INCOSE Wasatch Chapter Meeting
INCOSE IW Outbrief

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Summary

- IW Overview
- Individual Experiences & Takeaways
  - Paul White
  - Paul Nelson
  - John McCrea
- INCOSE Working Groups
  - Status – Alive, Growing, Dead
  - Configuration Management WG (Paul Nelson)
  - Digital Engineering Information Exchange WG (DEIXWG) (John McCrea)
  - Model-Based Enterprise Capabilities Matrix
  - Solicitation for involvement
- Discussion & Next Steps

INCOSE IW Overview

- 4 Days: January 26-29, 2019
- Torrance, California
- 200 sessions
- Up to 5 sessions running concurrently
- Most working groups were present
- 4 Town hall meetings
- Leadership meetings
- Receptions
- Networking

2019 Annual INCOSE international workshop
Torrance, CA, USA
January 26 - 29, 2019

Paul White Takeaways

- Saw how big INCOSE really is and what is going on with working groups
- MBSE was 1/3 of the sessions—increasing focus on MBSE
- 50% of working groups were present – could see which were active and strong and what they were working on
- How can we improve membership recruitment and retention?
- Certification & Academic Equivalence
- Professional Development Portal
- Americas Sector Regional Model
- Future of Systems Engineering (FuSE) Initiative – SE on AI, Internet of Things (IoT), and distributed manufacturing
- SEP Reception
- Training opportunities for us in Utah
- Working Groups & Wasatch collaboration

Paul Nelson Takeaways

- Trends:
  - ~70% of the sessions were focused on the Systems Engineering function/silo and not the broader end to end systems engineering for a system of interest needs (e.g. program, enterprise system, etc.)
  - MBSE has almost a cult following without strong data/business justification; seems to be a marketing ploy to funnel more investment towards systems engineering (not necessarily a bad thing). Odd that MBSE has an agenda within the IW agenda. About 30-40% of the event is the MBSE track.
  - I observed some new attendees and comments about how "intimidating" of a conference INCOSE (lots of PhDs, critical thinkers who mean well, but can be unapproachable)
  - Very A&D heavy attendance (Customers, OEMs, Suppliers, Vendors)
- Takeaways:
  - Great event and a great opportunity to learn and grow from a career development standpoint; great for networking as well (receptions, lunches, etc.).
  - Most beneficial to attend IW if you are involved in the working groups; IS is better for observation
  - FuSE (Future of Systems Engineering) Initiative was interesting to me:
    - https://www.incose.org/docs/default-source/events-documents/iw2019/wis-market-place/fuse-market-place-20190129.pdf?sfvrsn=2eb392c6_2

John McCrea Takeaways

- INCOSE is far more international than I realized, but still very US and specifically aerospace/defense focused
- Very different than traditional “conference”
  - best to get involved in 1-3 WGs and stick with those than hopping all over the place
- MBSE runs the world
- INCOSE IS 2020 is in South Africa!
- Challenges precede Working Groups
- Certification opportunities – free CSEP exam
- DEIX WG (Digital Engineering Information Exchange)
- Challenge - MBSE Enterprise Capabilities Matrix
- LOTAR (Long Term Archival and Retrieval)
- Training – internal and external opportunities
- INCOSE members can party!

Part of DEIXWG Team

Working Groups & Status

Working Group	Status	Working Group	Status	Working Group	Status	Working Group	Status	Working Group	Status
Affordability		Digital Engineering Information Exchange (DEIXWG)		Measurement		Product Line Engineering		Systems Engineering Case Study (emerging)	
Agile Systems & SE		Enterprise Systems		Model Based Systems Engineering		Reliability Engineering		Systems Engineering Quality Management (SEQM)	
Anti-Terrorism International		Global Earth Observation System of Systems (GEOSS)		Model-based Conceptual Design		Requirements		Systems of Systems	
Architecture		Healthcare		Motor Sports		Resilient Systems		Systems Science	
Automotive		Human Systems Integration		NAFEMS-INCOSE Systems Modeling & Simulation		Risk Management		Tool Integration and Model Lifecycle Managment	
Competency		Infrastructure		Natural Systems		SE Effectiveness		Training	
Complex Systems		In-Service Systems		Net-centric Operations		SE Tools Database		Transportation	
Configuration Management		Integration, Verification, & Validation (emerging)		Object-Oriented SE Method		Space Systems		VSME	
Cost Engineering		Knowledge Management		Oil and Gas		System and Software Interface			
Critical Infrastructure		Lean Systems Engineering		PM-SE Integration		System Safety			
Decision Analysis		Life Cycle Management		Power & Energy Systems		System Safety Integration			
Defense Systems		MBSE Patterns		Process Improvement		System Security Engineering			

