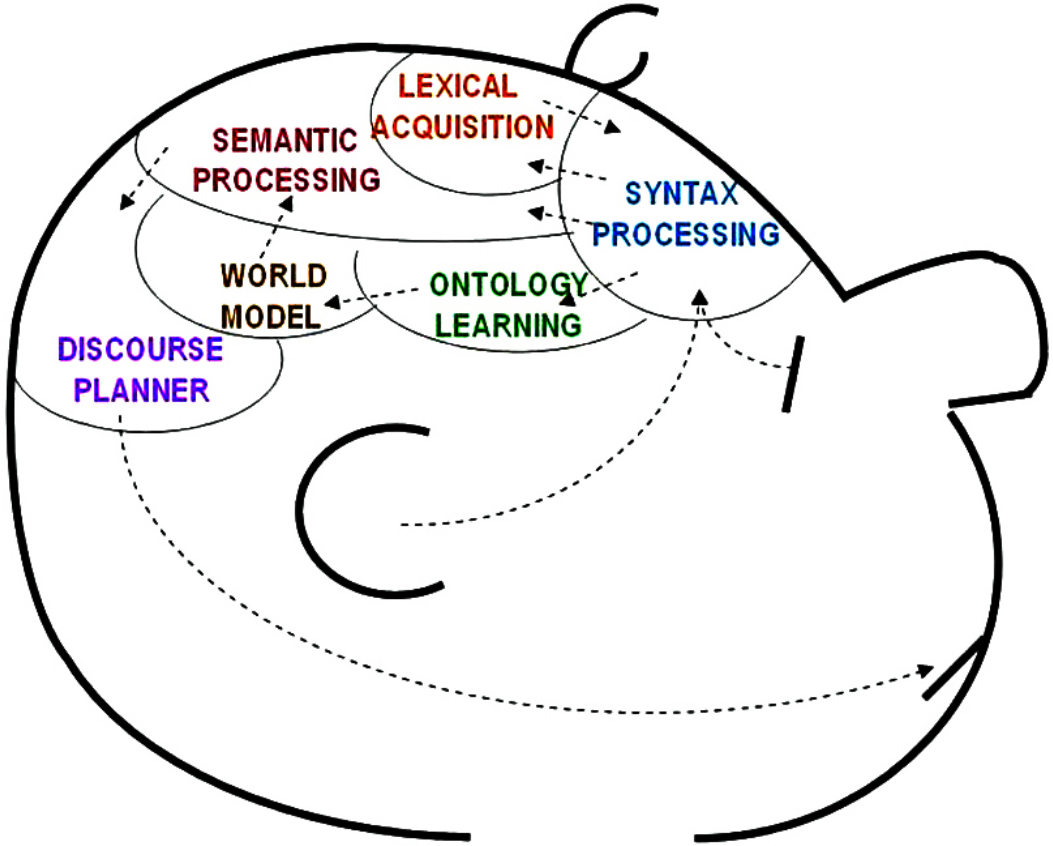

Harvesting the Business Value of Ontologies:
Recent Case Examples (Part-1)

Mills Davis
Project10X

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Smart platforms, smart devices

Context-aware services, semantic browsing, expert systems, and virtual assistants that complete tasks for you.

Siri

A Virtual Personal Assistant

The Big Think

If your computer were really smart...

It would understand you in your language.
It would make sense of your environment.
It would help you solve everyday problems.
It would be at your service, everywhere.

Will we see this in our lifetimes?

Brilliant Interfaces: The Senses

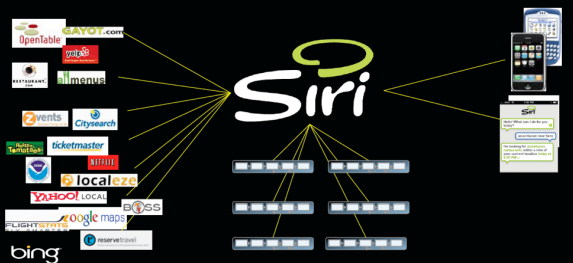
- Touch: Multitouch
- Hearing: Sound in and out
- Sight: Cameras
- Proprioception: GPS, accelerometer
- Taste: tasteful ☺

- Brain?

