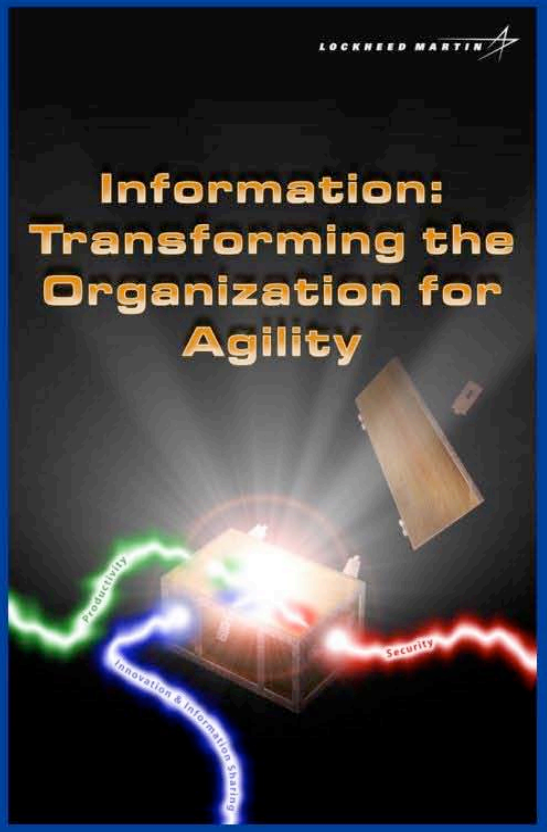
LOCKHEED MARTIN

11th Annual Lockheed Martin Information Technology Trends Conference 2006



Semantic Wave 2006

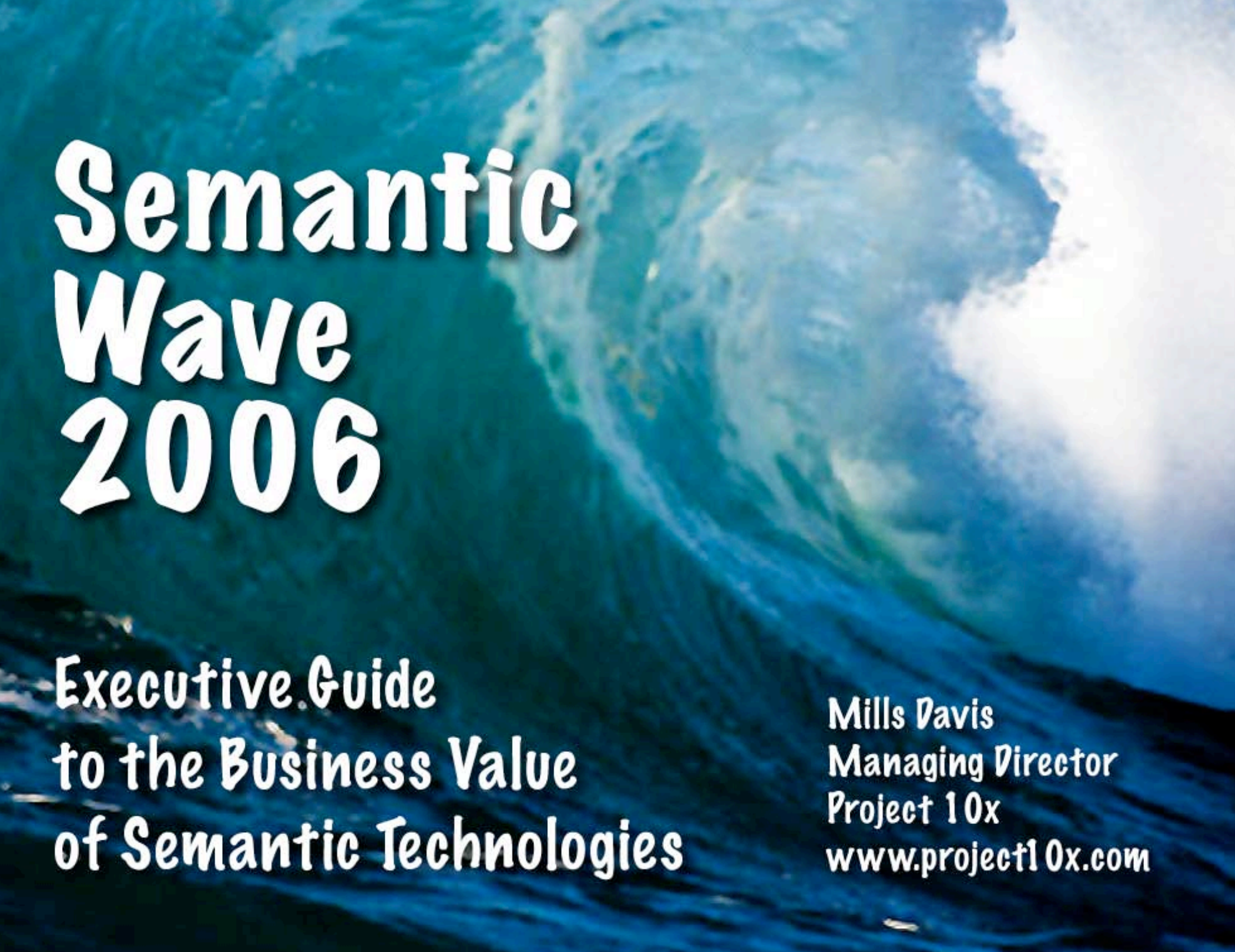
Executives Guide to the Business Value of Semantic Technologies

Mills Davis

Project10X

Managing Director

Orlando, FL
February 14–16, 2006



Semantic Wave 2006

Executive Guide to the Business Value of Semantic Technologies

Mills Davis
Managing Director
Project 10x
www.project10x.com


WARNING!
This presentation makes
Forward Looking Statements
Any statements in this presentation that are not historical facts are forward-looking statements that involve risks and uncertainties;actual results may differ from the forward-looking statements. Sentences or phrases that use such words as "believes," "anticipates," "plans," "may," "hopes," "can," "will," "expects," "is designed to," "with the intent," "potential" and others indicate forward-looking statements, but their absence does not mean that a statement is not forward-looking. Factors that could have a material and adverse impact on actual results are described in Part-2 of the Semantic Wave 2006 report. No Form 10-K has been filed with the Securities and Exchange Commission under the heading "Risk Factors." The presenter undertakes no obligation to publicly release the results of any revisions to these forward-looking statements that may be made to reflect events or circumstances after the date hereof or to reflect the occurrence of unanticipated events.

Mills Davis

- Mills Davis is Project10X's founder and managing director for industry research and strategic programs. He consults with technology manufacturers, global 2000 corporations, and government agencies on next-wave semantic technologies and solutions.
- Mills serves as lead for the Federal CIO council's Semantic Interoperability Community of Practice (SICoP) research into the business value of semantic technologies. Also, he is a founding member of the AIIM interoperable enterprise content management (iECM) working group, and a founding member of the National Center for Ontology Research (NCOR).
- A noted researcher and industry analyst, Mills has authored more than 100 reports, whitepapers, articles, and industry studies.

Semantic Wave 2006 Part-1

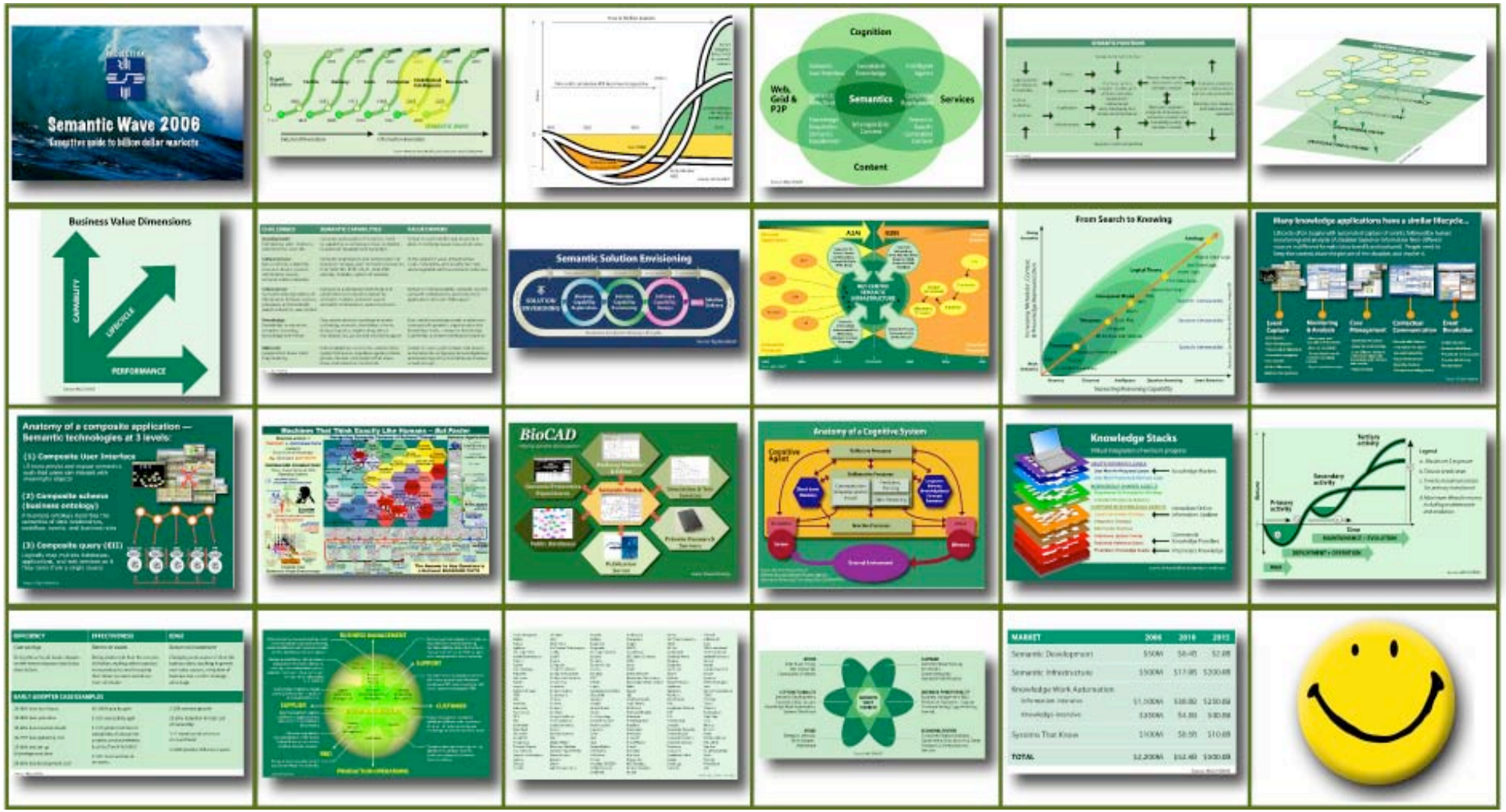
(http://www.semantic-conference.com/semanticwave.html)

- **Semantic wave**
  What is the semantic wave?
  What are the economics of the semantic wave?

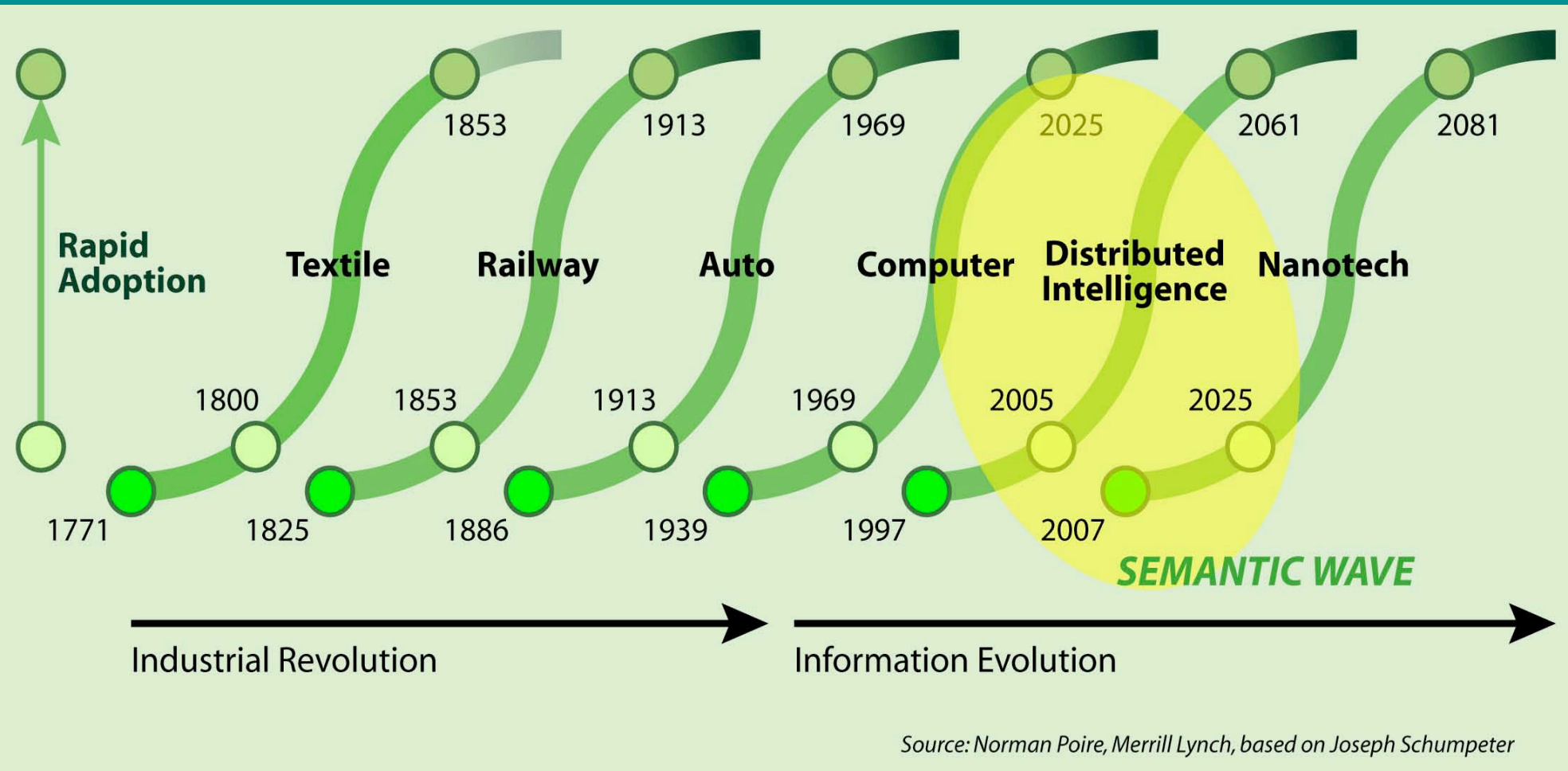
- **Semantic technologies**
  Why are semantic technologies needed now?
  What are semantic technologies?
  What is the scope of semantic technology R&D?
  What are the functions of semantic technology?
  How do semantic technologies impact information technologies?

