



**26**<sup>th</sup> annual **INCOSE**  
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Engineering Lifecycle Management.  
*What a bunch of Rhetoric!*  
(Submission 2509064)

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# A Little Ethos Setting



- Enterprise Architect, Sodius
- (ex) Chief Architect, No Magic
- (ex) UPDM Co-chair
- INCOSE Tools WG Co-chair
- OMG BPMN2 Certified
- OSLC Developer
- IBM Jazz CLM Integration Partner
- PTC Windchill Integration Partner
- Tasktop Sync Partner
- ~30 years Software and Systems Engineering
- 17 years Consulting
- Hobby Ontologist



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# Introduction



Paraphrasing Charlton and Adras, **management** is a process by which managers reflectively model and share a representation of their own processes to **enable themselves to perform** their eponymous information-processing activities of **monitoring, evaluating, predicting, and controlling** their enterprise and its systems. [@Charlton2003] Furthermore, managers manage for particular purposes. Purpose-driven, they **acquire systems** to **address the needs** of the enterprise and they manage their stakeholders, engineering lifecycle tools, and artifacts during the acquisition processes **to attain certain goals.**

# Introduction

# Logos

# Ethos

# Pathos

Diocles the Magnesian (circa 150 BC) said, "the Stoics agree to ***put in the forefront*** the doctrine of ***presentation and sensation***, inasmuch as the standard by which the truth of things is tested is generically a presentation, and again the theory of assent and that of apprehension and thought, which precedes all the rest, cannot be stated apart from presentation. For ***presentation comes first; then thought***, which is capable of expressing itself, puts into the form of a proposition that which the subject receives from a presentation.

[@Diogenes2013]



# Logos

# Ethos

# Pathos

Aristotle claimed that, “the speech that takes place in the assembly is defined as the deliberative species [where] the speaker either advises the audience to do something or warns them against doing something. Accordingly, the ***audience has to judge*** things that are going to happen in the future and they ***have to decide*** whether these future events are ***good or bad*** for the polis.”

[@Rapp2010]



# Introduction



"I keep six honest serving-men  
(They taught me all I knew);

Their names are

***What*** and

***Why*** and

***When***

And ***How*** and ***Where*** and ***Who***."

[@Kipling2009]

# Claim

## Whereas

- Modern MBSE tools are adequate for modeling *once* the adequately stable compositions of sufficiently static units of structure and behavior.
- Systems engineers and managers struggle to use these tools to specify, analyse, present, and manage these models as stakeholders and architects incrementally evolve those models over time and across space.
- Therefore, engineering lifecycle models management involves more than routine Change Management.
- Rather, management includes the formidable service of providing to decision-making stakeholders the arguments that demonstrate the adequacy of contextually-specific solutions to the enterprise's problems.



# Claim

Therefore

- Decision-making stakeholders need ***dialectical*** (i.e. logical) arguments for a proposed system's satisfaction of constraints such as those that are available from adequately formal modeling notations, solvers, and practices.
- In addition, they need ***rhetorical*** (i.e. persuasive) arguments that convince those stakeholders of the aptness of proposals through trust of the proponents and through warrants which appeal to generally accepted grounds.



## Motivation

# Meeting-Based Systems Engineering is a Chronic Waste of Time and Money



- HBR "*This Weekly Meeting Took Up 300,000 Hours a Year*", reports that modern enterprises **spend over 15%** of their staff time in meetings. (Mankins, 2014)
- Guardian "*Meetings: even more of a soul-sucking waste of time than you thought*", reports that modern meetings foster only decision-making on the **most trivial of issues**. (Burkeman, 2014)

**15%**

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**300,000 hrs**

# Motivation

## Meeting-Based Systems Engineering is a Waste



But this undesirable form of "MBSE"  
is the symptomatic consequence  
of managing enterprises by

**neglecting Arguments**

and by

**focusing on Artifacts.**

# Related Work

## Academia

Systems Theory

Semantic Web

SAFe

Decision Engineering

etc.

## Standards

Business Architecture  
Guild (BizBok)

INCOSE (Tools Interop  
and MLM WG)  
OASIS OSLC

OMG BMM, BPMN,  
DMN, UPDM, ODM,  
SBVR



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IBM Jazz CLM

JAMA Requirements

NASA JPL OpenMBEE

etc.



