Ontology Summit: Making the Case for Ontology

Track2: Case Studies

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Value Spectrum

Ontology, semantics, and knowledge technologies benefit and add value across a very broad spectrum of applications:

- **Low-hanging fruit** — Applications exist with proven benefits, low risk, and real value that can be realized with off-the-shelf tools and solutions used by subject matter experts, business users, and consumers. Simple solutions to the right problem can bring great value.
- **Mainstream** — These applications that address bigger needs and have characteristics best addressed with knowledge-centric approaches. Case examples exist that show solution patterns delivering substantial value. Multiple providers of technologies (products, services) and services have expertise in these areas. These applications often involve:
  - Discovering, connecting, integrating and interpreting information of different kinds, from multiple sources, and at varying scales
  - Aggregating, connecting and orchestrating services, applications, processes, and families of systems
  - Modeling and automating decision rules and decision-making processes
  - Methodologies that realize value from different stages of the solution life cycle.
- **Cutting edge opportunities, tough problems, and grand challenges** — These cannot be solved with current information technology approaches. Problem characteristics, including issues of scale, systemics, autonomics, security, dynamics, extent and depth of knowledge, and complexity of reasoning as well as time and mission criticality, etc. demand capabilities only possible or economically feasible with knowledge technologies, semantics, and ontologies.

Case Studies

Smart Platforms, Smart Devices	*MillsDavis*	*Siri*
Integration of Multiple Systems from Multiple Companies	*YefimZhuk*	*Sallie Mae*
Standardization of Terms and Definitions for Financial Services	*MikeBennett*	*EDM Council*
Semantic Tech in Rental Product Marketing	*JimRhyne*	*Sandpiper*
Ontology and Rules provide rapid Natural Language Understanding	*ChuckRehberg*	*Trigent Software*
Ontology and Rules provide Mass Customization of Vehicles	*ChuckRehberg*	*Trigent Software*
Content Intelligence and Smart Applications	*GregBardwell*	*Innovative Query Inc.*
Semantic BI for Blogging	*GregBardwell*	*Innovative Query Inc.*
Valuing the Harvest from using Ontologies	*RalphHodgson*	*TopQuadrant*
Architectures and Ontologies for Business Value	*CoryCasanave*	*Model Driven Solutions*
Model-driven Framework for Process Deployment, eXtreme Traceability	*SanjivaNath*	*ZAgile*
Applying Semantics to Enterprise Systems - Proctor and Gamble Case Study	*DaveMcComb*	*Semantic Arts*
Ontologies and CRM for Telecoms	*BillGuinn*, *MikeLurye*, *SusanMacCall*	*Amdocs*

Framework

- Dimensions:
  - Functionality
  - Architecture
  - When Used
  - Who Using
  - What Ontologies
  - Problem Addressed
  - Benefit
- Applications Classification
  - Integration
  - Decision Support
  - Semantic Augmentation
  - Knowledge Management

Industry Sectors

- Financial Services
- Vehicle Rental
- Pharmaceuticals
- Telecoms
- Manufacture
- Legal
- Intelligence / Security
- Government Agency
- Technology Development

Use Cases

- Knowledge Management
- Knowledge extraction and search
  - Business intelligence
  - Threat detection
  - Research and Development
- Industrial and Business Applications
  - Manufacturing
  - Customer product selection
  - Customer Relationship Management (CRM)
- Technology Development
  - Use of ontologies within development process
  - Data integration
  - Integration with process, Service Oriented Architecture (SOA)

Ontology Notations and Applications

- OWL
- UML
- UML extensions in ODM (Ontology Definition Metamodel)
- Semantic Media Wiki
- SPARQL
- Natural Language Processing
- Proprietary triple stores
- Rules based systems
- Vocabularies

Presentation Methods

- OWL tools
- UML tools
- Wiki
- Visio and other graphical notations
- Custom interfaces
- Forms
- Natural language

