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Model Lifecycle Management

Applying PLM concepts from the PLCS standard

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SWEDISH
STANDARDS
INSTITUTE

Chair of SIS/TK 280 (Information and automation in the product lifecycle)



Convenor of ISO/TC TC184/SC4 (Industrial data), Policy and Planning Committee
Member of ISO TC 184 (Automation systems and integration) and TC184/SC5
(Interoperability, integration, and architectures for enterprise systems and automation applications)

Current special assignments

- Smart Through Life Architectures (IoT++)
- Behavior Catalogues



eurostep

Content

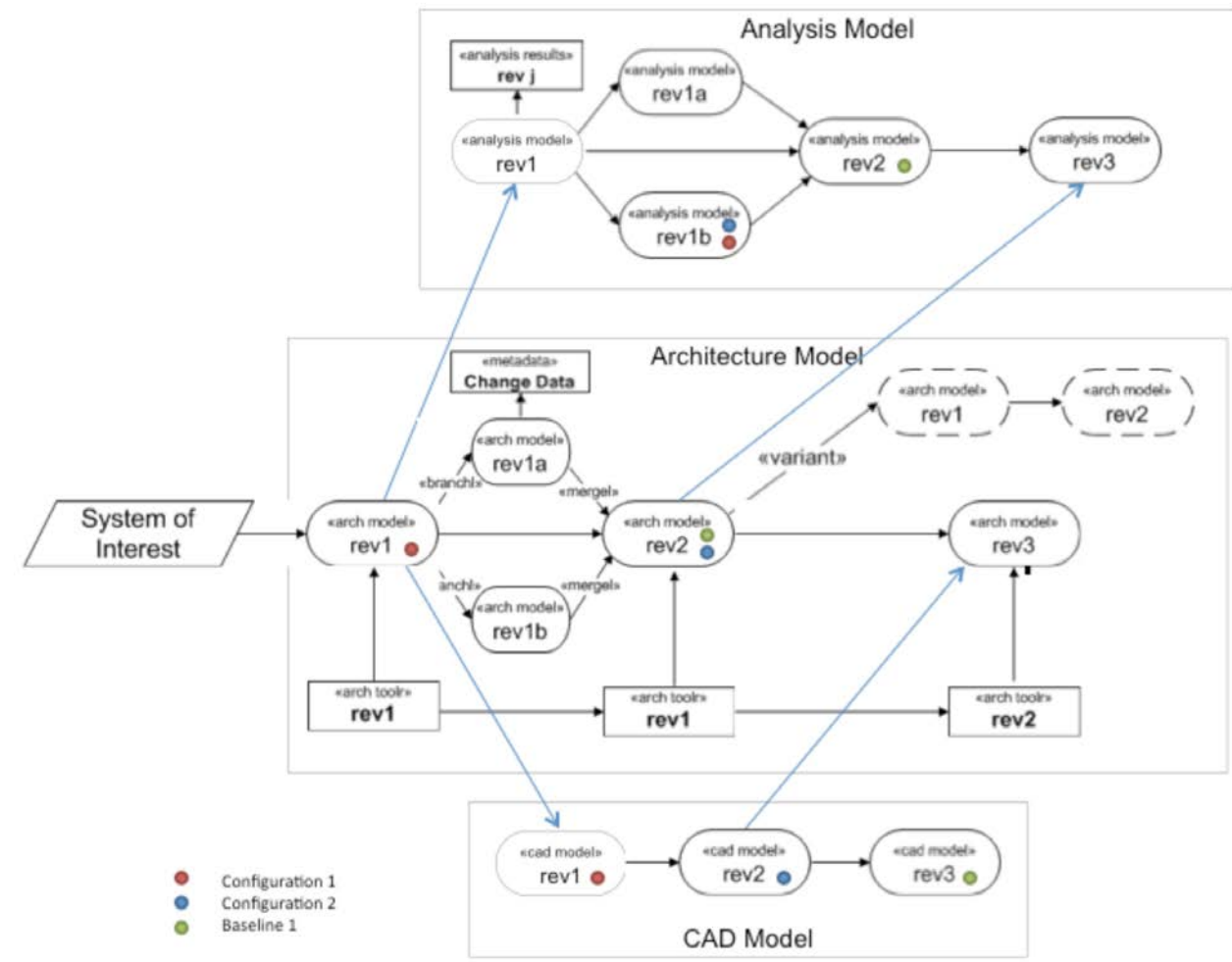
- **Model LifeCycle Management from a PLM point of view**
- **The scope of PLM in ISO 10303-239 PLCS**
- **IoT meets MLM in PLCS**
- **MoSSEC – an upcoming relevant ISO standard**
- **Summary**

Model LifeCycle Management from a PLM point of view



MLM and PLM

- **Model Based Systems Engineering needs PLM as well as MLM concepts**
- **Behavioral models is an integrated part of the system definition and need to share:**
 - Configuration Management
 - Change Management
- **MLM is NOT its own "stove pipe" technology**