- **Business value of semantic technologies**
  What are the dimensions of business value?
  What capabilities of semantic technology drive business value?
  How do semantic capabilities impact development?
  How do semantic technologies impact infrastructure?
  How do semantic technololgies impact information and knowledge?
  How do semantic technologies impact information-intensive applications?
  How do semantic technologies impact knowledge-intensive applications?
  How do semantic technologies impact system behaviors?
  How do semantic technologies impact intellectual property?
  How do semantic technologies maximize lifecycle return on investment?
  How do semantic technologies improve ROI?

Semantic Wave 2006 at a glance

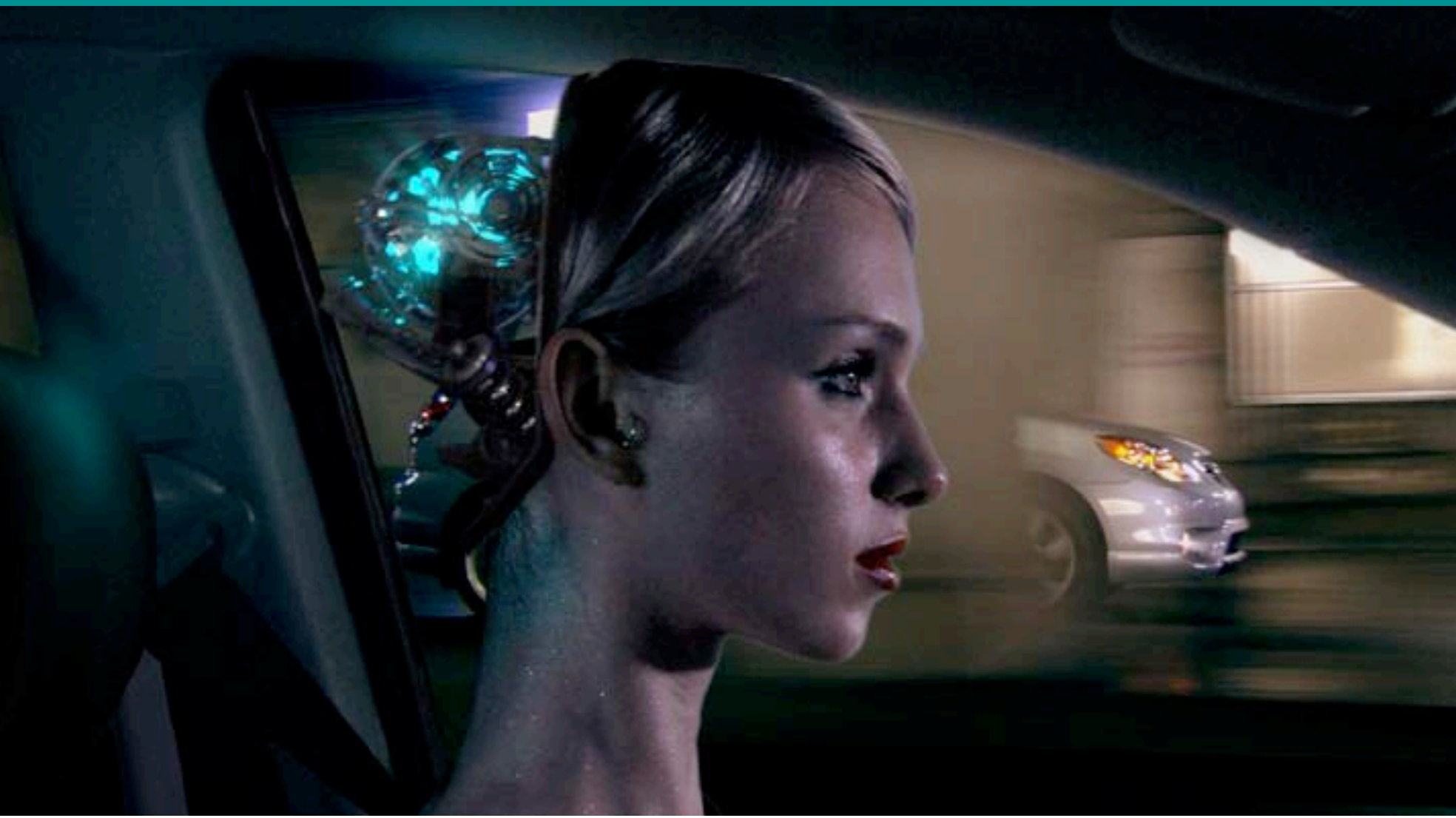


What is the semantic wave?

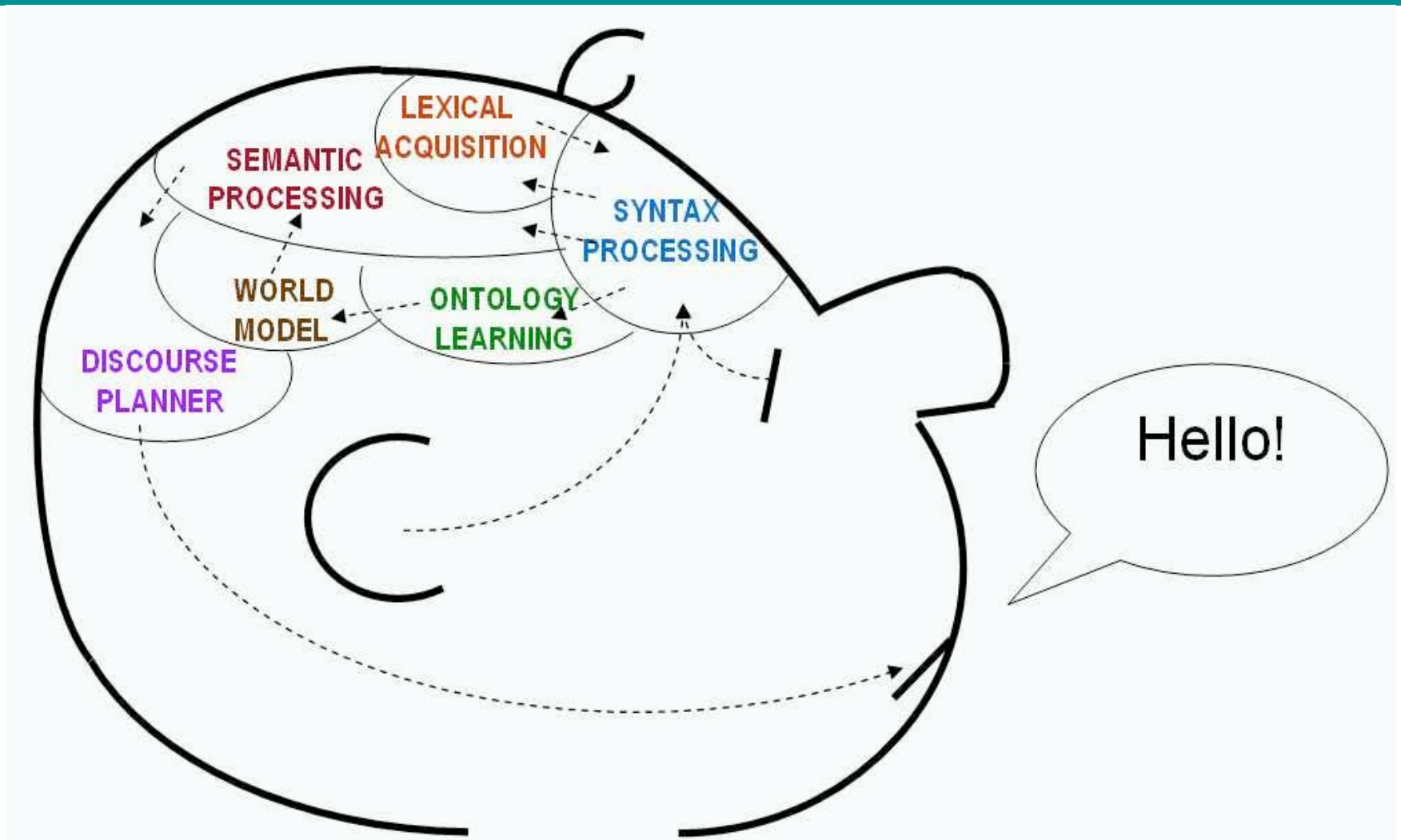


Source: Norman Poire, Merrill Lynch, based on Joseph Schumpeter

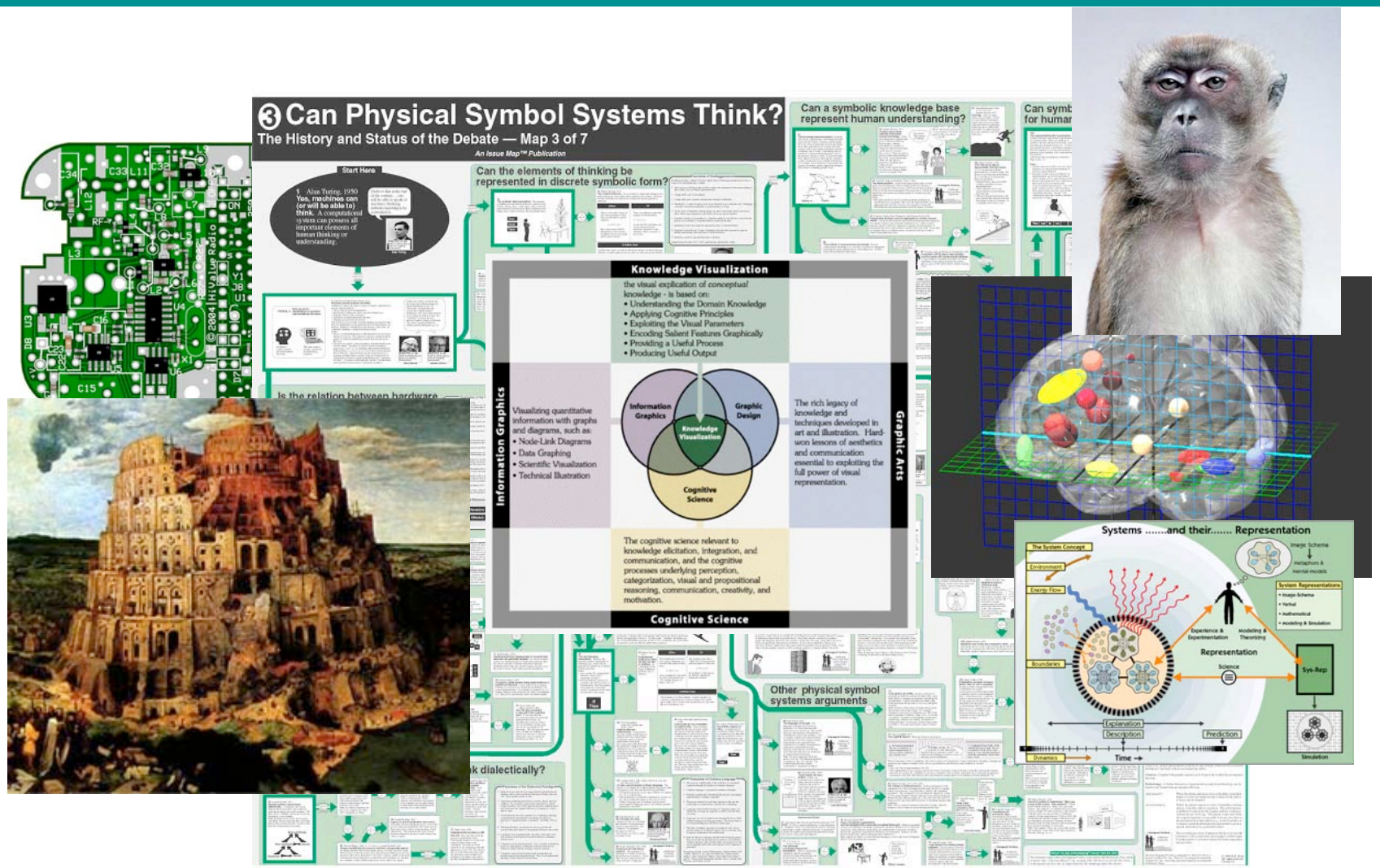
Shift in paradigm, technology & economics



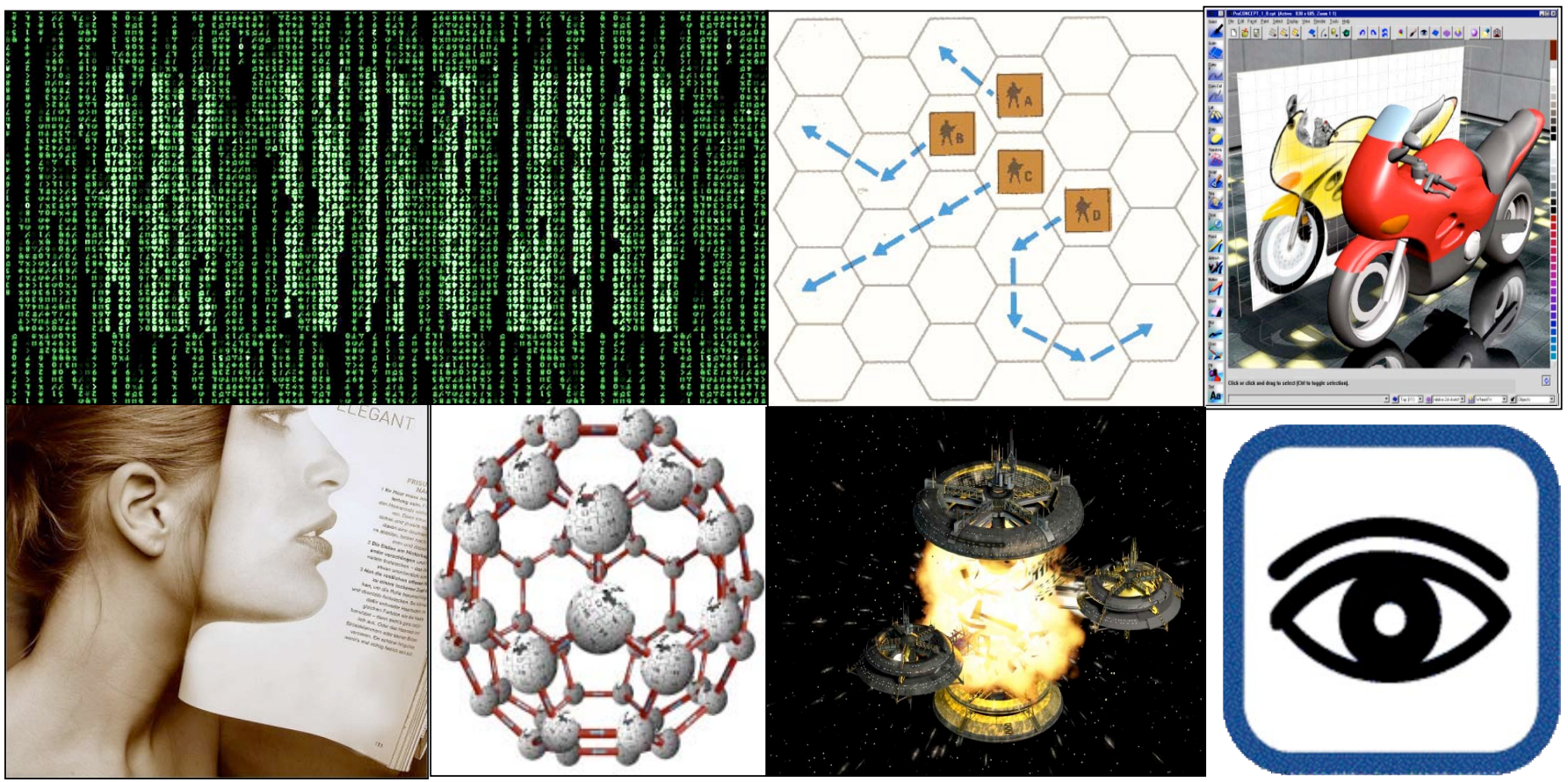
Representing meanings & knowledge about things so both computers and people can work with it



