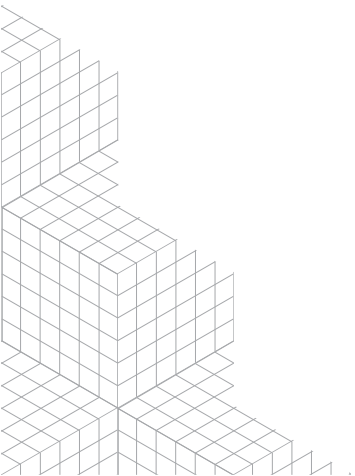
Optique™

Enabling End User Access to Big Data in the O&G Industry

Johan W. Klüwer (DNV) and Michael Schmidt (fluidOps)

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SEVENTH FRAMEWORK
PROGRAMME


SIEMENS

Statoil


fluid
Operations


DNV


UNIVERSITAS OSLOENSIS
MDCCCXI


UiO : University of Oslo


UNIVERSITY OF
OXFORD


TUHH
Technische Universität Hamburg-Harburg


SAPIENZA
UNIVERSITÀ DI ROMA


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


HELLENIC REPUBLIC
National and Kapodistrian
University of Athens

Paradigm Shift for Data Access

Budget:
13 800 000 €

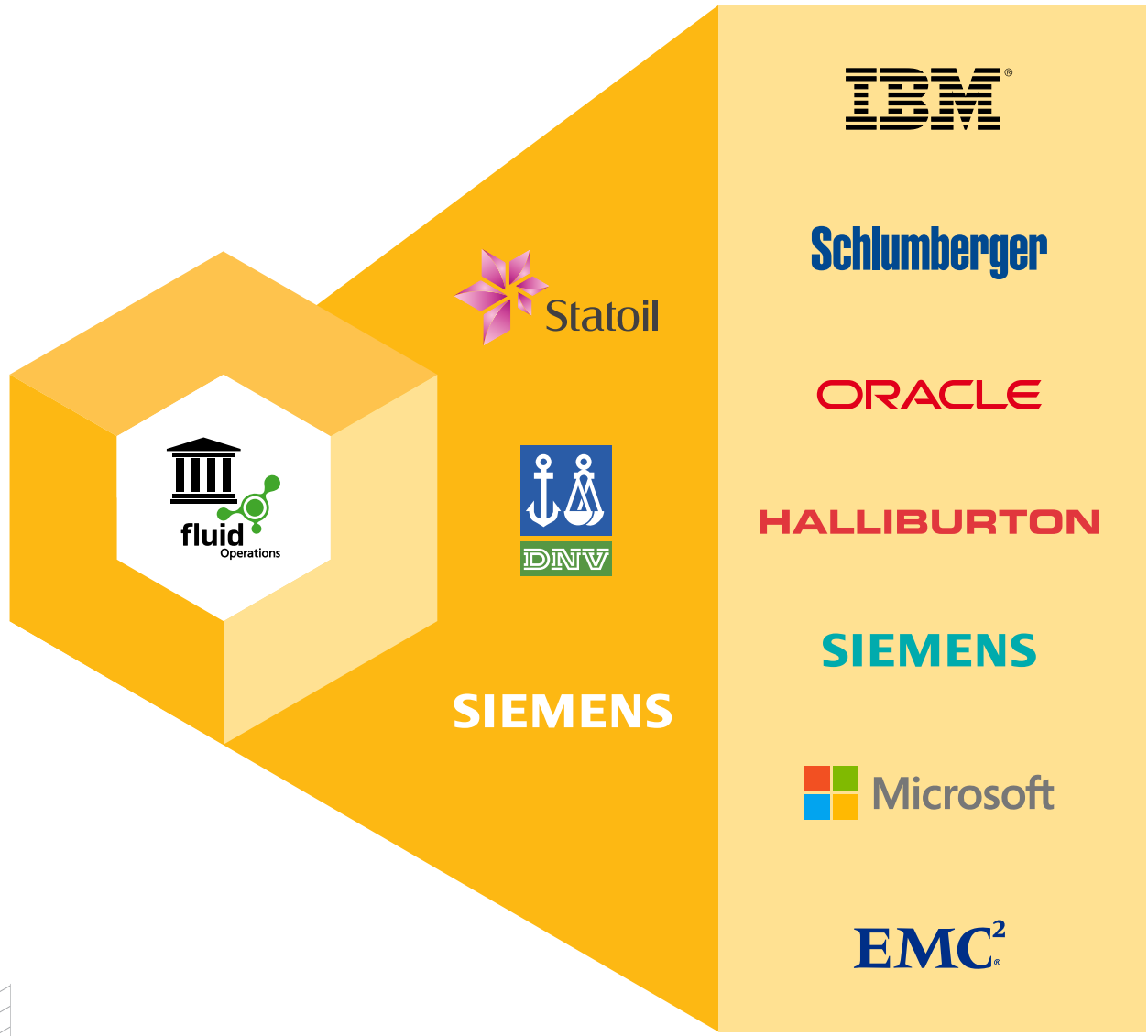
Running until
November
2016

10 partners
5 countries
100 man years

FP7
Large-scale
IP project

- O&G Big Data challenges
- The Optique mission
- Use case at Statoil Exploration
- O&G expert access to Big Data

