



Challenges in Standards for a Model-Based Enterprise

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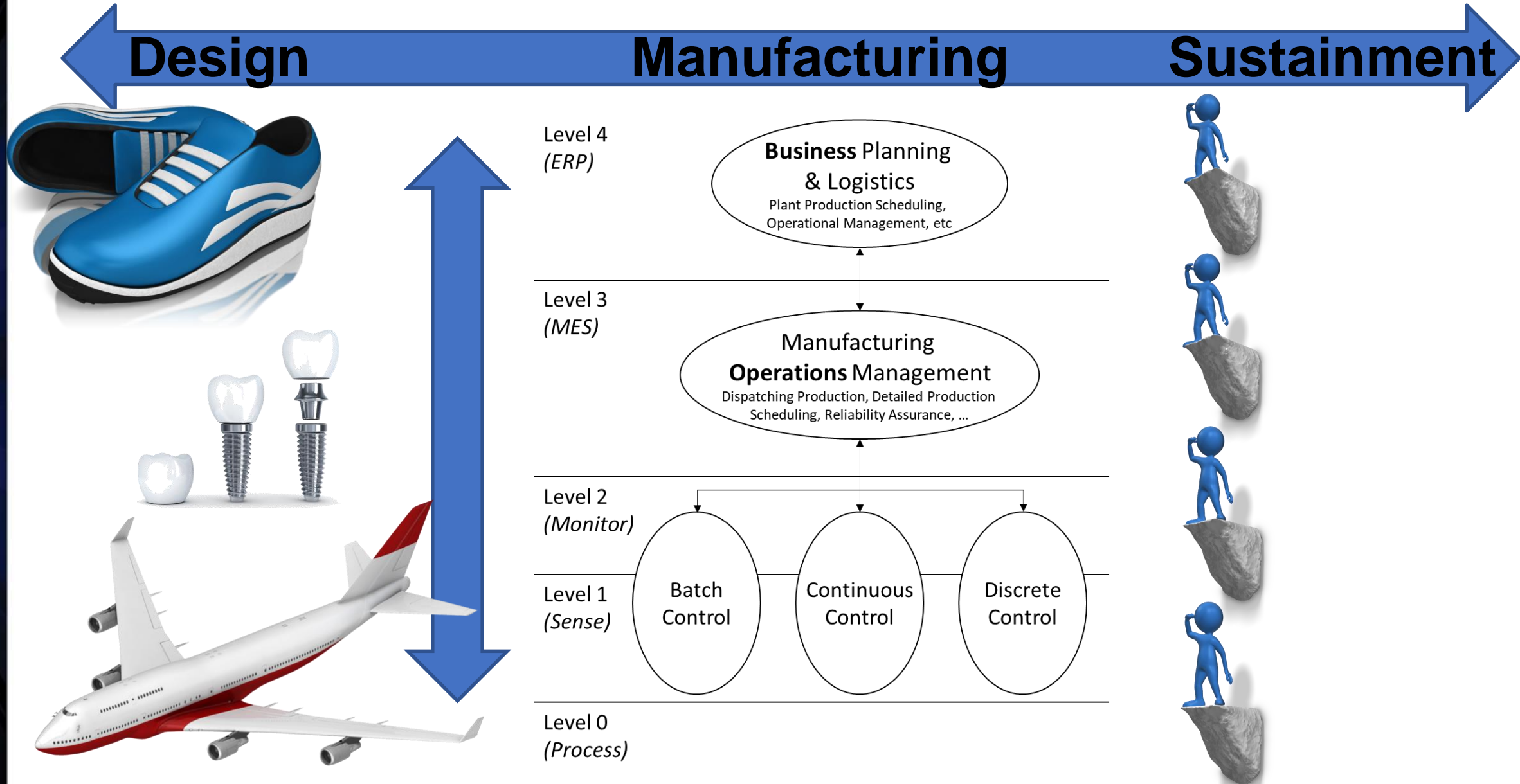
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B.L.U.F.

Industry needs **open architectures** to support the “brownfield” realities of manufacturing and allow **interconnectivity** across decentralized systems. **Model-Based Enterprise** would address this industrial need by **coupling existing technologies** with trusted systems, Internet of Things, Big Data, and Artificial Intelligence to enable **advanced variant configuration** – allowing Industry to be agile and flexible enough to manufacture **closer** to the end user, in **varying** lot sizes, for the first time.

