The Semantic Interoperability Community of Practice (SICoP) of the Federal CIO Council

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Notice:
In today's presentation, the part of Brand Niemann will be played by:

Ed Barkmeyer

Interoperability Program
NIST

Manufacturing Engineering Laboratory

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Overview

- Who/what is SICoP?
- What are we doing?
  - White Papers
  - Annual Semantic Technologies for eGovernment Conferences
- Relationship to Enterprise Architecture and Service-Oriented Architecture
- Future Activities

Who we are

- The Semantic Interoperability Community of Practice (SICoP) is a group of individuals representing
  - a broad range of government organizations
  - industry and academic partners
  - no formal commitment from agencies or companies
- Objectives:
  - **semantic interoperability** as an **operational** characteristic of software used in Federal agencies.
  - **semantic data integration** among software and data repositories provided by the Federal Government
  - make the Semantic Web operational in members' agencies.

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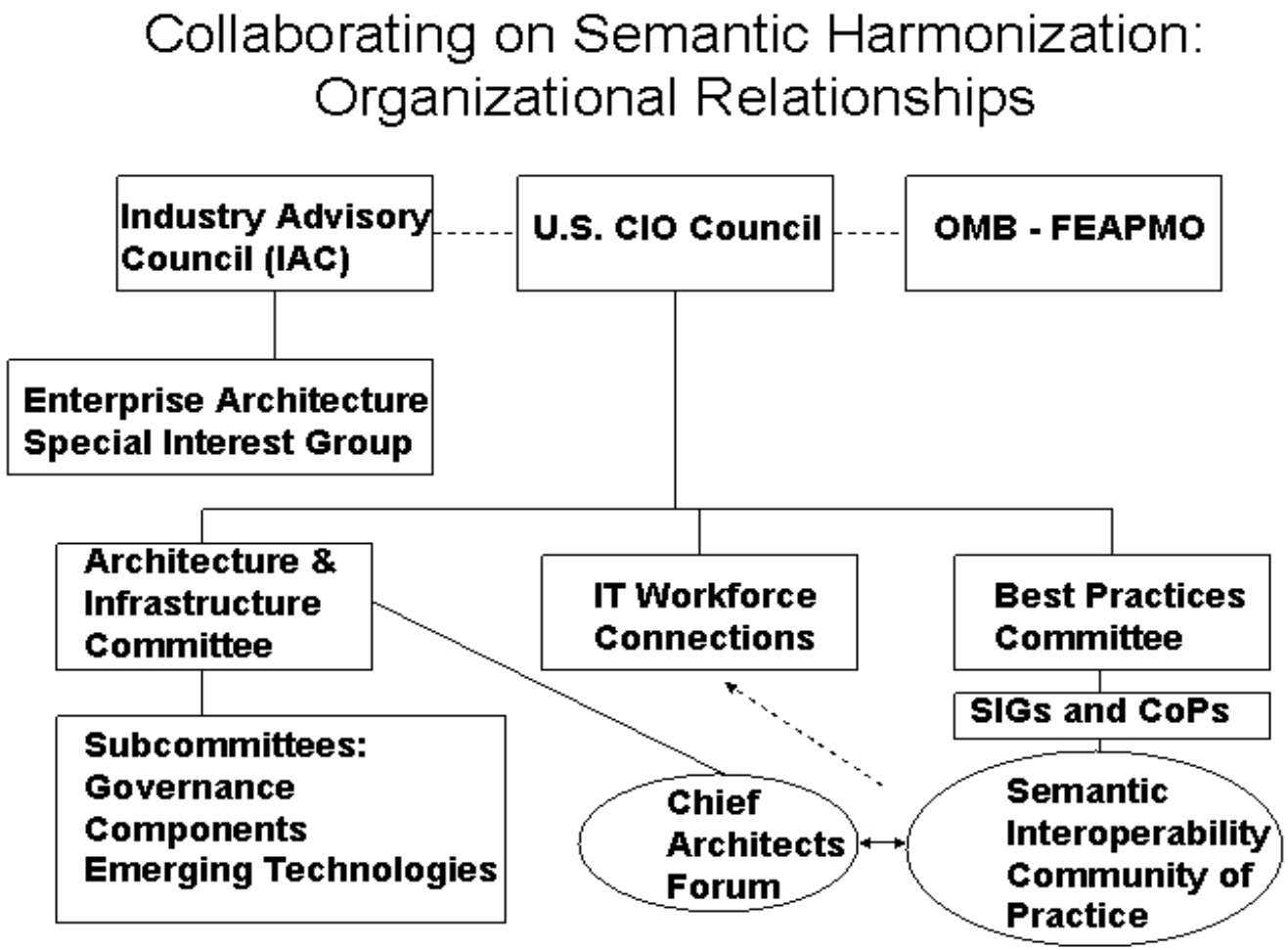
Who we are formally

