WELCOME

SCARECROW CONSULTANTS

MBSE FESTIVAL
Benefits and challenges of MBSE – I know an old lady

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Overview

1. Realising MBSE
2. I know an Old Lady
3. Conclusions
1: Realising MBSE

- Person
- Process
- Tool

MBSE enables drives
2: I Know an Old Lady ...
... Who Swallowed a Fly .....
... I Don’t Know Why She Swallowed a Fly

• Knowing ‘why’ is essential
• ‘Why’ will depend on context
  – Different stakeholders have different needs
  – Different stakeholders want different benefits
Realising MBSE Benefits

- Stakeholder Role
  - Person
  - Process
  - MBSE
  - Tool

- Benefit

- MBSE

- Enables
  - Person
  - Process
  - Tool

- Drives
  - Person
  - Process
  - Tool

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Typical MBSE Stakeholder Roles

- Stakeholder Role
  - Customer
  - External
  - Supplier

- Benefit
  - System Sponsor
  - Standard
  - Manager
  - Engineer
  - MBSE Sponsor

1..* must realise 1..*
Engineer Context

- Improve system development
- Improve consistency
- Improve automation
- Make approach more efficient
- Improve tool interoperability
- Improve communication
- Increase understanding
- Manage complexity
- ... for testing
- ... for artefact generation
- ... for model checking
MBSE Sponsor Context

Increase value of business

Increase sales

Increase quality

Invest in MBSE

Demonstrate ROI

Operator

User

Engineer
Identified Benefits of MBSE

- Time
- Resource
- Money
- Quality Attribute
- Safety
- Security
- Safety
- Compliance
- Complexity
- Communication
- Re-use
- Tool Interoperability
- Automation

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I Know an Old Lady Who Swallowed a Spider ...
... That Wriggled and Jiggled About Inside Her

• Look for tried and tested solutions
• For flies, this is a spider
• For MBSE, this is:
  – Standards
  – Architecture frameworks
  – Modelling notations
  – Processes
  – Methodologies
  – More staff
  – Etc.
Example Solutions – Architecture Frameworks

• Consider the following examples:
  – MODAF/DoDAF/NAF
  – Zachman
  – ISO 42010 (‘Systems and software Engineering - Architecture description’)

• What are you trying to do:
  – Development?
  – Acquisition?
  – Enterprise Architecture?
I Know an Old Lady Who Swallowed a Bird/Cat/Dog ...
... How Absurd ... Imagine That ... What a Hog

• Need to understand and control use of techniques
  – Shows no understanding of systems engineering
  – Shows no understanding of own competence

• Need common language:
  – In terms of spoken language (e.g. SysML)
  – In terms of domain-specific language (e.g. an Ontology)
Approach, System & Visualisation

![Diagram showing relationships between ontology elements and architectural framework, architecture, viewpoint, view, and diagram.]

«ontology element» Architectural Framework
1 describes structure of
1..* «ontology element» Architecture
1 conforms to
1..* «ontology element» View
1..* «ontology element» Diagram
0..*
1..*

1..* uses elements from
1

«ontology element» Ontology
1

«ontology element» Viewpoint
1..* «ontology element» View
1..* «ontology element» Diagram
0..*
1..*
Example of Common Spoken Language - SysML
Example of Common Domain Language – The MBSE Ontology
Focus on Architecture

- Rule
  - Architectural Framework
    - Rule
  - Ontology
    - Ontology
      - Ontology Element
        - Viewpoint
          - Viewpoint Element

- System
  - Architecture
    - Architecture
      - System
      - View
        - View
          - View Element

Relationships:
- Conforms to
- Corresponds to
- Visualises
- Uses elements from
- Constrains
- Describes structure of
- Describes

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Focus on Need
I Know an Old Lady Who Swallowed a Goat/Cow ...
… She Opened Her Throat … I Don’t Know How

• Complete chaos!
  – Lost sight of original goals
  – No concept of relationships between techniques
• The MBSE Ontology drives the implementation of MBSE
  – Basis for framework and associated views
  – Defines how views may be visualised (informs notation)
  – Allows understanding and definition of associated processes
  – Allows understanding and definition of associated competence
  – Provides valuable input into tool assessment
Example View Based on the MBSE Ontology
I know an old lady who swallowed a horse ...
... She’s Dead, of Course!...
3. Conclusions

• MBSE requires:
  – People, process and tools

• Essential concerns:
  – Understand why and the benefits
  – Do not apply techniques blindly

• Getting it right includes:
  – Have a solid basis for MBSE – use of MBSE Ontology

• Getting it wrong results in:
  – Dead bodies
  – Horse dung
Further reading
Contact us....

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