SIRIUS – a forum for data sharing

David Cameron, Centre Coordinator

SINTEF Seminar

Oslo, 25th January 2019

The SIRIUS Centre

- Eight years' financing from RCN
- 12 Industrial Partners (11 in 2017)
- 3 Leading Academic Institutions
- Centre for Research-Based Innovation
- Funding for 20 Ph.D. students
- Innovation through prototypes and pilots
- 45 affiliated researchers

Watch this space!

UiO : University of Oslo

simula

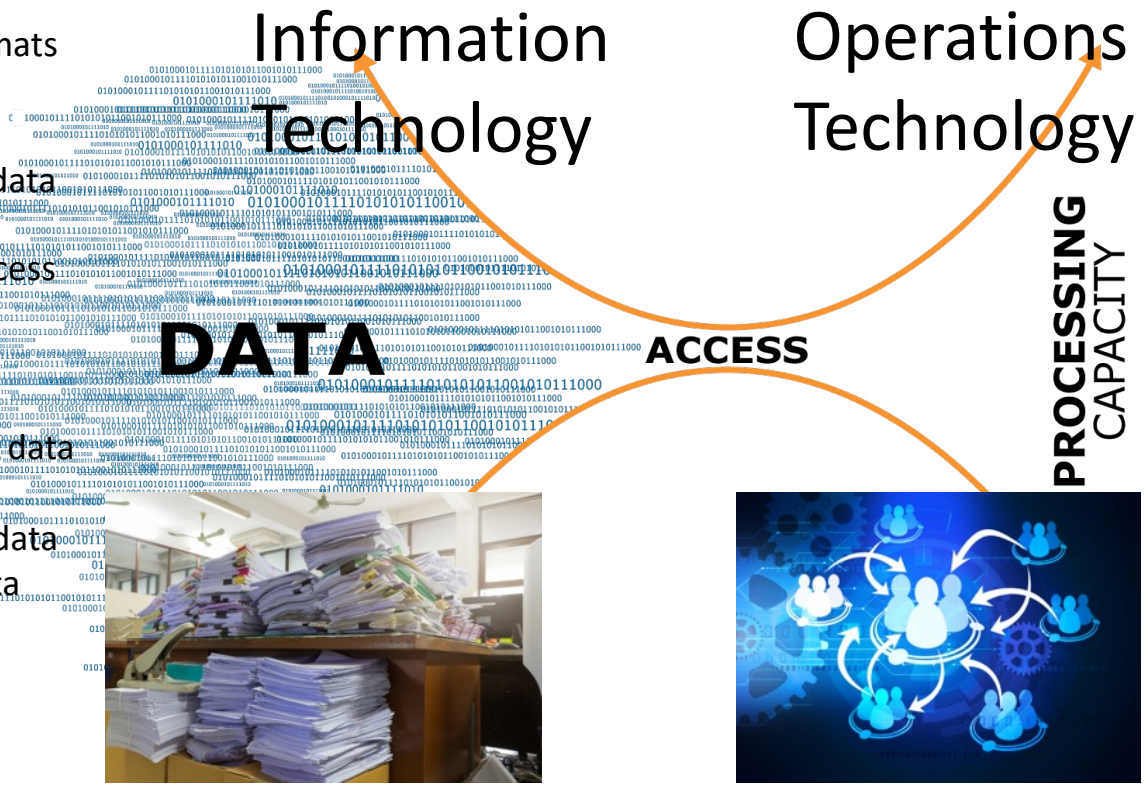
NTNU Norwegian University of Science and Technology