- SICoP is a Special Interest Group (SIG) within the Knowledge Management Working Group (KMWG) sponsored by the Best Practices Committee of the Chief Information Officers Council (CIOC) of the U.S. Government.
- Responsibility: provide findings and recommendations to the Best Practices Committee
- Approach:
  - meetings, tutorials, conferences, **pilot projects**, etc.
  - promulgating **best practices**.

Organization Structure for Semantic Harmonization



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How did SICoP come about?

- 2002: Semantic technologies discussed in CIO Council XML Web Services Working Group
- 2002-03: Semantic Technologies for eGovernment Pilot
  - See http://web-services.gov
- 9/2003: Semantic Technologies for eGov Conference
  - See http://www.topquadrant.com/conferences/tq_proceedings.htm
- 10/2003: CIO Council Knowledge Management Working Group recommends Community of Practice
  - See http://Km.Gov
- 2003-04: Semantic Technology Training Series TopQuadrant/U. Maryland and other presentations
- 4/2004: SICoP Kickoff Meeting

SICoP Accomplishments

- First Semantic Technology for eGovernment Conference
  - at the White House Conference Center, September 8, 2003
  - http://www.topquadrant.com/conferences/tq_proceedings.htm
- 2nd Semantic Technology for eGovernment Conference
  - September, 2004
  - 40 Defense and civilian agencies represented
  - 50 major contractors represented. :
  - http://www.topquadrant.com/conferences/sept8_2004/stgov04_proceedings.htm
- White Papers

SICoP Partnerships

- Federal XML Working Group
- Government XML CoP
- Ontolog Forum
  - Joint effort to "semantify" the Federal Health Architecture (FHA)
- other communities of practice

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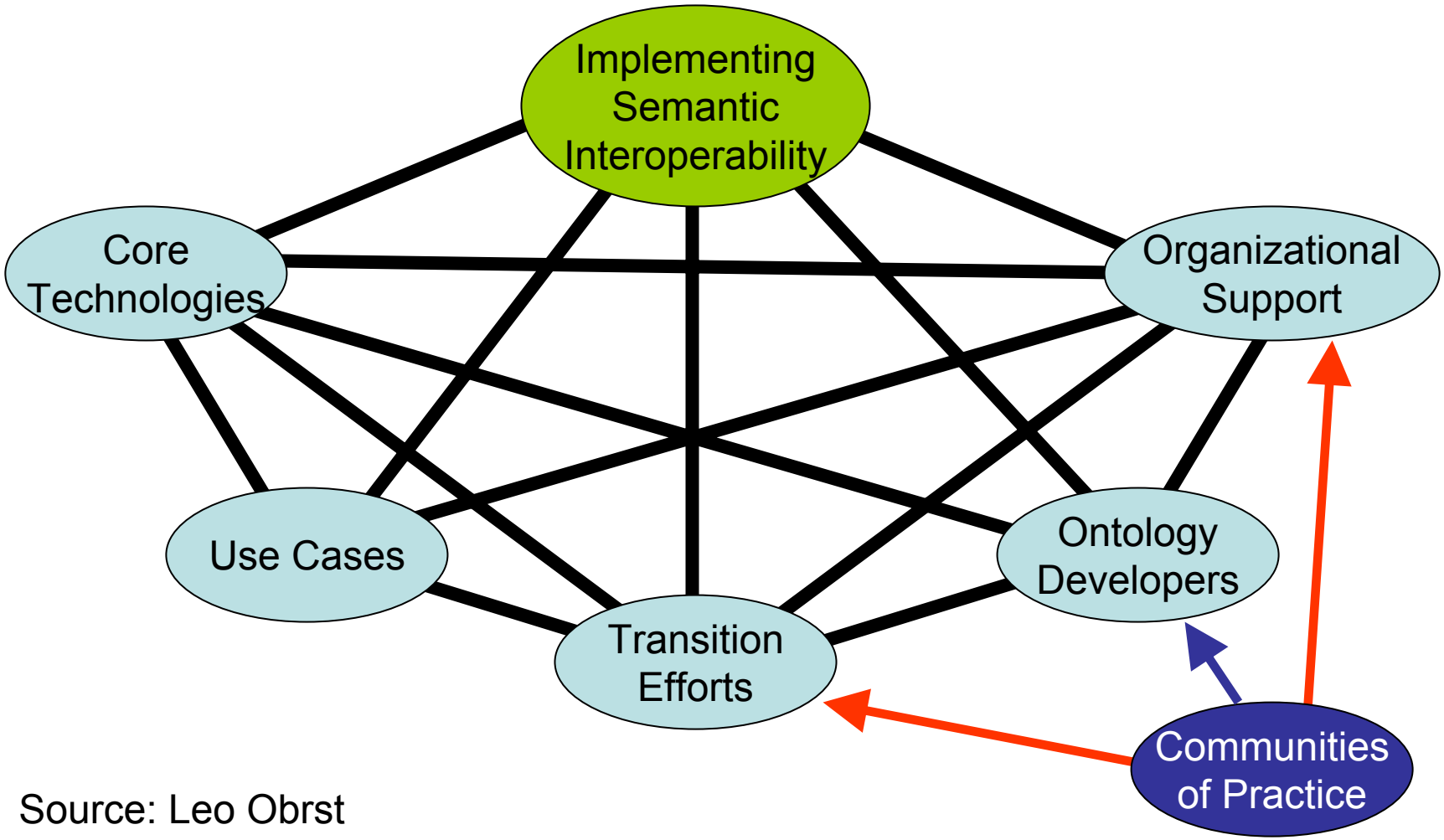
Contours of Practice



