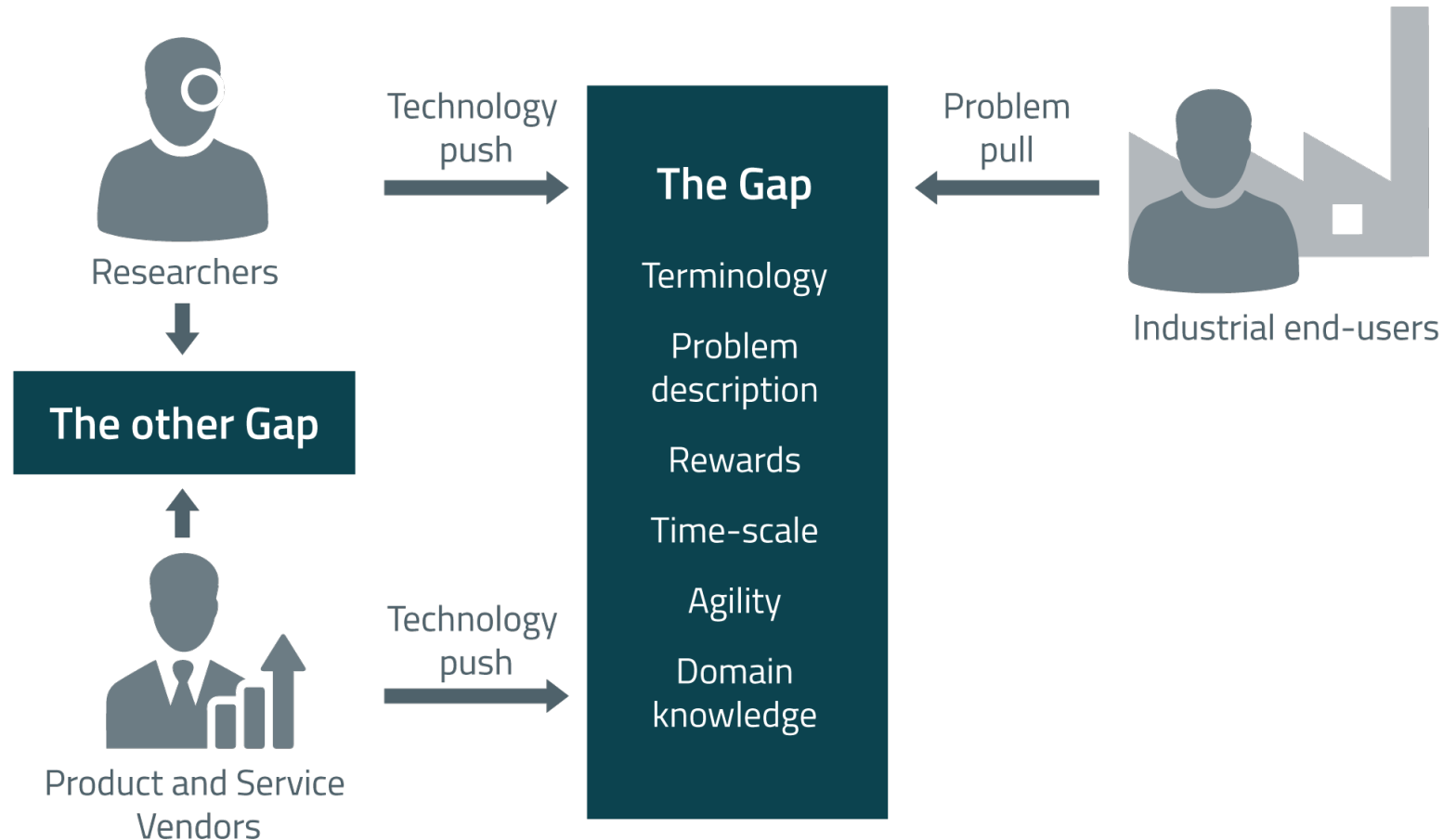
The Problem of Scalable Data Access



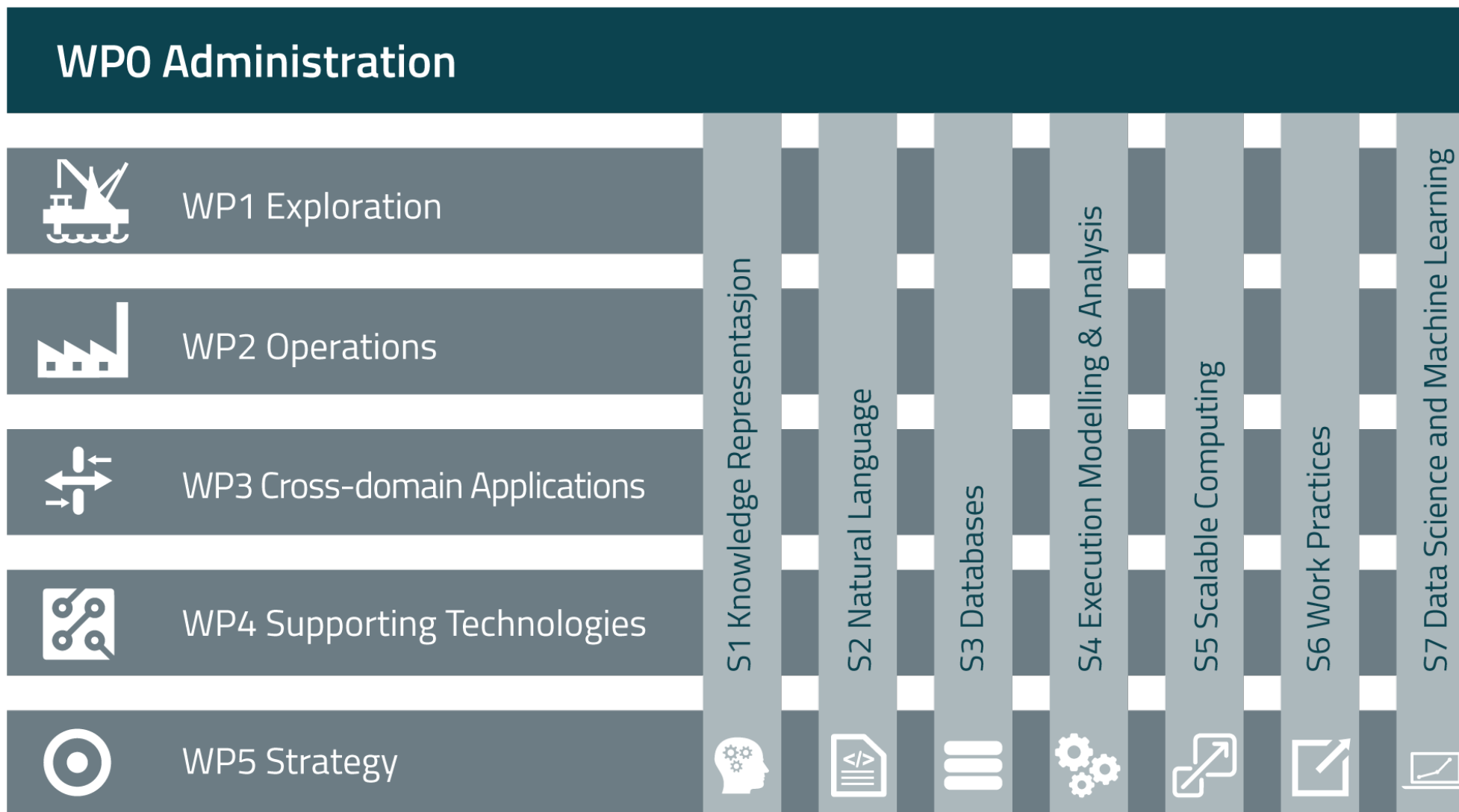
SIRIUS Objectives

- Accelerate innovation process for data access in oil & gas
- Transfer knowledge and expertise
- Transform work practices in the oil & gas industry
- Deliver scalable information systems for accessing disparate data sources
- Deliver a scalable, robust and efficient computational environment
- Reinforce mutual understanding and shared vision
- Establish SIRIUS as an internationally recognized center of excellence

