

OWL: An Integration & Analysis Hub for O&G IT

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General William Tecumseh Sherman

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"If I owned Hell and Texas,
I'd live in Hell and rent out
Texas."

Early industrial adopters include

- HCLS
 - heavy users of ontologies, including OWL
 - at least one novel scientific discovery w/ OWL already
- Financials: we think future is *very bright*, ironically:
 - OWL loves policy & regulatory apps
 - automated compliance checking, forensics
- Defense
 - OWL for integration across product lifecycle
 - Decision support & analysis apps (UAV planning)
- Enterprise IT
 - a laggard, but coming around slowly

What is the view globally?

- The EU is ahead and pulling away:
 - EU is ahead of the world and investing *heavily* in semantics
 - Defense is a special case
 - small startups (!!) -- a historic reversal
 - Far ahead in "heavy industry"
 - EU centralized funding ([FP7](#), currently) matters
- US is uncertain, though there are some signs of life:
 - HCLS is probably world leader; but really LS dominated
 - [Oracle's OWL](#) product *is crucial*
- China and Japan are mixed
 - China doing cutting-edge CS (including OWL) now
 - Japan leading in "digital cities", ubiquitous & small device apps

What about "heavy" industry?

- Lags behind other front-line industries w/r/t SW adoption
- Signs of change:
 - [ISO 15926](#) & [POSC Caesar](#)
 - Product Modeling Ontology ([PMO](#)) from SWOP (FP6)
 - this workshop
- Analogues in associated industries:
 - BIM (Building Information Modeling); see, e.g., [NBIMS](#)
 - Model-based Systems Engineering in manufacturing; see <http://mbse.sysmod.de/>
- These are *precursor* technologies: they will lead to SW adoption because of technical needs & "network effect"

Answering two questions...

What are we all doing here? I assume we're trying to see:

1. if there's enough "fit" between O&G and SW to make a match, and
2. if so, is there anything W3C can do to help

So:

1. What sorts of IT problems is Semantic Web technology especially well-suited to solve?
2. What sorts of IT problems do O&G companies have?

What is SW tech good for?

1. Information Integration

- abstract, declarative, high-level knowledge formalisms
- to enable, in a standardized & web-friendly way, integration of data *models* rather than data *sources*
- with computational & logical guarantees & properties:
 - logical consistency, automated alignment & fusion
 - automated explanations, biz rules, high-level query

2. Decision Support & Analysis

- represent complex problem domains in machine-readable form via ontology modeling
- use existing tools & custom code to build analysis apps

3. Integrating (1) and (2)...The "hub" idea...

Integration & Analysis

- Simply put, the more integration you do, the more analysis you *can* do
- The more analysis you do, the more integration you *must* do
- The NASA workforce analytics example:
 - Analysis needs (locate experts) fueled integration
 - which makes possible additional analysis (career planning)
 - requiring additional integration
 - etc etc etc
- We've seen this pattern repeated in HCLS, defense, financial, enterprise IT, etc.

Does O&G IT do any of this?

- Looking at ISO 15926, talking to people in O&G IT, and looking at the papers in this workshop...
- O&G IT face integration, analysis, configuration management, optimization problems at large scales, both of data and conceptual complexity, of the sort that other industries increasingly turn to SW tech to address
- In short: yes!

Next Steps

- Many possibilities, some of which require W3C help
- C&P focuses on [OWL infrastructure tools](#) particularly delivering value using automated reasoning & inference
- Requires serious commitment to standards
- [OWL 2](#) contains some "new stuff" that is O&G relevant:
 - improved expressivity, limited datatype reasoning
 - [profiles](#), especially OWL 2 RL, OWL 2 QL
 - annotations as an extension mechanism
 - OMG/UML interop & cooperation
- Till the next round of standardization:
 - [integrity constraints](#), fine-grained closed world reasoning
 - more equational reasoning, datatype reasoning:
 - temporal, spatial, units & quantities
 - description graphs for part-whole relations

- License OWL and other Semantic Web components for use in commercial products & in-house apps
- Build in-house apps for Fortune 500 customers & govt
- More information: kendall@clarkparsia.com or <http://clarkparsia.com/>