University of Oxford Department of Computer Science

sfi Centre for Research-based Innovation, The Research Council of Norway

The problem of scalable data access

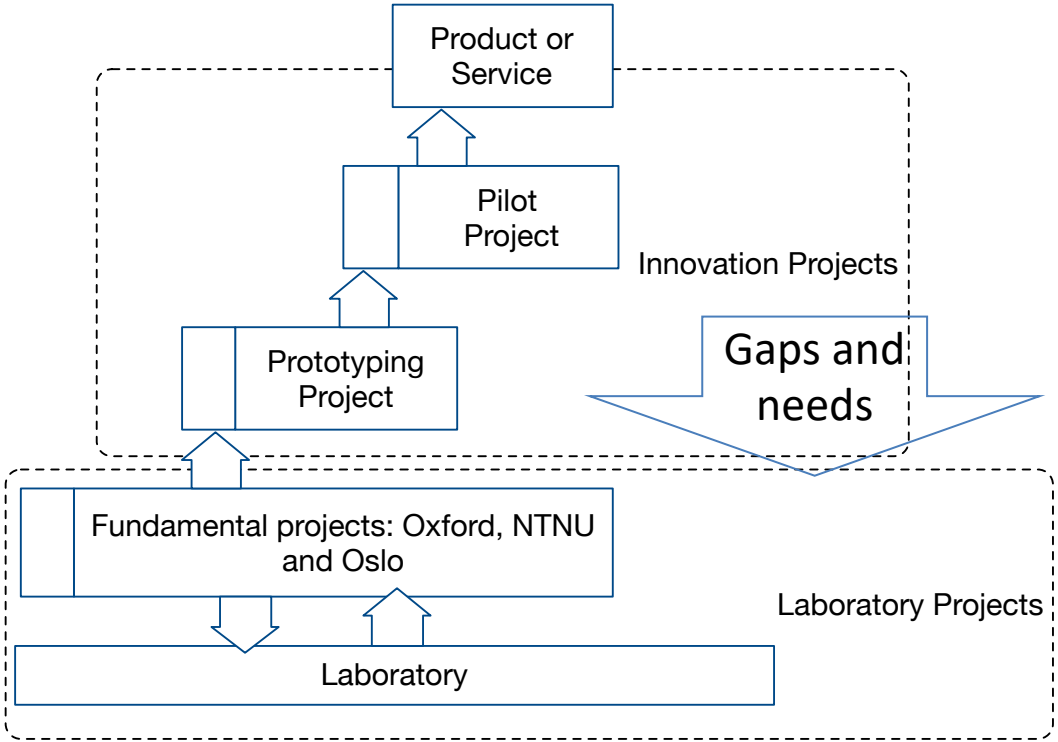
- Different formats
- Old software
- Complex, inconsistent data models
- Inefficient access methods
- Access and security
- Unstructured data
- Missing data
- Poor-quality data
- Too much data
- Manual work processes



Accessing data is a technical and organizational bottleneck.

We make poorer decisions and waste time on tedious work getting data.

From lab bench to products and services



Answering the challenges of KONKRAFT

- Digital collaboration
  - Simplification and standardisation.
  - Remove duplication and paper
  - Digitalization of NORSOK
- Upgrading of DISKOS
  - Easier to use – interoperable – a platform for the sector (the oil and gas crowd).
- Modifications and Maintenance
  - Planning
  - Equipment reuse

Beacons built on a common foundation

WP1 Exploration

- Geological assistant
- Subsurface data access & analytics
- Digital field & reservoir management

WP2 Operations

- Integrated digital planning
- Digital twins
- Digital field development

WP3 Cross-domain applications

- Personalized medicine
- Environmental applications

WP4 Research Programmes

- Analysis of complex systems / ABS
- Ontology engineering / OTTR
- Scalable computing / Melodic, Dolphin & Numascale
- Domain-Adapted Data science / Data wrangling toolbox, NLP
- Semantic integration / RDFox & Optique
- Industrial digital transformation / SIRIUS best practices

ICT Research to deliver scalable data access

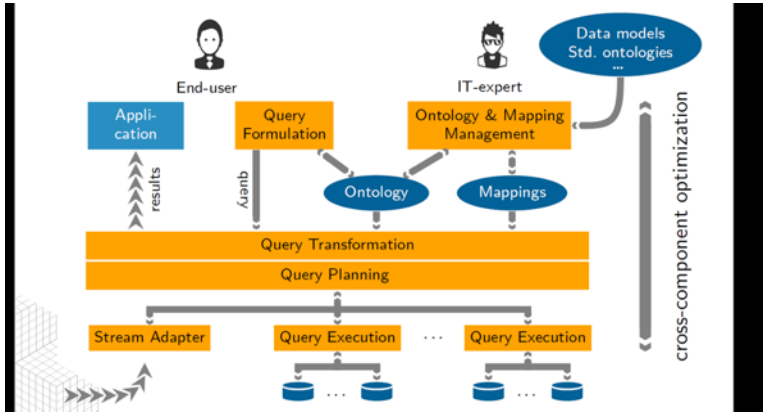
Well-designed, fast and predictable cloud systems	Analysis of complex systems	ABS for simulating and monitoring complex deployments
Simple representation of knowledge	Ontology engineering	OTTR templates and VQS tools
Fast databases and analytical tools	Scalable computing	Fast processors, clusters and optimized applications.
Interpretation of structured and unstructured data	Data science	Domain-adapted natural language and machine learning
Integration of diverse data sources	Semantic integration	RDFox and Optique databases and data access frameworks
Effective use of new technology	Industrial digital transformation	SIRIUS best practices for piloting and implementing technology