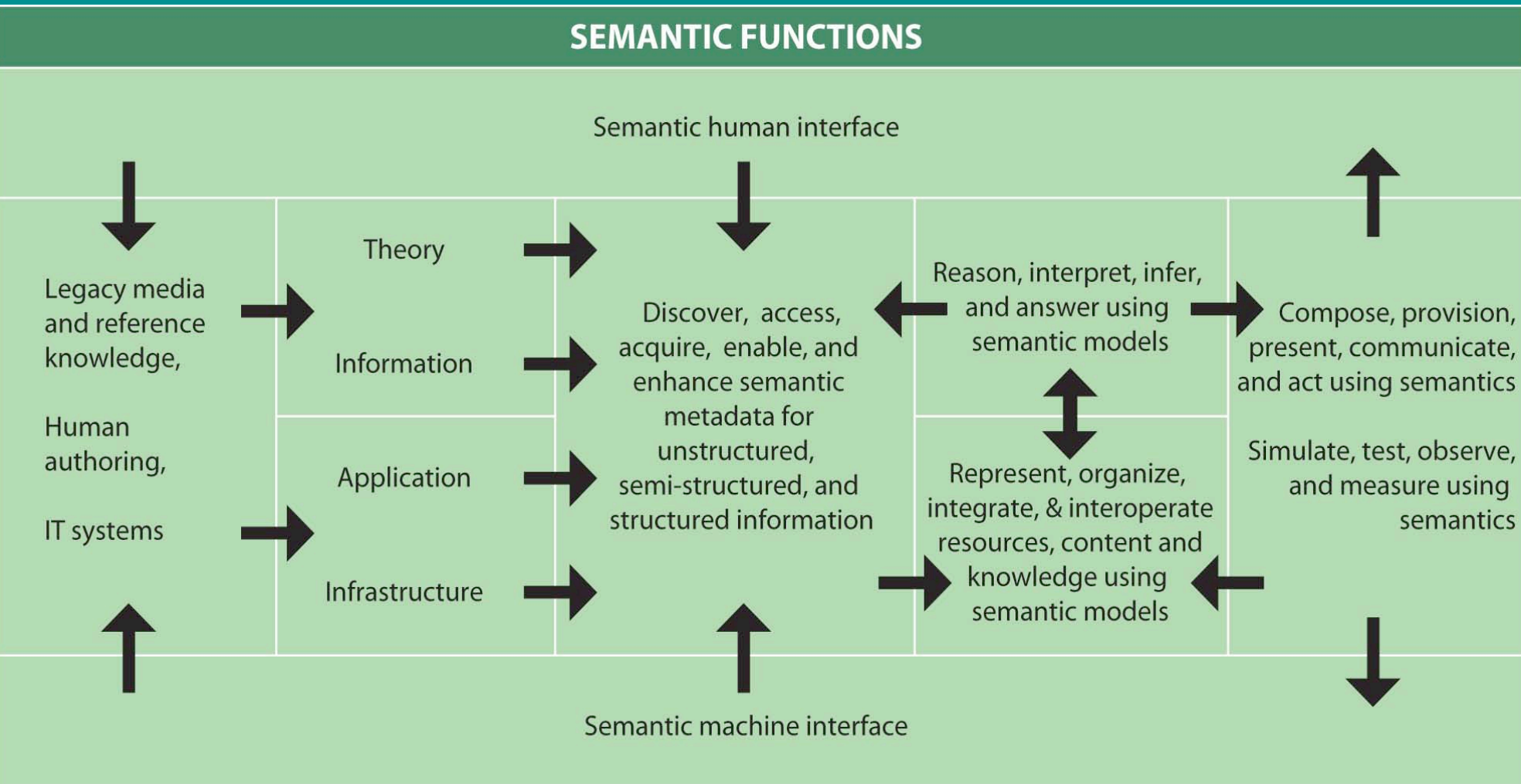
What do semantic technologies do?



Model knowledge about infrastructure, information, behavior, & domain expertise separately from programs and data…

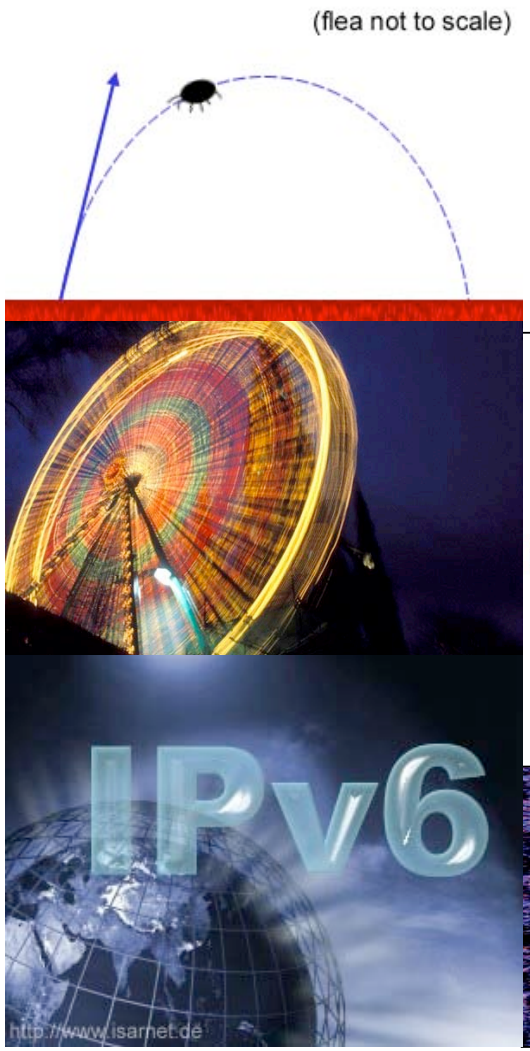


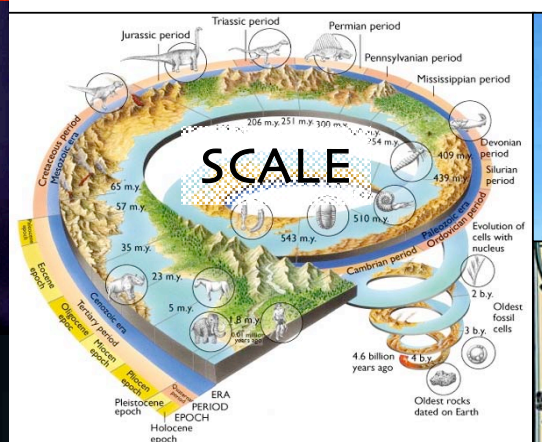
What are the functions of semantic technologies?

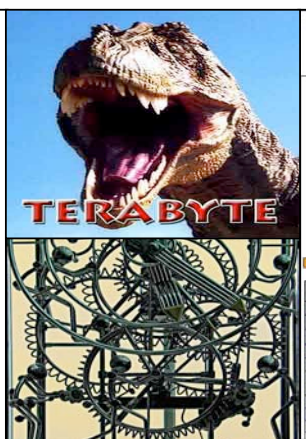


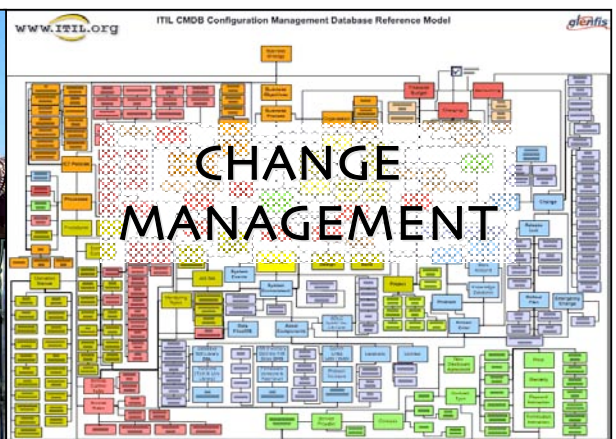
Source: MILLS•DAVIS

Solve problems of scale, complexity, function, performance, and cost…



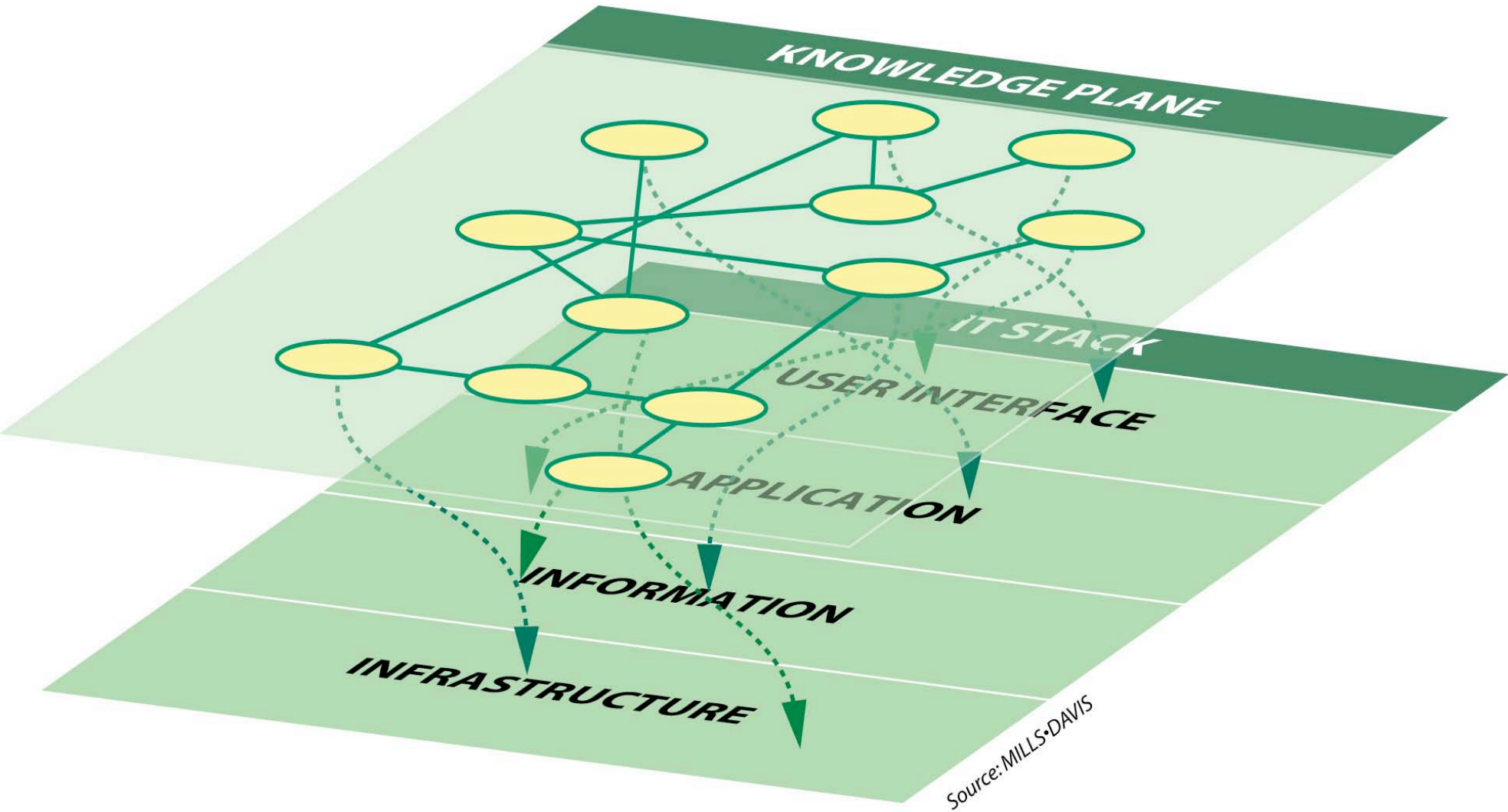




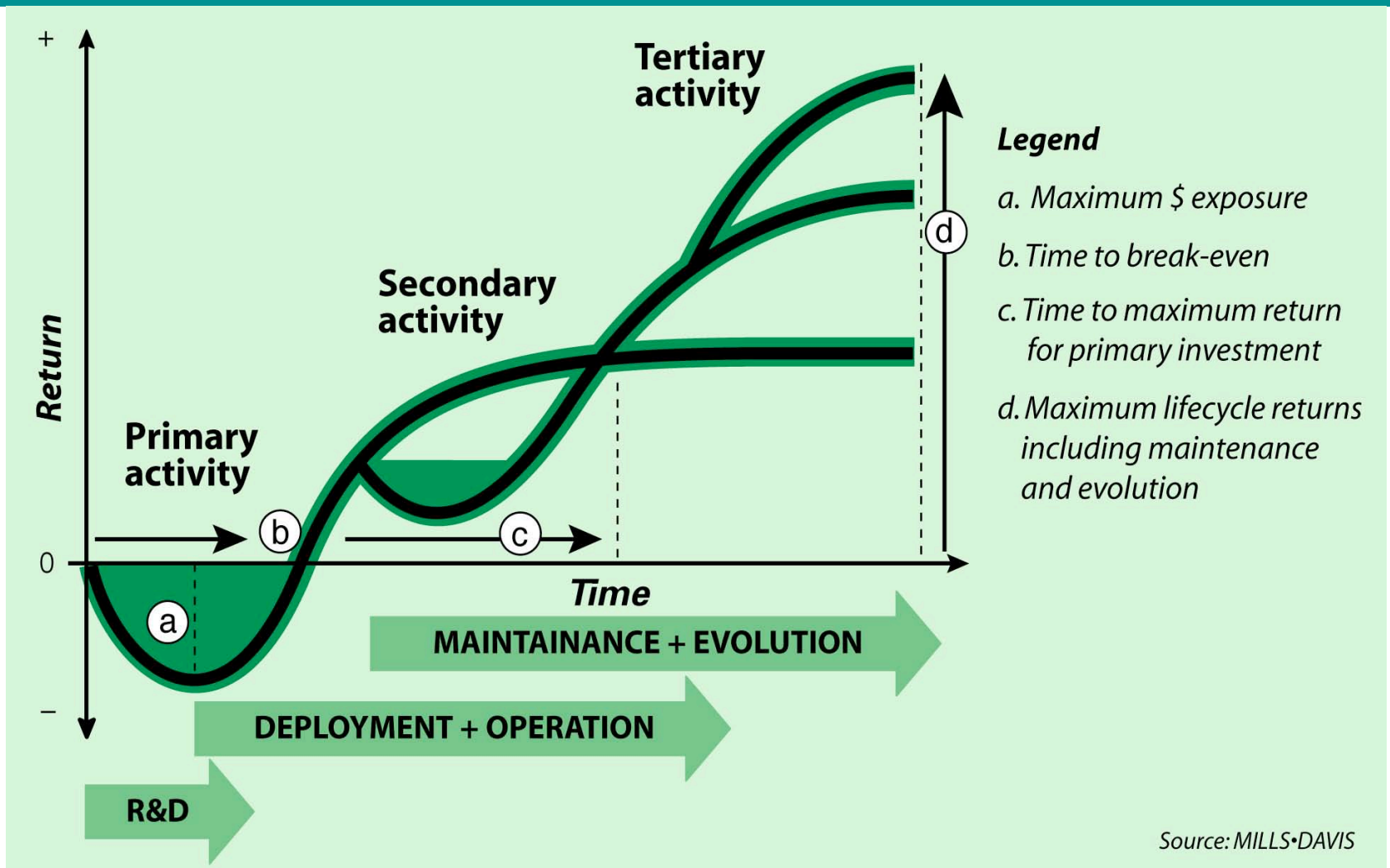


COMPLEXITY

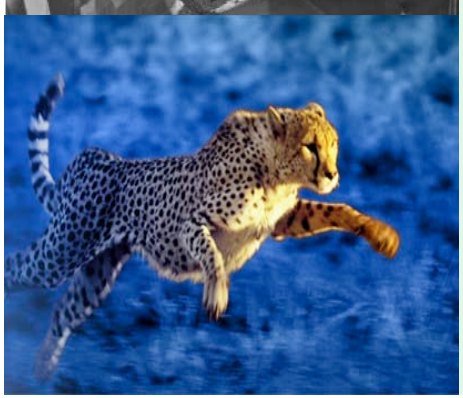
Semantic technologies impact all layers of the IT stack

