Using Semantic Web Technologies in Open Applications

Presented By: Dr. Manoj Dharwadkar
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Agenda

- Current Situation
- ISO 15926 and Semantic Web Technologies
- Bentley’s Vision of Open Applications
  - OpenPlant set of Products
  - Architecture and OpenPlant Schema
- Bentley Class Editor and ISO 15926 RDS/WIP Connection
- Next Steps and role of W3C for Oil and Gas Industry
Current Situation

- IDS-ADI Projects are producing methodology and basic software tools to accelerate ISO 15926 implementation
- RDS/WIP 1.0 established leveraging rapidly evolving Semantic Web Technologies
- Technology Developers need to implement these standards into their products
- Wide adoption of core Semantic Web Technologies in Oil and Gas Industry is required
ISO 15926 and Semantic Web Technologies

• Core problems ISO 15926 is trying to solve
  – Model the asset lifecycle information
  – Extract information from existing native formats
  – Convey information across globally distributed points
  – Verify the information at multiple conversion points

• ISO 15926 evolving alongside W3C standards

• Lifecycle information models can now be represented and implemented using Semantic Web technologies
Evolution of ISO 15926 alongside W3C

Data Model Representation

Internal OWL

External OWL

Grammar/Data Model

Templates

OWL

RDF Schema

Part2

RDF

XML Schema

Express

XML

ISO 15926

W3C
Bentley: *Sustaining Infrastructure*

Our mission is to provide solutions to Design – Build – Operate the world’s infrastructure with the goal of:

- Sustaining our society
- Sustaining the environment
- Sustaining the profession
Serving Distributed Enterprises

The business of infrastructure entails distributed enterprises.
A Strong Global Company

- 24 years of growth and stability
- 2,500+ employees, 80 offices, 40 countries
## Bentley Product Portfolio

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Bentley’s Vision of Open Applications – OpenPlant™

- Data interoperability using Industry Standards
- Common ontology - fundamental part of the software application
- OpenPlant™ set of products is software designed for the distributed world
  - uses ISO 15926 Reference Data natively for application content
  - lets engineers quickly access and share data, facilitating collaboration in an open environment
  - provides complete, consistent and correct data throughout the plant lifecycle
Interoperability Architecture and OpenPlant Schema
Bentley Class Editor and the ISO 15926 RDS/WIP Connection
ISO 15926 RDS/WIP

- Single global source for reference data
- Contains standardized product models
- Extensible
- The “inbox” for ISO
- Anybody can browse
- Certified user can extend
- All entries are permanent
- Includes browser and SOA interfaces
Bentley Class Editor supports ISO 15926

- ISO 15926 dictionaries
- Engineering Friendly
- View of Reference Data
- Information model building
- Simplified mapping interface
- Differencing
- Extensible
Overview of Bentley Class Editor
RDS/WIP Connection

- RDF Triple Store
- PHP - RAP
- SPARQL protocol for RDF implementation using WSDL 1.1

ISO 15926 RDS/WIP 1.0

Bentley Scope

IDS-ADI Scope

SPARQL Query

Internet

SPARQL Query Result

Bentley Class Editor
RDS Plug-in
RDS Proxy
Bentley Class Editor and the ISO 15926 RDS/WIP Connection

- Demonstration
Role of W3C for Oil and Gas Industry

• Consider use cases from Oil and Gas industry while developing new W3C standards:
  - Each standard term used by the industry should have at least one URI. Multiple URIs for same term must be harmonized (owl:SameAs).
  - RDF/OWL should be able to support all aspects of asset lifecycle modeling needs:
    • Temporal aspects – how to determine Car was red from Jan 08 to July 08?
    • Templates – Composite and Aggregate Relationships
  - Issues related to exposing information to all project participants
    • Security and Access Control
  - Issues related to accessing data from multiple sources
    • Origin, Context, Ownership, History
Role of W3C for Oil and Gas Industry

- Assist Oil and Gas industry in accelerating adoption and implementation by
  - Working closely with the large Core Technology providers to rapidly provide tools supporting emerging protocols
  - Effectively communicating with the Oil and Gas community for timely resolution of implementation issues
  - Providing implementation and best practices guidelines
    - For effectively using query protocols – for e.g., when parts of data being queried is at different locations and has different ownerships
    - For mapping native concepts to URIs
    - For exposing the native system data as a triple store in a distributed manner and providing a SPARQL service for global access
Next Steps - iRING Bentley Components
Thank You

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