Source: Leo Obrst

White Papers (“Modules”)

- 1: Executive Summary: Semantic Technologies and the Vision of the Semantic Web
  - Jie-Hong Morrison, Computer Technologies Consultants, Ken Fromm, Loomia.
  - Published, 4 September 2004, at:
- 2: Exploring the Business Value of Semantic Interoperability
  - Irene Polikoff, TopQuadrant.
- 3: Implementing the Semantic Web
  - Michael Daconta, US Department of Homeland Security.

Semantics

- Semantics = a branch of linguistics that deals with the meaning of words and sentences
- Information Semantics = representation of meaning for computational systems and data
- Meaning changes by context and over time

Semantic Web

- an aggregation of websites and data stores
  - data with semantic markup
  - accessible semantic technologies and services
- Objective: improved response to information requests
  - better information relevance and confidence
  - automated rote search processes
  - intelligent reasoning and brokering agents
- critical infrastructure for the Semantic Web
  - conceptual frameworks
  - reference ontologies
  - well-understood contracts of interaction

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Foundations of the Semantic Web

"The semantic web is not built on radical new technologies"

- established basis technologies
  - computer languages
  - information theory
  - (distributed) database management
  - model-based design
  - description logics
- "meaning" to software agents is based on well-defined formal structures stored with data