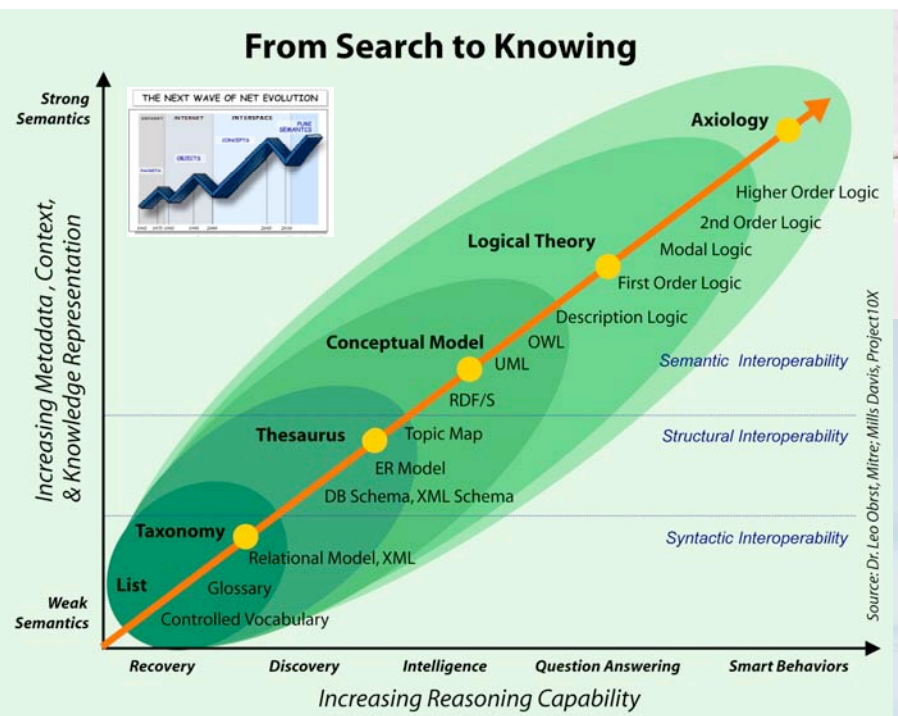


Semantic technologies impact all stages of the solution lifecycle

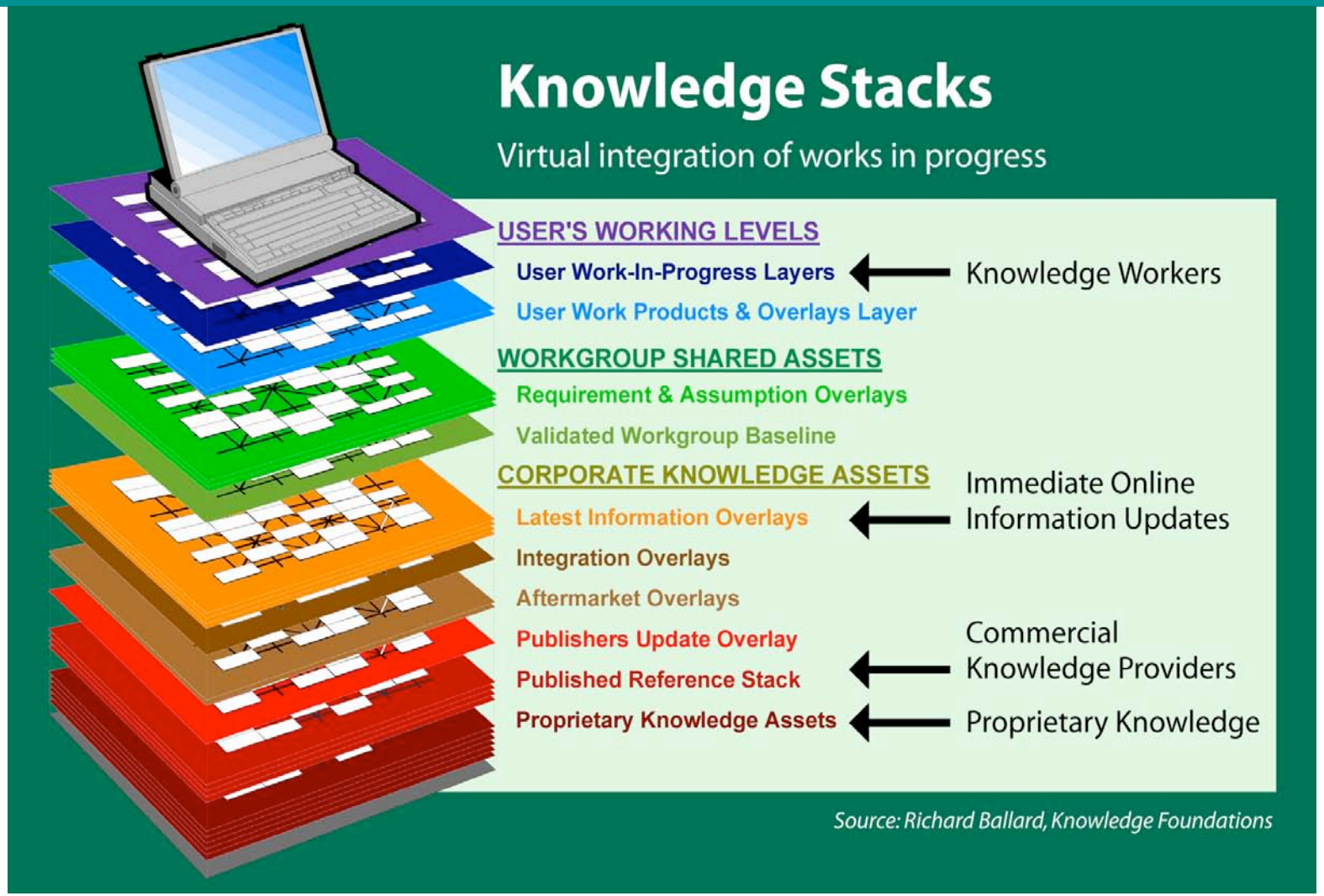


From Search to Knowing





Semantic technologies create new forms of intellectual property



Who is developing semantic solutions?

Who is developing semantic solutions?

Active Navigation
Adobe
Aduna
Agilense
AKT Triple Store
Amblit Technologies
Anteon
Apelon
APR Smartlogik
Arbortext
Ask Jeeves
AskMe
Aspasia
Astoria Software
AT&T
ATG
Attensity
Autonomy
Axontologic
BBN
BEA
BioWisdom
Black Pearl
Blue Oxide
BrandSoft
Broadvision
Business Objects
C24 Solutions
Capraro Technologies
Captiva
Celcorp
Cerebra
CheckMi
Cisco
ClearForest
CoeTruman Technologies
Cogito
CognIT
Cognos
Composite
Compoze Software
Computer Associates
Conformative Systems
Connecterra
Connotate
Content Analyst
Contextware
Contivo
Convera
Copernic
Correlate
Cougaar Software
Coveo Solutions
Crystal Semantics
Cycorp
Dassault Systems
DAY
Digital Harbor
Discovery Machine
Dynamic Digital Media
Dream Factory
EasyAsk
Ektron
EMC/Documentum
Empolis
Endeca
Engenium
Enigmatec
EnLeague Systems
Entopia
Entrieva
Epistemics Ltd.
Factiva
Fair Isaac
FAST
FileNet
Fujitsu
GeoReference Online
Global360
Gnowsis
Google
Grand Central
Groxis
H5 Technology
Hewlett Packard
Hummingbird
Hyperion
i2 Inc
IBM
iLog
Image Matters
Informatica
InforSense
Infosys
Innodata (ISOGEN)
Intellidimension
Intelliseek
Intellisophic
Interwoven
Inxight
iSOCO
ISX Software
ISYS Search Software
JARG
Jayna
Kalido
Kanisa Software
Knowledge Foundations
Knowledge Media Institute
Kofax
Kowari
L&C
Lockheed Martin
Logic Library
Mark Logic
McDonald Bradley
Metacarta
MetaIntegration
Metallect
Metamatrix
Metatomix
Microsoft
Mind Alliance
Miosoft
Modulant
Mondeca
Moresophy
NCR Teradata
NetMap Analytics
Neurok
Noetix
Northrop Grumman
nStein
NuTech
Ontologent
Ontology Works
Ontopia
Ontoprise
OpenText
Oracle
Profium
Radar Networks
Raytheon
Readware
RuleBurst
Reed Elsivier
SAIC
Sandpiper Software
SAP
SAS
SchemaLogic
Semagix
Semandex Networks
Semantic Light
Semantic Research
Semantic Sciences
Semansys
Semaview
Semtation GmbH
Serena
SiberLogic
Siderean
SilkRoad
Software AG
Sony
SRA International
SRI International
Stanford University
Stellent
Stratify
Sun Microsystems
Sybase
Synomos
SYS Technologies
Tacit
Taxonomywarehouse
TEMIS
The Brain
Thetus
Thomson
TopQuadrant
Triple Hop
Troux
Ultimus
Unicorn
Verity
Versatile Info Sys
VerticalNet
Vignette
Visual Knowledge
Vitria
Vivisimo
WiredReach
XSB

Source: MILLS•DAVIS—1/10/2006

Who is investing in semantic technologies?

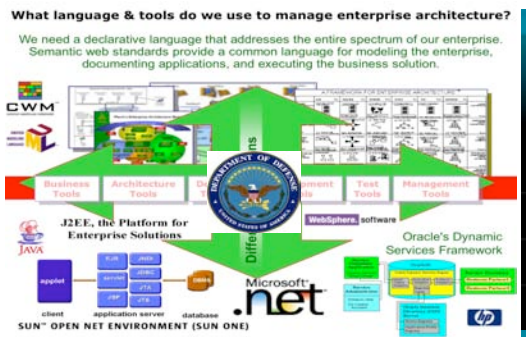
Where, how, and in what ways do semantic technologies have application?

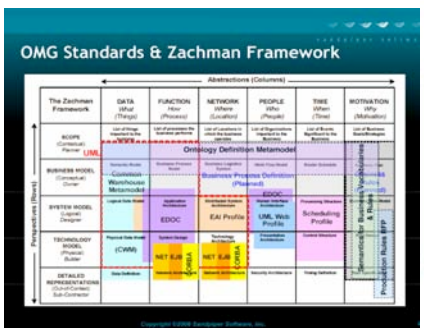
What capabilities of semantic technologies drive business value?

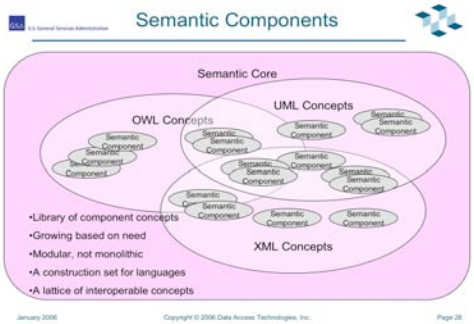
CHALLENGES	SEMANTIC CAPABILITIES	VALUE DRIVERS
Development: Complexity, labor-intensity, solution time, cost, risk	Semantic automation of *"business need-to-capability-to-simulate-to-test-to-deploy-to-execute"* development paradigm	Semantic modeling is business rather than IT centric, flexible, less resource intense, and handles complex development faster.
Infrastructure: Net-centricity, scalability; resource, device, system, information source, communication intensity	Semantic enablement and orchestration of transport, storage, and computing resources; IPv6, SOA, WS, BPM, EAI, EII, Grid, P2P, security, mobility, system-of-systems	In the semantic wave, infrastructure scale, complexity, and security become unmanageable without semantic solutions.
Information: Semantic interoperability of information formats, sources, processes, and standards; search relevance, use context	Composite applications (information & applications in context powered by semantic models), semantic search, semantic collaboration, semantic portals	Semantic interoperability, semantic search, semantic collaboration, and composite applications become "killer apps."
Knowledge: Knowledge automation, complex reasoning, knowledge commerce	Executable domain knowlege-enabled authoring, research, simulation, science, design, logistics, engineering, virtual manufacturing, policy and decision support	Executable knowledge assets enable new concepts of operation, super-productive knowledge work, enterprise knowledge superiority, and new intellectual property.
Behavior:. Systems that know what they're doing	Robust adaptive, autonomic, autonomous system behaviors, cognitive agents, robots, games, devices, and systems that know, learn, and reason as humans do	Semantic wave systems learn and reason as humans do, using large knowledgebases, and reasoning with uncertainty and values as well as logic.