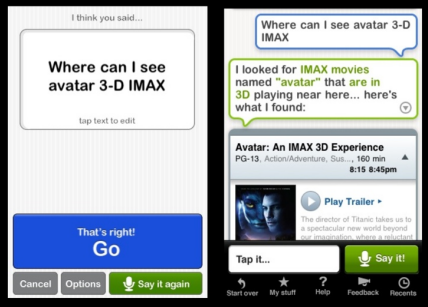
The Phase Transition:

TIRED	WIRED
keywords	➢ Language as Interface
typing	➢ Sensory Awareness
browsing	➢ Problem Solving
information	➢ Personal Services

Bringing the Big Think to the Small Screen



Speech + Semantics + APIs



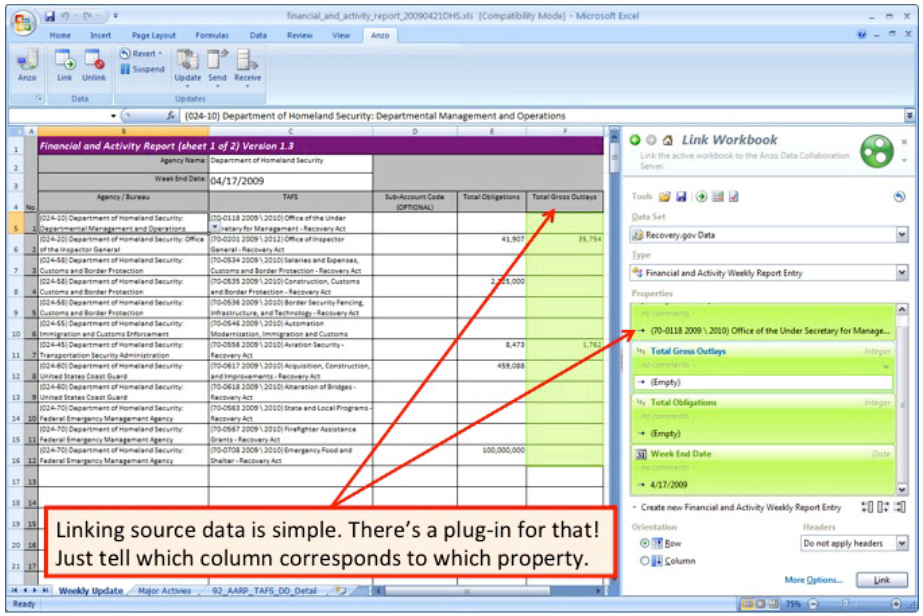
Do-it-yourself data exploration

CHALLENGE

- When events trigger action, researchers and analysts examine the data. Combining information from multiple spread sheets and databases is tedious and manual. Desktop tools do not know the categories and properties expressed by column (or row) headings. Moreover, for IT to create a new database or data warehouse is time-consuming, costly, and assumes that all requirements are knowable in advance..

SOLUTION

- Knowledge-centric solution for data exploration links source data from spreadsheets, files, or database tables to a standard (semantic) model stored on a server. There's an app for that. Works on desktop or via browser. Selecting data to add to a spreadsheet is a pull-down menu option. Filters apply easily. Numerous lenses for visualizing data.



Source: Cambridge Semantics

BENEFITS

- Focuses on ease of use for end-users with tools they know how to use; minimum IT involvement, if at all.
- Rapid and low-cost to solution (hours/days), vs. slow and time-consuming for RDBMS, data warehouse, or manual
- Flexibility in the face of inevitable change: rapid, low-cost, incremental modification vs. time-consuming costly, and difficult revision of conventional stores.
- "Low-hanging fruit" for many agencies and programs..