CM WG Purpose

… is to ensure that the **state of the art** and the **body of knowledge** in **CM** be used to enhance the state of the art and the body of knowledge of **SE**; and vice versa. The CM WG will lead this effort within INCOSE; in liaison with external CM related **experts**, **standardization bodies** and other **organizations** and **communities**, as appropriate.

CM Working Group Work Potential Products

- Identify Software Engineering CM practices and technologies (source code management, package deployment…) that should be carried over into existing engineering standards (CMII, EIA-649, ...)
- Identify scope of CM we want to tackle: release process, version management, variant management (PLE), branch and merge, ...
- Define accountability process for reconciling changes across disciplines integrated by MBSE (CM of CMs)
- Upgrade CM glossary to MBSE scope
- Describe CM vision in a digital thread/twin implementation

DEIX-WG

- Supports the strategic objective to accelerate the Transformation of Systems Engineering to a model based discipline
- Aspires to ensure Digital Artifact are transferable within industries with complex systems
- Successful fulfillment of this mission allows for the free flow of digital artifacts between buyers and suppliers throughout a global supply chain; as well as, enable the collaboration between disciplines within those industries
- **Thought Areas:**
  - Topical Encyclopedia for Digital Engineering Information Exchange (DEIXPedia)
  - Digital Engineering Information Exchange Model
  - Digital Viewpoint Model (DVM)
  - DEIX Standards Framework
- http://www.omgwiki.org/MBSE/doku.php?id=mbse:deix

DEIX-WG Continued

- Scope includes the following activities:
  - The WG activities and products span the systems engineering lifecycle as it relates to Digital Engineering information inputs and outputs of ISO 15288 and 15289 digital artifacts.
  - The WG will also addresses the exchange of digital artifacts between various technical disciplines involved in the systems engineering lifecycle.
  - The WG covers the presentation of digital engineering information to classes of technical and non-technical stakeholders across the complex global supply chain.
- 12 week sprint increments
- Weekly meetings Friday Mornings