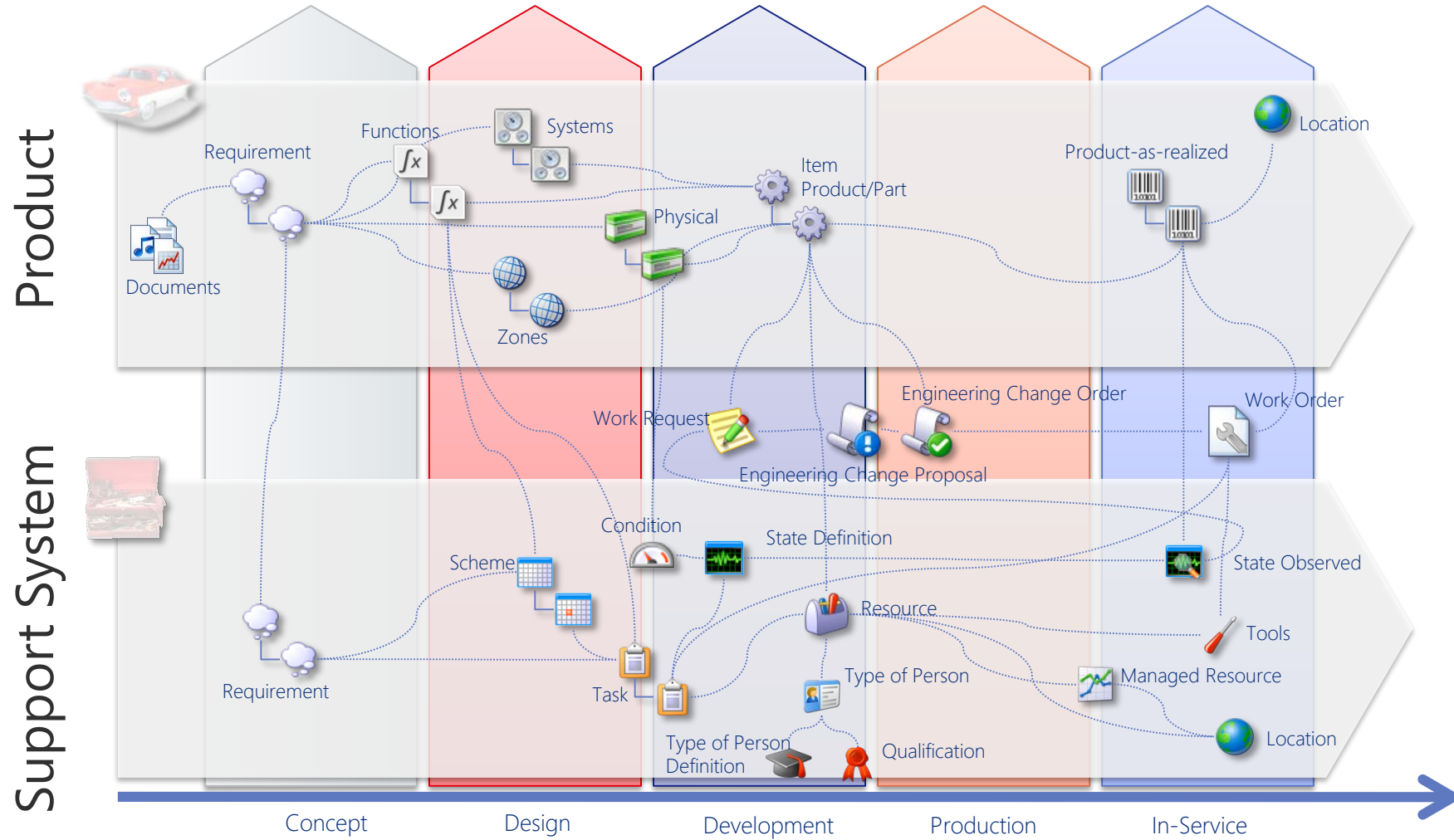


From: Model Lifecycle Management for MBSE by Fisher, Friedenthal, Sampson, VanZadt, Palmer, Nolan, Loeffler, Bajaj, Hovey and Hart