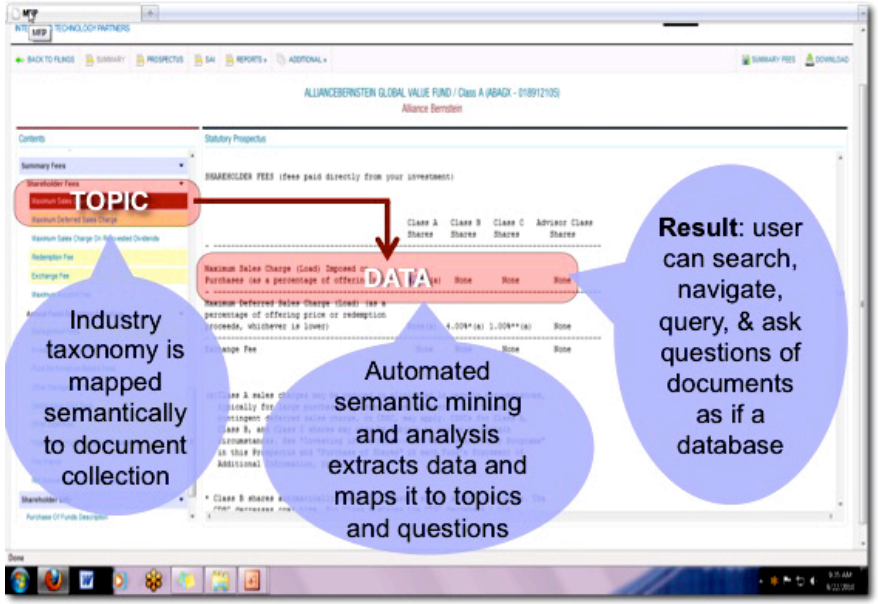
Better access with semantic search, navigation, query & question answering

CHALLENGE

- Mutual fund industry rules change requires consumer friendly interactive access to 250,000 mandated plan documents. While the industry's trade association has developed a standard taxonomy for key topics, (a) buyers do not know industry jargon, (b) often related data is not adjacent to topic, and (c) buyer lacks a way to hone in on answers to questions. Conventional DB and CMS approaches are labor intensive, error prone and costly to update.

SOLUTION

- Knowledge-centric solution semantically analyzes and indexes the database corpus using deep linguistics and domain knowledge to extract data, link information to topics, and find answers to questions. Consumers can navigate by topic (faceted search) pose questions in natural language, and query data contained in documents as though it were a database.



Source: Recognos Financial

BENEFITS

- 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, applications within government and industry are massive.

Knowledge-centric information webs & process interoperability

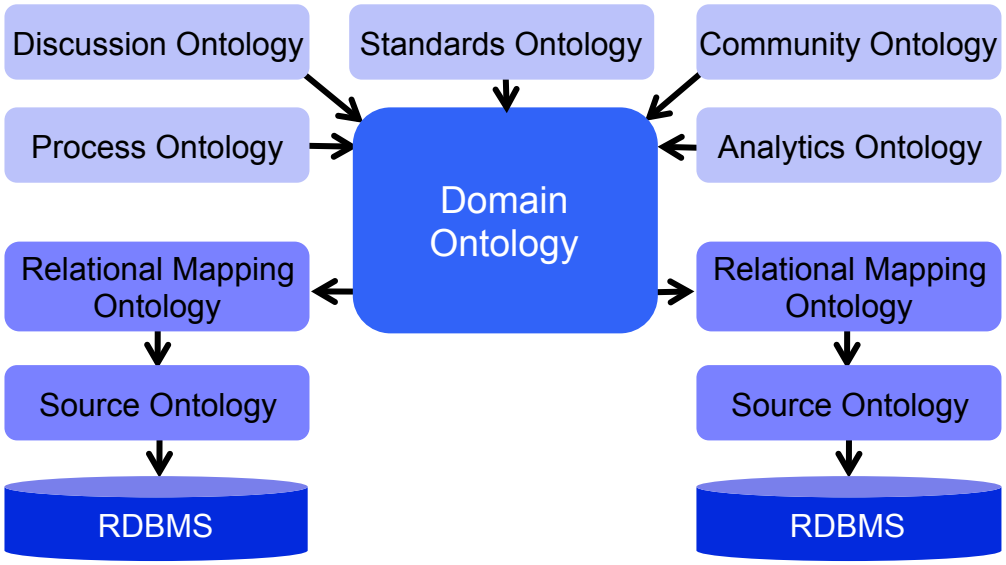
CHALLENGE

- 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.
- “We’ve tried everything else and failed.”
  — DoD CTO for Business Mission

SOLUTION

- Built a semantic **information web** that connected 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 had demonstrated a solution

Enterprise Information Web Ontology Architecture



BENEFITS

- Semantic information web ontology patterns enable federated search, information sharing, and SQL-like querying across heterogeneous business databases.
- Basic to very complex analytics and reporting across all systems become end-user generated queries that reference analytics ontology(s) connected to the domain ontology.
- Development, extension, and upgrades to the “system of systems” is rapid, incremental, iterative, non-invasive and low-risk.

