

Semantic Web

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Innovation Grant

The logo for the MITRE Technology Program, featuring a stylized graphic of stacked blocks in yellow, orange, and blue to the left of the text.

MITRE
Technology
Program

The MITRE logo, consisting of the word "MITRE" in a bold, black, sans-serif font.

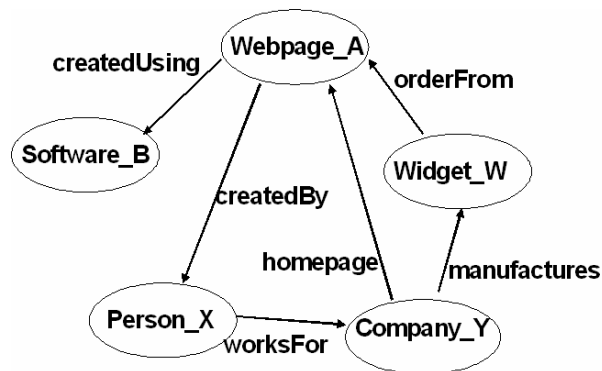
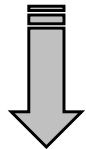
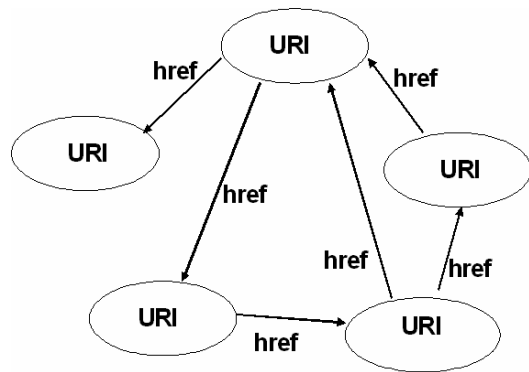
MITRE

Problem

- **The current Web was designed to present information to people, not to other machines.**
 - HTML tells a browser what to display, XML tells how the data is structured, but neither expresses what the data *means*.
- **Semantic Web technologies aim to make the data machine-processable.**
 - Facilitate information discovery and access
 - Process information not originally designed to interoperate
 - Combine information from various sources to create new information
 - Work in an open-world framework where information is incomplete and inconsistent

Background

The Semantic Web is an evolution of the existing Web.



Global "digital dial tone" of Web infrastructure and unambiguous global identity of URIs

enhanced with new standards
influenced by decades of work in

Knowledge Representation & Engineering, Formal Logic, Semantics, and Ontology

giving us new capabilities where

Explicit semantics enable looser coupling and more flexible composition of services and data.

Anyone, anywhere can add to an evolving, decentralized "global database."

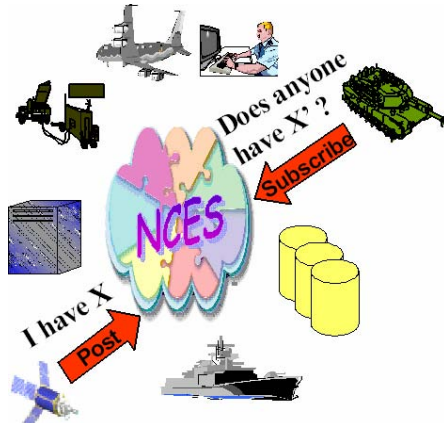
Objective

- **Separate the Semantic Web hype from the facts**
- **Evaluate Semantic Web relationship with other technologies and how it impacts, drives, and is influenced by them**
 - e.g., **Service-Oriented Architectures, Web Services, Human Language Technologies, etc.**
- **Assess how it should/will affect MITRE and our sponsors**
- **Develop recommendations to position MITRE and our customers for the effective use of the Semantic Web**

