# Ontology for Federation and Integration of Systems

*Ontology Summit 2012*

*March 1st, 2012*

# Proposition

Problem statement

- Federation and integration (information sharing, interoperability, shared services, etc.) is the problem of this decade – it is costing productivity, lives and ~~billions~~ trillions of dollars annually. It is the pre-requisite to solving many problems in the large. It is a problem faced by most CIOs in government and industry.

A problem not solved…

- ISO 15926 addresses some of these concerns but has not been widely implemented or recognized
- Other standards and methods we have do not directly target this problem. Not: UML, OWL, LoD, E/R, SOA, DoDAF, XML Schema, Common Logic or SBVR , etc.
- With all these solutions – we still have a pervasive problem!
- While not ideal, the standards above can and are used for federation and integration, but, they are all built for other purposes and repurposed to solve the integration and federation problems. Experts can pull these technologies together to solve a specific problem, we want to make it easy to do so with an integrated and standardized approach supporting mainstream solutions and internet-scale federation.

# What is Federation?

Combining multiple independently conceived data sources and/or systems and using them together for analytics and other purposes.

**Example**: A sales department may want to combine public, internal and external information about prospect companies as part of their CRM system

**Key term**: *Independently conceived*

- Different systems may use different structures, technologies, vocabularies, identifiers or theories when expressing information about the same things.

Sharing information between potentially independent organizations (and their independently conceived systems).

- **Example**: U.S. Government Information Sharing Environment (ise.gov) initiative to combat terrorism and other threats to the U.S.

# What is Information Federation?

Enabling collaborative processes that may cross organizational boundaries.

- **Example**: An agency wants to outsource human resources but needs to understand how the processes, services and information of their internal department can be satisfied by an external provider. Information federation is essential.

Service Oriented Architecture Mediation and Brokering

- **Example**: U.S. States provide services to access healthcare information but each State's service is different. The federal government as well as other states need to interact. Some level of mediation is required across these independently conceived services. Information exchange and federation is the essence of SOA.

# Federation & Integration - State of the art

Point-point structural transformation of data {Lets hack a solution point}

- Representations : XSD, XSLT, Copybooks, Code {Which are not accessible to most stakeholders}

Standardized or centralized data structures or APIs {One size fits all}

- Representations: XSD, SQL-DD, UML, "Master Data Management"
- Service/API Definitions: WSDL, Corba, SoaML

Canonical data model with proprietary/structural mapping {Convert to MY WAY}

- Representations: E/R, UML Classes, RDFS, Code/Proprietary, Data Warehouse

Web data with point-point links {Publish now, federate later}

- Representations: RDFS+ (SEMWEB/LOD)

Conceptual or logical ontologies (sometimes) with logical links {Abstraction}

- Representations: Ontologies, Rules, UML (With Extensions), SBVR

# Panelists

**Mr. DennisWisnosky et al.**

**Dr. TommiKarhela** (VTT Technical Research Centre, FI)

**Mr. AnatolyLevenchuk** (TechInvestLab, RU)

**Mr. CoryCasanave** (Model Driven Solutions, US)