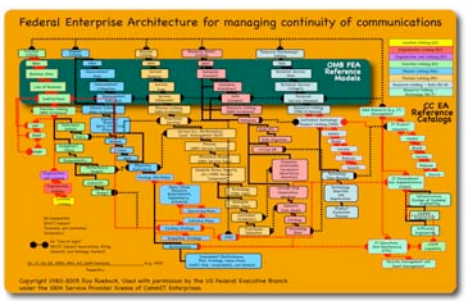
Source: MILLS•DAVIS

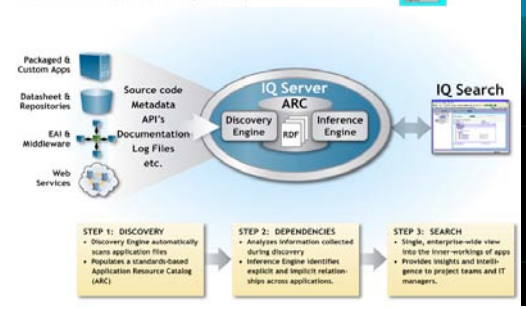
Semantics for Enterprise Architecture

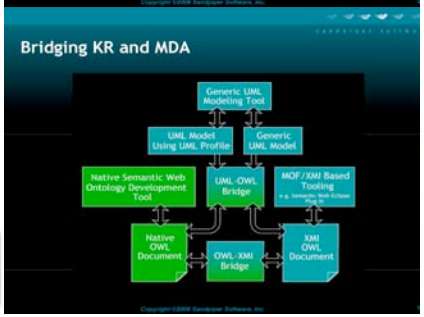


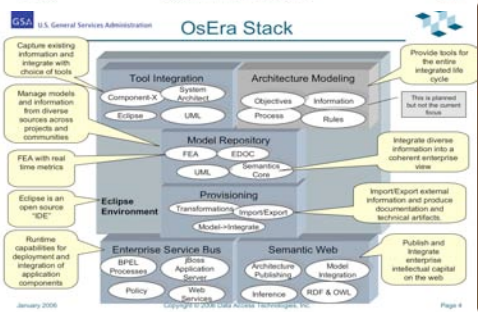


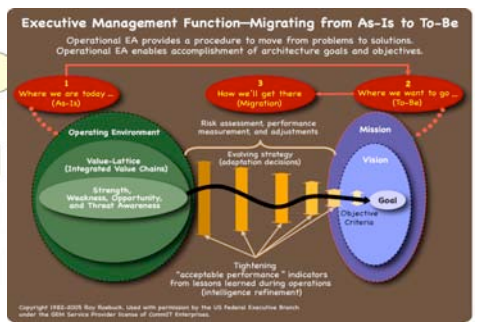


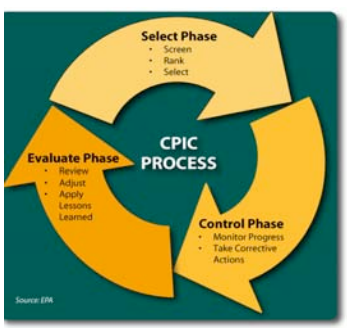


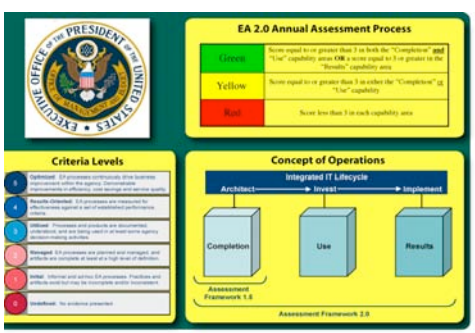


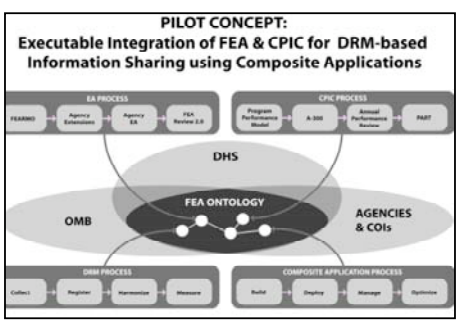




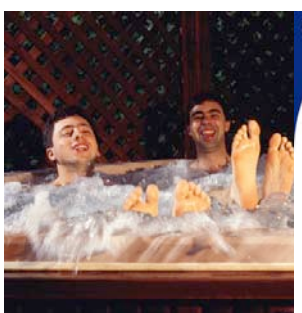


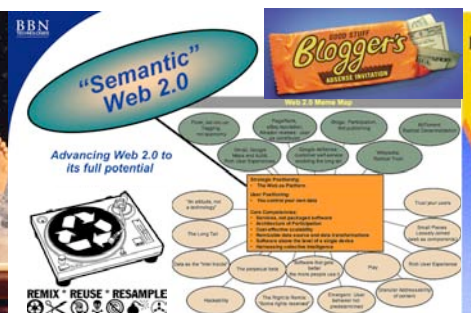




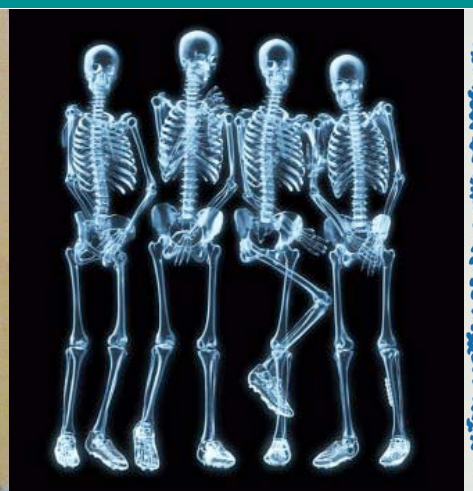


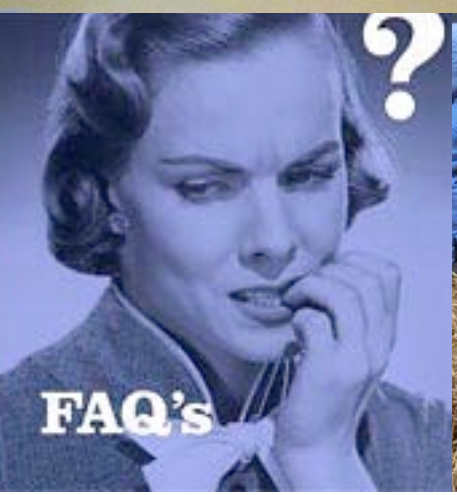
Semantic Web 2.0

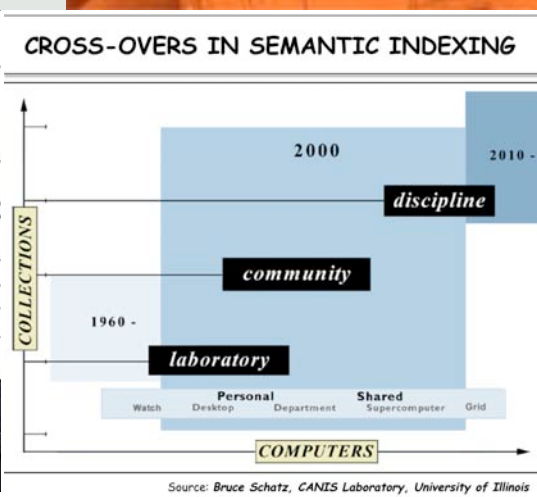




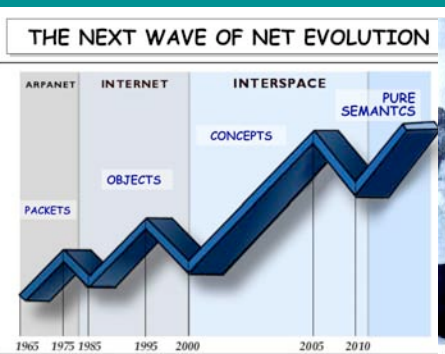
Semantic Discovery: Extract, Annotate, Enhance