Activities

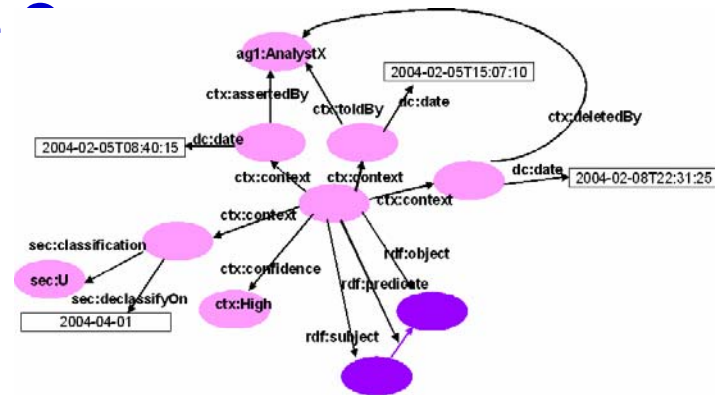
- Investigate the maturity of the Semantic Web and its component technologies
- Develop and examine prospective sponsor-focused use cases
- Derive requirements for Semantic Web technologies from these use cases
- Identify research needs for MITRE's Technology Program

Highlight

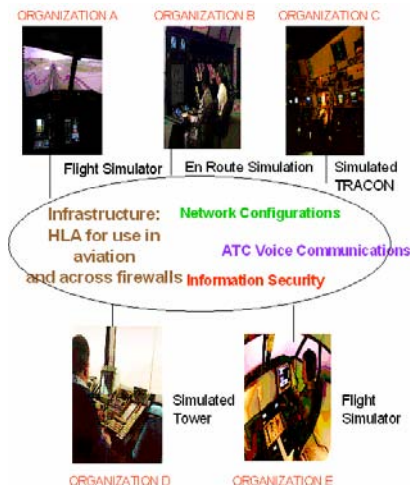


Netcentric Information Discovery & Mediation

Example Use



Capturing and Tracking Metadata



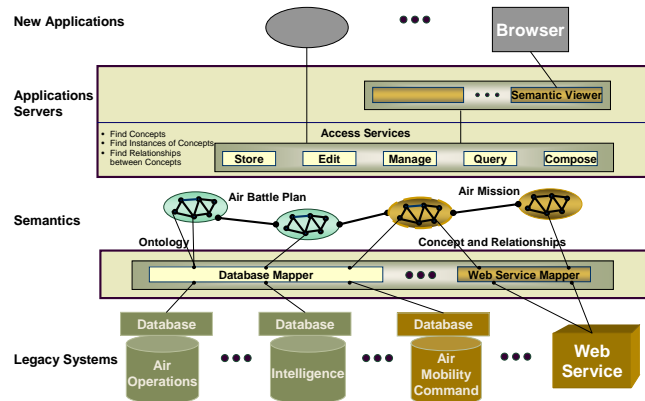
Service Discovery and Interoperability for Advanced Distributed Simulations



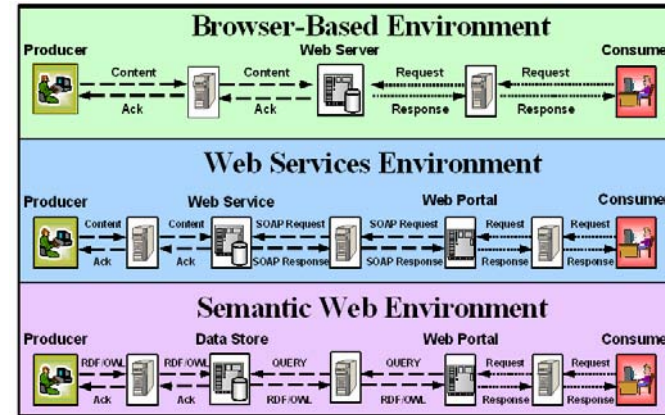
Correlation of Heterogeneous Data for Discovery of Financial Crimes