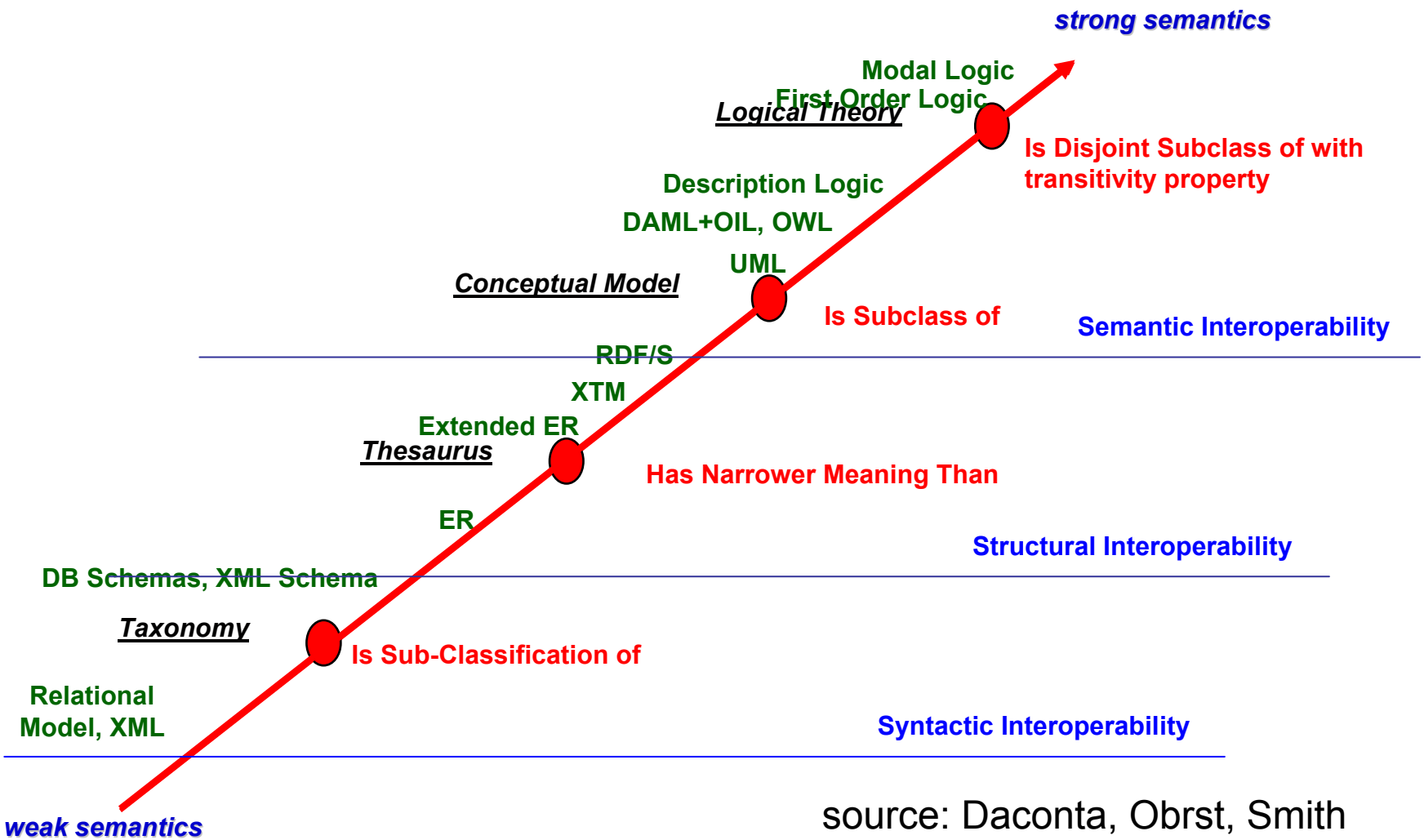
Semantic Interoperability

- a smaller problem than the Semantic Web
- use of semantic technologies and tooling to mediate data and meaning across contexts in a well-defined domain
- depends on reference models and dictionaries for the domain