DEIXWG Digital Viewpoint Model (DVM) Sub-Group Concept Model

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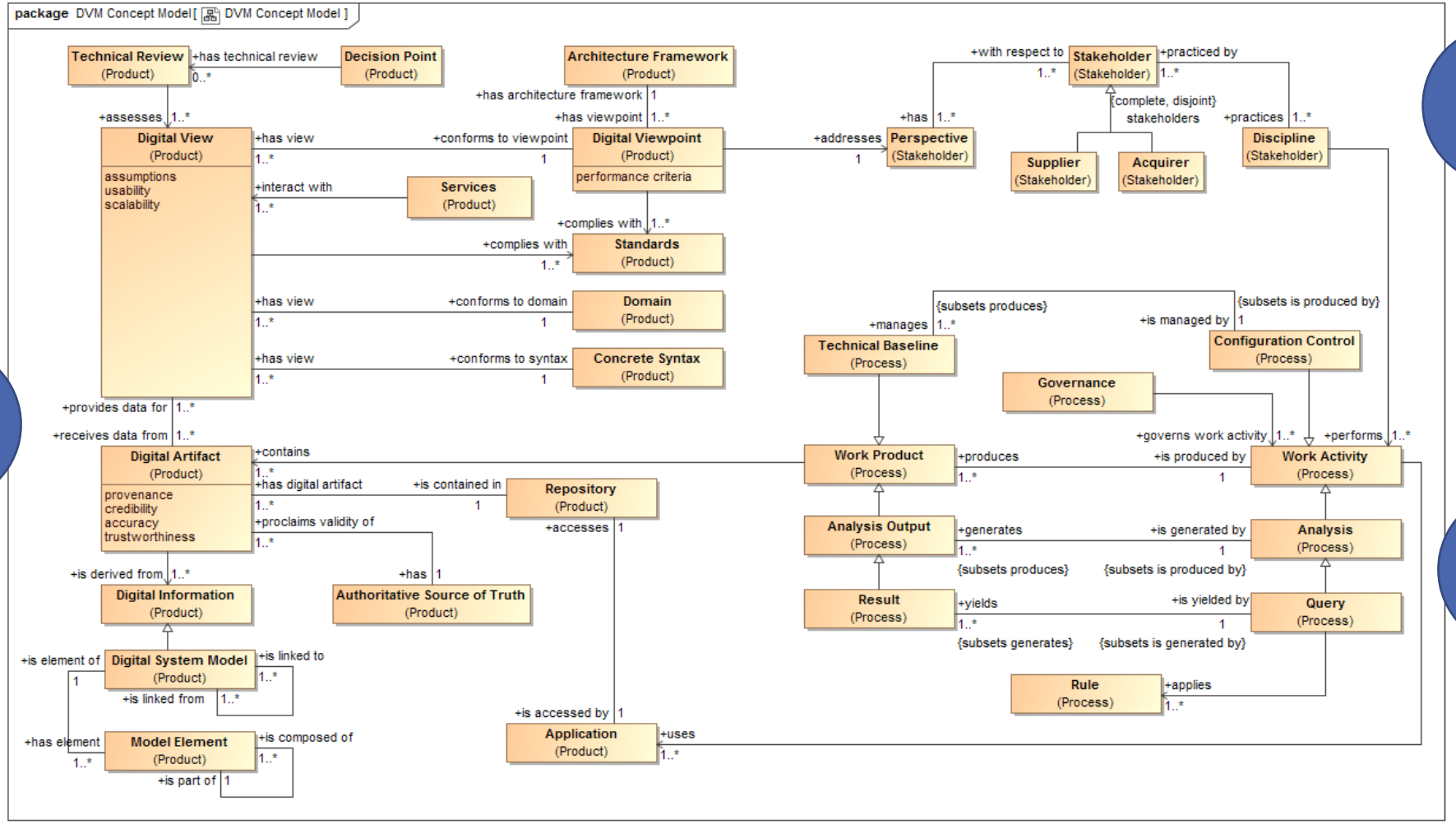
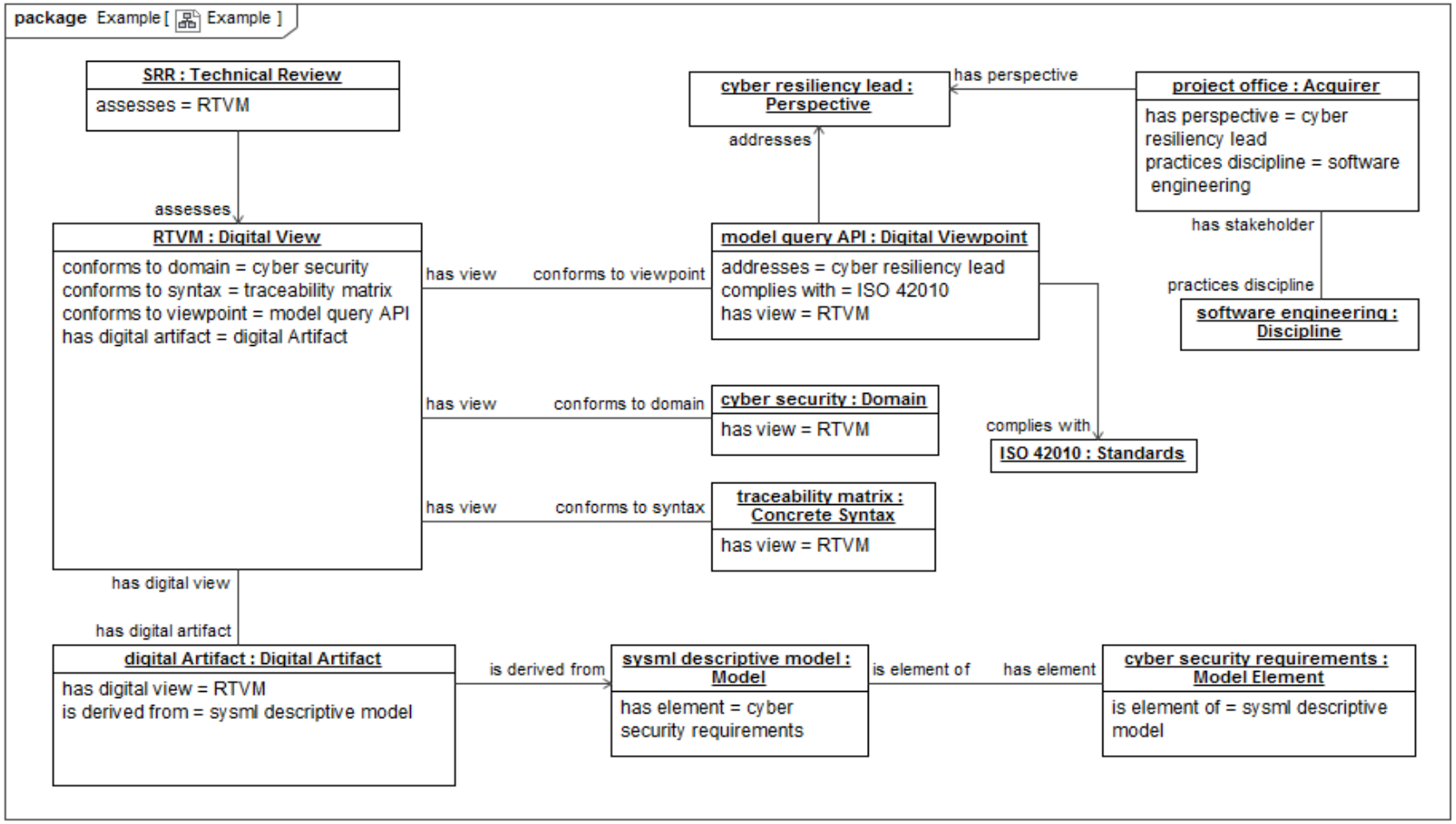
DVM Concept Model divided into 3 different ontologies: (1) Product, (2) Process, (3) Stakeholder