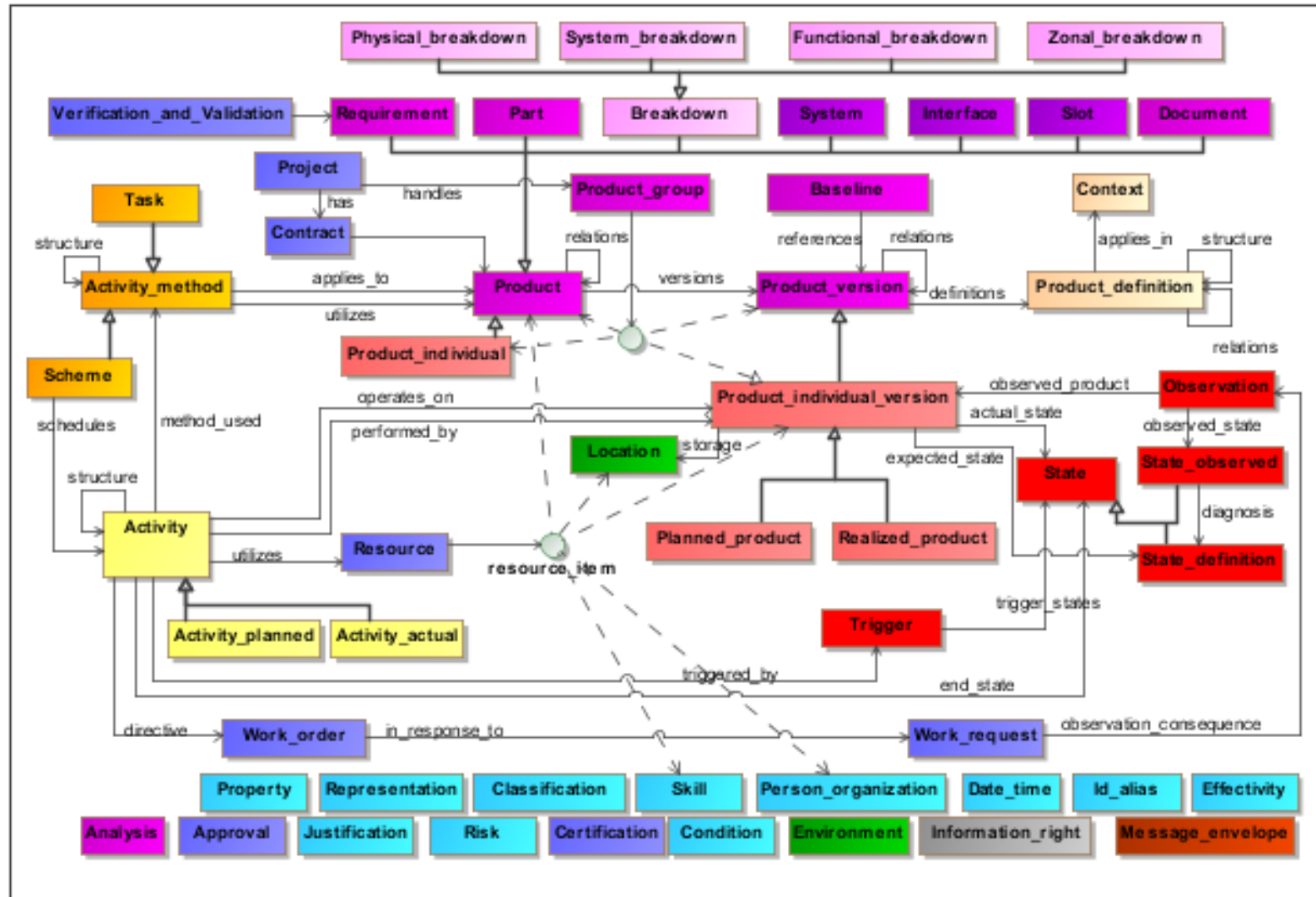
The scope of PLM in ISO 10303-239 PLCS



Scope of PLCS



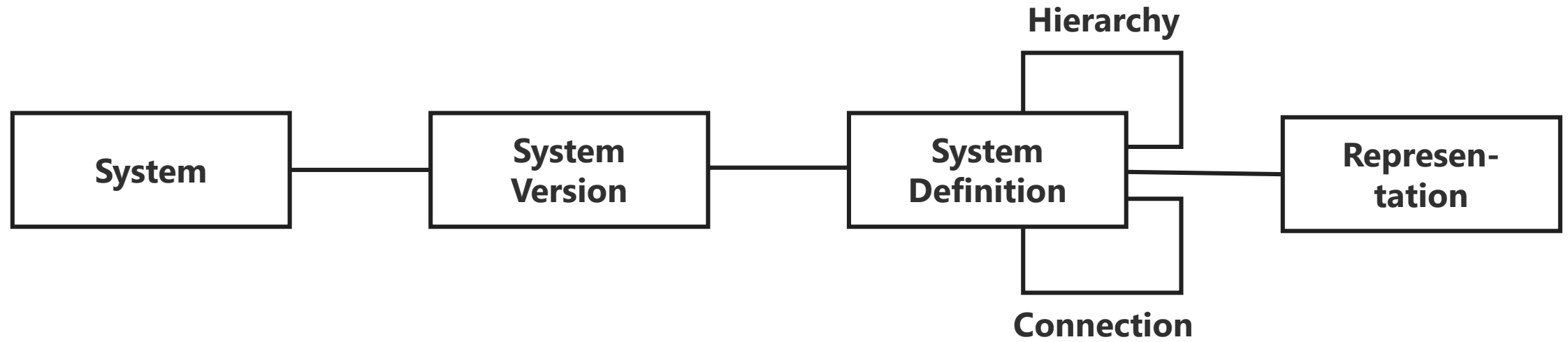
Another view



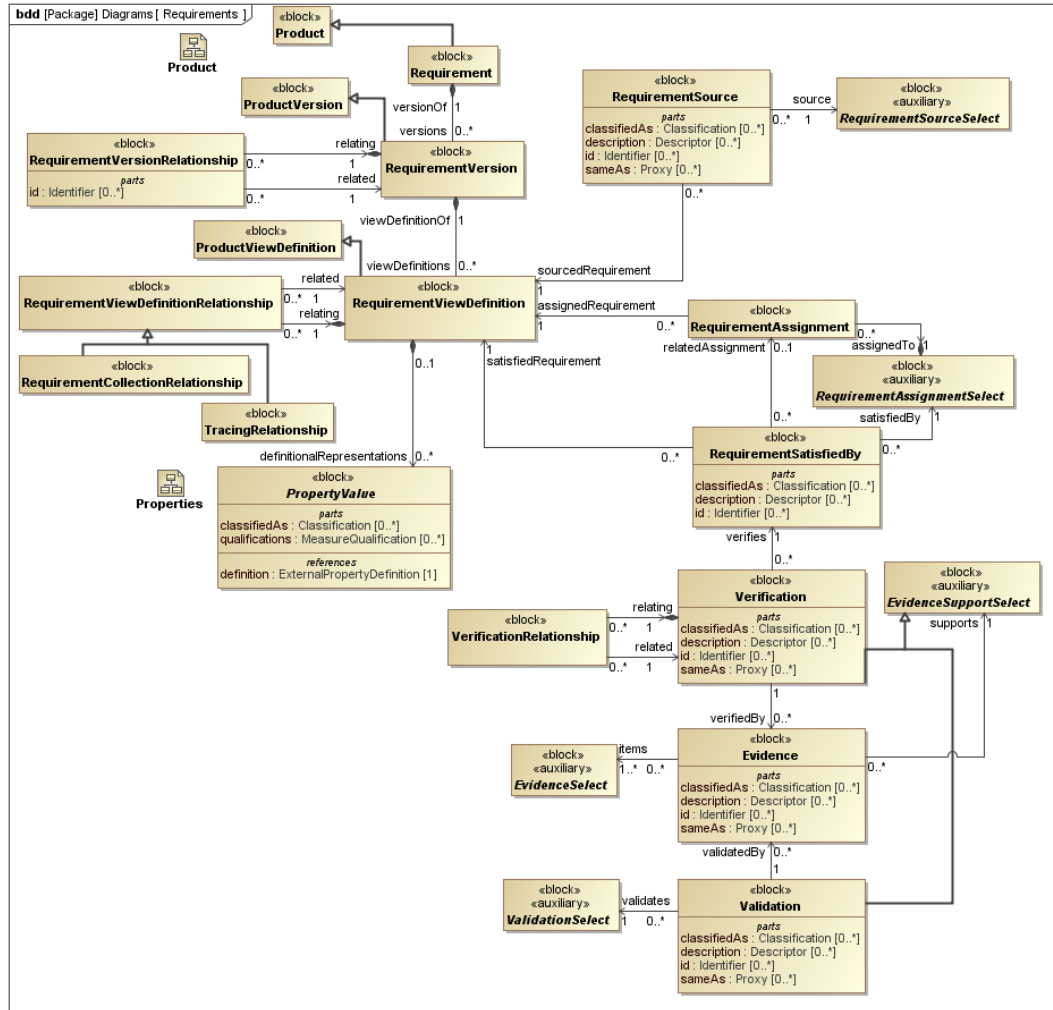
Product Designs	Information Control
Individual Products	Information Exchange
Product Breakdown	
Product Descriptions	
States	
Activity Specifications	
Activity History	
Product Environment	
Management Process	
Details	



System/Component



PLCS – Requirement, Verification and Validation



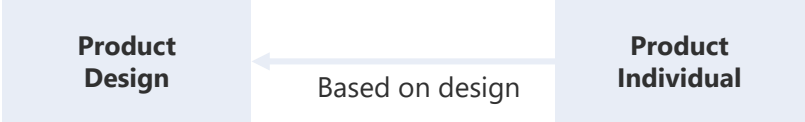
- **Simulation models used as Requirements**
 - Experiences from SBA
 - Supported by Requirement, Verification and Validation concepts
- **Industry struggling with the interaction between physical and virtual**
 - Cyber Physical Systems
 - PDM vs. VPDM
- **Aerospace & Defences as well as Automotive looks for complete management models**