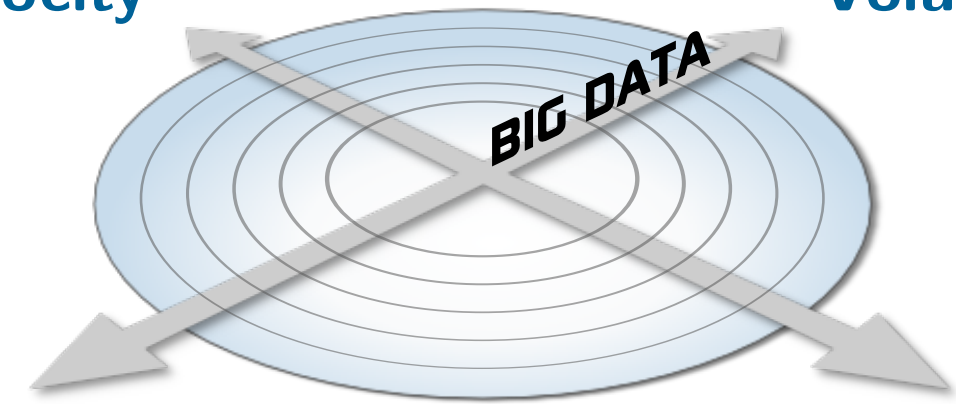
The Optique **Ecosystem**



Big Data Challenges

Velocity

Volume



Variety

Complexity

O&G Information Challenges

Complexity drivers:

- Many disciplines
- Many locations
- Requirements – standards, regulations, customer demands
- Asset management – lifecycle data

Data storage and access mechanisms:

- Proliferation of data formats and models
- Application dependent data
- Limited tools for end users

O&G Disciplines

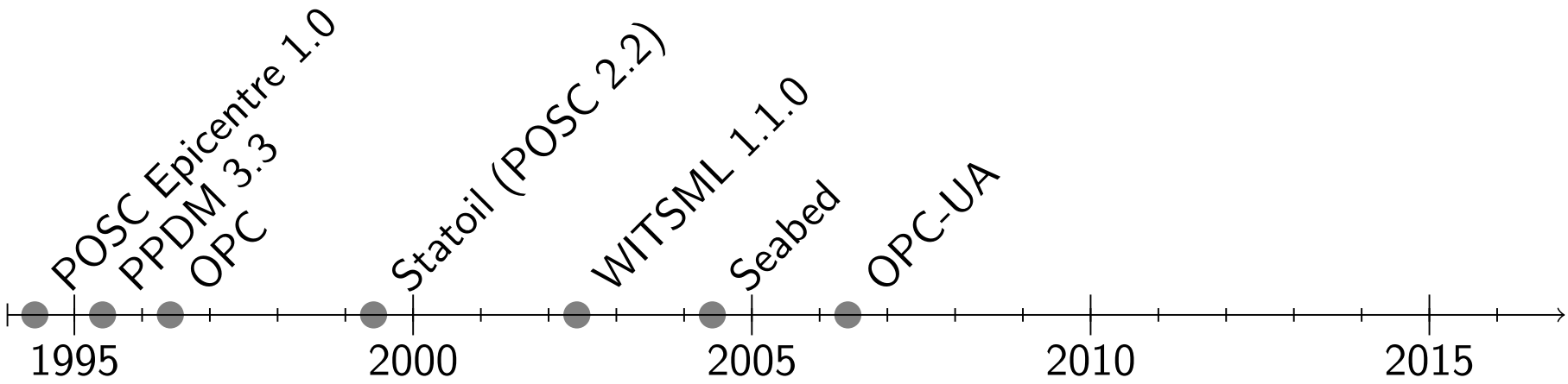
Administration
Procurement
Civil/architect
Drilling
Electrical
Project control/economy
Geology
HVAC
Instrumentation/metering
Marine operation
Inspection
Piping/layout
Material technology
Structural
Operation
Process
Quality management
Mechanical
HSE
Telecommunication
Subsea
Weight control
Reservoir
Pipeline

(NORSOK, 1996)

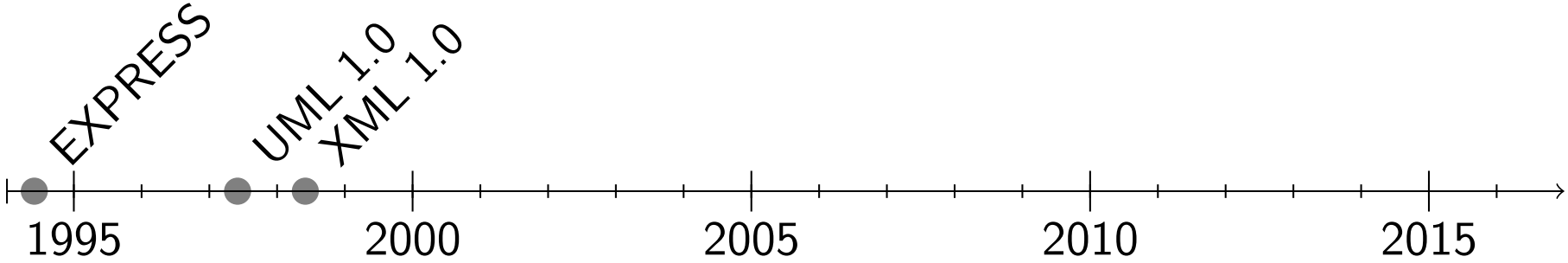
Top-down Perspective
on O&G Corporate Data

Promote uniformity across the enterprise.

- Production of information
- Use of information
- Hand-over of information



Technologies



Experts are *still* struggling
with spreadsheets and
ad hoc filters/look-up tables.

The O&G **Expert vs. SQL**

"A quite common situation in several or all my projects so far, I've had the need to check and cross check data which in our current tool was quite difficult, perhaps combine the data between tables and hopefully not having to do it in Excel all the time.

However, the program had an option to do SQL based searches. As few or none of the engineers know SQL coding, I had the IT support or system support make me the SQL string that was needed in order to make a specific search, and I then copied it into a text field so that I could use it later or try to modify it.

This is quite common for several of my engineers in similar positions as I had."