Example instance of the DVM Concept Model for a particular use case (review of cyber requirements for an SRR technical review)



Still have these open questions… Need answers to ensure that this is a valid model of the DVM domain

- How well does this model fit the scope of concepts we're considering?
  - What are other types of Digital Information?
  - What are some forms of Models?
    - Matlab? Excel?
    - Then what constitutes a Model Element?
- What is the definition of "provenance" in the context of a Digital Artifact and how do we capture it?
- How well does this model capture the needs for expressing what a Digital View is and to what it must conform?
  - Example Domains?
  - Example Concrete Syntax?
  - Example Standards?

Model-Based Enterprise Capabilities Matrix

- Excel-based spreadsheet composed of descriptive model-based capability rows and columns that define the capability stage
- Identify a comprehensive set of model-based capabilities, credibly sourced, that can be used by organizations to plan the improvement of their model-based enterprise capabilities
- Users are encouraged to tailor the Matrix
- http://www.omgwiki.org/MBSE/doku.php?id=mbse:mbecm

Matrix Areas

- Workforce/Culture
- SE Processes/Methodology
- Program/Project Processes/Methodology
- Model Based Effectiveness
- IT Infrastructure
- Modeling Tool Construction
- Project Use
- Policy

Matrix Structure

- Rows: Range of Model-Based Engineering factors/attributes, grouped by areas, that directly or indirectly support/enable across the enterprise
  - Workforce/Culture, SE Processes/Methodology, Program and Project Process/Methodology, Model-Based Effectiveness, Tools and IT Infrastructure, Project Use, Policy
- Columns: Increasing Stages of Capability
  - Left-most column reflects non-MBSE/MBE Capabilities (i.e., Doc-centric)
  - Right-most column reflects fully mature MBSE/MBE Capabilities
  - Intervening columns reflect increasing, incremental Stages of Capability for each particular factor/attribute (row)

Attributes	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4
Attr1					
Attr2					
Attr3					
Attr4					