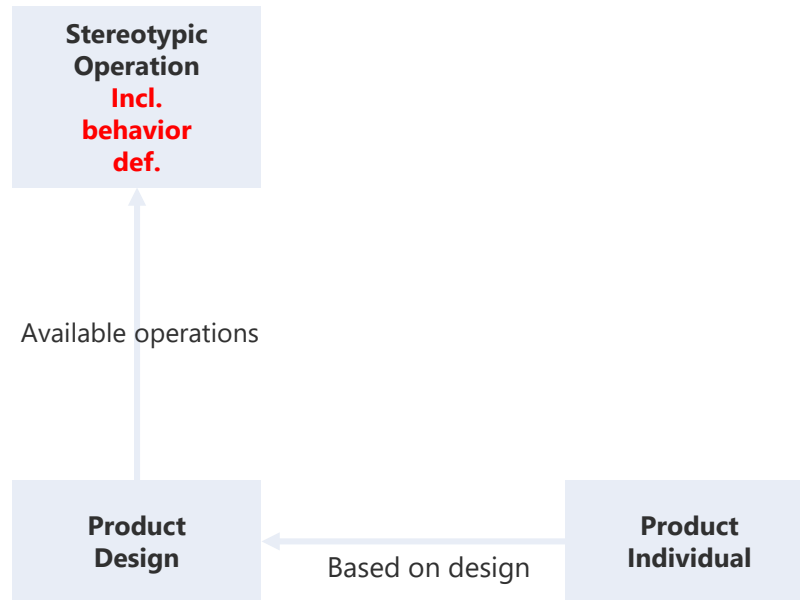
IoT meets MLM in PLCs

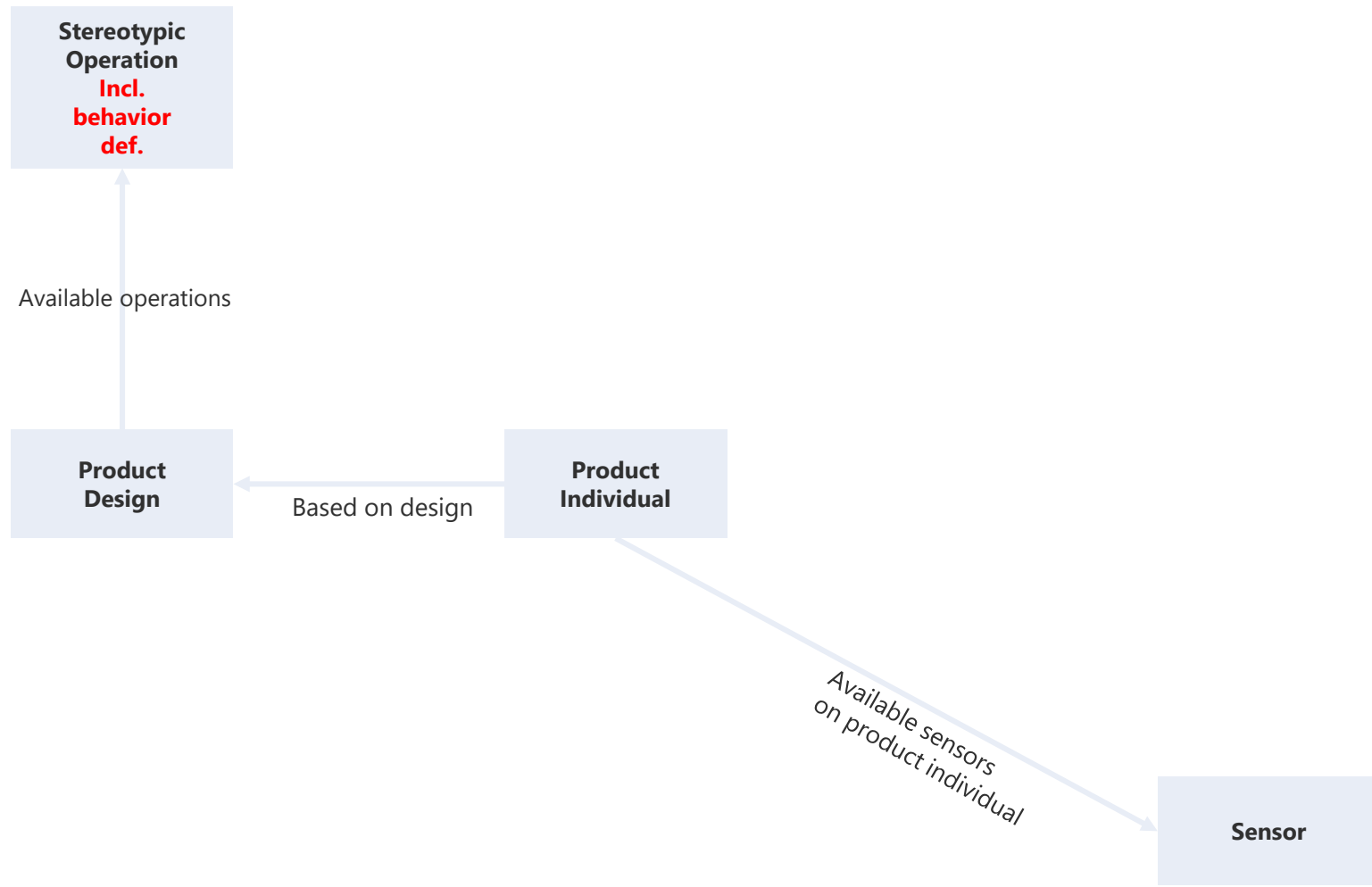


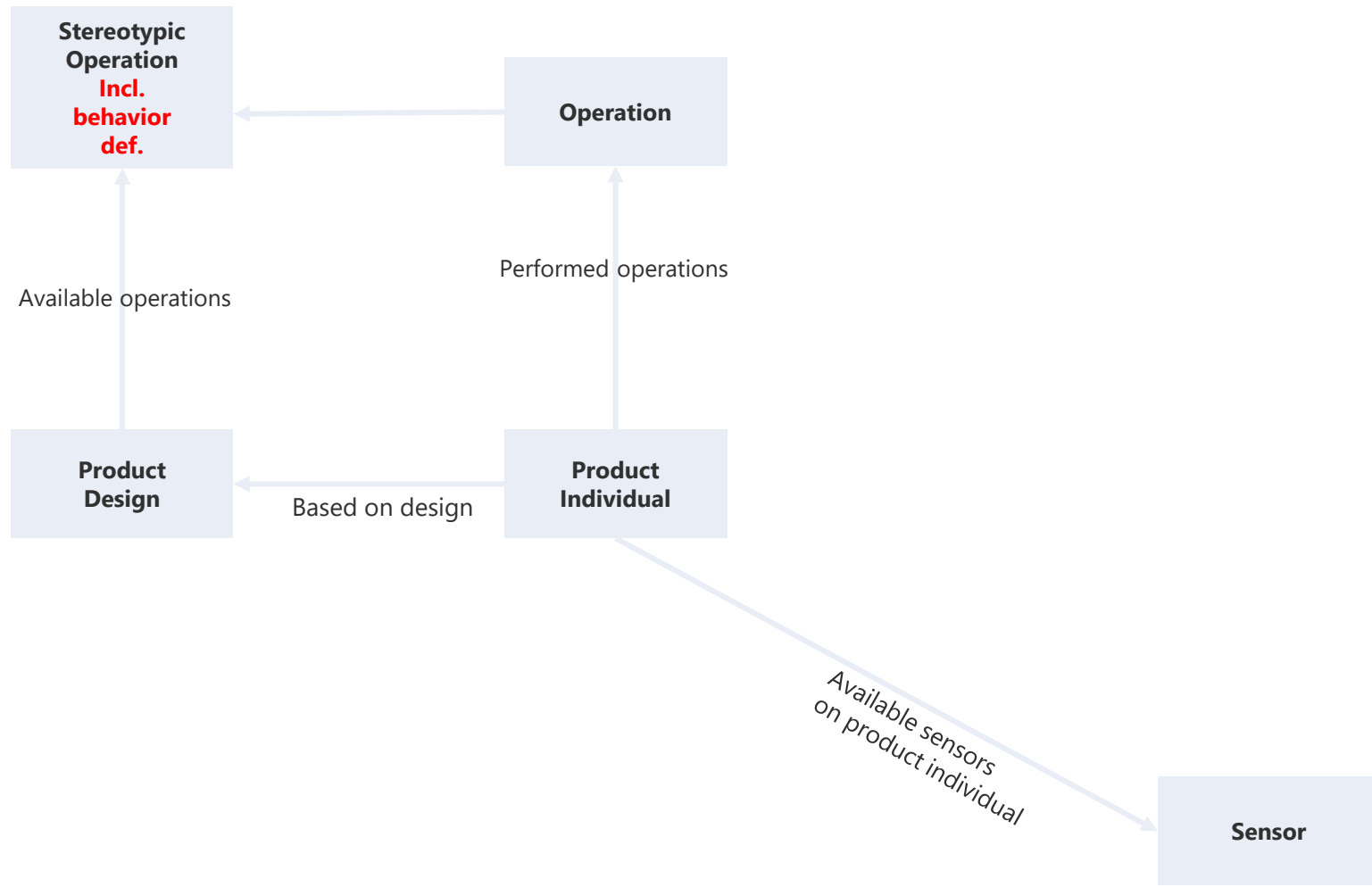