The Problem



“There are problems that manufacturing companies have been trying to solve for decades. How do I make my inventory management more efficient? How do I match the supply of product that I’m making with the actual demand?”

Rick Smith, co-founder of Fast Radius
On the need for a Digital Supply Chain

<http://www.webcitation.org/6xjLMf63a>

“It’s really an ecosystem of technologies that work together. It’s not just one thing, it’s many things that are working together.”

Alan Amling, VP of strategy at UPS
On IIoT in Logistics

<http://www.webcitation.org/6xjLMf63a>

“What’s changing now is the speed required to deliver a lot size of one. Consumers are no longer willing to wait 15, six, or even three months. Innovation is moving from mechanical features to embedded software, driving a need to condense design cycles – and a convergence of silos. Non-integrated, non-real-time solutions won’t support the next wave.”

John McNiff, VP of Solution Management at SAP
On Configurable, Personalized Products

<http://www.webcitation.org/6xjM0bug7>

The Question

How do I match product needs to process capabilities?

In the context of PHM,

How do I know when to sacrifice system capacity today to ensure capacity and availability of my systems tomorrow?

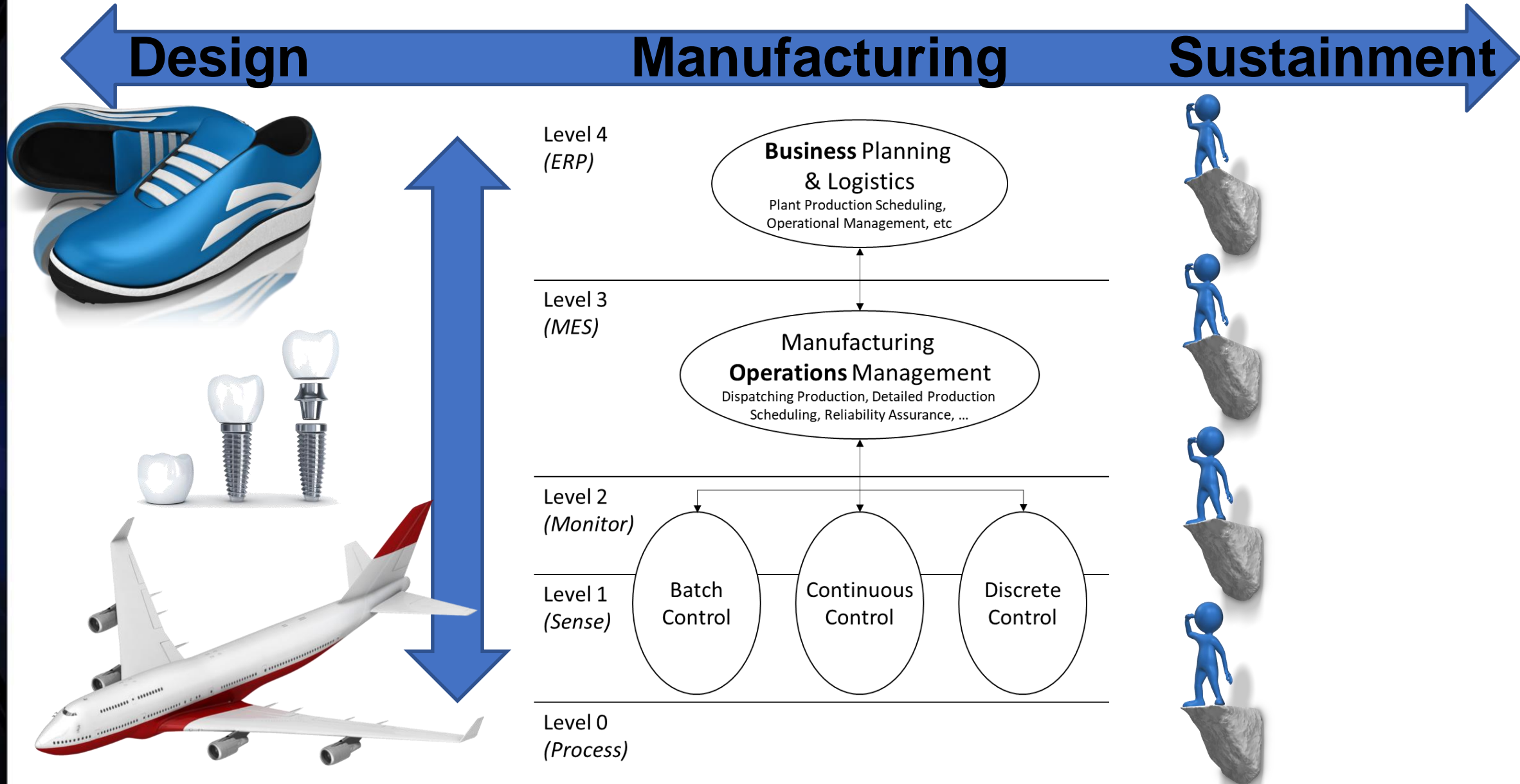
The Need

- Standards for Product Definitions
 - What is the product?
 - What are the feature requirements?
- Standards for Process Definitions
 - What resources exist?
 - What capabilities do the resources have?
- Methods for matching and/or aligning the definitions
 - How do the available capabilities satisfy the feature requirements?

