A 21st Century Approach to MBSE
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50s to 80s: Documents

The worse thing that happened to requirements was the death of the typewriter. Now there is a near zero cost in changing a requirement.

- Unknown Systems Engineer
80s to 00s: Diagrams
90s to 10s: Models
20s and 30s: Interconnections

- Software dependent system
- Internet of Things (IoT)
- Interactions
  - Machine to machine
  - Machine to human
  - Human to human
- Security
- Quick Feedback/Interacts
Modern Systems Are Systems of Systems

http://www.cvel.clemson.edu/auto/systems/auto-systems.html
Software is King

Nature of Product Innovation is Shifting

- More than 80% of R&D is related to software according to Ericsson
  - The world’s 5th largest software company
- 70% of all innovation is related to software according to AB Volvo
- 80-90% of all innovation in a car is related to electronics (HW & SW) according to Volvo Cars
Software is King
Growth of IoT

IBM Institute for Business Value
Complex Interactions
Security

• “Newly discovered hack has U.S. fearing foreign infiltration” (Juniper) – CNN
• “Hackers Remotely Kill a Jeep on the Highway—With Me in It” – WIRED
• Facebook’s $10,000 Bug Bounty
• “Hacks of OPM databases compromised 22.1 million people, federal authorities say” – Washington Post
We have an unprecedented opportunity to run A/B tests with online users and innovate more quickly based on actual user responses. Microsoft needs to shift the culture from planning the exact features to planning a set of possible features, and letting the customers guide us.

- Ray Ozzie, Microsoft’s Chief Software Architect
What This Means

• Innovation is happening quicker and quicker
• Decisions are being made with data and not opinions
• Systems can’t just be “built to last” they need to be “built to evolve”
• Customer’s are more involved
Clear Some Misconceptions

• A collection of diagrams is NOT a model
• Models have been used for generation, however the “M” in “MBSE” is about building a connected knowledge base
• A table/report/diagram/etc is a view into the model
21st Century Approach: Speed Up Feedback
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• Get your customers (or a representative) involved early
• Provide a quick landing/overview page for them to view the model
• Facility feedback WITHIN the model
• Show how the system connects to the bigger context (policy, 50k foot reqs, etc)
21st Century Approach: Only Deliver What They Want

- Most Developer's don’t want our Class Diagrams or our pseudo code
- High level executives probability don’t care how the sausage is made
- Provide them a place to learn and explore more
21st Century Approach: Build Connections
21st Century Approach: Building Connections

• Pull threads all the way back
• Let people use what they are familiar with
• Share information across disciplines
• Provide context to engineers
21st Century Approach: Think with Big Data & AI

- Automate analysis
  - Requirement’s quality, writing style, linkage
  - Auto parse documents for functions & assets
  - Compare models to historical models and provide recommended improvements

- Background simulations of complex model
  - Pull variables from other tools

- Auto build & sends docs or commands
21st Century Approaches

Speed Up Feedback

Deliver What They Want

Build Connections

Big Data & AI

Improves YOUR productivity
QUESTIONS?