**Product
Design**

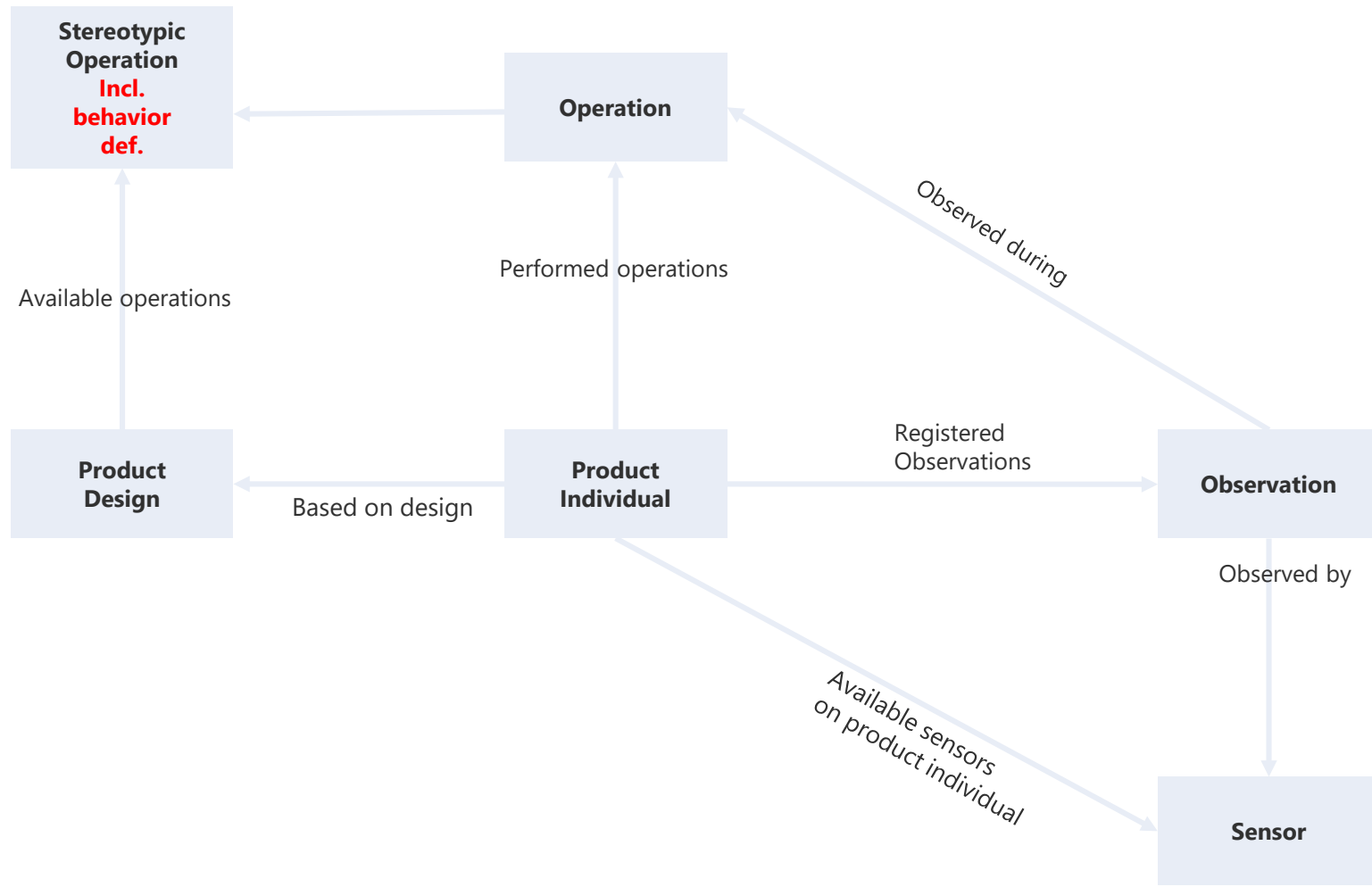


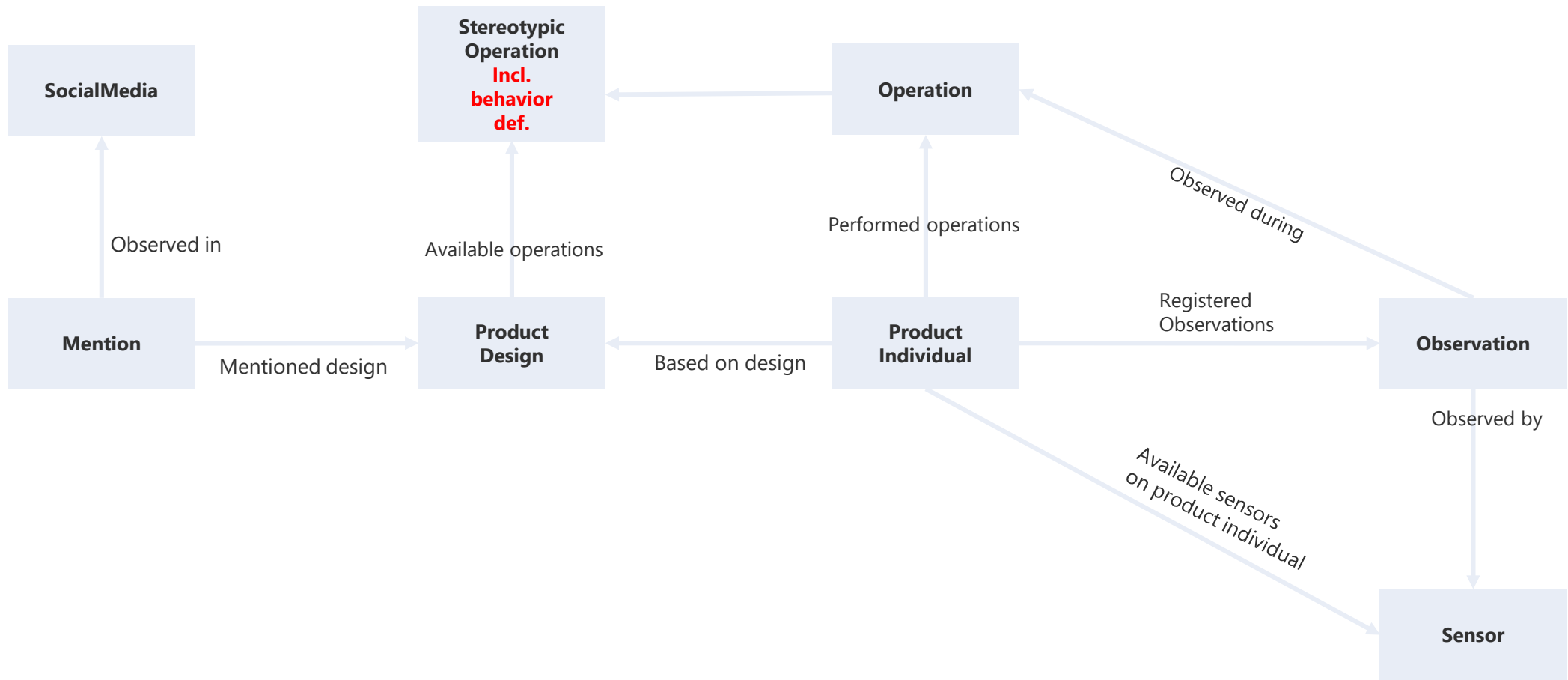


