INCOSE MBSE Initiative

Methodology and Metrics Activity Breakout Session

Outbrief

31 January 2011
Breakout Summary

- Number of participants: ~25-30 (23 on sign-up sheet)
- Reviewed breakout agenda
- Shared standard breakout questions (next slides)
- Outstanding talk and video demo from G. Oswalds on “Using Simulation and Visualization to support MBSE”
  - Application of Harmony-SE tying in Visualization
- Broke into open discussion surrounding standard questions and general feedback on topics of Methodology and Metrics
Standard Breakout Questions
(All Teams)

1. What metrics should we use to measure goodness?
2. What kind of data is out there?
3. Who can contribute to webinars?
4. Who can contribute to papers for 2012?
5. What can you contribute to advancing the MBSE roadmap?
6. What standards are relevant to your particular area?
Participant Feedback IW11
[Methodology (1/1)]

• “Make or buy”?  
  – Consensus centers around **tailoring** candidate methodologies  
  – Questions emerge such as “how do we tailor” a methodology? Where do we start?  
  – Suggest review of current SE practices, many of which have developed over dozens of years in an organization  
  – Try and answer how to meet the spirit of existing /proven techniques in a model-based or model-driven context?  

• Some methodologies better suited to certain domains – truth or myth? Experiences with hybrid approaches  

• In some cases, external constraints may drive use or limit selection of methodologies  

• Should methodology selection be risk-driven? (Apply risk-driven approach to selection)
Breakout Agenda for IW11
[Methodologies (2/2)]

- Suggestion for INCOSE to reach out to academia and frame as a study problem
- How do we create incremental steps toward deploying a methodology? And measure progress along the way? Perception exists that it is “all or nothing”
- Need to answer how you plan to grow a methodology within an organization?
  - Requires organizations to identify a Process Owner to provide continuous stewardship of methodology and not just focus on process of selection of methodology, and then you’re done
- Metrics for success: Measure actual use of an adopted/tailored methodology(ies) or hybrid throughout the project lifecycle
- Applicable/Candidate Standards?
  - OMG Systems & Software Process Metamodel (SPEM) V2
  - Tool support: Eclipse EPF / IBM Rational Method Composer (RMC)
- Excellent interest level in contributing to this Activity Team:
  - Rick Steiner, JD Baker, David Long, Chris Hansen, Arno Granados, Channy Laux
Breakout Agenda for IW11 [Metrics(1/3)]

- Measure Architecture “goodness”/maturity throughout project lifecycle
- How do we know our design is any good? Completeness, elegance, maturity spec?
- Measure/quantify how MBSE helps to facilitate V&V earlier in the project lifecycle
- Measure of risk mitigation/closure
- Measure of system satisfying quality attributes
- Can we associate cost w/size of system model and estimate level of effort to complete?
- Measure learning curve, capital investment, lessons learned, obtaining feedback
Breakout Agenda for IW11
[Metrics(2/3)]

- Following MBSE adoption, use metric to monitor progress?
- Measure MBSE progress as it is being applied, following adoption
- Need to identify high payoff metrics (prioritize), may be driven by stakeholder engagement, stakeholders with $’s to quantify ROI
  - Types of metrics, e.g., tool metrics, process metrics, cost metrics, others?
- Measure adaptability of a particular methodology (related to Usability)
- Measure compression of timeline to field new systems using MBSE
- Measure learning curve, capital investment, lessons learned, obtaining feedback
- Measure introduction of errors throughout lifecycle process
- Measure reuse, payoff, reduced time-to-market of MBSE paradigm
- Measure cost of processing change requests
Breakout Agenda for IW11 [Metrics(3/3)]

- Measure amount of work or “design-in-process” to identify areas of priority and focus
  - Objective function to minimize flow rate of design-in-process

- Measure of model complexity
  - This is a “DARPA hard” problem
  - A lot of research in this area

- Measure completeness of work products throughout project lifecycle w/emphasis early in lifecycle

- Applicable/Candidate Standards?
  - ISO/IEC 27004, CMU CMMI, IEEE 1024 (software)

- Measure the quality/correctness of the models (margin, uncertainty, etc.)

Coordinate w/INCOSE Measurement WG
Backup
Breakout Agenda for IW11

- Kickoff w/brief introductions
- Jeff E. to introduce John W. as new Activity Lead following IW11
- Guest talk by Gundars Osvalds (Northrop Grumman) entitled “Using Simulation and Visualization to Support MBSE”; will include a video
- Jeff E. to briefly review content of Wiki
- Jeff E. to recap IW09 MBSE workshop breakout participant feedback to set stage for workshop interaction, dialog, and participation
  - Seeking active participation from MBSE Usability team from morning session
- Jeff E. and John W. to facilitate working dialog and capture notes
  - Need to make time for workshop dialog and solution ideas on Metrics (tool metrics, process metrics, other metrics?)
- Jeff E. and John W. to submit breakout notes to Sandy F. and Mark S. for incorporation into MBSE workshop outbrief
Standard Breakout Questions (First Cut Answers)

1. What metrics should we use to measure goodness?
   a. Activity level of participation in WG and contribution of members
   b. Wide dissemination of Body of Knowledge (BoK) in particular methodologies
   c. Methodologies in practice well documented for full scale of applicability

2. What kind of data is out there?
   1. Metrics: INCOSE Measurement WG

3. Who can contribute to webinars?

4. Who can contribute to papers for 2012?

5. What can you contribute to advancing the MBSE roadmap?

6. What standards are relevant to your particular area?
   1. Metrics: ISO/IEC 27004, CMU CMMI, IEEE 1024 (software)
Methodologies Outbrief (IW09) (1/2)

- Most recent participant recommendations comes from MBSE Workshop at INCOSE IW09 held in San Francisco
  - MBSE workshop at INCOSE IW10 did not formally break out Activity Lead and Challenge Teams

- Participant Feedback (morning session)
  - Create public Wiki site to capture
  - Best practices & experiences using methodology(ies)
  - Discussion forum for methodology Q&A
  - Forum for methodologist to post latest updates and links to resources
  - Include comparison chart/table of features for each methodology to identify strengths or “sweet spot” for lifecycle SE functions (e.g., reqts, architecture, design, risk)
  - Provide tailoring guide to map to standard project phases (what is coverage to lifecycle phase (needs evaluation)
  - Evaluate methodologies to determine if certain methods have strengths that should be incorporated into local process models
Methodologies Outbrief (IW09) (2/2)

- Participant Feedback (afternoon session)
  - Differentiate work product-centric methodologies from process-centric methodologies (R. Hodgson)
  - Review “X-model” (R. Hodgson)
  - Seek process element/ process pattern reuse
  - Role of governance
  - Do some methods work better in certain domains?
  - Enterprise modeling and instantiation (R. Griego)

- Response to recommendations:
  - Will need a great deal more participation from practitioners and other interested stakeholders to adopt these recommendations
  - This is A LOT of work
  - Best opportunity near-term is to stand-up public Wiki site for methodologist to post information about their particular methodologies
  - Possibly continue annual update of MBSE Methodology Survey (TBD)
    - Want to get out of annual “maintenance” business