Experts spend too much time collecting data

Bottom-up Perspective
on O&G Corporate Data

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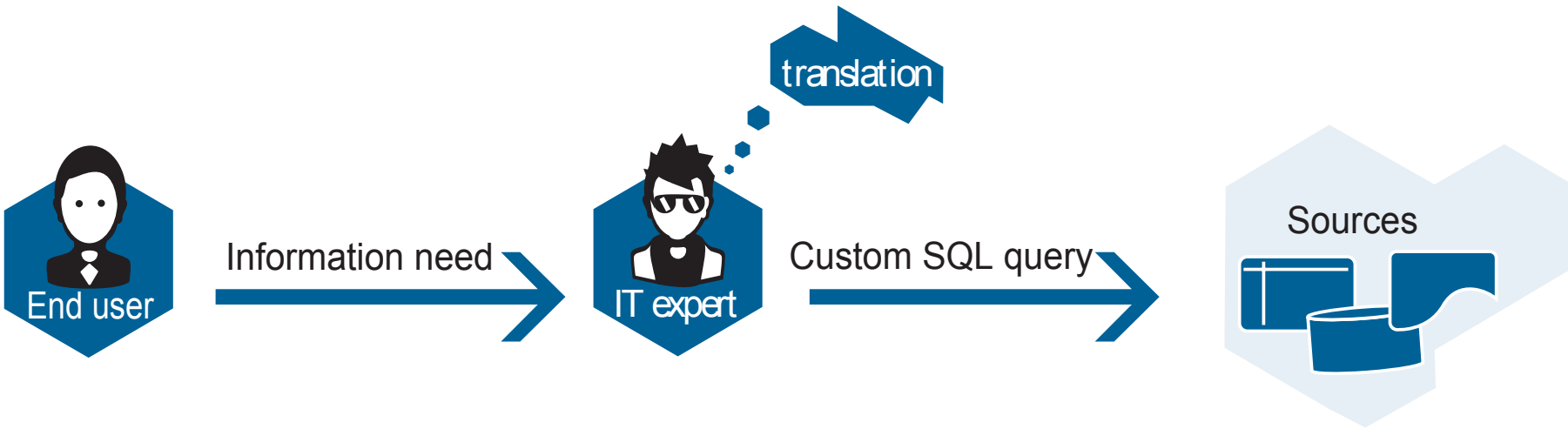

- IT staff become critical engineering project resources

Use Case at Statoil: **Stratigraphy**

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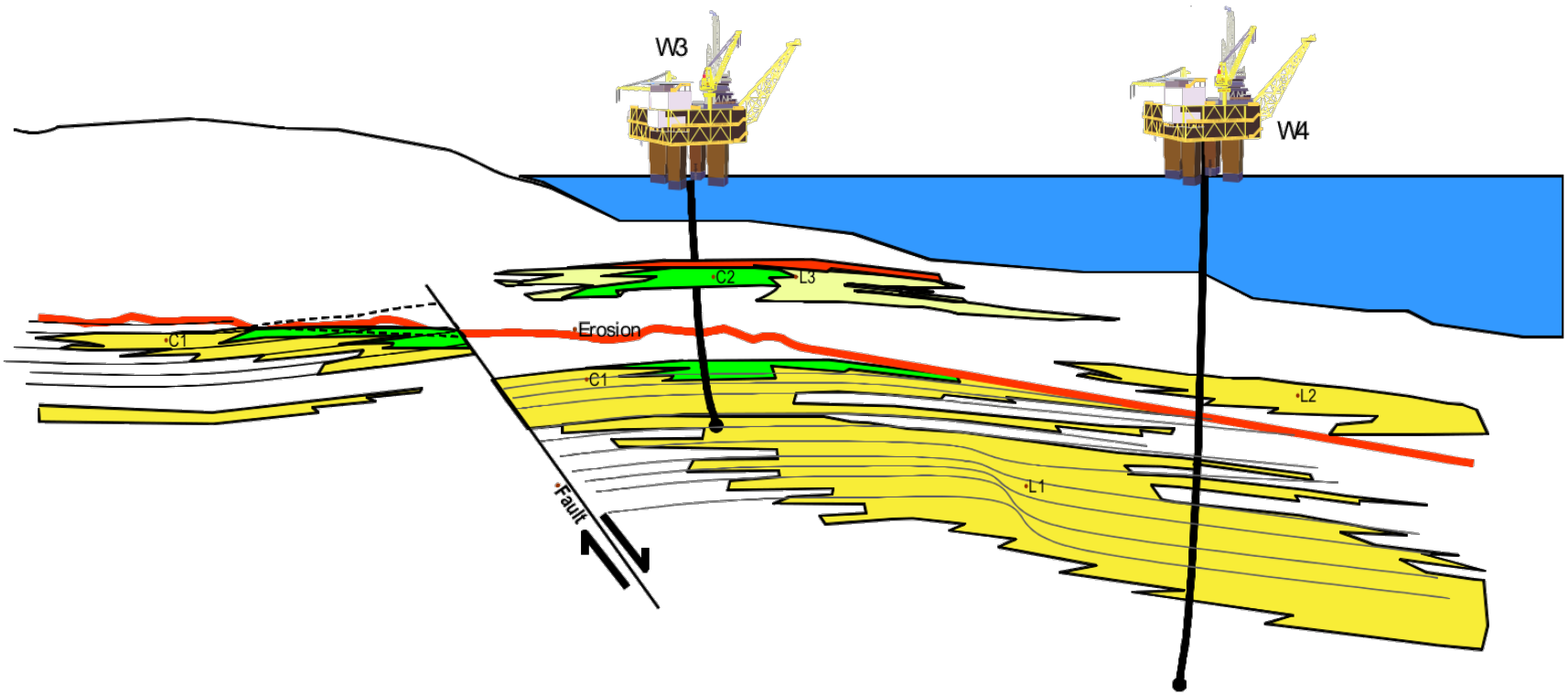

"In my area of interest, return the wellbores that penetrate chronostrat unit C1 and return information about the lithostratigraphy and the hydrocarbon content ...in the wellbore interval that penetrates the C1 unit."

fluid Operations

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From Prospects to Projects in a **Data-driven Process**