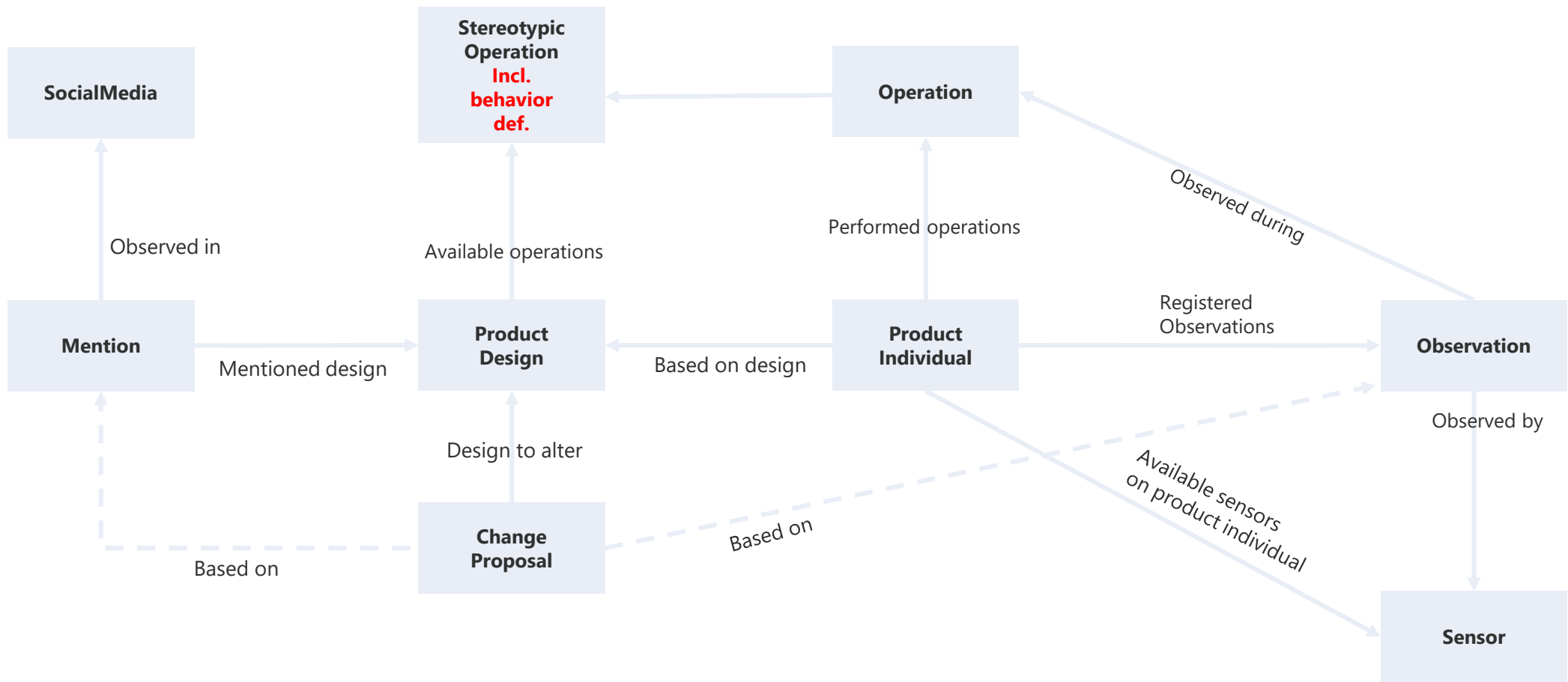


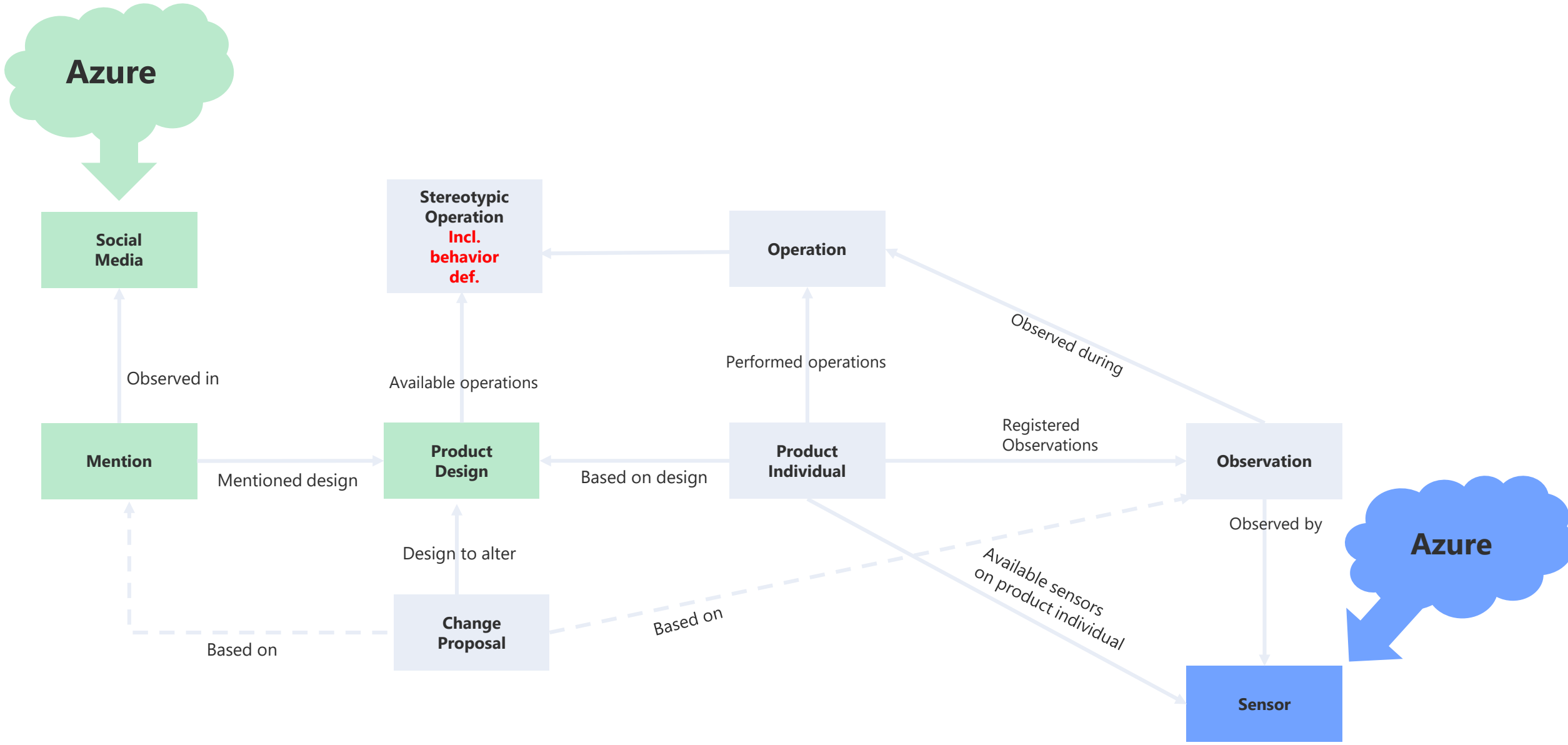








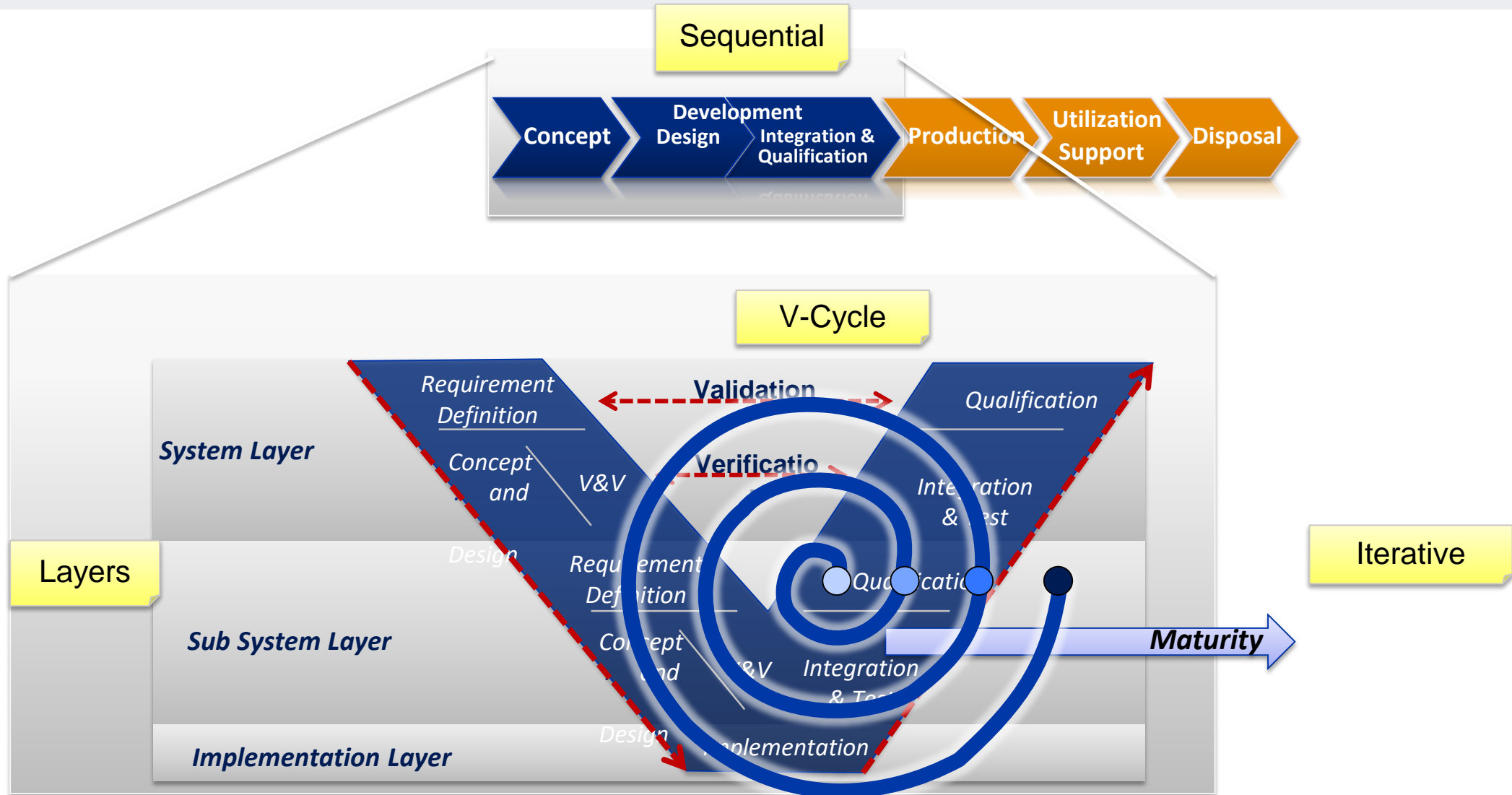




