

Ontology-based Data Access: Theory and Practice

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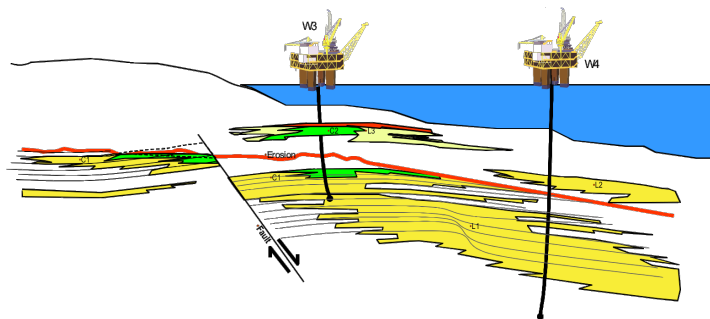
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<http://ontop.inf.unibz.it/ijcai-2018-tutorial>

- Oil & Gas: Statoil [Kharlamov et al. 2017a]
- Turbine Diagnoses: Siemens [Kharlamov et al. 2017b]
- Cultural heritage: EPNet project [Calvanese et al. 2016]
- Maritime security: EMSec project [Brüggemann et al. 2016]
- Manufacturing: Case study [Petersen et al. 2017]
- Health care: electronic health records [Rahimi et al. 2014]
- Public debt: the Italian Ministry of Economy and Finance [Antonioli et al. 2014],
- Smart cities: IBM Ireland [López et al. 2015]
- Development of data integration solutions: SIRIS Academic SL Barcellona
- ...

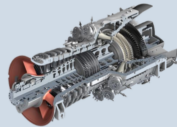
- Optique use case partner
- Exploration domain: analyse existing relevant data in order to find exploitable accumulations of oil or gas
- Improve the efficiency of the information gathering routine for geologists
- Efficient, creative data collection from multiple large volume data sources



- Optique use case partner
- Siemens energy department
- streaming and temporal data

- **Siemens**

- produces huge appliances, e.g., turbines
 - installs them in plants



- **Siemens service centers**

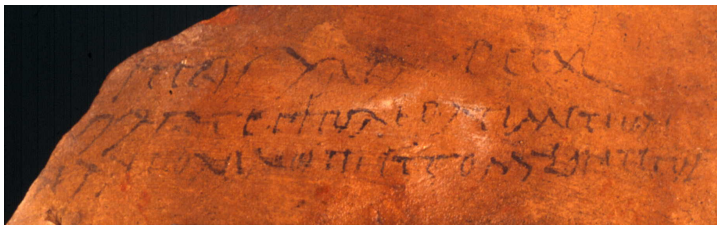
- offers constant monitoring and diagnostics service
 - over 50 service centers world wide
 - each SC is responsible for several thousands appliances
 - their job: monitoring and diagnostic of turbine

- **Monitoring and diagnostic tasks**

- reactive and preventive diagnostics
 - offline, after an issue is detected
 - predictive analyses
 - real-time, to avoid issues



- Ontology-based data integration for humanities and archaeologists
- ERC advanced grant EPNet “Production and distribution of food during the Roman Empire: Economics and Political Dynamics”.
- Linking three datasets:
 - 1 the EPNet relational repository
 - 2 the Epigraphic Database Heidelberg
 - 3 the Pleiades dataset



- EU FP7 Melodies project: working with Open Data, 16 partners.
- Geospatial extension Ontop-spatial used for accessing geospatial data
- Use cases: urban development, land management, disaster management

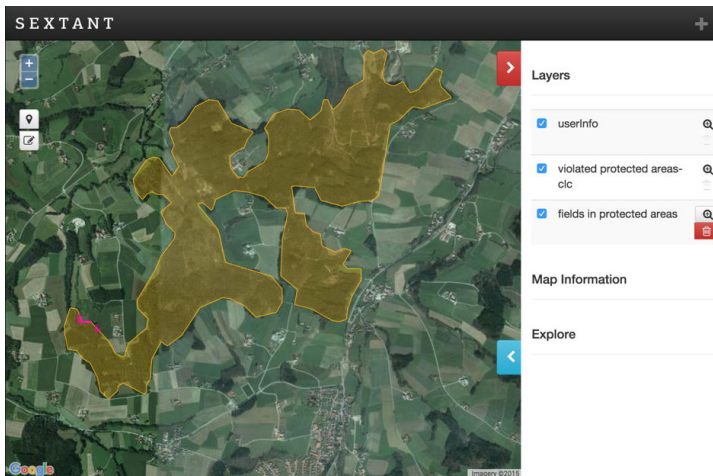


Figure: Visualization of violated protected areas in land management

- German BMBF project EMSec, collaborated with Airbus:
- real-time services for maritime security
- Geo-spatial support by Ontop-spatial (developed as a fork of Ontop)
- SPARQL federation to access different kinds of data sources:
 - SPARQL endpoints of Ontopover *in situ* data
 - open SPARQL endpoints: Geonames, DBPedia



- [1] E. Kharlamov et al. "Ontology Based Data Access in Statoil". In: *J. of Web Semantics* 44 (2017), pp. 3–36. DOI: 10.1016/j.websem.2017.05.005.
- [2] E. Kharlamov et al. "Semantic Access to Streaming and Static Data at Siemens". In: *J. of Web Semantics* 44 (2017), pp. 54–74. DOI: 10.1016/j.websem.2017.02.001.
- [3] Diego Calvanese et al. "Ontology-based data integration in EPNNet: Production and distribution of food during the Roman Empire". In: *Eng. Appl. of AI* 51 (2016), pp. 212–229.
- [4] Stefan Brüggemann et al. "Ontology-based data access for Maritime Security". In: *Proc. of ESWC*. 2016.
- [5] Niklas Petersen et al. "Realizing an RDF-Based Information Model for a Manufacturing Company - A Case Study". In: *International Semantic Web Conference (2)*. Vol. 10588. Lecture Notes in Computer Science. Springer, 2017, pp. 350–366.
- [6] A. Rahimi et al. "Validating an Ontology-based Algorithm to Identify Patients with Type 2 Diabetes Mellitus in Electronic Health Records". In: *Int. J. of Medical Informatics* 83.10 (2014), pp. 768–778.

- [7] N. Antonioli et al. “Ontology-based Data Management for the Italian Public Debt”. In: *Proc. of FOIS*. IOS Press, 2014, pp. 372–385.
- [8] V. López et al. “Data Access Linking and Integration with DALI: Building a Safety Net for an Ocean of City Data”. In: *Proc. of ISWC*. Vol. 9367. LNCS. Springer, 2015, pp. 186–202.