Challenges are organisational, too



ORGANIZATION

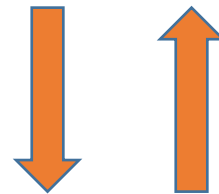


Exploration

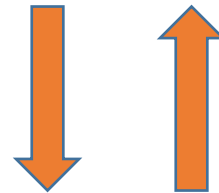
- Projects:
 - Activation of in-house (company) and national data repositories (like DISKOS, CDA, DINO, etc)
 - Analogues
 - Possible feasibility studies under development
- Represent Knowledge Representation, Natural Languages and Databases and work close together with Work Practices
- Piloting at Department of Geosciences (UiO) with DISKOS (...and aiming on other NDR's and/or E&P databases)

Data Access Problem

Geologist: «I want all composite well logs from wells that penetrate the Stafjord Formation, with porosities larger than 25% on the Tampen Spur»



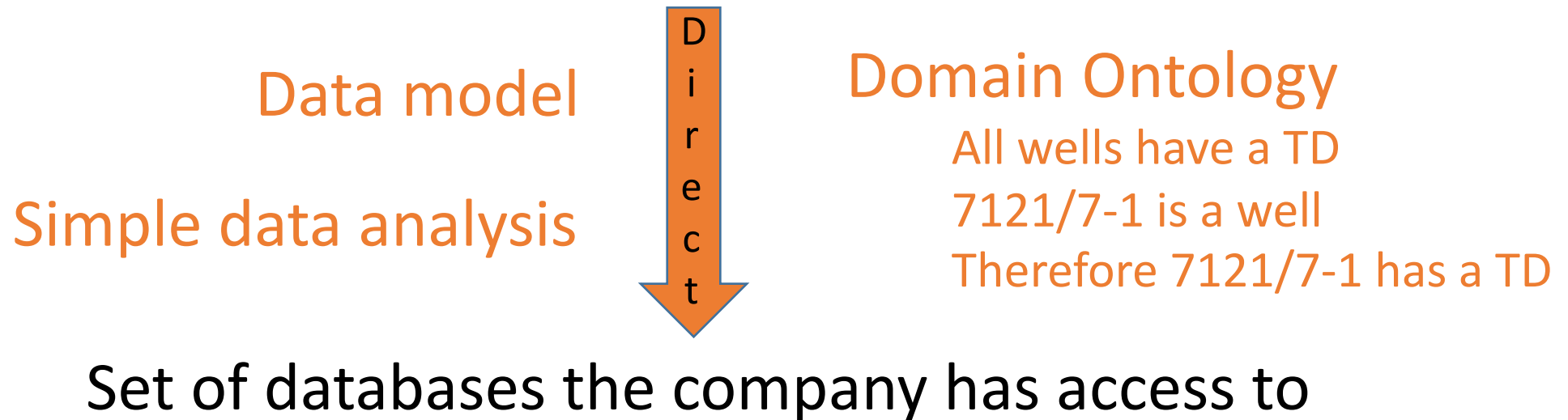
Companies Data Manager



Set of databases the company has access to

Data Access Problem

Geologist: «I want all composite well logs from wells that penetrate the Stafjord Formation, with porosities larger than 25% on the Tampen Spur»