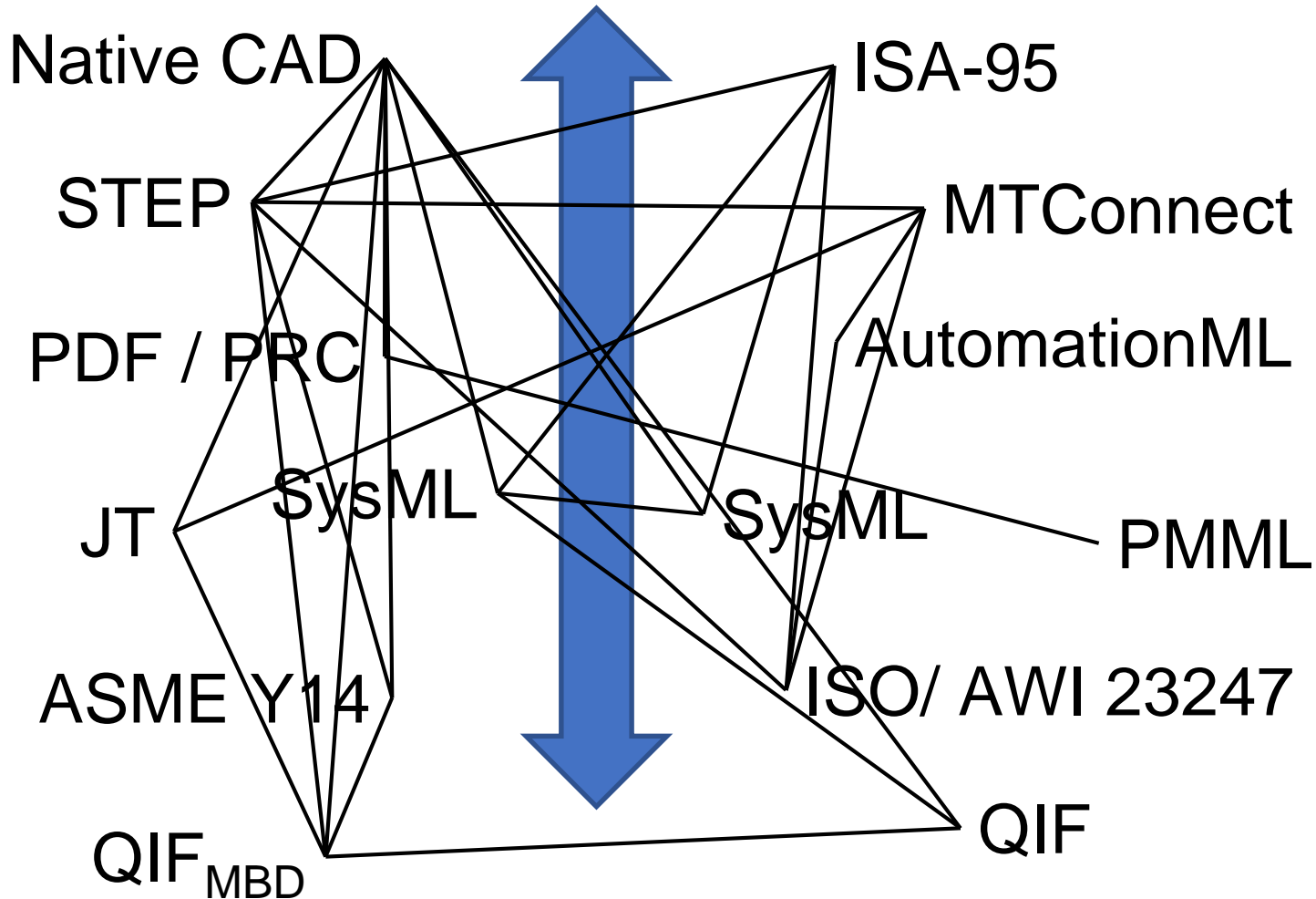
Three Classes of Standards

- Practice and Specification
 - ASME Y14 & ASME MBE
 - ISO TC 10 / TC 213
 - ISA-95
- Data and Information
 - ISO 10303 (STEP)
 - ISO 32000 (PDF) / ISO 14739 (PRC)
 - ISO 14306 (JT)
 - MTConnect
 - ANSI/DMSC QIF
 - OAGIS
 - OPC UA
- Modelling
 - PMML
 - MIMOSA
 - Automation**ML**
 - ISO/ AWI 23247
 - ASME V&V 50
 - OMG Sys**ML**
 - OMG **UML**