Access to Exploration Data

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-

SEARCH

DISKOS – CDA – DINO – JUPITER – German NDR – local databases



Industry pain

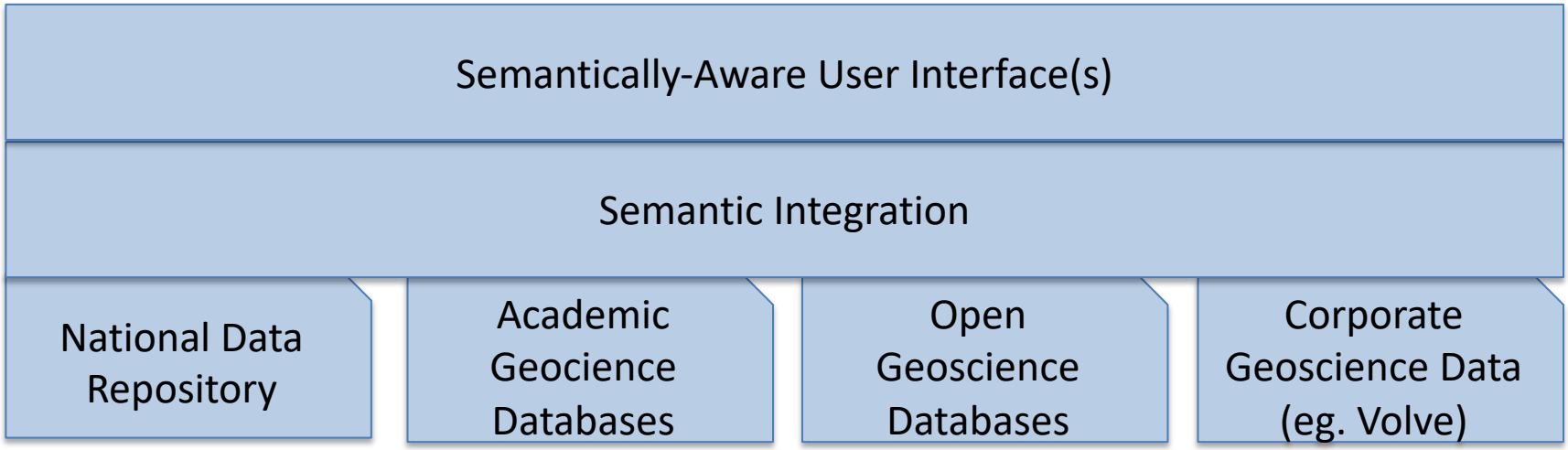
- Bottleneck: Human experts need to translate queries for different database systems
- Access time to the requested data can be days or weeks

Semantic Integration of Databases:

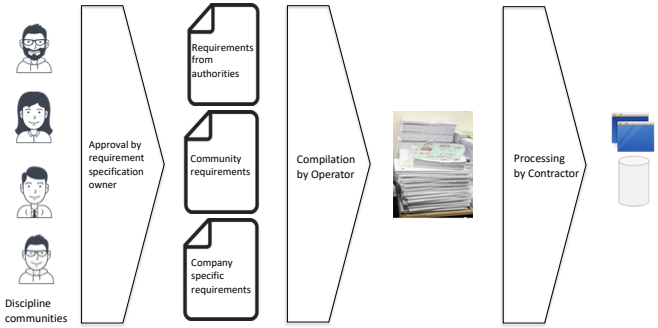
- Graphical frontend to compose queries for geoscientists
- Query rewriting, ontologies
- Leverage outcomes of the EU project Optique