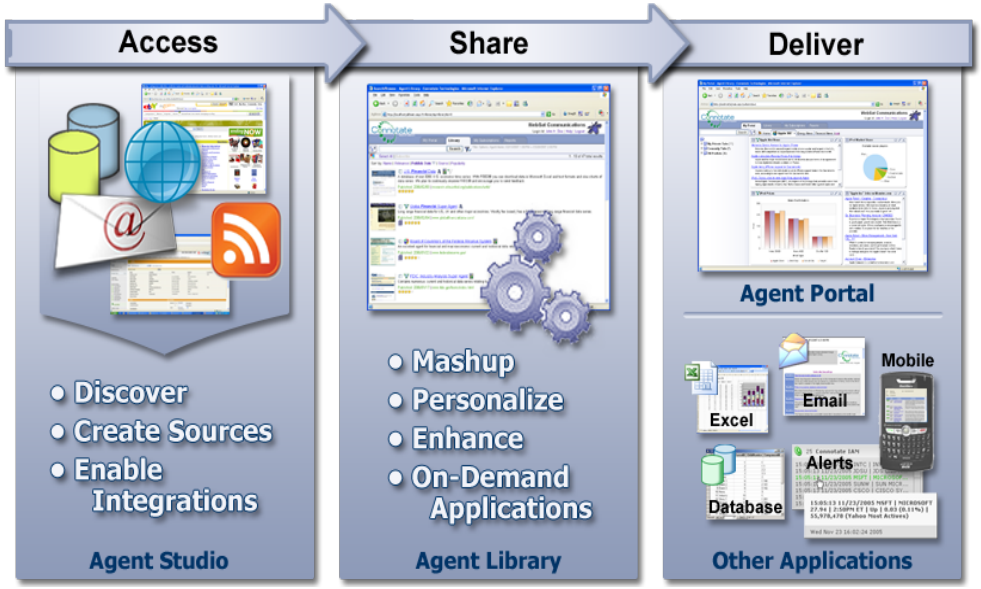
Do-it-yourself semantic agents to discover, aggregate, analyze & report information

CHALLENGE

- Agencies need to find, monitor, aggregate and make sense of information from a great many sources across the web as well as internally within government. The manual effort involved can consume 25-45% of an analysts time. Also, it is costly to custom program and update searches and analytics as needs change.

SOLUTION

- Intelligent semantic software agents to access, harvest, tag, and standardize information that are easy to create by anyone and can be shared and reused. Train agents to capture site information, content elements, and take action to extract specific data, capture files, define schemas. 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.



Source: Connotate

BENEFITS

- 360 degree views on topics, issues, etc. combining information from internal and external sources including web pages, blogs, local news, message boards, social media, databases, email, intranets, enterprise applications, etc.
- Productivity improvements from automated gathering, monitoring, and alerting for needed information events that is 24/7/365 or other frequency.