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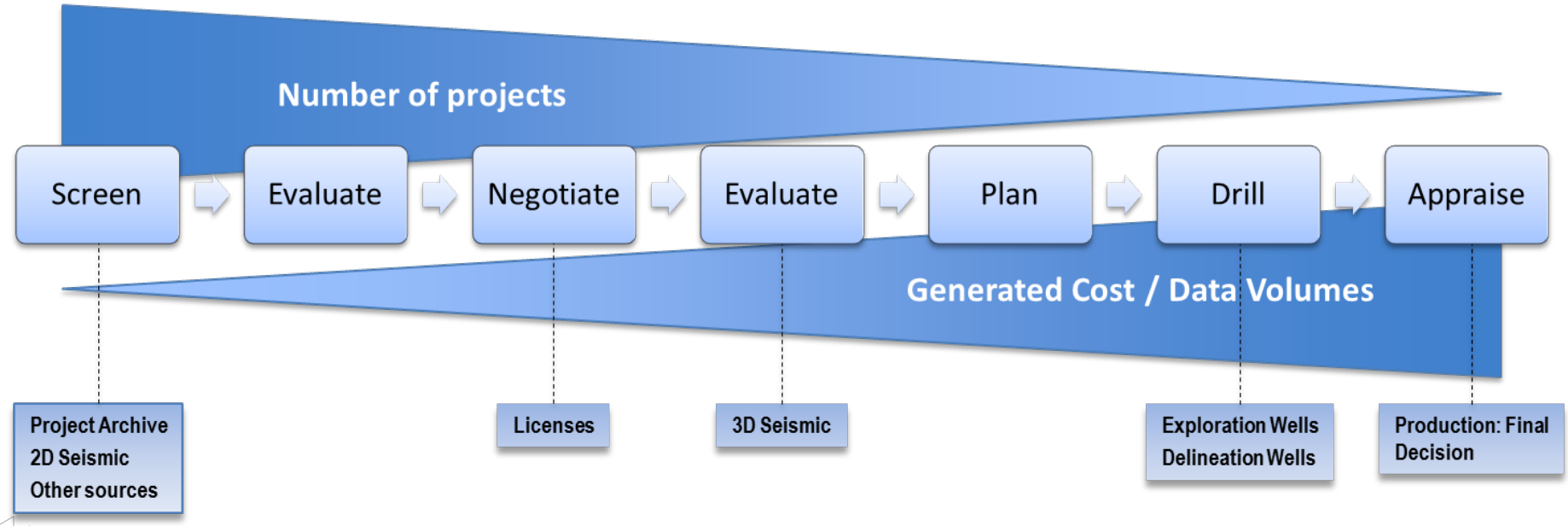

GIS Datasets from Corporate Archive