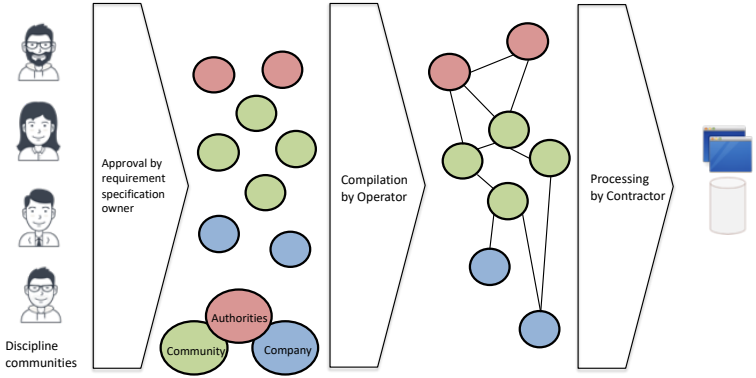
Subsurface Data Platforms

The geoscience and data science crowd



Digital Field Development





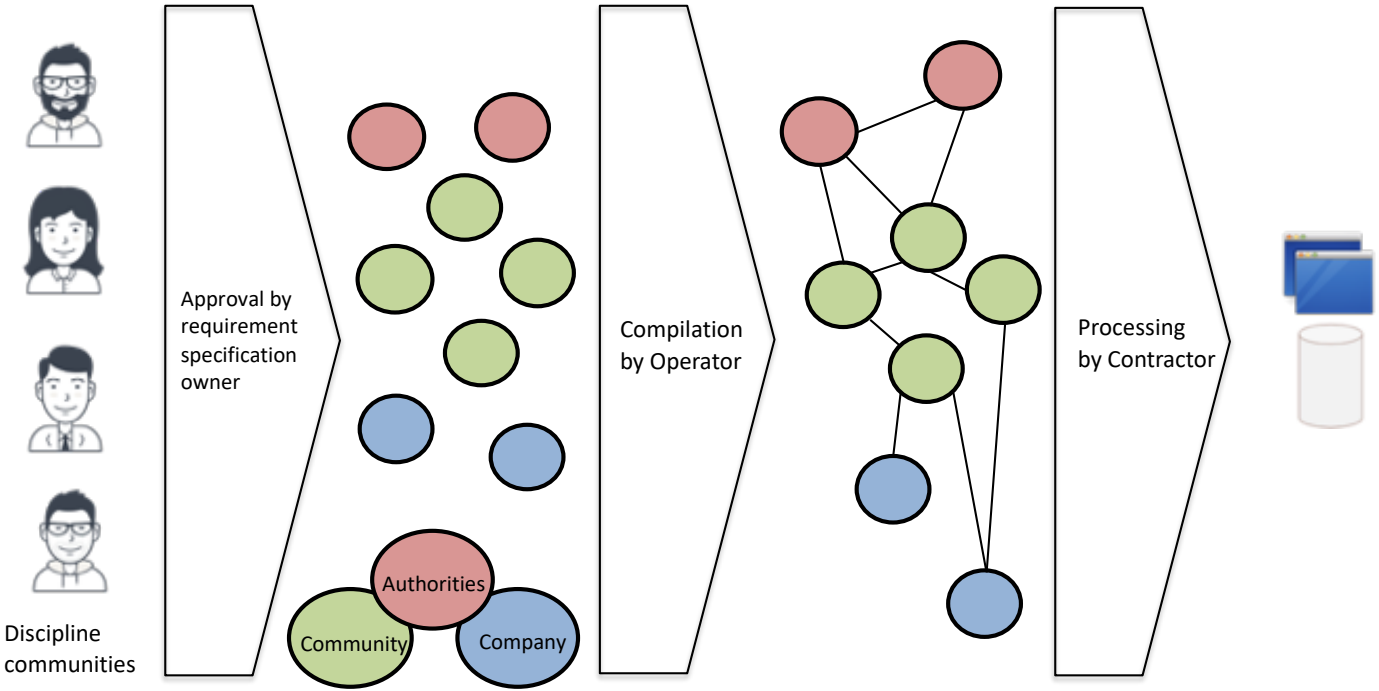
Industry pain:

- Processing of requirement specifications by manual interpretation of text
- Asset information locked in hundreds of proprietary applications
- Huge information loss in handover from one project phase to another