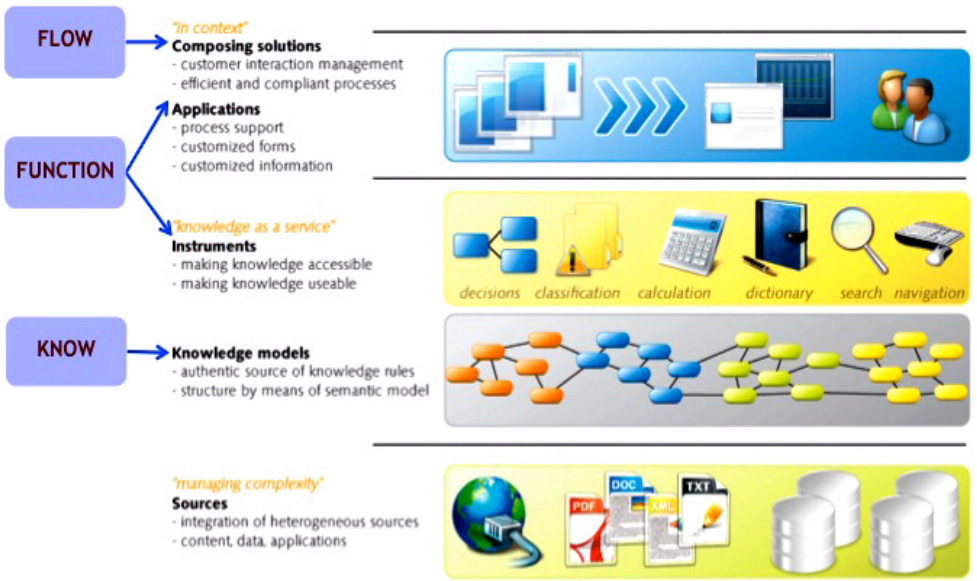
Smart knowledge-driven citizen-centric services

CHALLENGE

- Permitting site synthesizes requirements, processes, and information across multiple jurisdictions and 14 independent institutions into a unified user experience.
- Immigration site helps new arrivals solve varied problems of relocation. It combines information, and decision logic from 12 agencies into an easy to use single point of service delivery.

SOLUTION

- Knowledge-centric solution separates the **know** from the **flow** and the **function** to create declarative applications configured by users with semantic models of legislation, knowledge, processes, data, and UI. The core infrastructure consists of an ontology, which is enriched with business rules. All functions use the same ontology, e.g., semantic search, information access, automated decision making, decision support, and dynamic processes.



Source: BeInformed

BENEFITS

- "Open knowledge as a service" bridges the gap between government and citizens and facilitates effective cooperation between independent institutions – both public and private.
- Provides automated decisions and decision support; means for agencies to manage their knowledge / rules; ability to quickly adapt to external events / implement new legislation; improved decision making, guaranteed compliancy, less errors; improved service delivery to the public; and substantial cost reductions.

Policy-driven compliance, risk, and change management

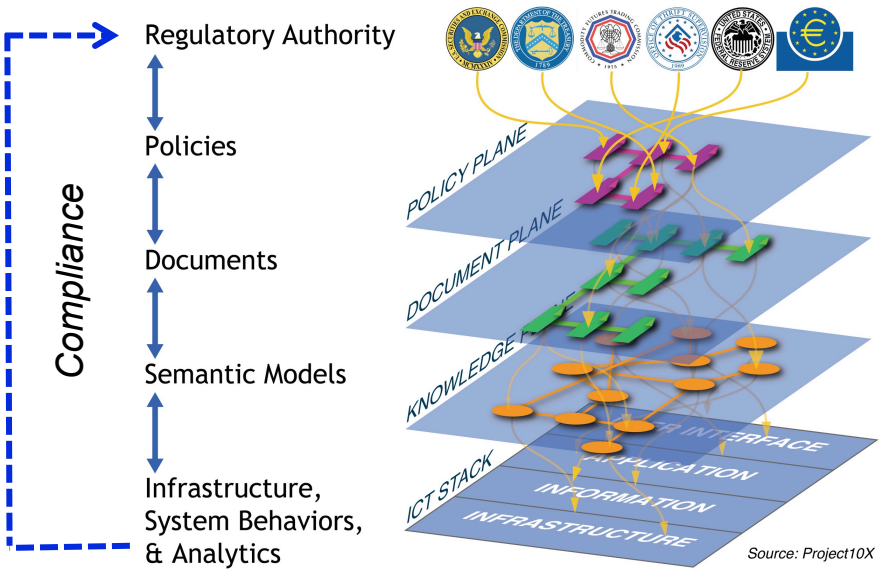
OPPORTUNITY

- Global financial services firm was $600B behind in M&A because it could not keep up with compliance requirements. Knowledge to track and report regulatory mandates comprehensively across the business was fragmented in separate documents, systems, and data stores, thus slow, prone to error, and difficult to change.
- “Our only solution is to add more belly buttons, which means committing thousands of people to compliance.”