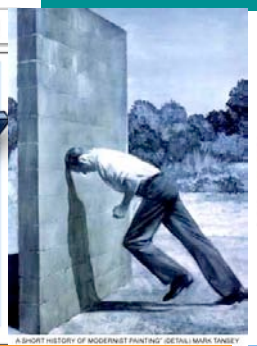


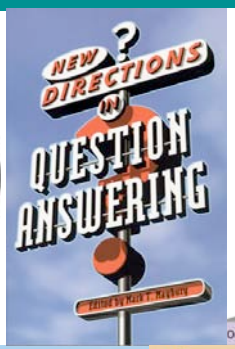


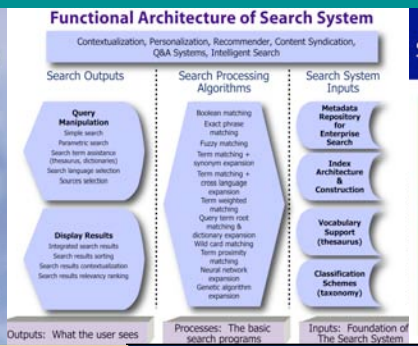


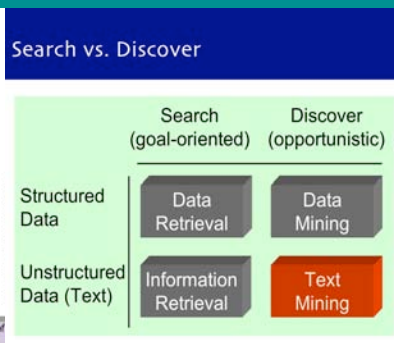
Semantic Search & Navigation

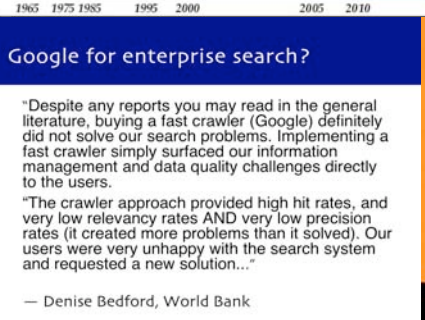


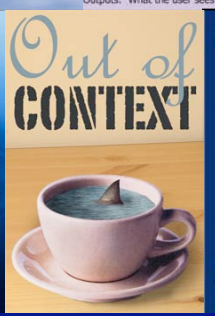


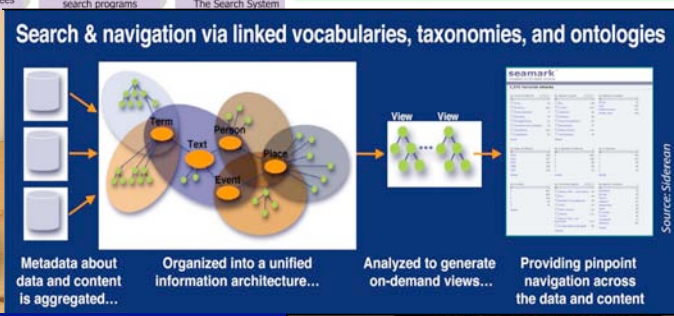


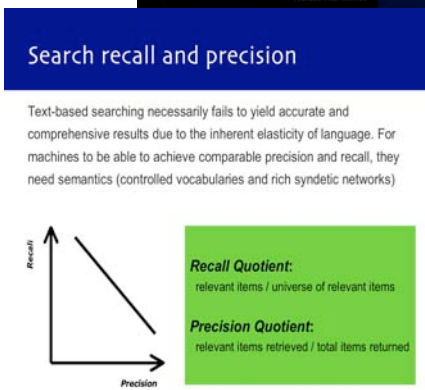


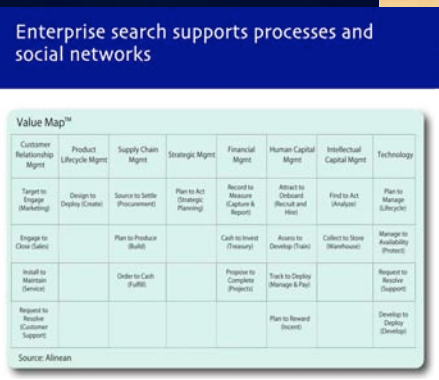


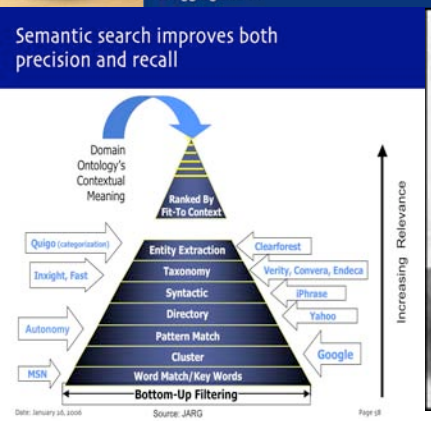




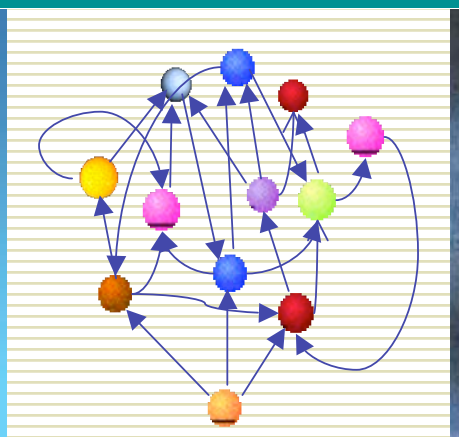


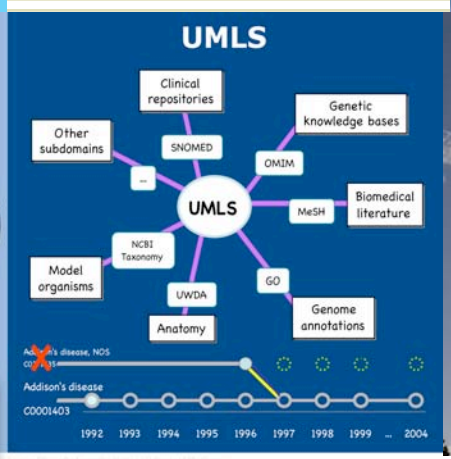




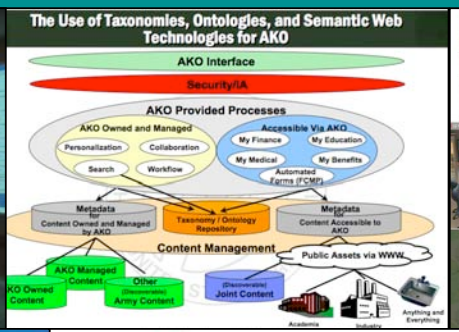


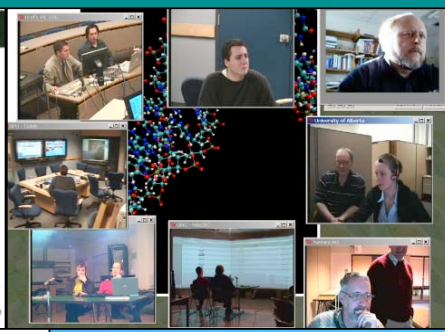
Subject Ontology Management

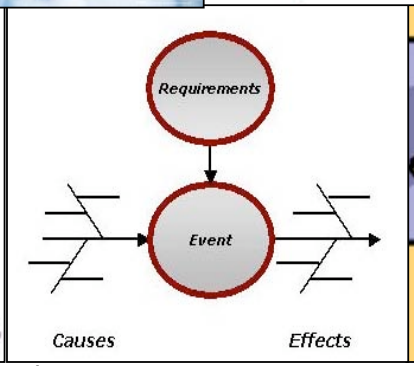


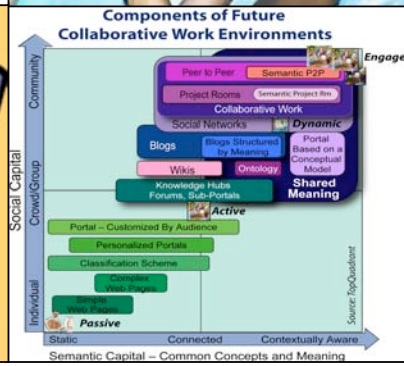


Semantics for Collaboration

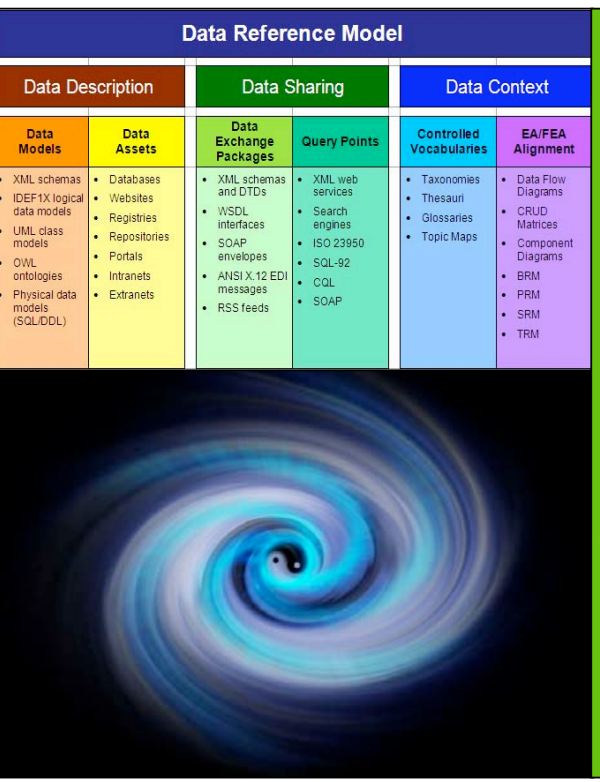


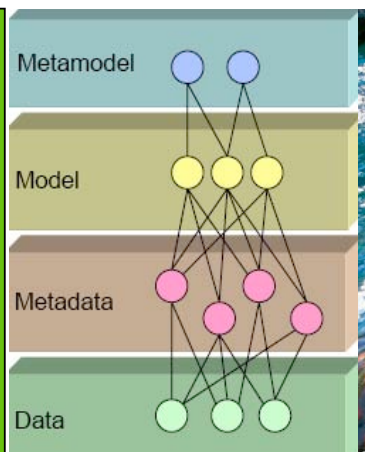


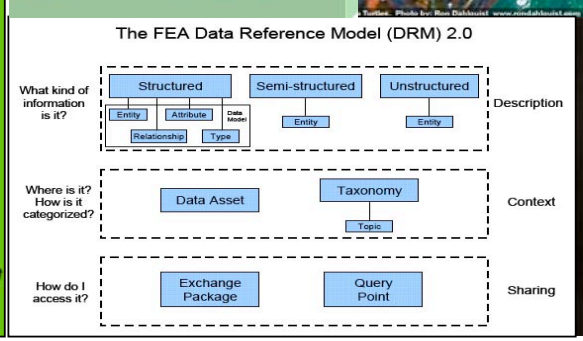


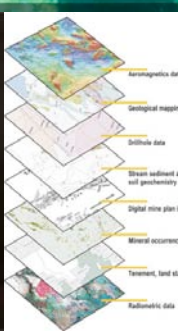


Semantics for Information Sharing

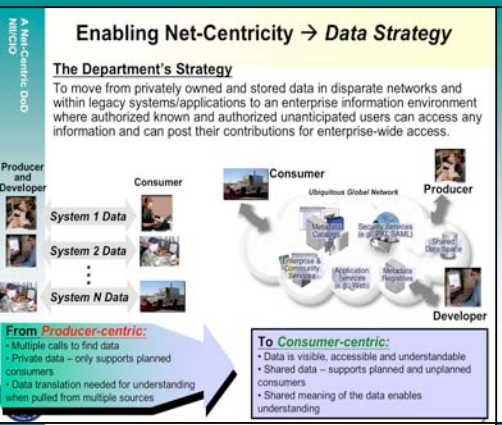


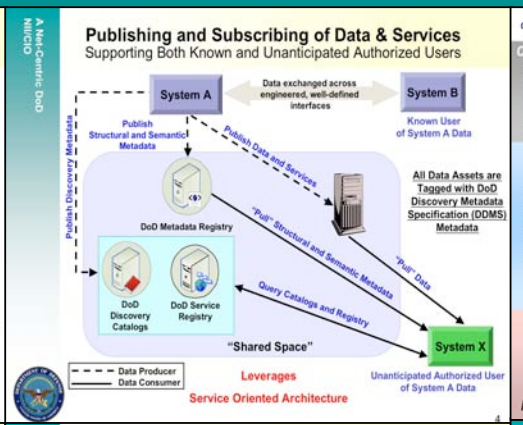


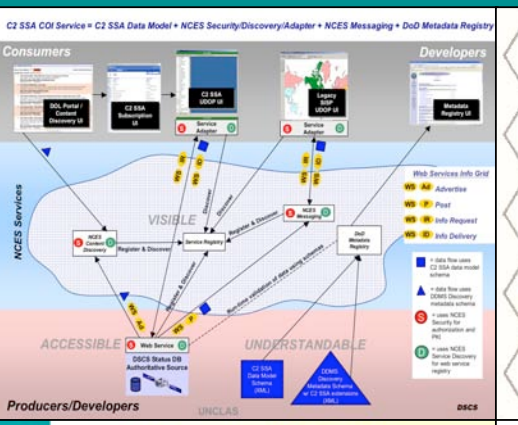


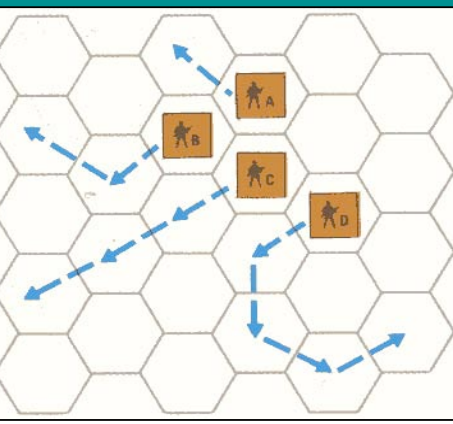


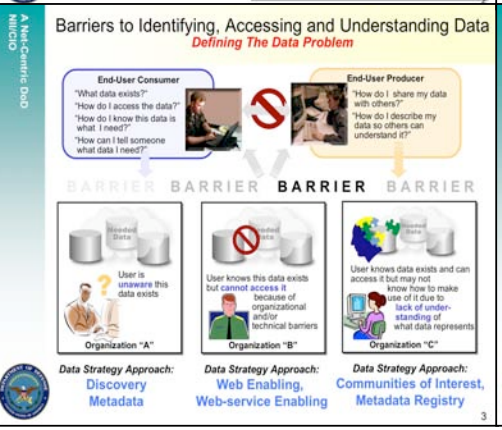
Net-Centric Information Sharing