Key components

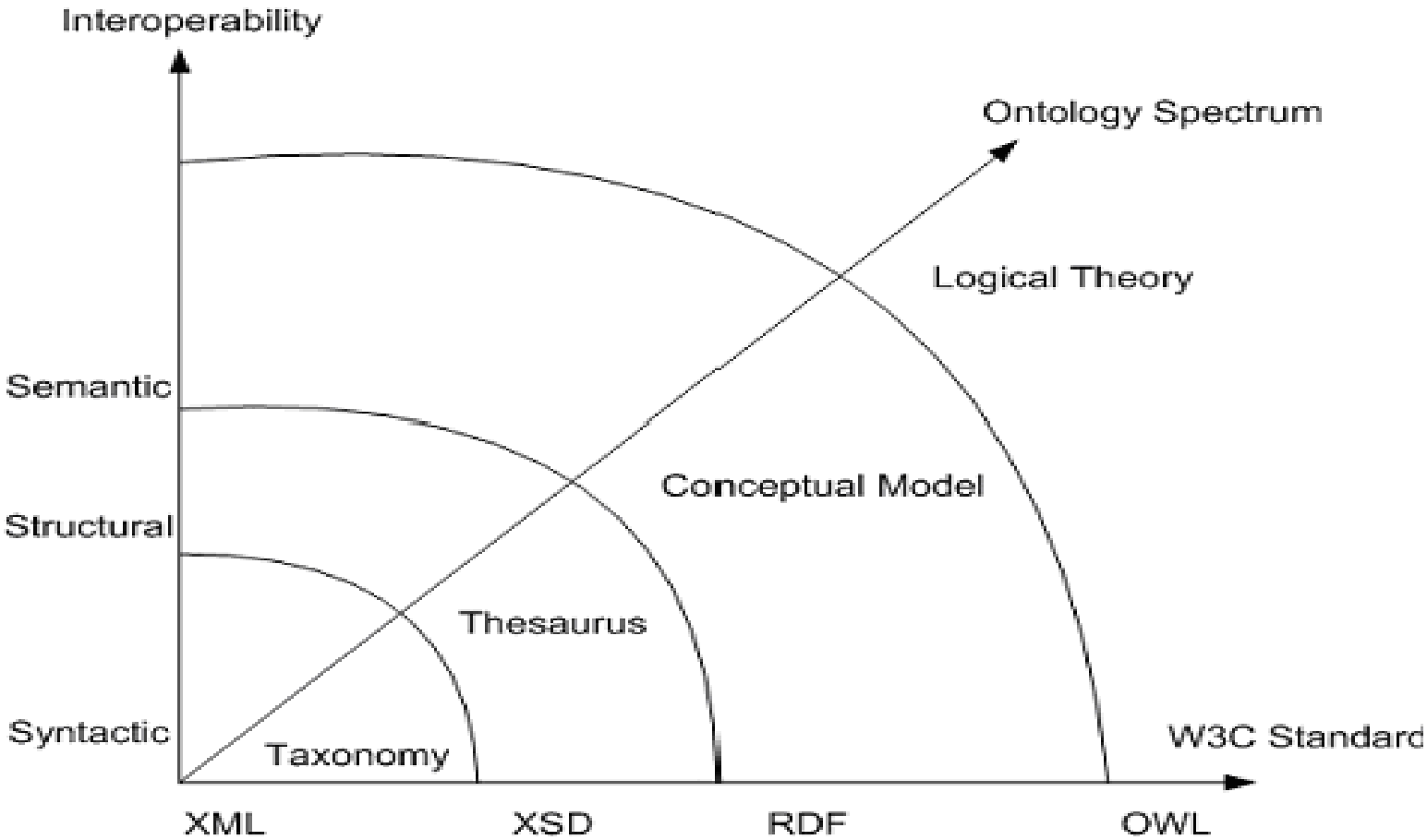
- Technologies/languages
  - XML
  - RDF
  - OWL
- Reference “ontologies”
  - Taxonomies
  - Thesauri
  - Conceptual models (or schemas)
  - Logical theories

Ontology spectrum



source: Daconta, Obrst, Smith

3 Dimensions of Semantic Computing



Adapted by Richard Murphy, GSA (and SICoP Member).

Relationship to Enterprise Architecture

- Three levels of interoperability
  - Organizational Interoperability:
    common goals, interacting business processes, collaborations
  - Technical Interoperability:
    common networks, middleware, representation
  - Semantic Interoperability:
    correct interpretation of exchanged information by recipient in context
- Semantic Interoperability is a major concern in the FEA Data Reference Model

Relationship to Service-Oriented Architecture

- Service-Oriented Architecture
  - information and services provided by Web services
  - service boundaries are explicit
  - services are autonomous
  - services share *schema* and *contract*
  - *policy controls compatibilities*
- Semantic interoperability
  - schema and contract have conceptual models
  - client and service share ***interpretation***
  - compatibility by common interpretation (and conversion when technical schemas differ)

NIST/MEL Interoperability Program

- Scope
  - product and process engineering
  - manufacturing production and supply-chain operations
- Standard schemas and service interfaces
- Testing
  - standards conformance
  - interpretation consistency
- Semantics
  - ontologies for standard schemas and interfaces
  - tooling for ontology development and mapping
  - reasoners to support interpretation testing

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Future SICoP Activities

- Mandates
  - The E-Government Act of 2002
    (Categorization of Government Information)
  - The Federal Enterprise Architecture
    Data & Information Reference Model (DRM)
  - Selected Lines of Business
    (e.g., Data & Statistics and Federal Health Architecture)
- Activities
  - Individual E-Gov Initiatives and Agency Missions;
  - White Paper Modules 2 and 3.
  - Coordination with Semantic Web
    Best Practices and Deployment Working Group
  - Semantic Technologies for eGovernment Conferences

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  - Jeff Pollock, *Network Inference, Inc.*
  - Nancy G. Faget, *U.S. Army Corps of Engineers*
  - Mike Daconta, DHS

Websites

- CIO Council Knowledge Management WG
  http://www.km.gov
- Semantic Interoperability CoP (SICoP)
  http://www.web-services.gov
  (white papers, etc.)
- Collaboration site:
  http://colab.cim3.net

NIST Contacts

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  - ISO 18629 Process Specification Language (PSL)
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