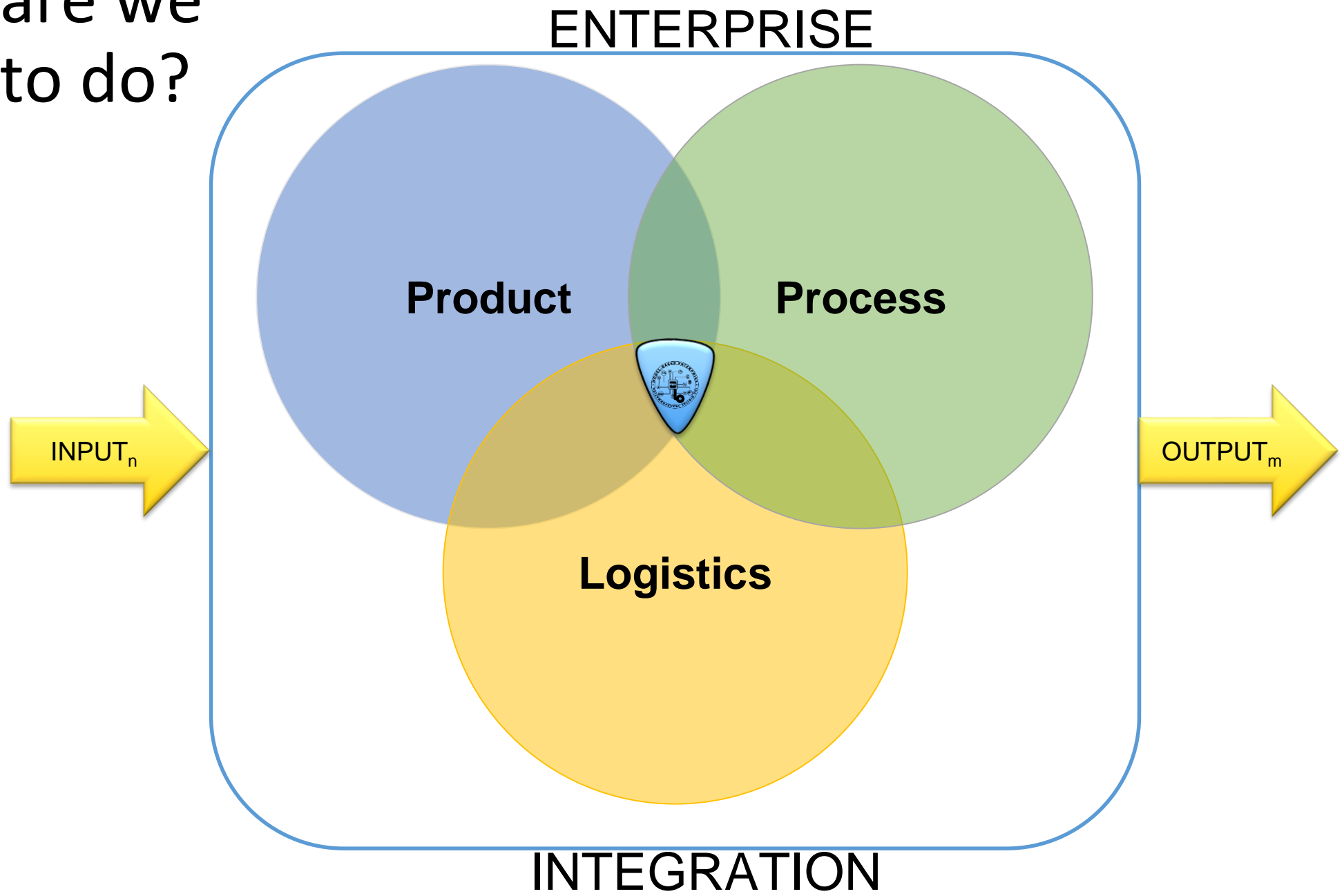
The Problem: Redux

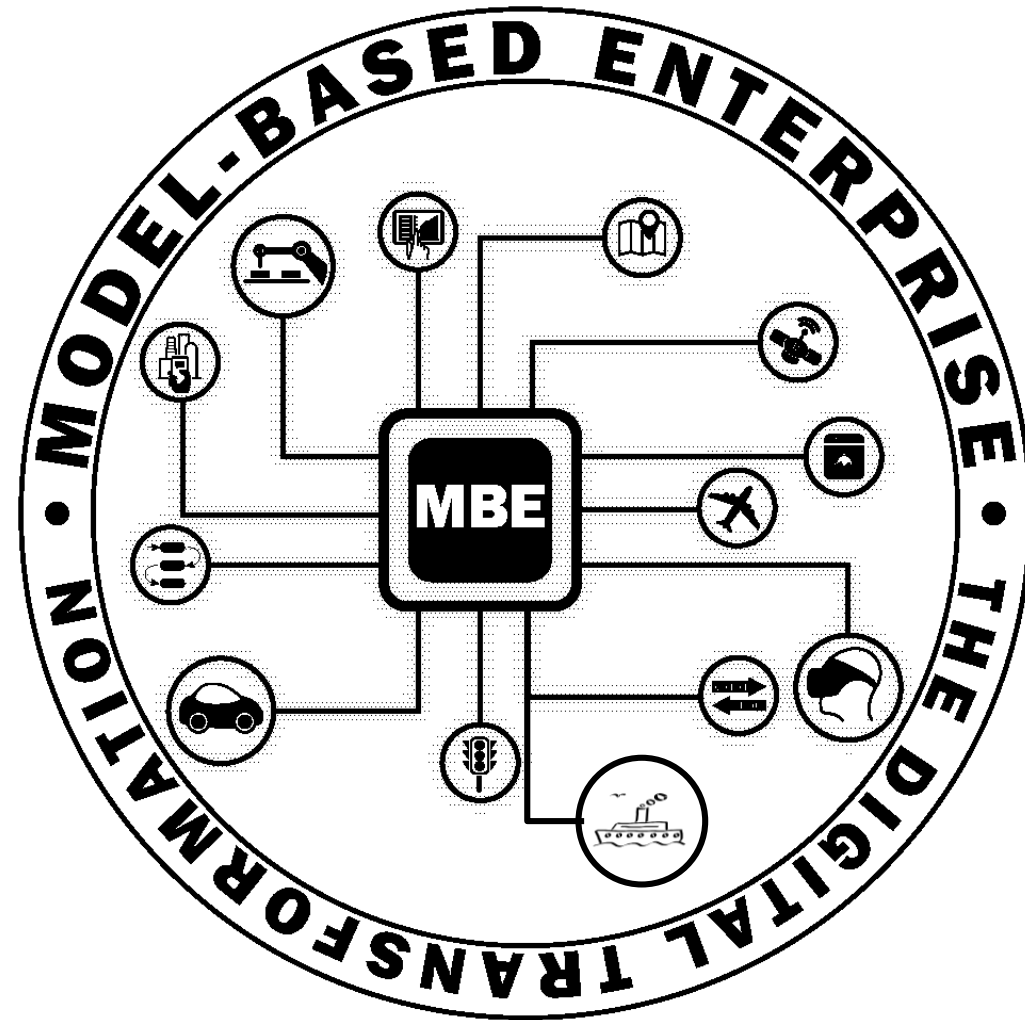


The Problem: Redux



What are we going to do?





Enabling decisions on making capabilities for required control across the product lifecycle based on outcomes

Questions? Save 'em for the panel! ;-)

Thank you for your kind attention!

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Digital Thread: <https://go.usa.gov/xNP8x>

SMS Test Bed: <https://smstestbed.nist.gov>

My Publications: <https://go.usa.gov/xNP8R>