Model theory: What's Modeled

- Business Conceptual Models
- Domain knowledge and research
- Logical data structures
- Technical development constructs
- Terminology (words)
- Business rules

Benefits / Metrics

- Stated benefits
  - Customer retention
  - Competitive advantage
  - Time to market
  - Threat detection
  - Corporate knowledge
- Some numeric metrics
  - Calls processing: 15% improvement
  - Development cost savings (before and after)

Value Models

- Identifying which of the Track 3 value models may apply in case studies:
  - Customer Satisfaction - YES
  - Actionable Business Intelligence - YES
  - Service Orientation – YES (as in SOA)
  - Complex Business Events & Workflows - YES
  - Collaborative Operations - YES
  - Interoperable Business Services
    - Indirectly via common ontologies across business units

Some Common Themes

- Extraction of information using common ontologies
  - From structured and unstructured data
- Managing combinational complexity
- Reuse of common ontology terms
- Ontology in the development process
- Corporate knowledge
- Terminology versus ontology

Case Studies: per Applications Classification

- Integration
  - Common ontologies across business units; industry standards
  - Ontology within development process
  - Integration with rules, process, SOA
- Decision Support
  - Availability of knowledge in knowledge bases
  - Call center case study
- Semantic Augmentation
  - Augmented search, customization, manufacture
- Knowledge Management
  - Research and Development
  - Knowledge extraction (structured and unstructured sources)

CASE STUDIES — QUICK SUMMARIES	
Resource	**Case Example**
Apple SIRI	Ontology-driven virtual assistant as a next generation assistance paradigm for smart consumer applications: Ontology-based UI focuses is on task completion, with intent understanding via conversation in context, and where the virtual assistant learns and applies personal information. Key roles for ontology include interface intelligence, unification of domain and declarative task models, semantic auto-completion, and service orchestration.
BeInformed	Smart knowledge-driven citizen-centric services — separate the know from the flow, data, and function; everything is a knowledge model and a business rule, no exceptions; business users create rules, application modelers create and configure services, administrators deploy applications. The design is the model, is the application, is the documentation. Fast, lean development; dynamic context-aware processes; operational savings; flexibility; and greatly improved life cycle economics
Cambridge Semantics	Do it yourself data exploration and analytics — a semantic collaboration platform for operational intelligence and advanced analytics; deploys rapidly, integrates with tools that professionals already use, and enable teams to quickly connect all of the data sources and model the workflow needed to and analyze data, investigate processes, and answer questions; empowering subject matter experts and business users leads to 2-10x improvement in time to solution plus flexibility to evolve it rapidly and cost-effectively.

CASE STUDIES — QUICK SUMMARIES	
Resource	**Case Example**
Connotate	Do-it-yourself semantic agents to discover, aggregate, analyze & report information; anything pointed to in a browser, you can teach a semantic agent to monitor and intelligently process. Agents “speak” HTML, XML, RSS, RDF, PDF, database and Excel. Mash-ups create new data by element and schema, in time periods, across sources and time periods, and put data into context. Productivity increases can exceed 2X.
Department of Homeland Security	(a) DHS infrastructure taxonomy; (b) Complex event modeling, simulation and analysis (CEMSA) Ontologies resolve semantic differences across sources of information and domains allowing reasoning and inference – to identify for example, for a given emergency situation, default actions, resources, roles/ responsibilities of relevant agencies.
EDM Council	Standardization of terms and definitions for financial services and a pilot test of the semantic resource as applied to mortgage-backed securities. Automated semantic tagging, indexing and systemic publishing of factual reference data is feasible systemically and vastly more consistent, accurate, and cost-effective than pre-financial meltdown processes. PIlot test demonstrates the viability of tagging financial contracts using standard semantics and identifiers in support of risk analytics.