MoSSEC – an upcoming relevant ISO standard

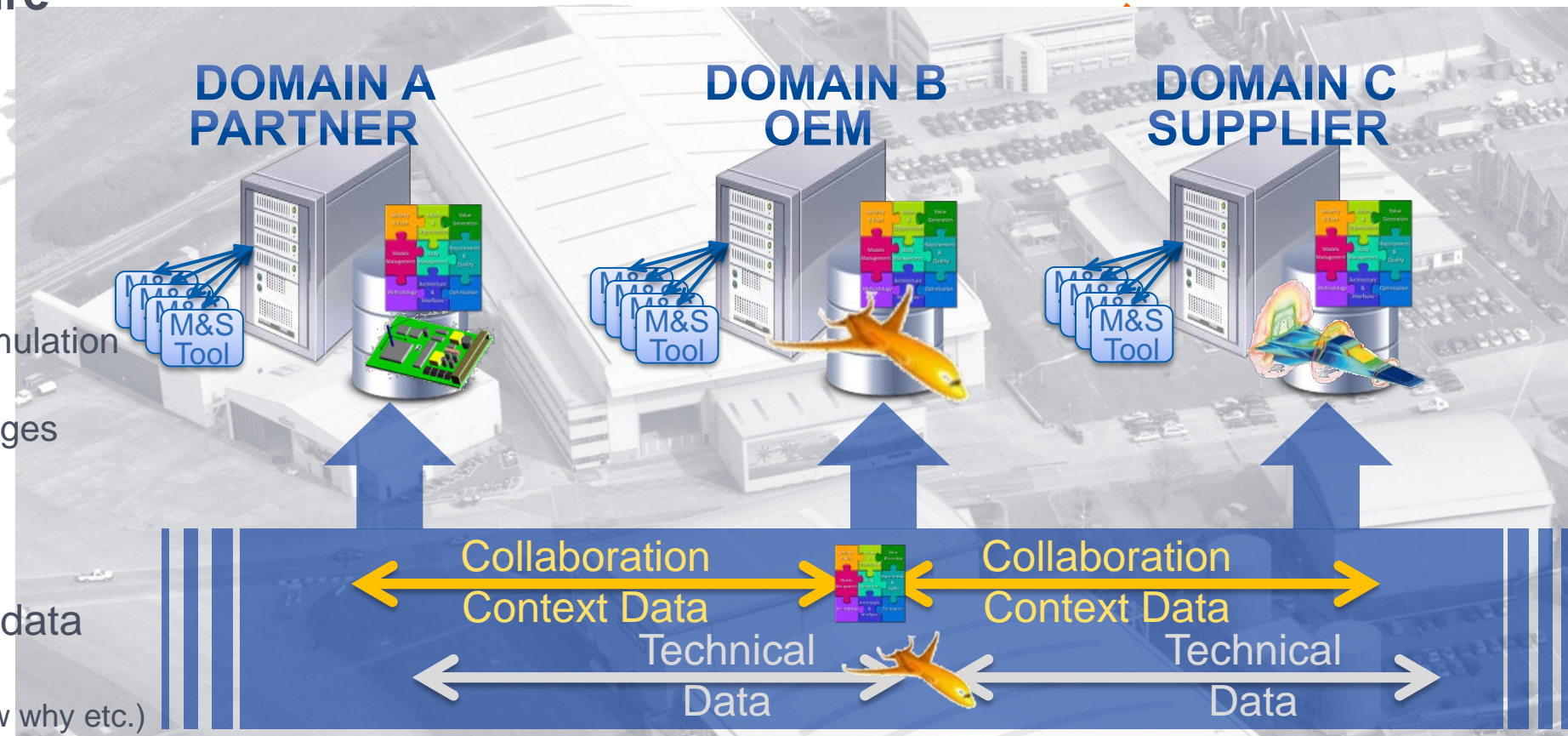


Lifecycle of "System of Interest"