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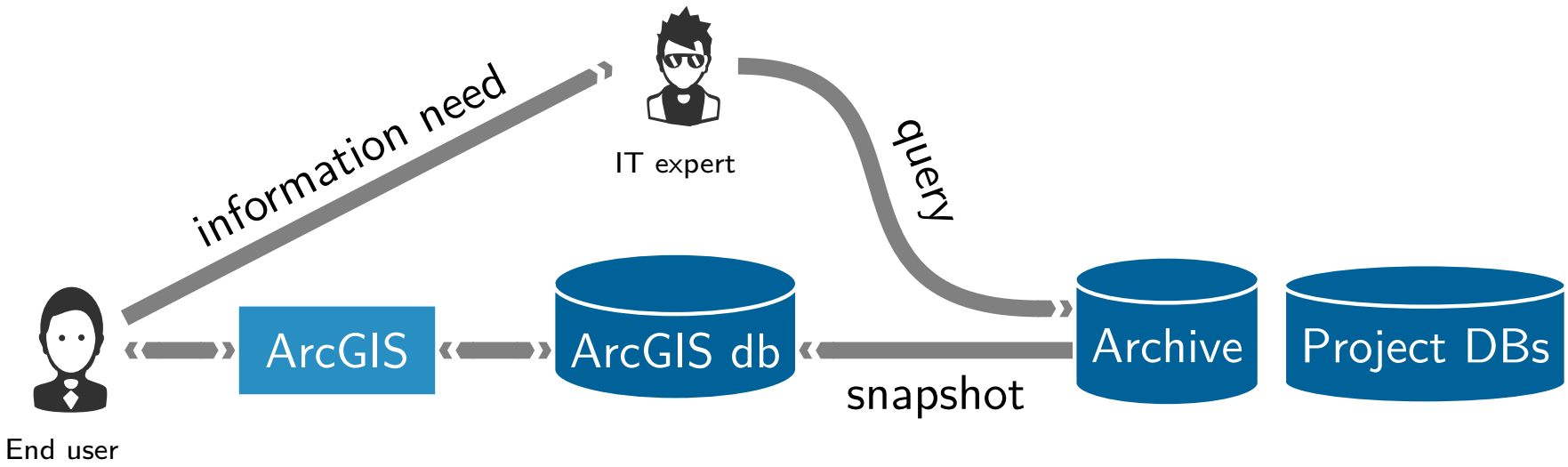
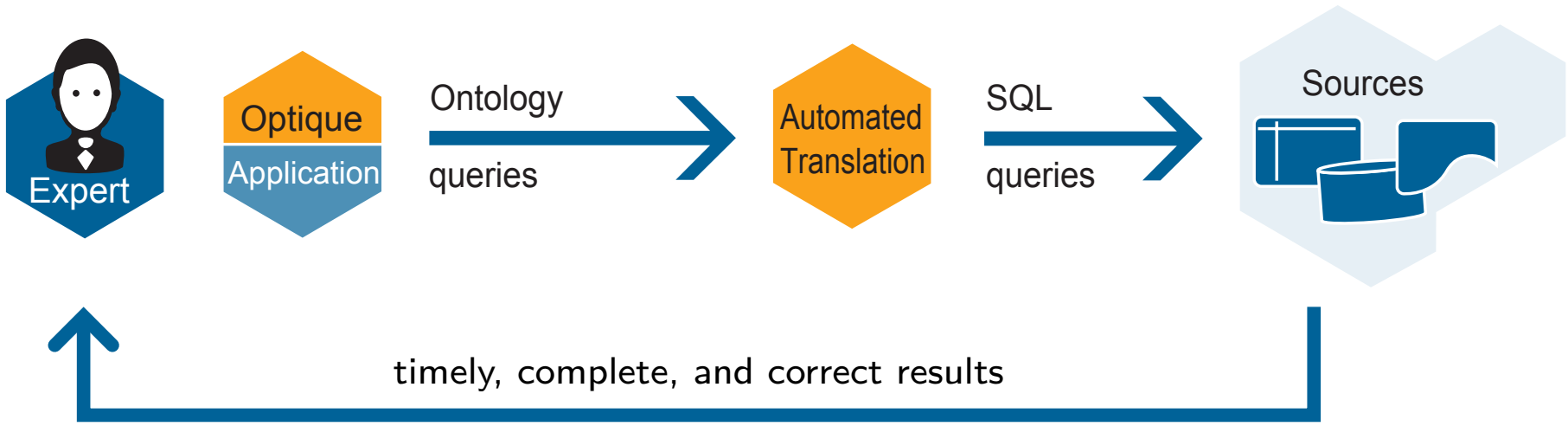
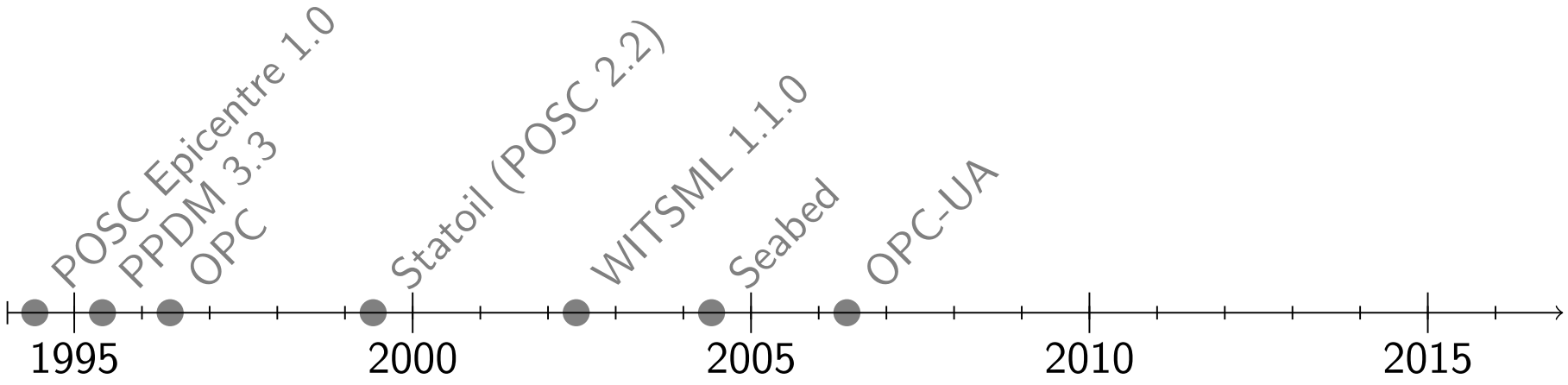