SOLUTION

- Knowledge centric collaborative solution that captures all of the 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.

FEATURES



BENEFITS

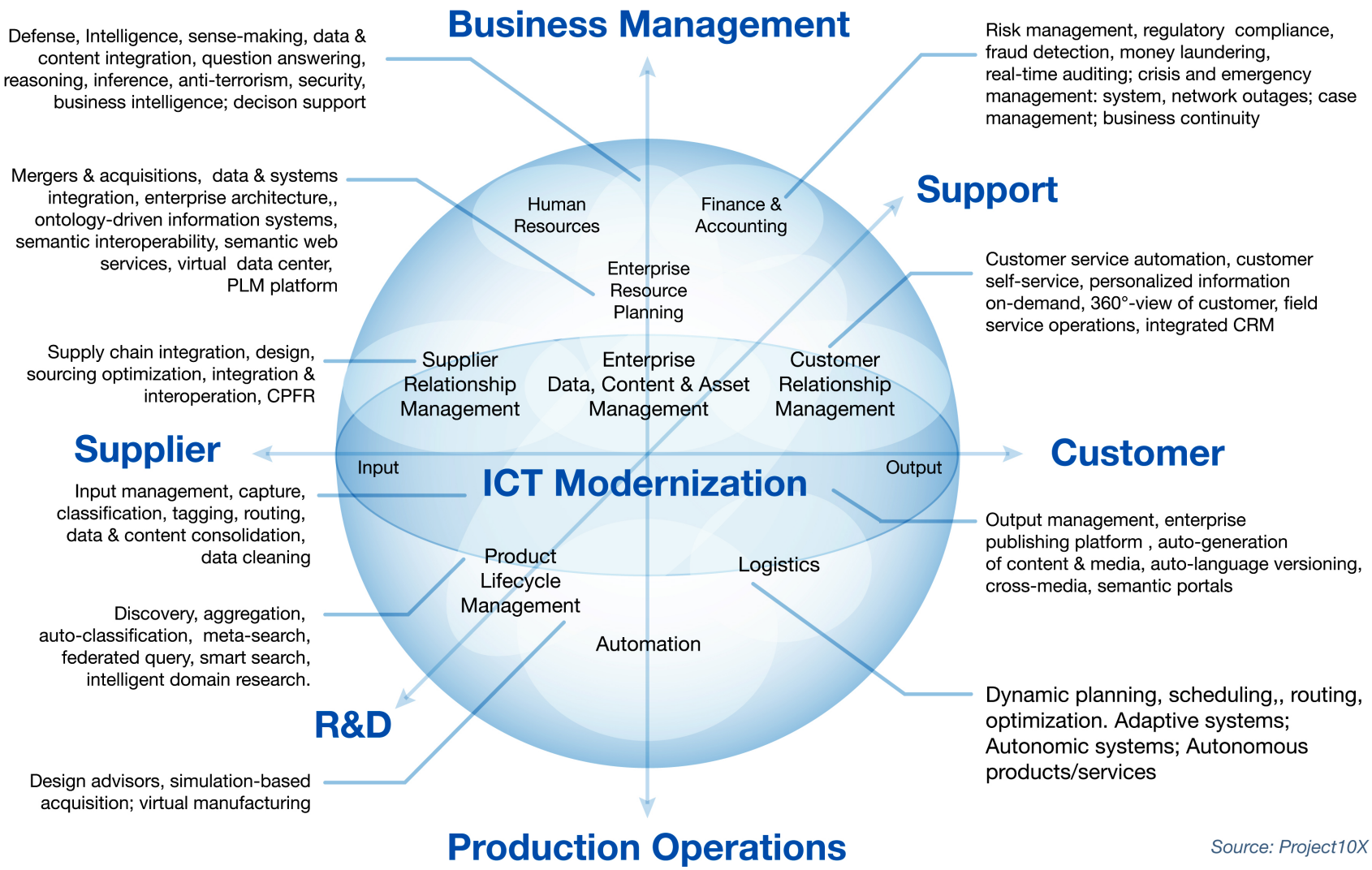
- Development of knowledge-centric compliance solution requires fewer resources, is more rapid, less costly, quicker to show value.
- Operation of knowledge-centric solution requires less labor, is more reliable and less error prone.
- Maintenance and upgrades are less costly and time consuming. Assessing impact of changes on documentation, systems, and procedures is more automated. Change management and version control is automated.