Requirements as Digital Artefacts

- From documents to structured data
- Objects for all life cycle phases (e.g., design, fabrication, maintenance)
- Requirements become rules over the asset model
- Compliance checking is automated
- Handover is information sharing

Digital Field Development



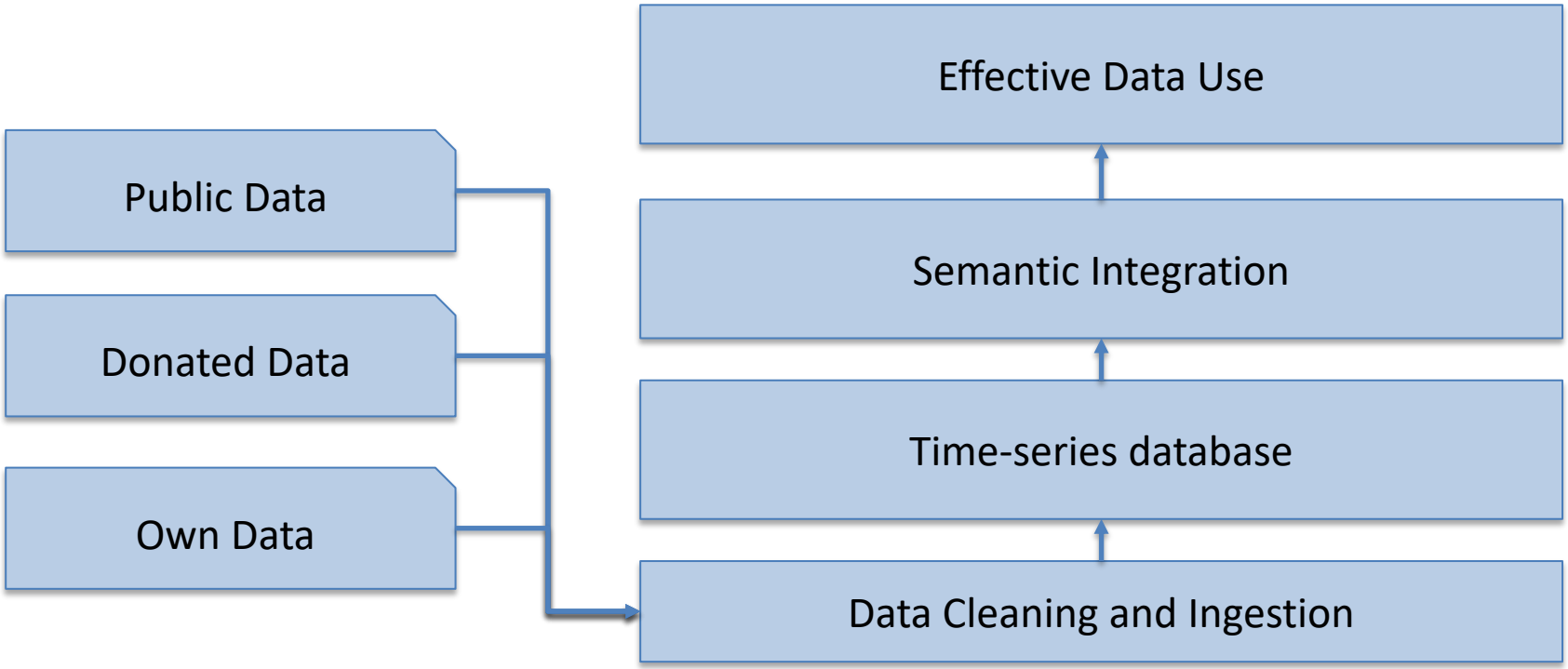
Digital Twins

Industry Pains:

- "Everybody" is offering a digital twin.
- Fragmented systems, siloed perspectives and overload of data.
- Systems are difficult to configure, maintain and scale.
- Challenges in work practices, security and alignment to business.

- A standards-based semantic backbone for digital twins
- Faceted data access and semantic user interfaces for usable twins
- Domain-adapted interpretation of unstructured information in twins
- Formal simulation of complex twin deployments and architectures

Laboratory for Streaming Data Analysis



SIRIUS' role

- Researchers that can use the shared data.
- Tools and approaches that open up the shared data.
- A non-competitive and pre-competitive forum for sharing of data and information about data

Contact SIRIUS

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