- Query development may take several days
- Including other sources in queries is difficult/impossible

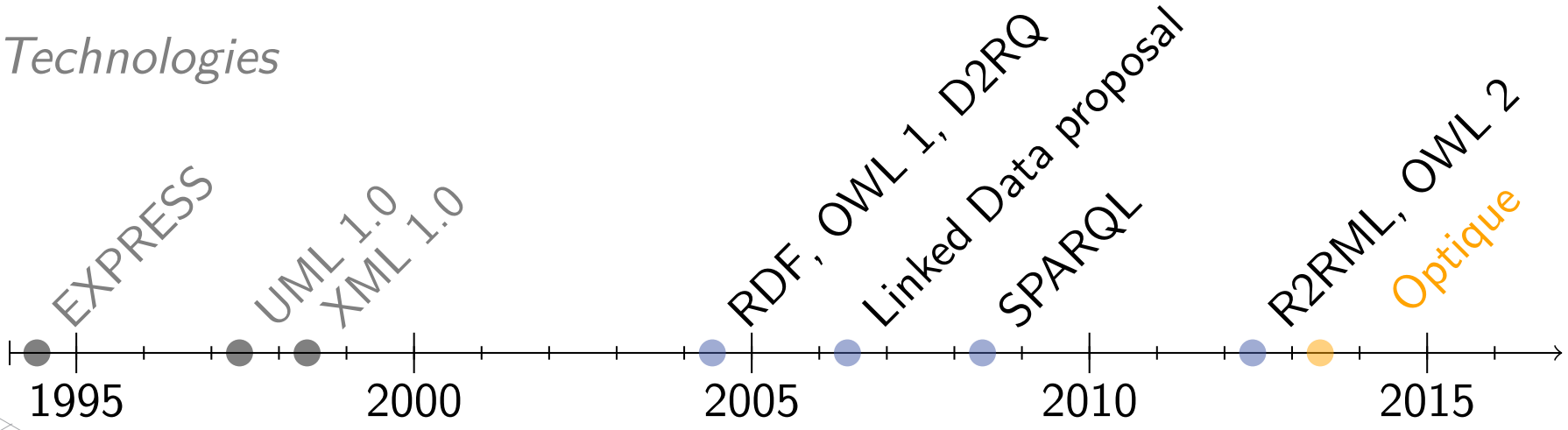
New **Expert Friendly** Interface



Emerging **Semantic Technologies**



Technologies



Existing **Systems and Sources**

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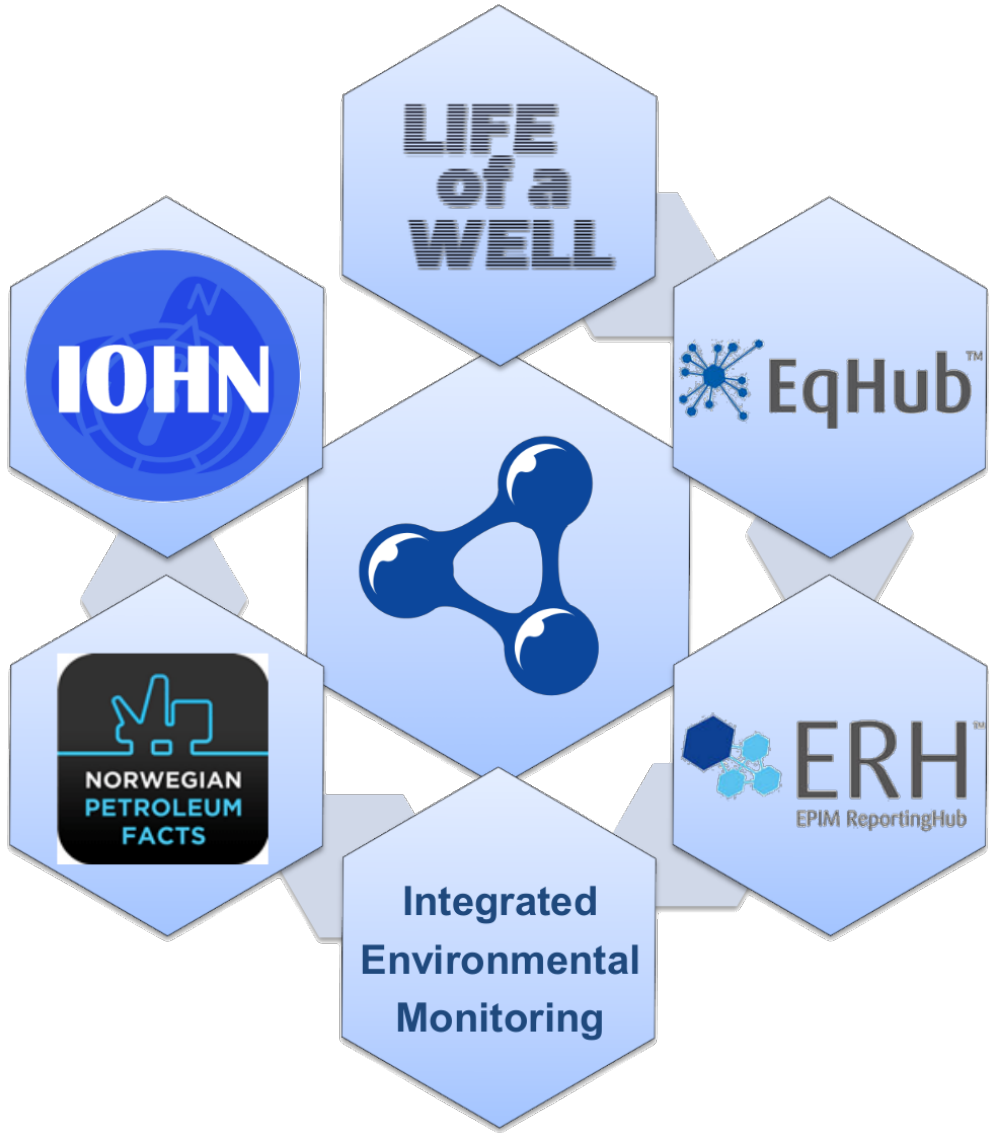


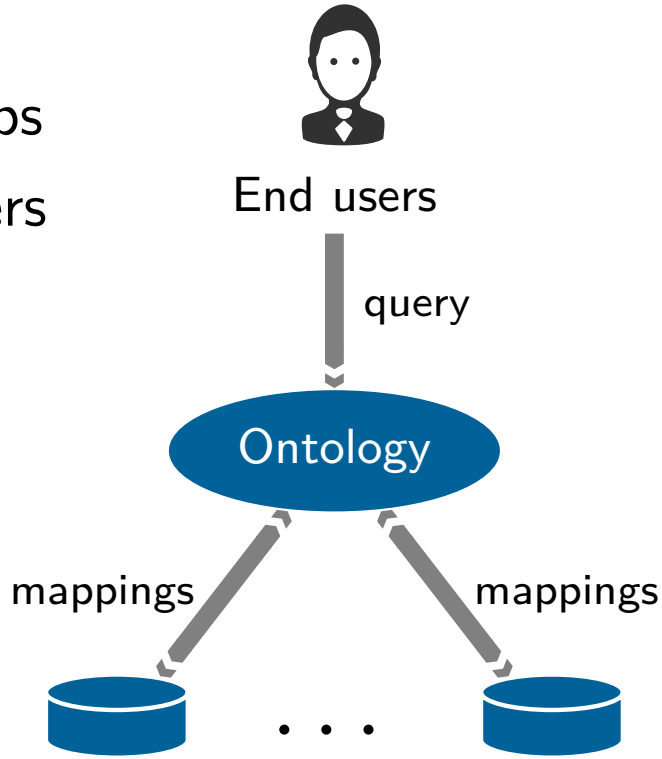
Ontology-based Data Access (OBDA)

Ontology:

- Knowledge of concepts and relationships
- Understandable by humans & computers
- Integrating multiple domains

Mappings:

