Digital Engineering Information Exchange
Working Group (DEIXWG):
Product Descriptions & Next Steps

John H. Coleman, Ph.D.
DEIX WG Chair
John.Coleman@Engility.com
Engility Corporation

Chris Schreiber
DEIX WG Co-Chair
Chris.Schrieber@LMCO.com
Lockheed Martin Corporation

Frank J. Salvatore
DEIX WG Co-Chair
Frank.Salvatore@sEngility.com
Engility Corporation

NDIA 21st Annual Systems Engineering Conference
Grand Hyatt Tampa Bay, Tampa, FL 33607
October 22 - 25, 2018
Digital Engineering Information Exchange Encyclopedia (DEIXPedia)

The project, the need, and the product

John H. Coleman, Ph.D.
DEIX WG Chair
John.Coleman@Engility.com
Engility Corporation
The Product Development Project:
Digital Engineering Information Exchange Encyclopedia (DEIXPedia)
Project Lead: John Coleman

- **The Effort:** Develop DEIX Encyclopedia
  - **IDENTIFY:** Based on usage in digital engineering /MBSE literature
  - **DESCRIBE:** Sufficiently describe thematic topics, NOT words or phrases
  - **ACCEPT:** Achieve community acceptance
  - **EVOLVE:** Improve thematic topics as community’s thinking evolves
  - **ADOPT:** Monitor adoption of thematic topics

- **Need Volunteers for** Encyclopedia Products:
  - **EXPERTS/WRITERS** to provide content and write encyclopedia entries
  - **TECH-EDITORS** to ensure consistency of formatting, grammar, and structure
  - **PEER-REVIEWERS** to agree that the entries accurately reflect current thinking & use

For More Information Go To OMG MBSE Wiki:
http://www.omgwiki.org/mbse/doku.php
The Need for DEIXPedia

• No majority agreement on common concepts in the digital engineering community

• Challenges with current concepts
  • TOO MANY variations of DEIX thematic topics in use
  • UNOFFICIAL descriptions of DEIX thematic topics
  • CONFUSION with thematic topics borrowed from other fields
  • DISAGREEMENT on proper application thematic topic names
Product Description:
The DEIXPedia

• Think “Wikipedia” or Online Encyclopedia
• Entries are 500 to 1,000 words – 1 to 2 pages
• Description of Encyclopedia Article
  • Provides in-depth explanation of thematic topics
  • Extensive explanation of Digital engineering topics
  • A place for community critiques & consensus of topics as they evolve

• Notional Outline for Encyclopedic Entry
  • Concise Definition
  • The Concept Details
  • Common Usage
  • Examples
  • Similar Concepts
  • Related Terminology
  • References
Finite Set of Digital Viewpoint Models (DVM)

The project, the need, and the product

Frank J. Salvatore
DEIX WG Co-Chair
Frank.Salvatore@sEngility.com
Engility Corporation
The Product Development Project: Define a Finite Set of Digital Viewpoint Models (DVM)

Project Lead: Frank Salvatore

• **The Effort:** Decide on formalisms and conventions for a generic digital viewpoint model that stakeholders can use to offer or requests for any ISO 15288.2 Review
  - **DEFINE:** The finite set of 15288.2 reviews and the critical stakeholders for those reviews
  - **DESCRIBE:** A generic digital viewpoint model with agreed formalisms and conventions
  - **MODEL:** 1 or 2 examples of digital viewpoints required for ISO 15288.2 reviews
  - **EVALUATE:** Seek comments and inputs from the broader community
  - **ADOPT:** Solicit and catalog any Digital Viewpoint Models the community creates

• **Need Volunteers for** Digital Viewpoint Models:
  - **INFORMATION & DATA MODELERS** to develop information flow models for digital viewpoints
  - **SYSTEMS ENGINEERS** to define typical sources, models, and data for MBE digital artifacts
  - **REQUIREMENTS ANALYSTS** to elicit stakeholders’ requirements for ISO 15288 digital views