CASE STUDIES — QUICK SUMMARIES	
Resource	**Case Example**
Franz | AMDOCS	Ontologies for telecom customer relationship management: Semantic technology enabled, closed-loop, self-learning system lets customer service see what happens, when it happens, understand what it means to the business, and take action and enforce business policy – automatically, intelligently and in business real time. Eliminated system and agent diagnosis time; decrease average handling time; improve agent and customer satisfaction.
IBM & U of Maryland	Dr. Watson Project — After Jeopardy, Watson goes to med school: Previous applications of expert systems and AI in medicine have been impressive, but limited. In the post-Watson era potential for broad enhancement of medical practice seems likely, if challenges can be overcome.
Innovative Query	(a) Content intelligence and smart applications; ontology integrates structured and unstructured information, improves search, discovery and collaboration; and filters information to user need and context. (b) Semantic BI for blogging: ontology used to semantically index information from structured and unstructured sources, both internal and external, enabling custom alerts, and more precise and rapid response to social media.
Mayo Clinic	Relationships among biomedical ontologies and classifications: Ontologies bridging and interrelating medical and scientific disciplines will play an integral role in the evolution of medicine from practice-based evidence to evidence-based practice.

CASE STUDIES — QUICK SUMMARIES	
Resource	**Case Example**
Model-driven Development	Architectures and ontologies for business value: Architectures and ontologies are mutually supportive.
Recognos Financial	Better information access with semantics for search, navigation, query & question answering — case example from the mutual fund industry: Concept-based, faceted navigation uses semantic analysis of content to reduce cognitive burden for users including extract specific data from tables (e.g., the amount of a specific type of fee). Question answering allows users to express questions in their own words and get the right answer. Automated semantic indexing and analysis is more consistent, accurate, and cost-effective than comparable manual methods. Since, 80% of all data in organizations is unstructured, semantic applications within government and industry are massive.
Revelytix	DoD knowledge-centric information webs & process interoperability: DoD attempted to build a data warehouse to connect HR systems and information across the Department. After 11 years and $1B dollars expended, had nothing to show for it. After everything else had failed, they decided to build a semantic **information web** to connect existing systems of record using a common domain ontology connected to relational mapping and source (metadata) ontologies. After 9 months (and very modest dollars expended), DoD demonstrated a solution.

CASE STUDIES — QUICK SUMMARIES	
Resource	**Case Example**
Sallie Mae	Integration of multiple systems from multiple companies: ontology provides unifying model across diverse systems while supporting tailored views and facets of this subject matter to different subject matter experts.
Sandpiper	Semantic technology in rental product marketing: ontologies power semantic search and search engine optimization to improve user experience and business outcomes.
Semantic Arts	Applying semantics to enterprise systems - Proctor and Gamble case study: Ontologies provide a practical way to integrate research findings across disciplines.
Top Quadrant	Valuing the harvest from using ontologies (a medley of case examples): Ontology used for enterprise vocabulary management, semantic-xml message building, data integration, and enterprise architecture. Graph data model (subject, predicate, object) provides canonical data for connecting data silos into information webs.

CASE STUDIES — QUICK SUMMARIES	
Resource	**Case Example**
Trigent Software	(a) Ontology and rules provide rapid natural language understanding; (b) Ontology and rules drive mass customization of vehicles -- Ontology and rules driven configurator and custom manufacturing process identifies best parts, assemblies, availabilities, and plant schedule to meet promised delivery date error-free. Fast rules engine handles 600K rules with average of 24 condition elements and can configure a truck in under 10 seconds on a laptop.
Visual Knowledge	Policy-driven compliance, risk, and change management pilot: captures regulatory mandates, maps them to policy documents, then to semantic models defining schemas, processes, and decision-making rules, to deployed operational systems and procedures, to analytics that track, assess, and report human and system behavior and ensure compliance.
zAgile	Model-driven framework for process deployment with extreme traceability: Executable knowledge models specify project goals, roles, methods, activities, deliverables, quality, and resources and enable tool interoperability, process automation, and end-to-end traceability at the level of individual concepts. Result can be up to 3-10X faster concept to deployment, with up to 3-10X reduction in project costs.