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# Capabilities Sought

- Manage Identities.
- Assure Information is Accessible to the right Parties.
- Allow Access to Authorized Content; Reject Discovery of Unauthorized Content.
- Provide Retrieval and Persistent Storage of Models, Model Elements, and Model Configuration Items.
- Record and Provide Intentions on Historical Changes in Needs, Constraints, and Solutions.
- Record and Provide Provenance Properties (5W+H) on Curated Model Content.
- Notify Subscribers of Changes to Published Content.
- Compare two or more Graphs of Model Content and Identify Differences at Optional levels of Granularity.



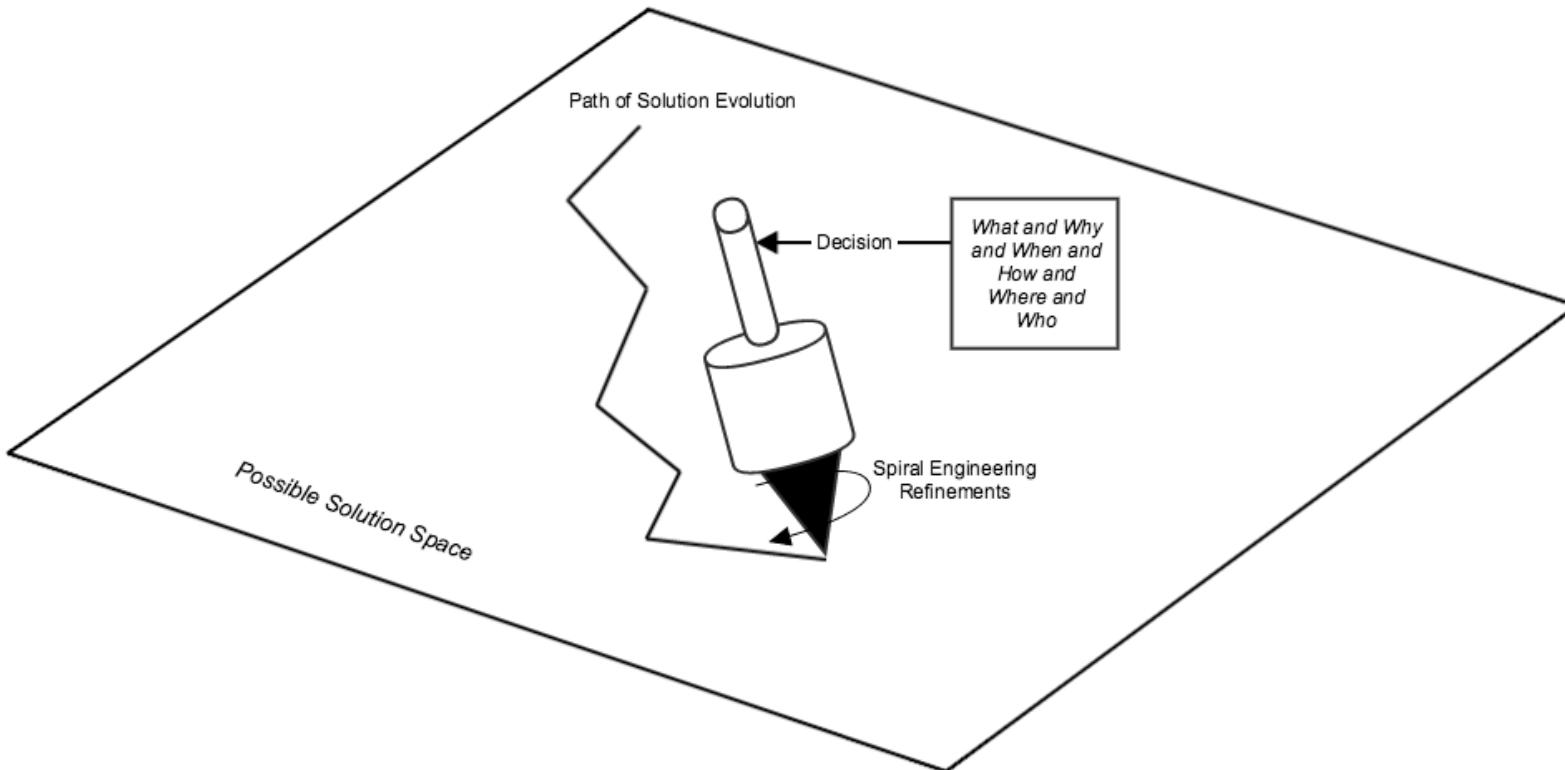
# Implied Features



- Business Ontologies Throughout
- Pragmatic Notations for Syntax and Semantics
- Reasoning Across an Open-world Descriptive Logic
- Automated Provenance-Tracking Relationships

# Recommendations

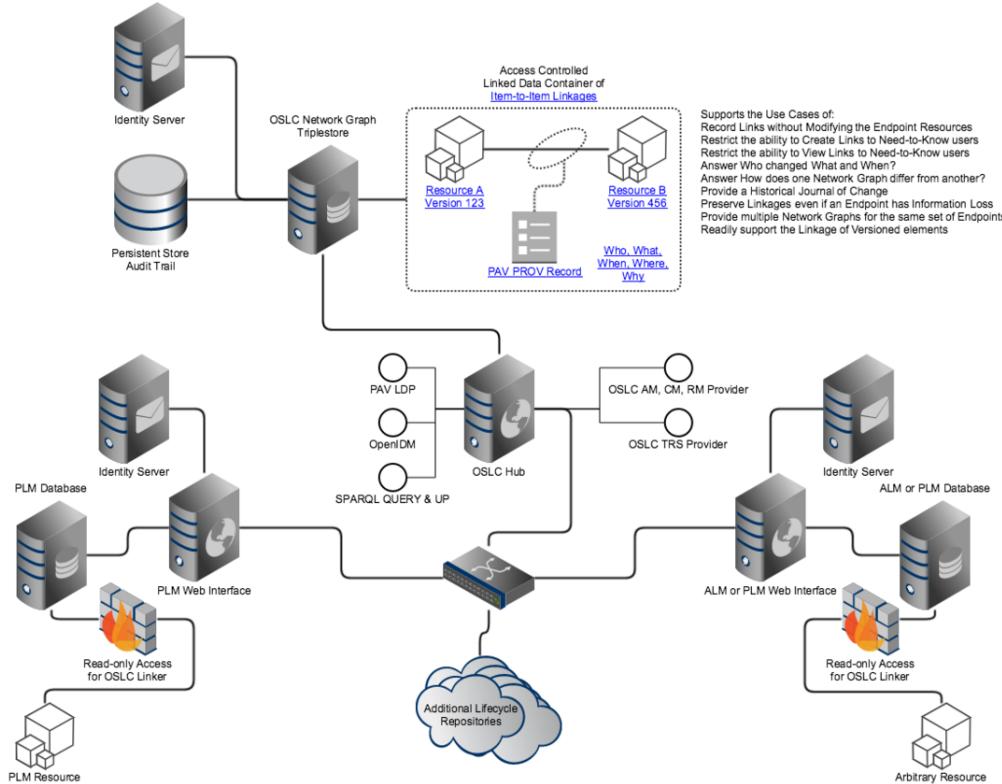
## Appreciate the Importance of Decisions



*"Spinning Dreidel Lifecycle Model"*

# Recommendations

## Implement Repositories that Automatically Collect Provenance



*"Provenance-tracking OSLC Hub"*

Recommendations

# Logos

# Ethos

# Pathos

Appreciate that Validation of Solutions requires all of:

a sound Logical verification of the solution,

establishing credibility and trust between the Proponents and Stakeholders,

and empathizing with the Stakeholders and their concerns.



# Future Work



Model Lifecycle Management Activity Team within the Tools  
Interoperability Working Group is Working:

- Elicitation of Issues and Capabilities
- Architecture of a Concept of Operations
- Promotion of Features Sought in Future Generations of Systems
- Specification of Decision Management Tools
- Collaborative Ontology Engineering Environments
- Collaborative Enterprise Architecture Environments
- Evangelization in the Universities and Industries