Optique™ - project

- Predecessor of SIRIUS
- Scalable End-user
Access to Big Data



SIEMENS



UiO : **University of Oslo**



FREIE UNIVERSITÄT BOZEN
LIBERA UNIVERSITÀ DI BOLZANO
FREE UNIVERSITY OF BOZEN · BOLZANO

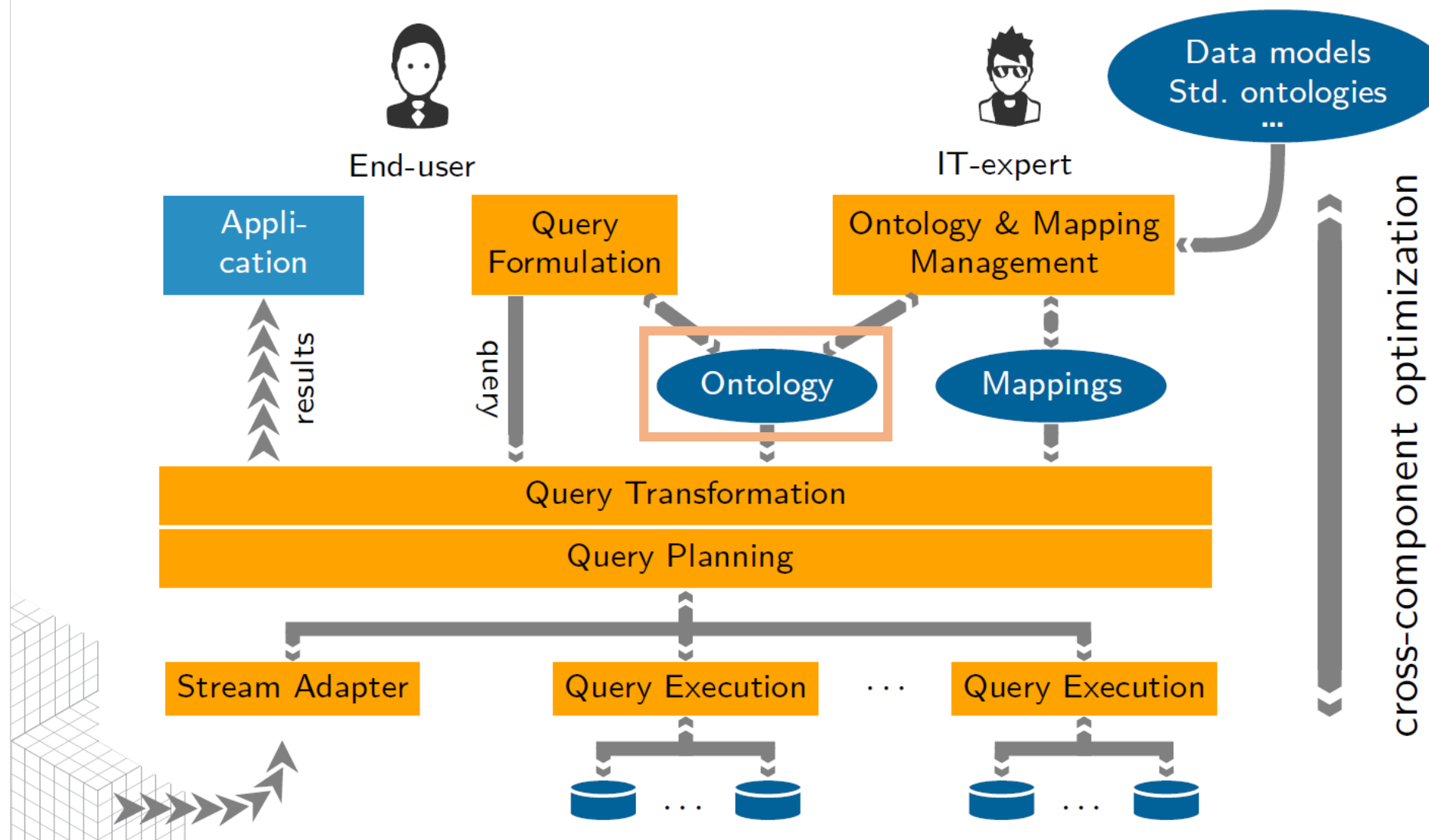


HELLENIC REPUBLIC
National and Kapodistrian
University of Athens



SAPIENZA
UNIVERSITÀ DI ROMA

Optique Architecture

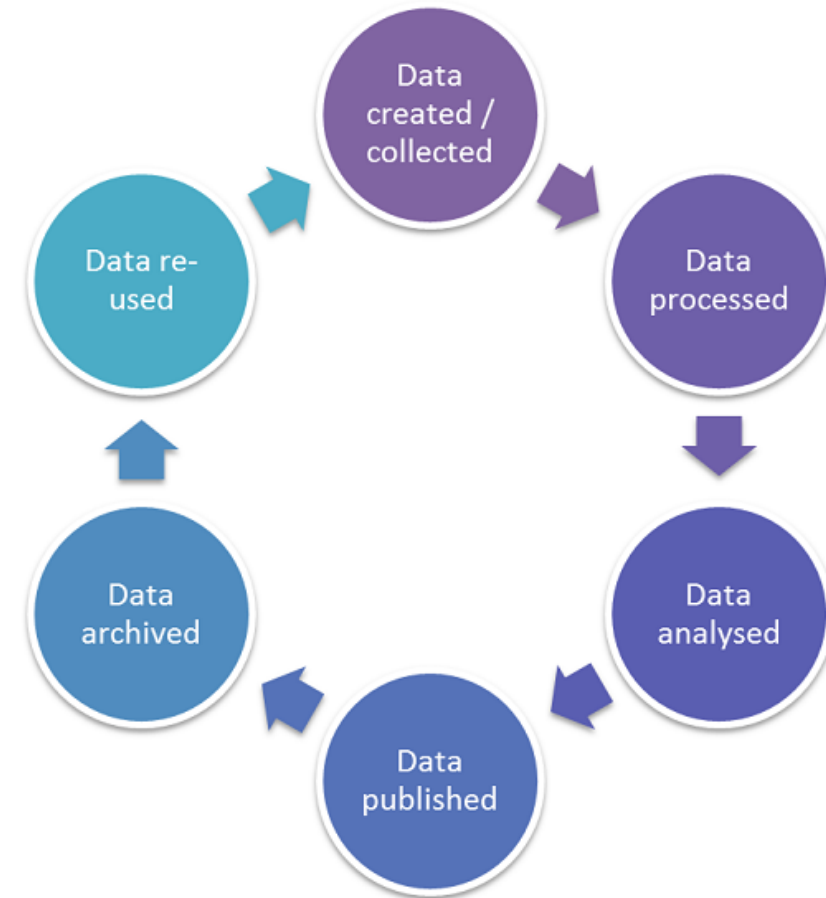
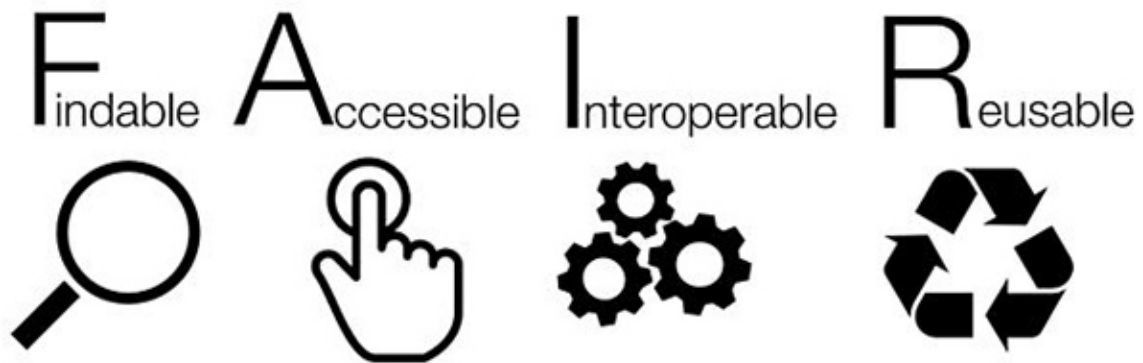


The **Query Formulation** Interface

- Let users formulate ad-hoc queries
- Filtering on attributes
- Connecting objects
- Selecting what information to extract
- Choosing types (Facility → FixedFacility | MovableFacility)

Research Data Management

- Open Science
- Research data life cycle



NDR's in Research and Education

- Enormous value and potential of NDR's for Research and Education
- Statement: DISKOS probably the world's biggest research data archive
- Numbers (2010-2017)
 - ~70 Master theses (UiO) related to Petroleum Geosciences used data from DISKOS

SIRIUS - Value for Education

1. The role of SIRIUS in research-based education
 - Digital Geo-logists or -physicists / Petroleum Data Scientists
 - Knowledge Representation in Petroleum Geosciences
 - Cooperation with Brazil

2. What effect will the innovations have on education
 - Direct, easy search access to NDR's
 - Data driven education, active role for students in data collection

My Dream

Student in Petroleum Geoscience: «I want all Gamma Ray logs from wells that penetrate Rotliegend deposits, with porosities larger than 25% between 3°E-12°E and 50°N-60°N»

SEARCH

DISKOS – CDA – DINO – JUPITER – German eq.

Data Access?

Work with us!

- As a partner company
 - Welcome oil companies and engineering companies
- As a participant in our Innovation Forum
- On a case-by-case basis in SIRIUS innovation projects

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