- View data through the ontology



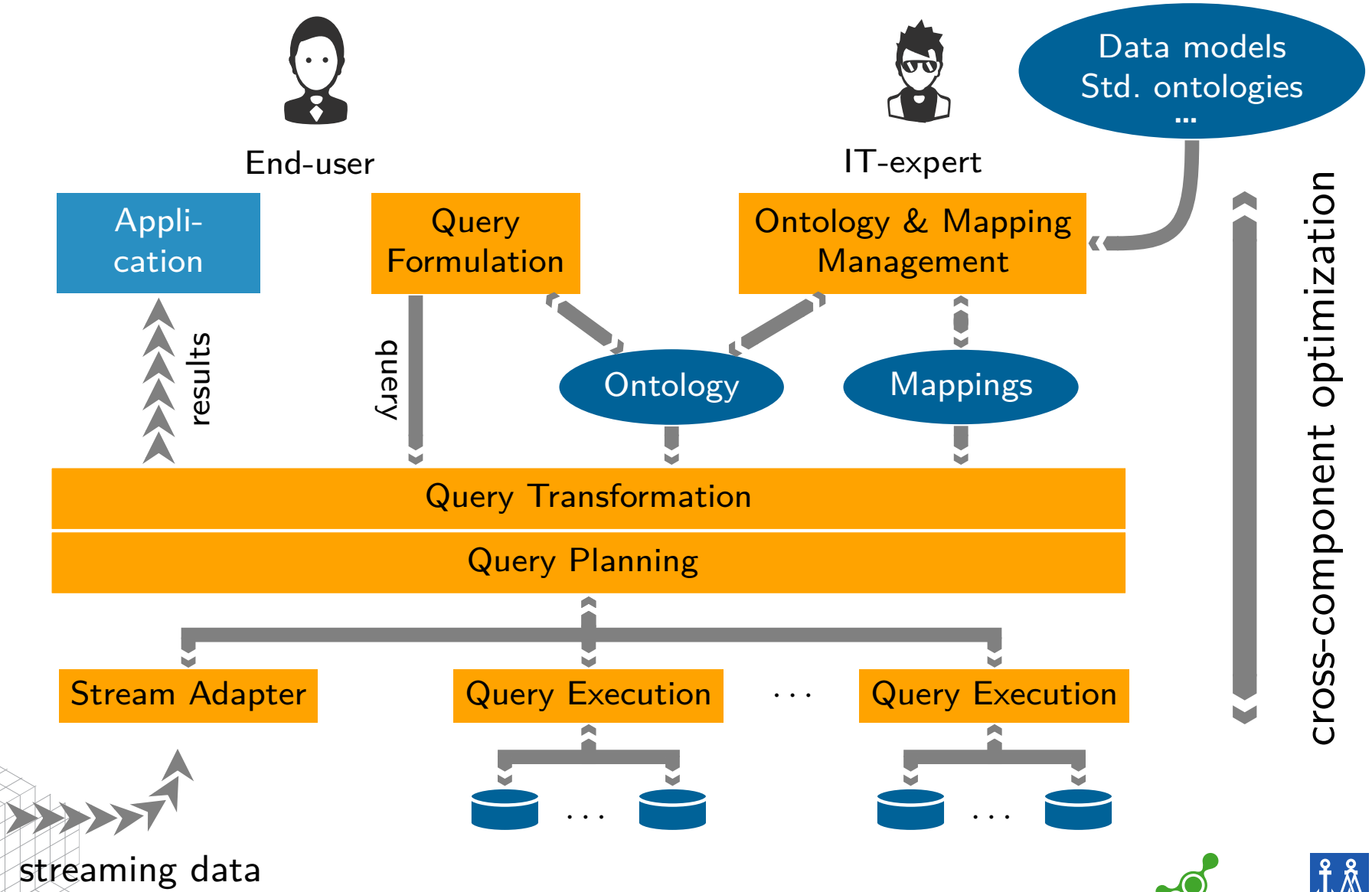
Ontologies at O&G Complexity are now **Practical**

- Mature tools for building and verifying ontologies
- Exponential improvement in reasoner efficiency

Year	$\mathcal{O}$**-size**	**Complete**	**Time (s)**
1995	3k	No	10^5
1998	3k	Yes	300
2005	30k	Yes	30
2010	400k	Yes	5

(Horrocks 2012)

Optique Architecture



Optique Architecture **Zoom-in**

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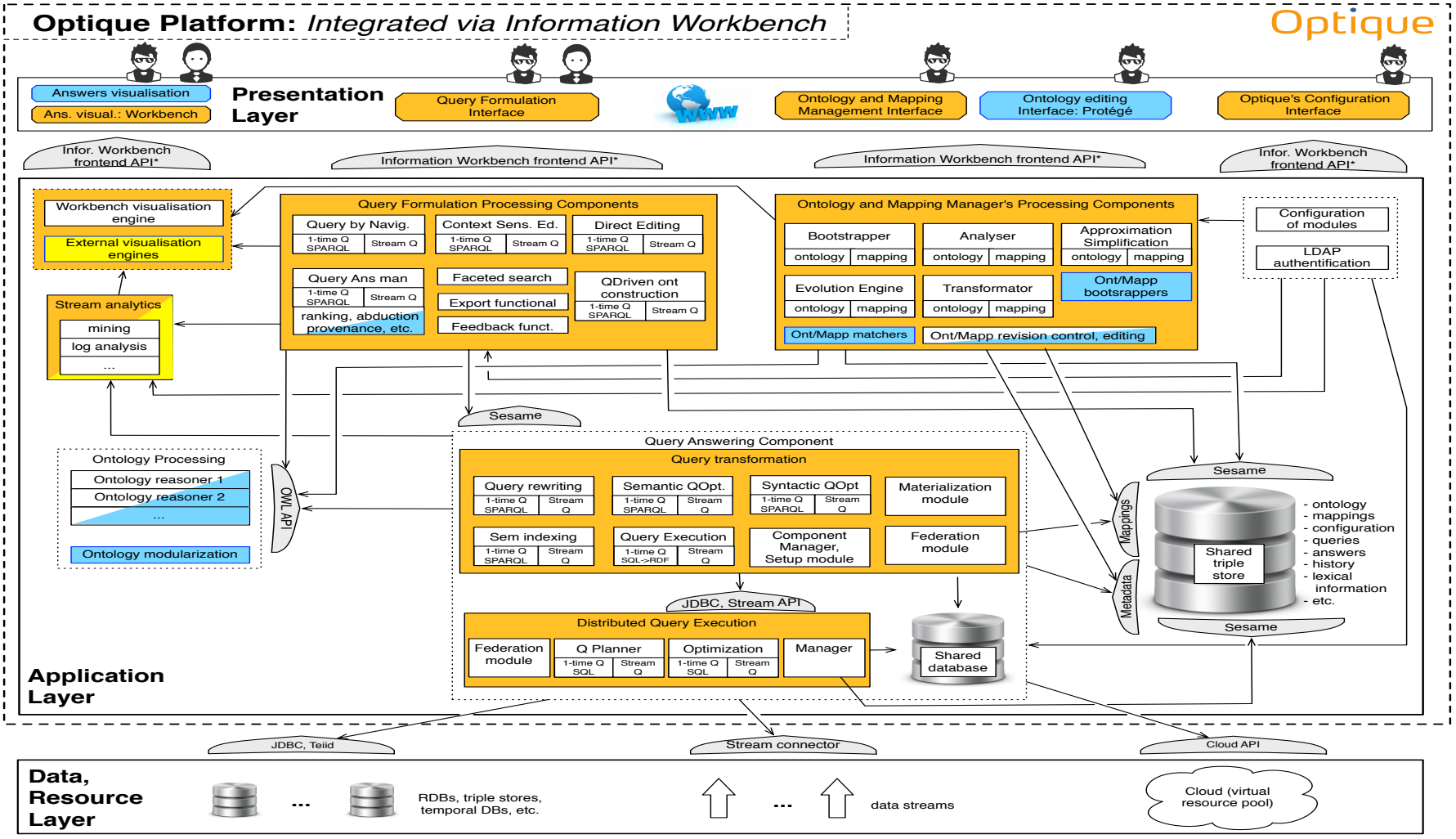