Highlight

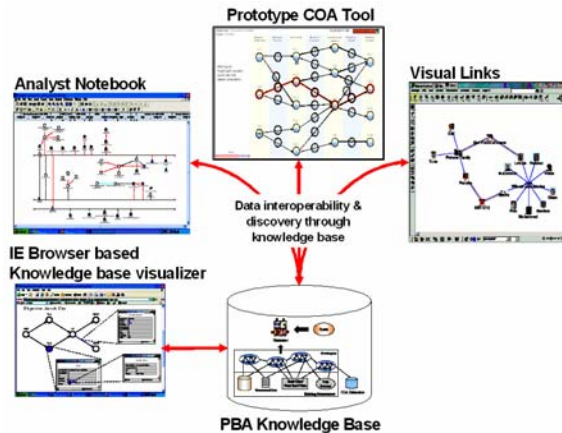
MTP Projects Using Semantic Web



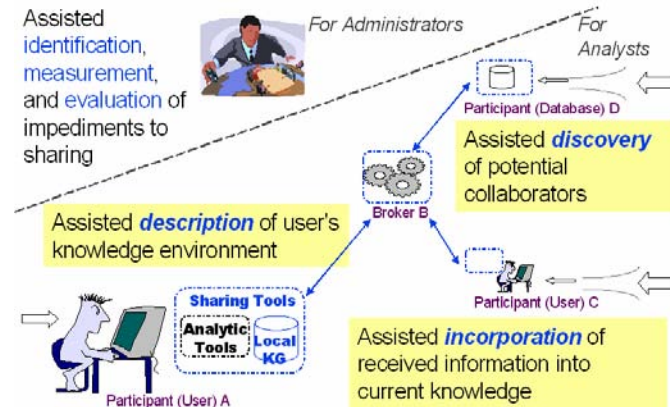
Semantic Integration of the C2 Enterprise



Security Guards for the Future Web



Analysis Support to Predictive Battlespace Awareness

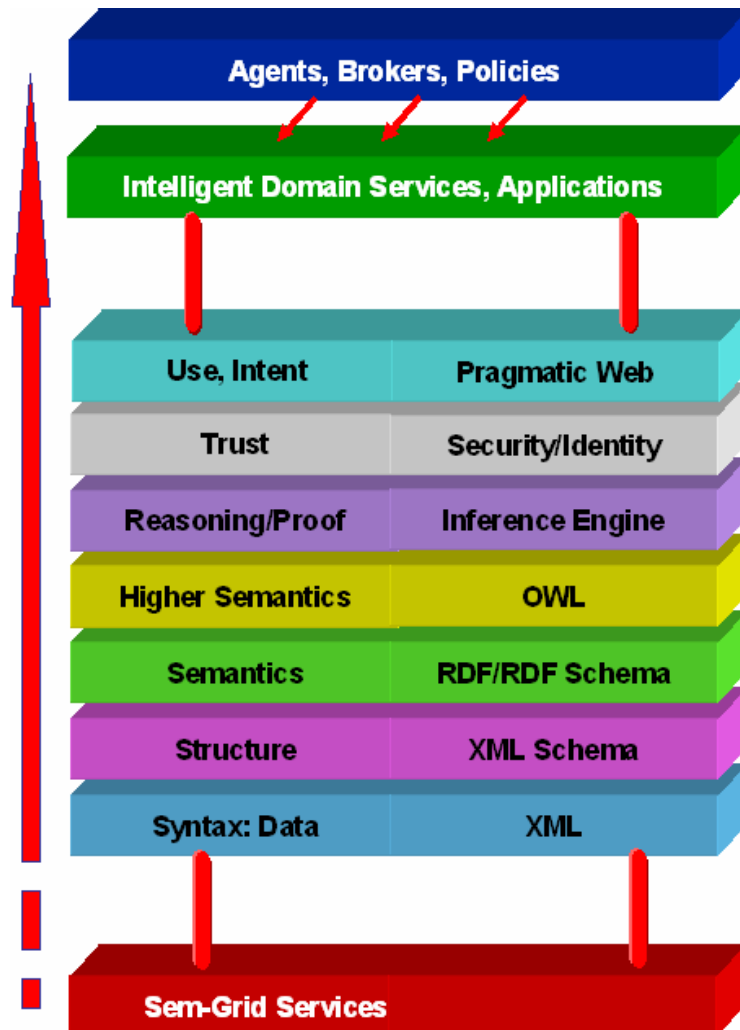


Intelligence Sharing Across Boundaries

Impacts

- **Machine-processable semantics is central to the next generation of information systems.**
- **To be effective, essential elements of the information technology future require getting humans out of the discovery and composability loops.**
 - e.g., data integration/interoperability, service-oriented architectures, netted smart objects (smart dust)
- **Semantic Web technologies offer this potential.**
- **The SWIG's goal is to ensure that MITRE will have the skills and leadership to make this happen.**

Future Plans



More research needed....

- Semantic brokering, mediation, context, & policy servers
- Machine learning, induction of semantic models
- Safe proof-carrying transformations, processing, composing, inference
- Object identity, URI proxies, finding & matching resources
- Automated metadata generation & knowledge base population