The Need for DVM

- No finite set of digital viewpoints for reviews in ISO 15288 systems engineering lifecycle standards

- Challenges:
  - **NONCOMPLIANCE**: Entities can not definitively define digital artifacts that satisfy the letter and intent of contractual obligations
  - **MISSUNDERSTANDINGS**: Non-standard descriptions of digital artifacts inhibit mutual understandings of acquirer and suppliers’ needs
  - **INSUFFICIENT**: Descriptions of digital artifacts are insufficient to leverage the interactivity and collaborative capabilities of digital technology
  - **INEFFICIENT**: Cyclical conversion of digital artifacts to e-documents adds costs
  - **DISATISFACTION**: Static e-documents do no satisfy all stakeholders’ diverse needs
Product Description:
The Digital Viewpoint Model

- Think Information Flow Models for Digital Views
- Description of Generic Digital Viewpoint Model (DVM)
  - Provides Platform independent description of generic digital viewpoint model
  - Defines formalisms and conventions for DVM
  - Serves as means to define SW Controller for Digital Views
  - For the Digital View, the DVM expresses
    - Content
    - User Interaction
    - Control Behavior
- Includes 1 or 2 Examples of Digital Viewpoint Model for 15288.2 Review(s)
- Notional Components
  - IFML Meta model
  - Interaction Flow Model
  - Domain Model
  - Viewpoints
Model-centric Digital Engineering Information Exchange Model (DEIXM)

The project, the need, and the product

Chris Schreiber
DEIX WG Co-Chair
Chris.Schrieber@LMCO.com
Lockheed Martin Corporation
The Product Development Project:
Model-Centric Digital Engineering Information Exchange Models (DEIXM)
Project Lead: Chris Schreiber

• The Effort: Create a reference model for exchanging information in a model-centric engineering ecosystem
  • DESCRIBE: The formalisms and conventions for exchanging model-centric digital artifacts
  • IDENTIFY: The models commonly or universally exchanged between entities and roles within the digital engineering ecosystem
  • DEFINE: The characteristics and attributes of models commonly or universally exchanged
  • MODEL: The exchange of model-centric digital artifacts that supports a generic engineering ecosystem
  • SHARE: The models with the broader community

• Need Volunteers for Encyclopedia Products:
  • ENTERPRISE SYSTEM MODELERS to develop information exchange in an enterprise of enterprises model
  • INFORMATION & DATA MODELERS to define typical sources and types digital artifact exchanges
  • REQUIREMENTS ANALYST to elicit and model top-level requirements for information exchanges

For More Information Go To OMG MBSE Wiki:
http://www.omgwiki.org/mbse/doku.php
The Need for Model-Centric DEIXM

- No industry wide ability to develop, maintain, identify and discover, or reuse engineering models between parties in an digital engineering ecosystem

- Challenges:
  - **UNORGANIZED**: No governance, rules, or criteria that define how to seamlessly exchange engineering models in an engineering ecosystem
  - **ADHOC PROCESSES**: No systematic procedures to exchange engineering information with diverse roles in a digital engineering ecosystem
  - **STRUCTURELESS**: No architecture to facilitate the creation of a digital engineering environment or ecosystems to exchange engineering information
  - **NO STANDARDS**: No agreed conventions for entities that want to participate in a digital engineering ecosystem to share or exchange their engineering information
Product Description: The Model-Centric DEIXM

- Think of National Information Exchange Model (NIEM)
- Describes an information exchange model for model-centric digital artifacts in an engineering ecosystem
  - Models of commonly exchanged model-centric digital artifacts
  - Models of Roles and Entities
  - Models of Associations & Relationships
  - Models of processes for exchanging
  - Proposed conformance rules to participate
- Notional Components
  - Meta-data and Meta-models
  - Information Exchange Requirements Model
  - Engineering Enterprise Systems Models
  - Model-centric Digital artifacts Data Models
Digital Engineering Information Exchange (DEIX) Standards Framework