* E.g., widget development, Java, REST

fluidOps Platform Integration

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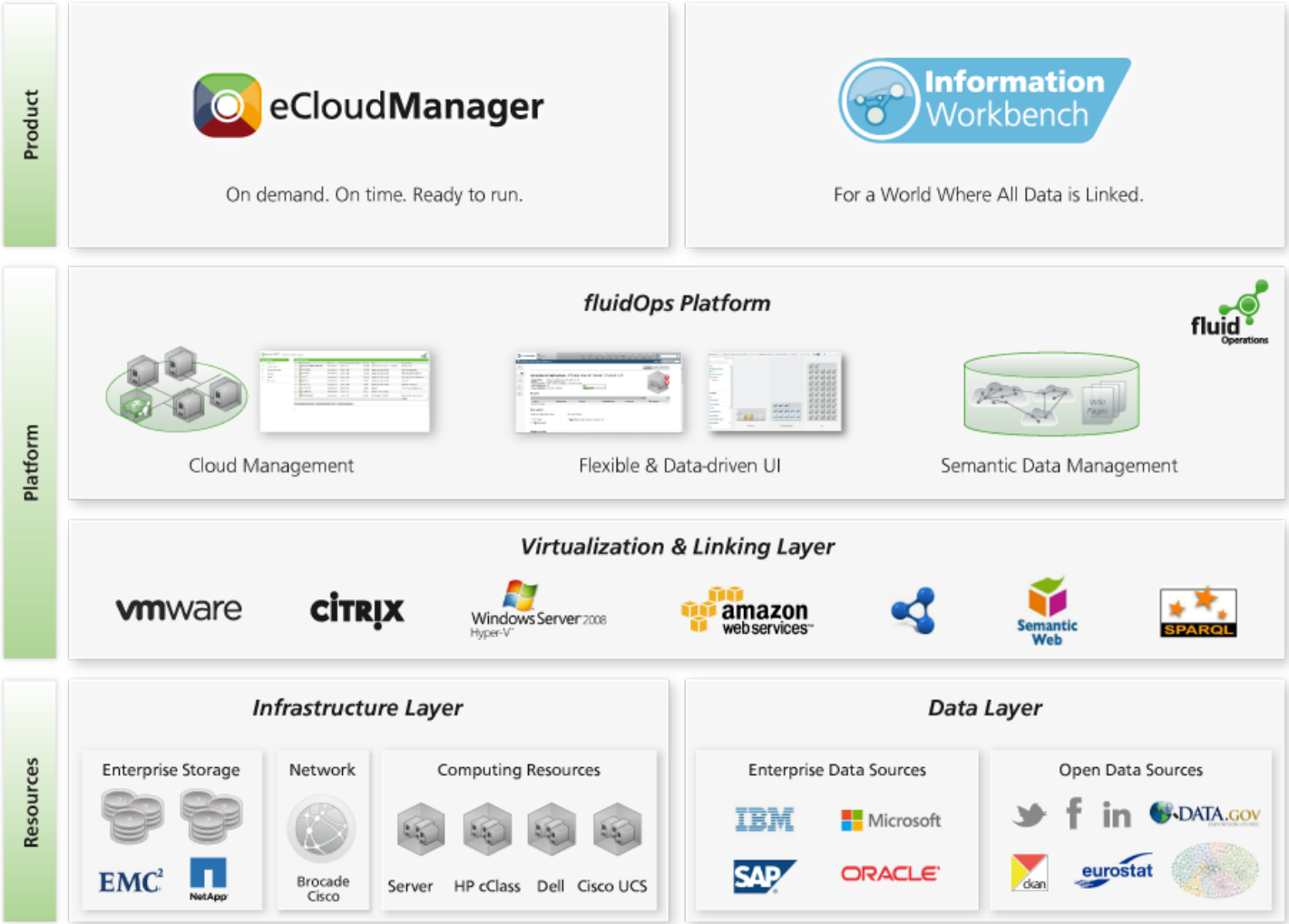

fluid Operations

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Incremental Implementation

- Build on the data you have today
- Leverage processing power of existing systems
- Engage people to develop knowledge and capabilities

Optique **Partner Programme**

Optique **Benefits**

Optique introduces new *technology* and new *ways of working*.

- More efficient enterprise knowledge workers
- More efficient IT operations
- More efficient enterprise information management

Optique™

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