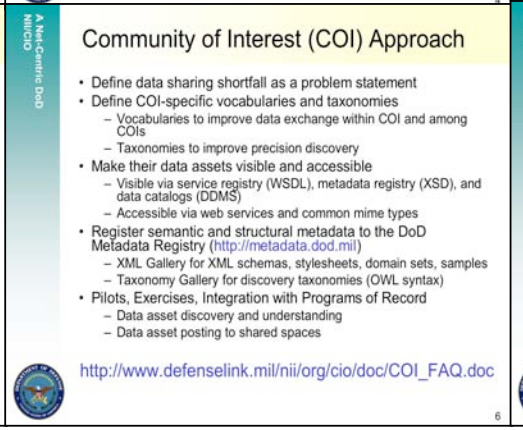


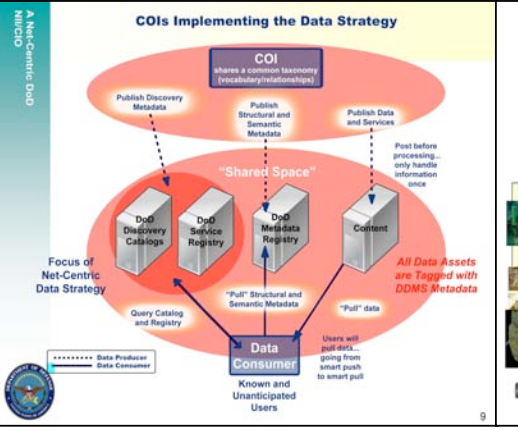


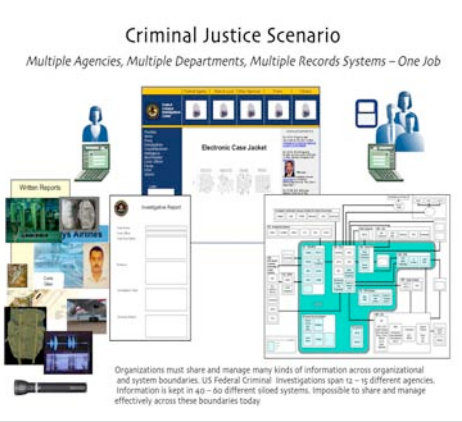




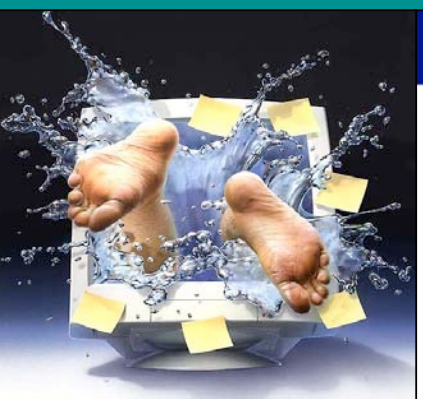


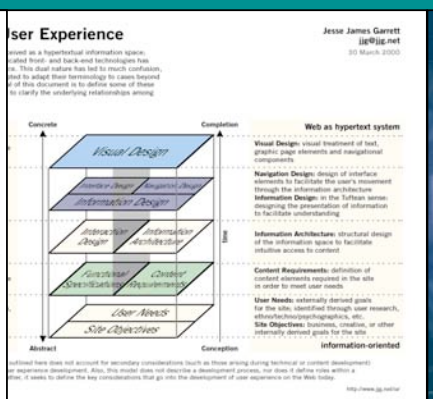


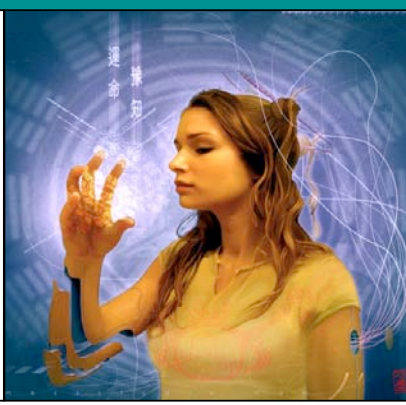


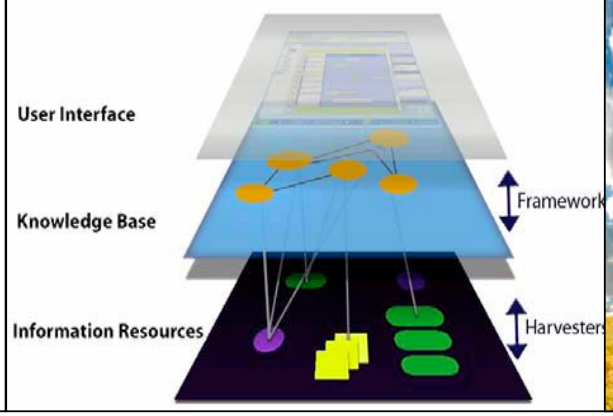


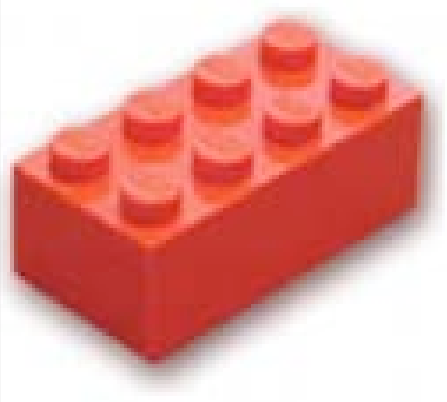
Semantic Desktop



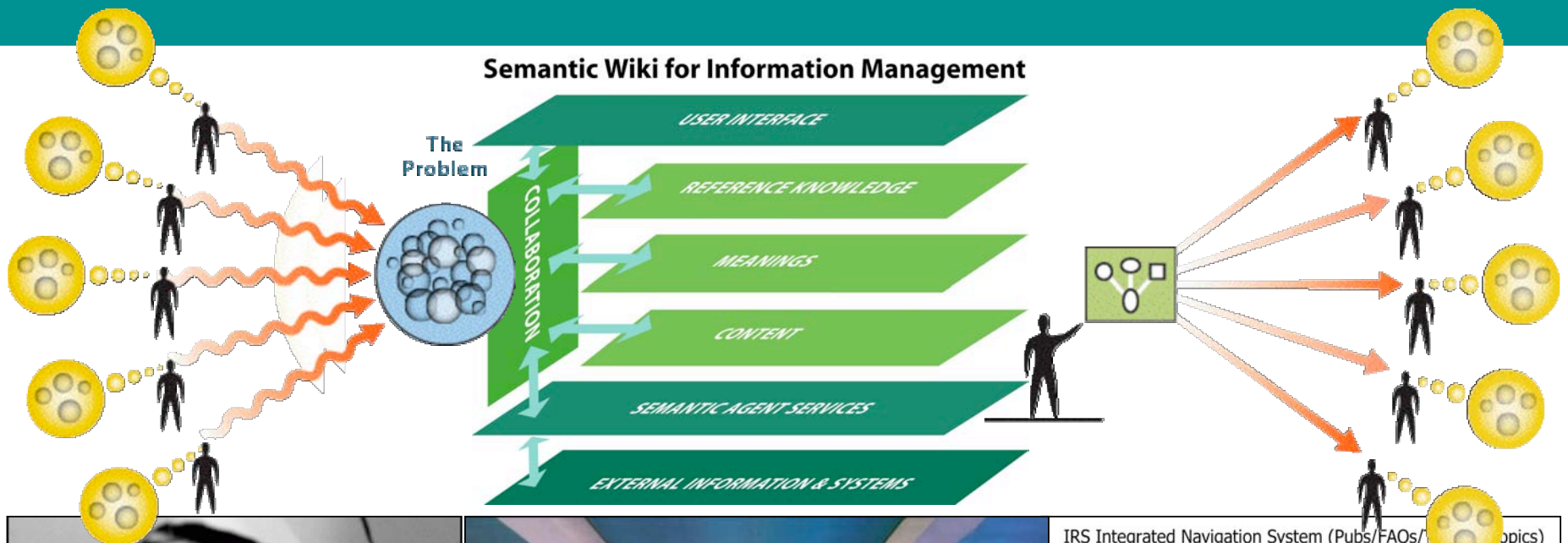


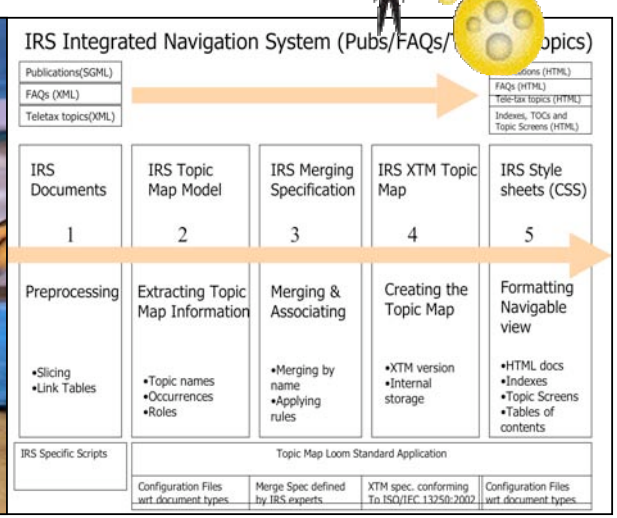




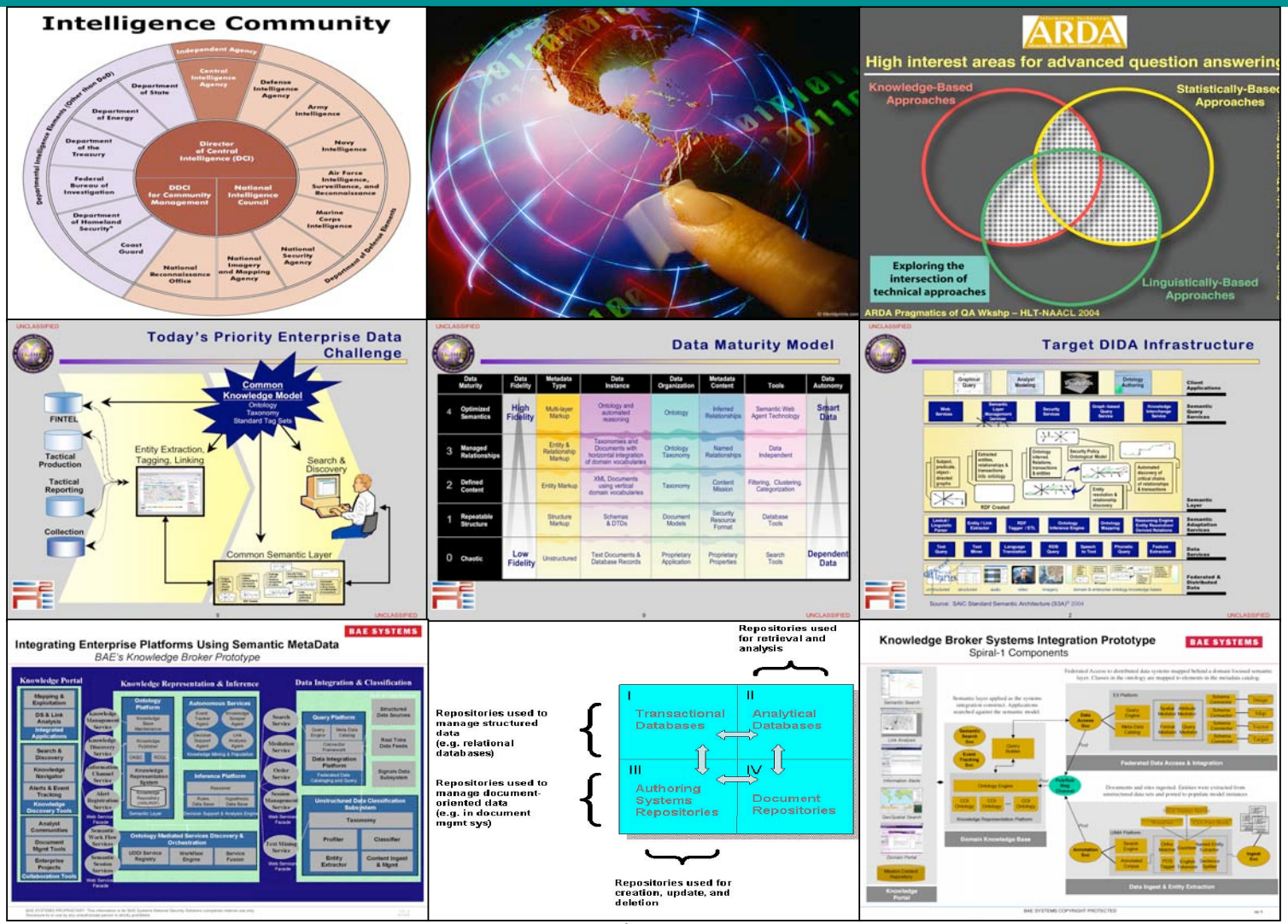


Semantic Wiki

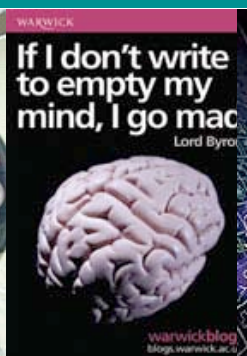


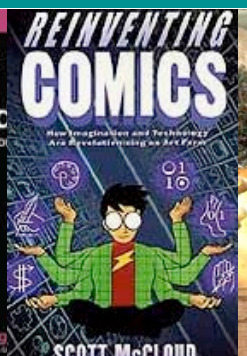


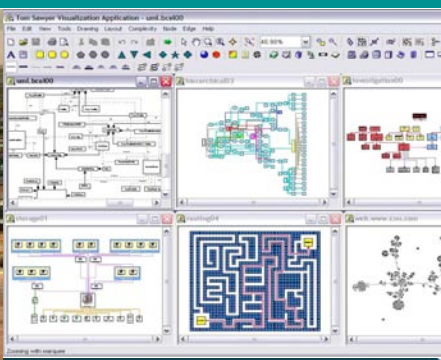
Semantic Analyst

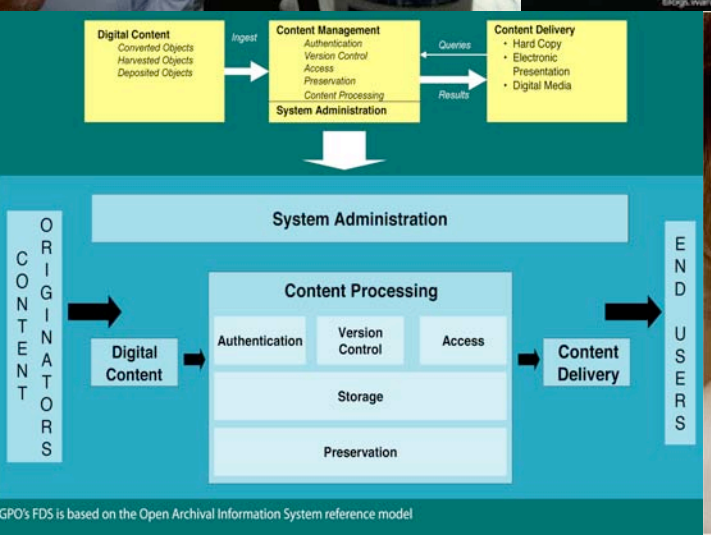


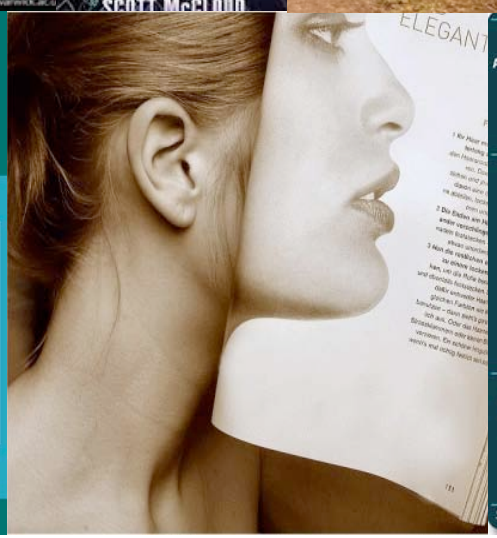
Semantics for Publishing

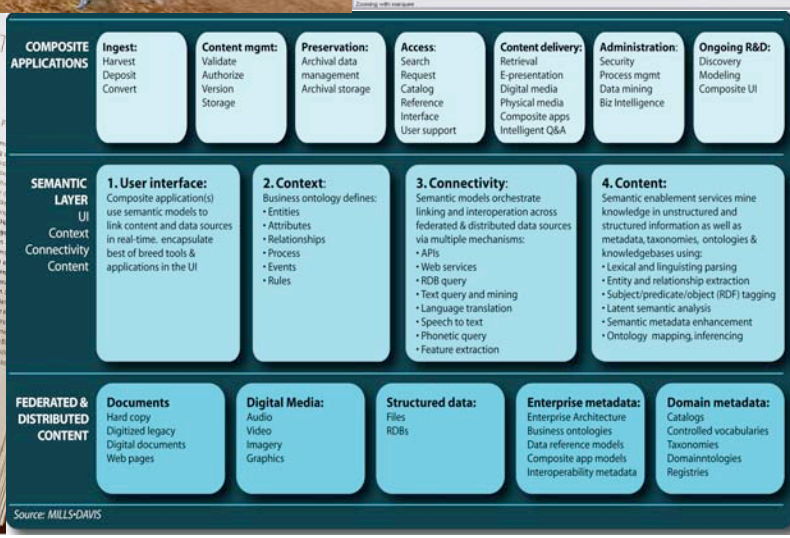




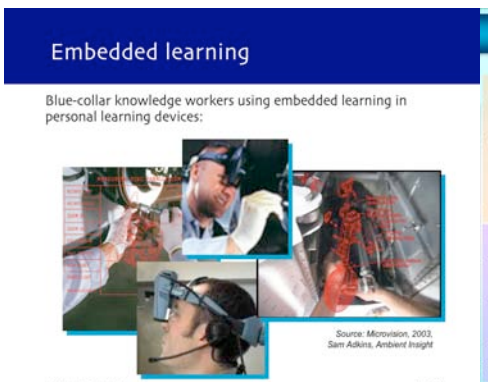


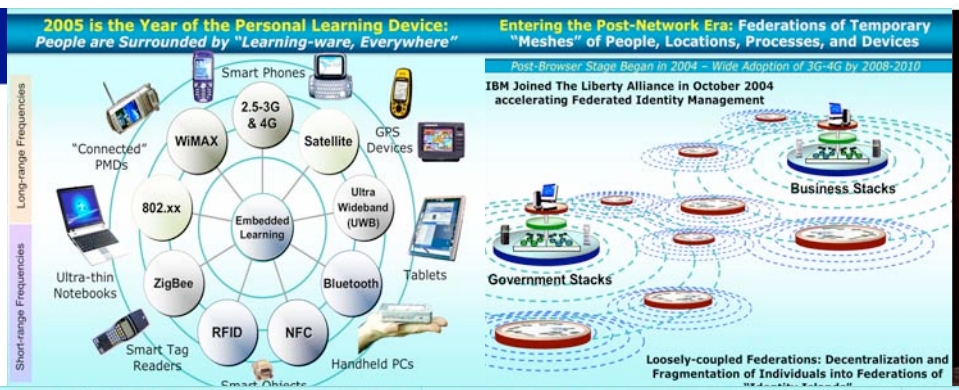


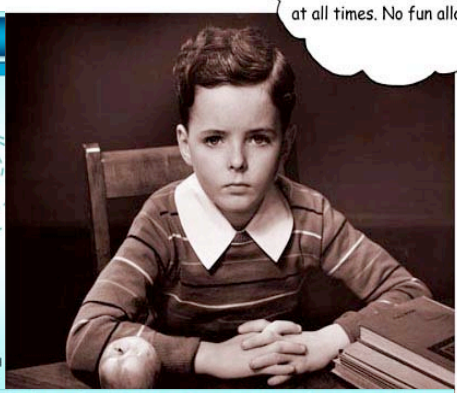




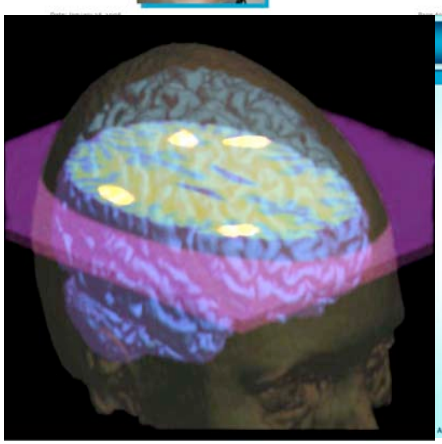
Semantics for Learning

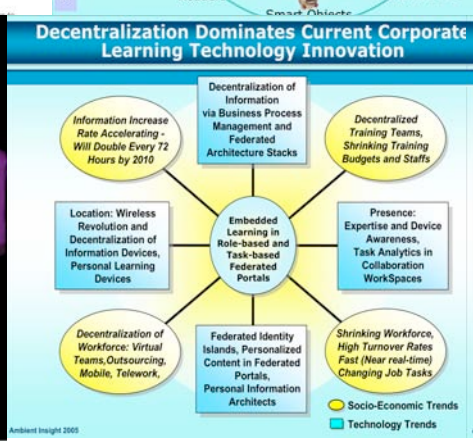


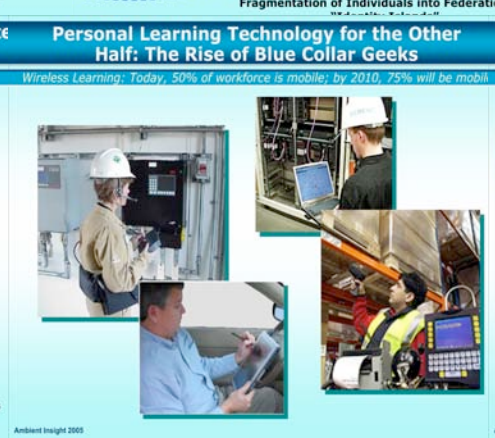




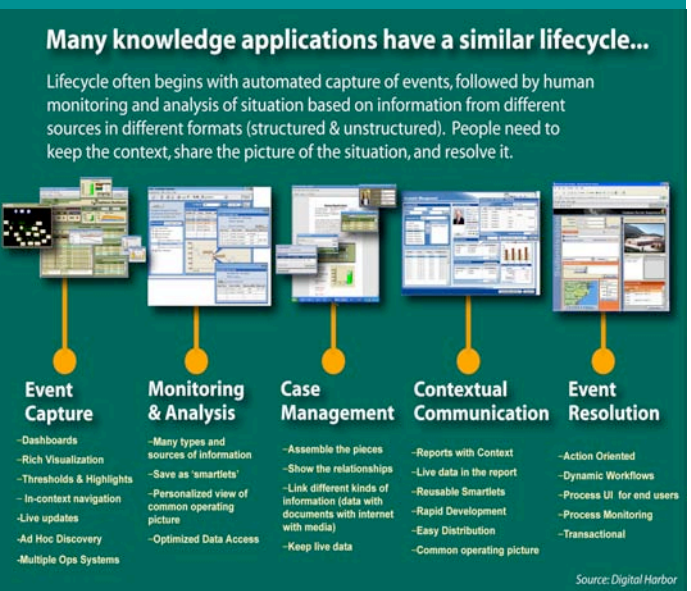
Everyone knows learning must be serious and difficult and you must remain seated at all times. No fun allowed.