Ontology-driven application and process themes

- Semantics in commercial off the shelf software such as BI, ERP, CRM, SCM, PLM, and HR
- Ontology-driven discovery in law, medicine, science, defense, intelligence, research, investigation, and real-time document analysis
- Advanced (collaborative) analytics for hindsight, insight, and foresight
- Risk, compliance and policy-driven processes such as situation assessment, exceptions, fraud, case management, predictive analytics, and emergency response
- Knowledge-intensive processes such as modeling & simulation, acquisition, design, engineering, and virtual manufacturing
- Network & process management such as diagnostics, logistics, planning, scheduling, cyber-security, and event-driven processes
- Adaptive, autonomic, & autonomous processes such as robotics, intelligent systems, and smart infrastructure
- Systems that know, learn & reason as people do such as e-learning, tutors, advisors, cognitive agents, and games.

Where else can we apply ontology-driven approaches?

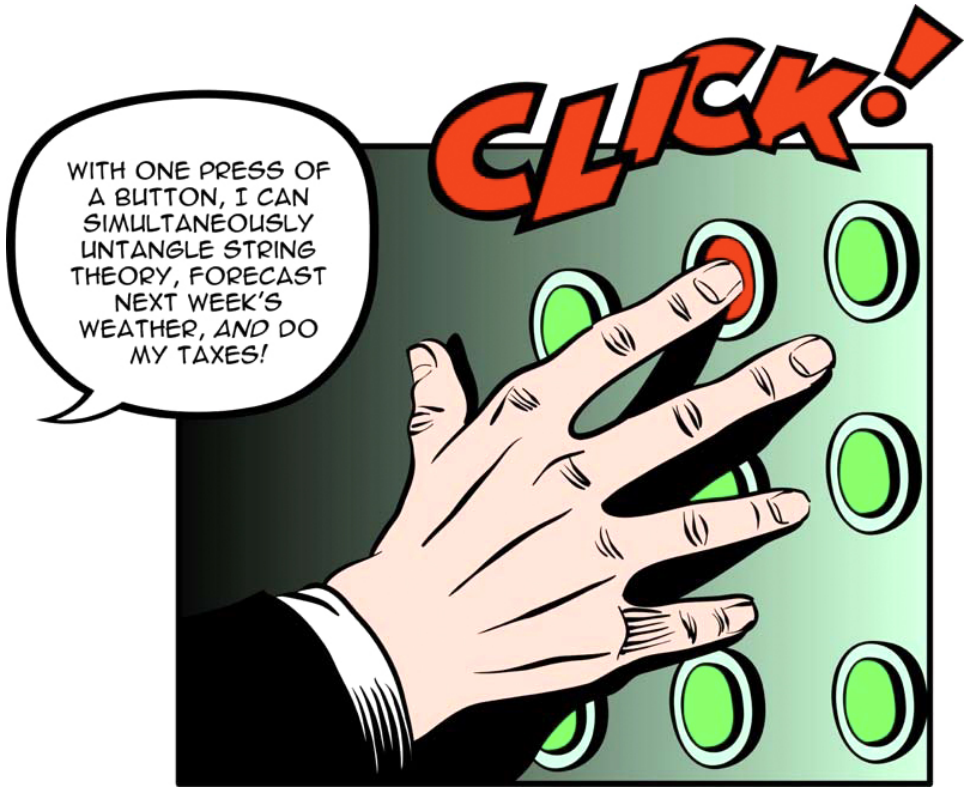
Just about everywhere you look..



Source: Project10X

This diagram highlights ten functional areas where enterprise adopters are applying semantic technologies.

Questions?


WITH ONE PRESS OF A BUTTON, I CAN SIMULTANEOUSLY UNTANGLE STRING THEORY, FORECAST NEXT WEEK'S WEATHER, AND DO MY TAXES!
CLICK!