The project, the need, and the product

Celia Tseng
Project Lead for DEIX-SF
celiastseng@gmail.com
The Product Development Project:
Develop Digital Engineering Information Exchange Standards Framework (DEIX-SF)
Project Lead: Celia Tseng

• **The Effort:** Create a framework for official standards related to Model-Centric Information Exchanges
  - **SEARCH sources and repositories** for information exchange standards
  - **IDENTIFY needs for standards** to facilitate seamless exchanges of model-centric digital artifacts
  - **REVIEW existing standards** for content for relevance to needs for standards.
  - **ANALYZE relevant standards** to determine acceptability, overlaps, and gaps
  - **CREATE a standards hierarchical framework** and references to acceptable standards
  - **RECOMMEND to INCOSE Standards Committee** modifications or new standards to fill gaps or meet needs

• **Need Volunteers for** Encyclopedia Products:
  - **RESEARCHERS** to search and identify relevant standards
  - **ANALYSTS** to analyze relevant standards for relevance, applicability, and needs
  - **STANDARDS AND POLICY EXPERTS** to advise product team and broker information & relationships

For More Information Go To OMG MBSE Wiki:
http://www.omgwiki.org/mbse/doku.php
The Need for DEIX-SF

- No industry-wide agreement on standards or conventions to enable a universal exchange of digital artifacts between buyers and suppliers in a global supply chain

- Challenges:
  - **NO STANDARDS**: No agreed conventions for entities that want to participate in a digital engineering ecosystem to share or exchange their engineering information
  
  - **COMPETING STANDARDS**: Many related industries, professional disciplines, and open communities have competing, duplicative, or inconsistent standards for information exchange
  
  - **COMPLEXITY**: Difficulty in achieving dominant standards naturally with the degree of diversity among model information, stakeholders, and interrelationships
Product Description:

The DEIX-SF

- Think of National Building Information Model Standard (NBIMS)
- Hierarchal expression of engineering information exchange standardization
  - Needs Analysis for Standards
  - Subset of Standards Organizations' repositories
  - Summarize Literature review of relevant standards
  - Results of Gap Analysis
  - Recommendations
- Notional Outline
  - Hierarchy of Needed Standards
  - Catalog of Relevant Standards
  - Requirements to fill Gaps
  - Recommendations to INCOSE Standards Committee
  - Proposed Engagement Plan for Standards Organizations

The Standards Framework

Document Tree

Related to Exchanging Digital Artifacts
DEIX Working Group’s NEXT STEPS
The project, the need, and the product

John H. Coleman, Ph.D.
DEIX WG Chair
John.Coleman@Engility.com
Engility Corporation
Seeking a More Diverse DEIX WG Stakeholder Community that use Model-Centric Digital Artifacts

**Diverse International Business Representation**

*Seeking Engineers and Product Development Businesses from the Global market place*

**Diverse Industrial Representation**

*Seeking representatives from all types of product based and science & engineering services industries*

**Diverse International Governments Representation**

*Seeking representatives from any international government organizations*
<table>
<thead>
<tr>
<th>Stakeholder Entry</th>
<th>U.S. Industrial Base Liaison and Advocate</th>
<th>U.S. Government Interdepartmental Liaison and Advisor</th>
</tr>
</thead>
</table>
| **International Engineering Community Liaison and Advocate** | **Mr. David Allsop**  
The Boeing Company  
NDIA Co-Chair, Modeling & Simulation Committee  
david.allsop@boeing.com  
**NDIA M&S Website**  
http://www.ndia.org/divisions/systems-engineering/committees/modeling-simulation-committee | **Ms. Philomena Zimmerman**  
Deputy Director, Engineering Tools & Environments  
Philomena.M.Zimmerman.civ@mail.mil  
**Defense Innovation Marketplace**  
https://defenseinnovationmarketplace.dtic.mil/  
**DASD, Systems Engineering**  
https://www.acq.osd.mil/se |

| **Mr. Troy A. Peterson**  
SSI  
Assistant Director, Transformational  
tpeterson@systemxi.com | **INCOSE Website**  
https://www.incose.org/ |  
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