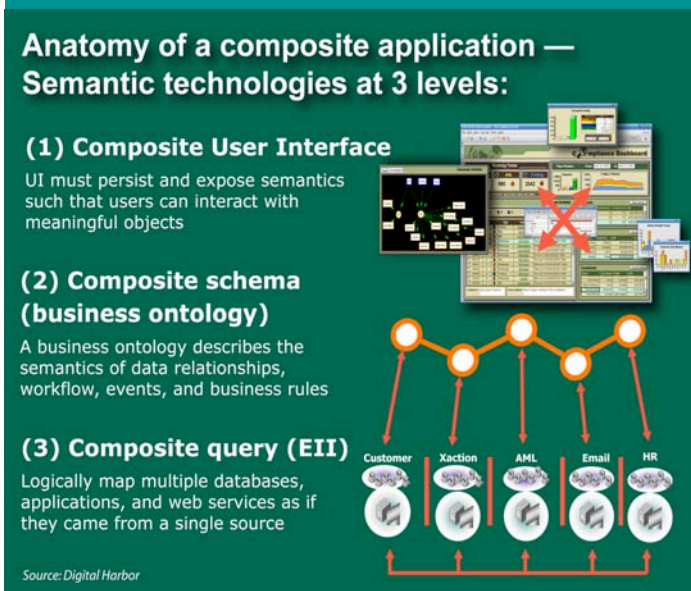


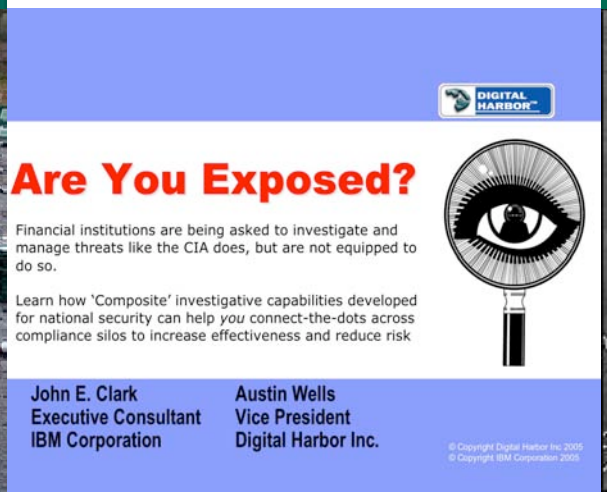


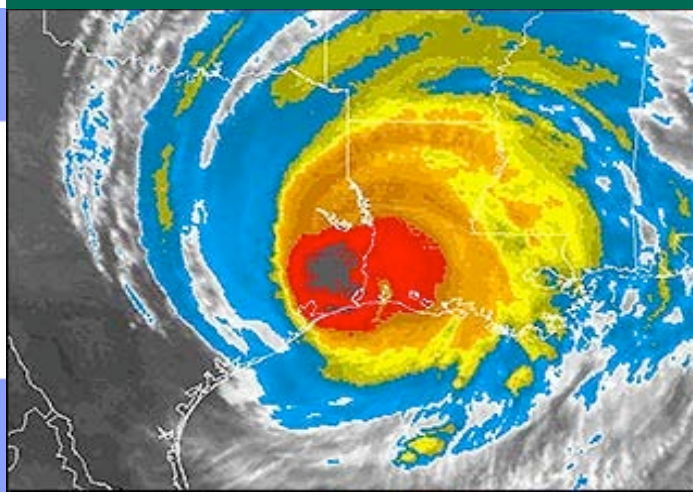


Semantics for Composite Applications

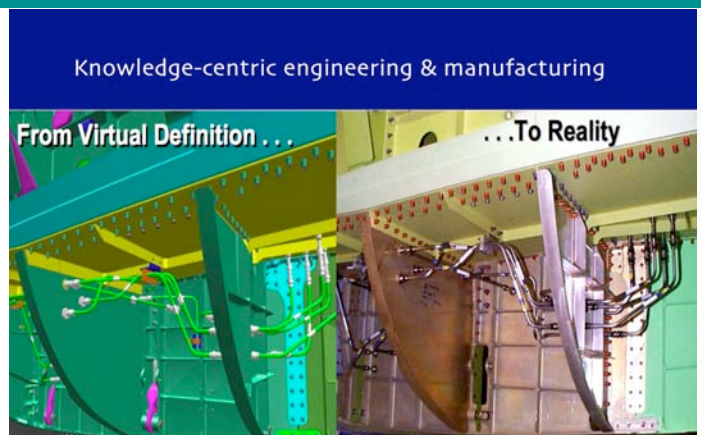


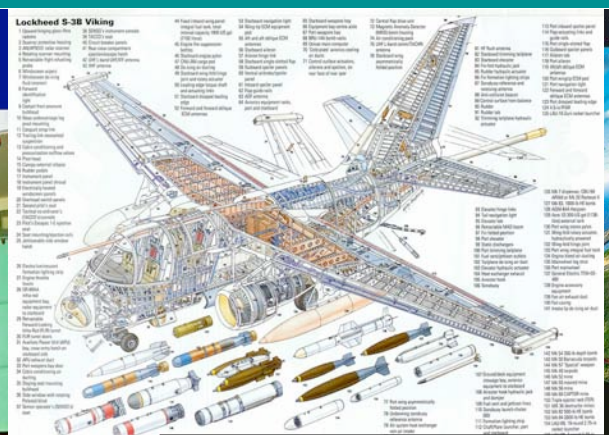


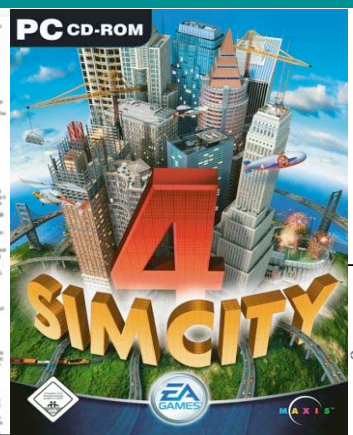


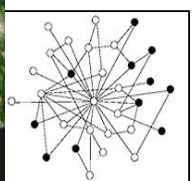


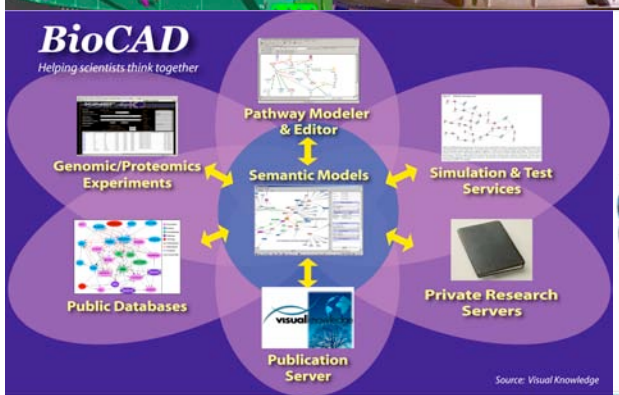
Knowledge Computing

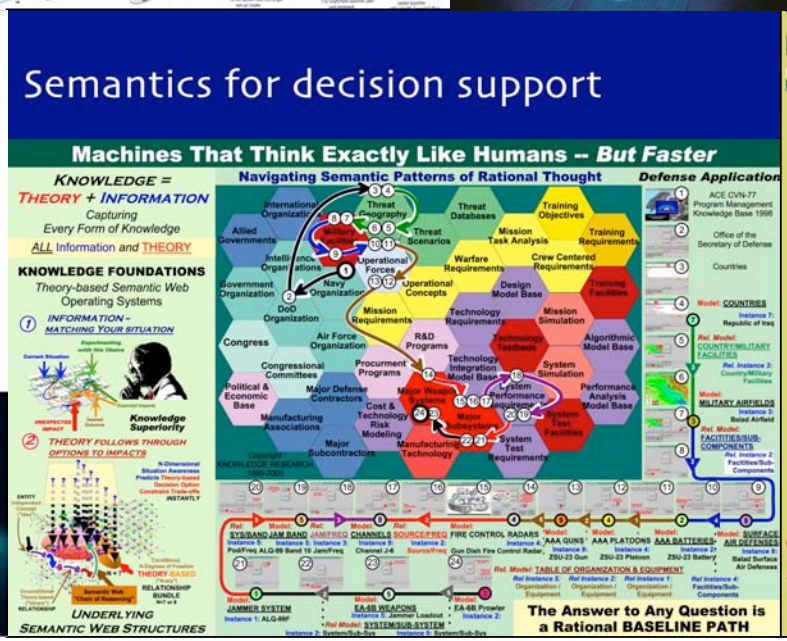


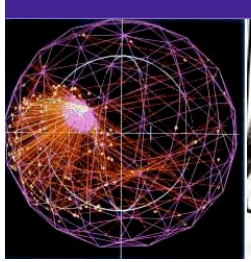


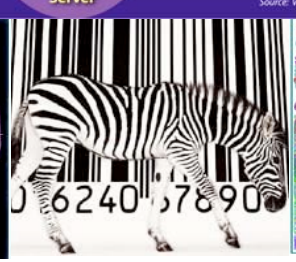


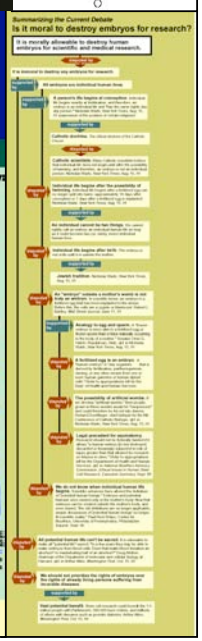




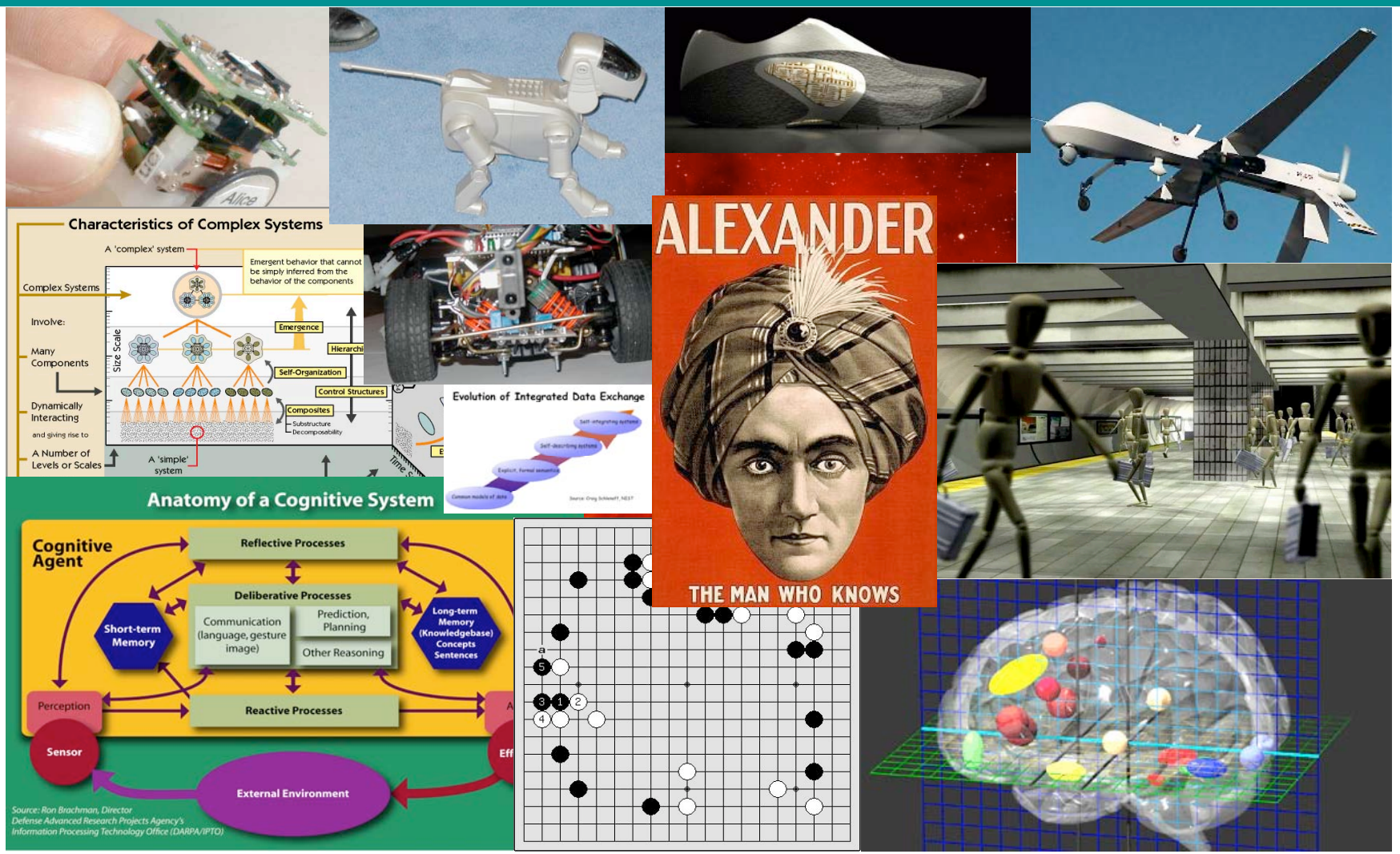








Systems that Know



How do semantic technologies improve performance?

EFFICIENCY	EFFECTIVENESS	EDGE
Cost savings Doing the same job faster, cheaper, or with fewer resources than it was done before	*Return on assets* Doing a better job than the one you did before, making other resources more productive and increasing their return on assets and attainment of mission	*Return on investment* Changing some aspect of what the business does, resulting in growth, new value capture, mitigation of business risk, or other strategic advantage
EARLY ADOPTER CASE EXAMPLES		
20-80% less labor hours 20-90% less cycle time 30-60% less inventory levels 20-75% less operating cost 25-80% less set-up & development time 20-85% less development cost	50-500% quality gain 2-50X productivity gain 2-10X greater number or complexity of concurrent projects, product releases & units of work handled 2-25X increased return on assets.	2-30X revenue growth 20-80% reduction in total cost of ownership 3-12 month positive return on investment 2-300X positive ROI over 3-years

Source: MILLS•DAVIS

Q&A