Challenges for distributed systems engineering

- **Distributed Infrastructure**
 - Secure Collaboration for:
 - Locations
 - Organisations
 - Software Platforms
- **Distributed Processes**
 - Multitude of Modelling and Simulation tools
 - Simulation driven design changes traced and under PLM control
- **Distributed Data**
 - Modelling and Simulation data
 - V-cycle meta-data
 - (who what when where how why etc.)
 - Efficient sharing, synchronisation and integration

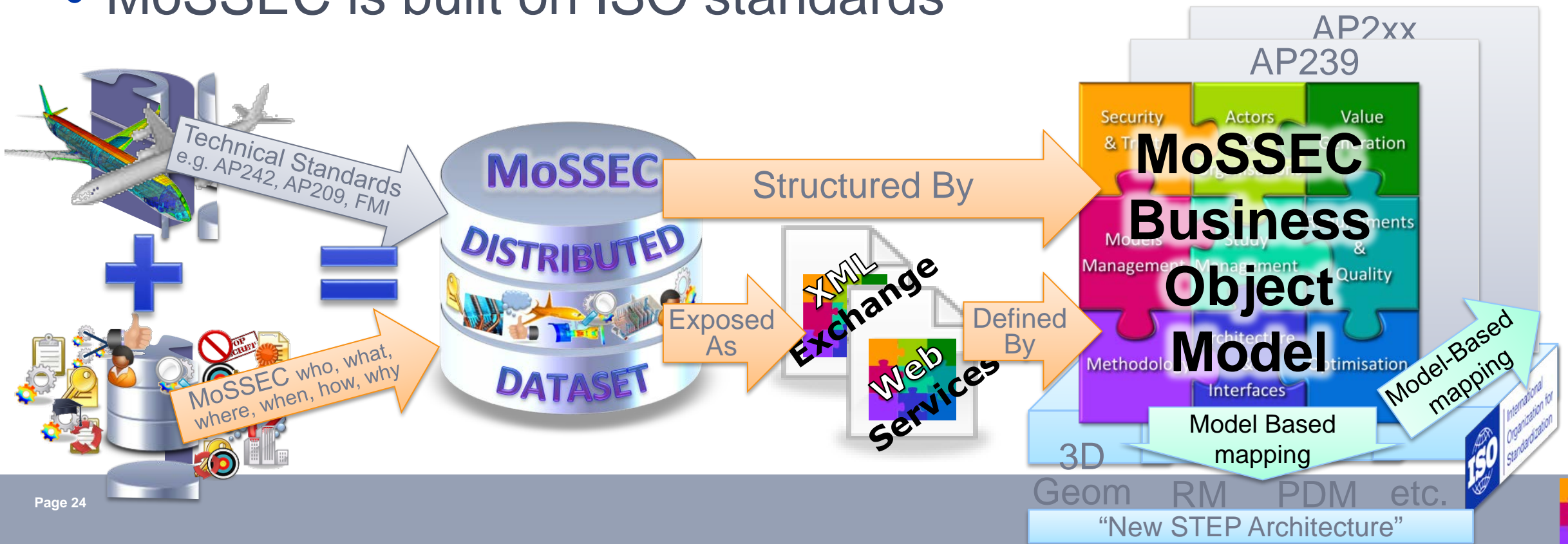


Distributed SE challenges are applicable to in-house organisations

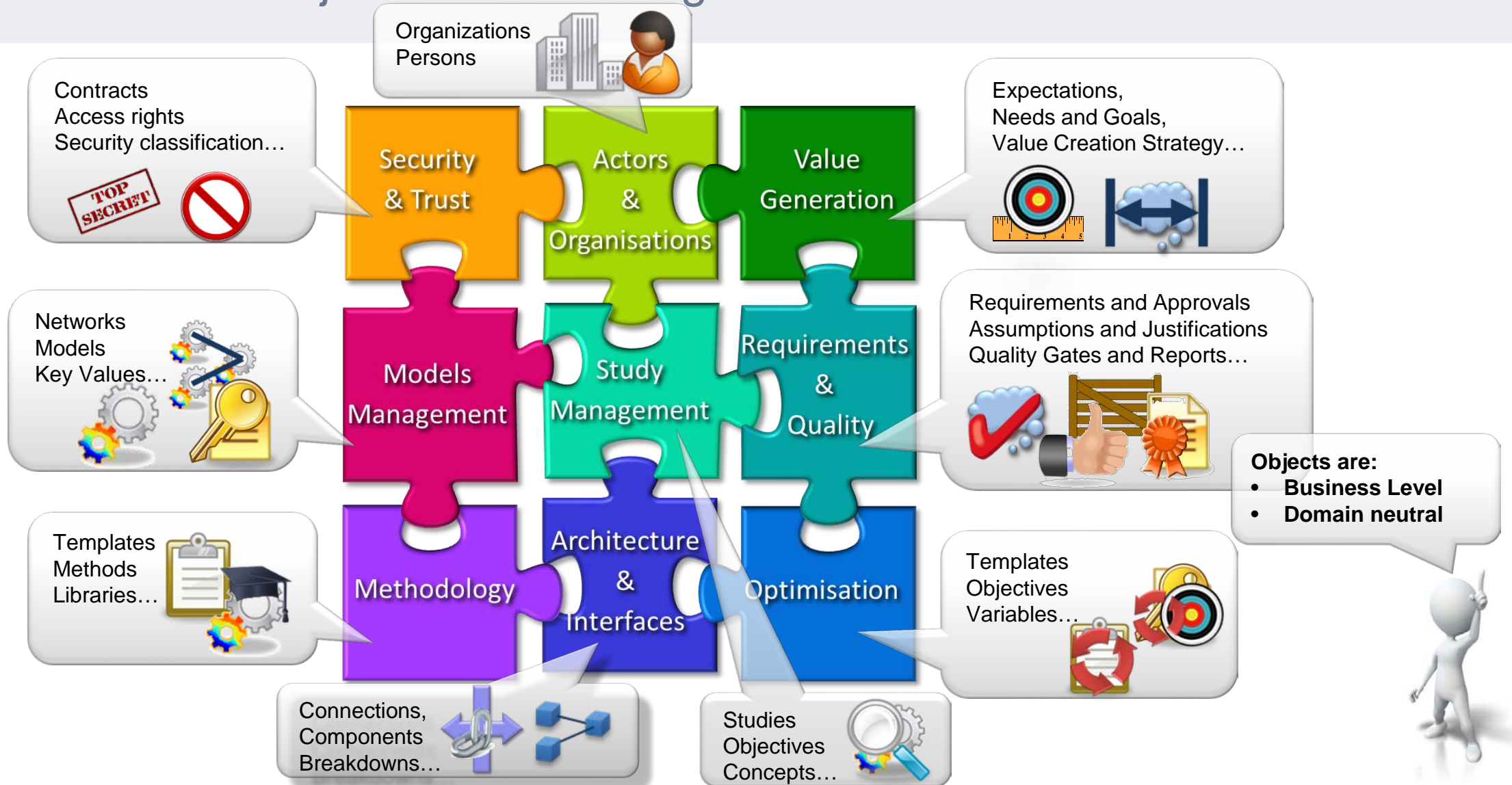


MoSSEC: a common approach based on standards

- MoSSEC provides a common approach for:
 - Structuring the Distributed Dataset
 - Structuring the Information Services for Dataset Management
- MoSSEC is built on ISO standards

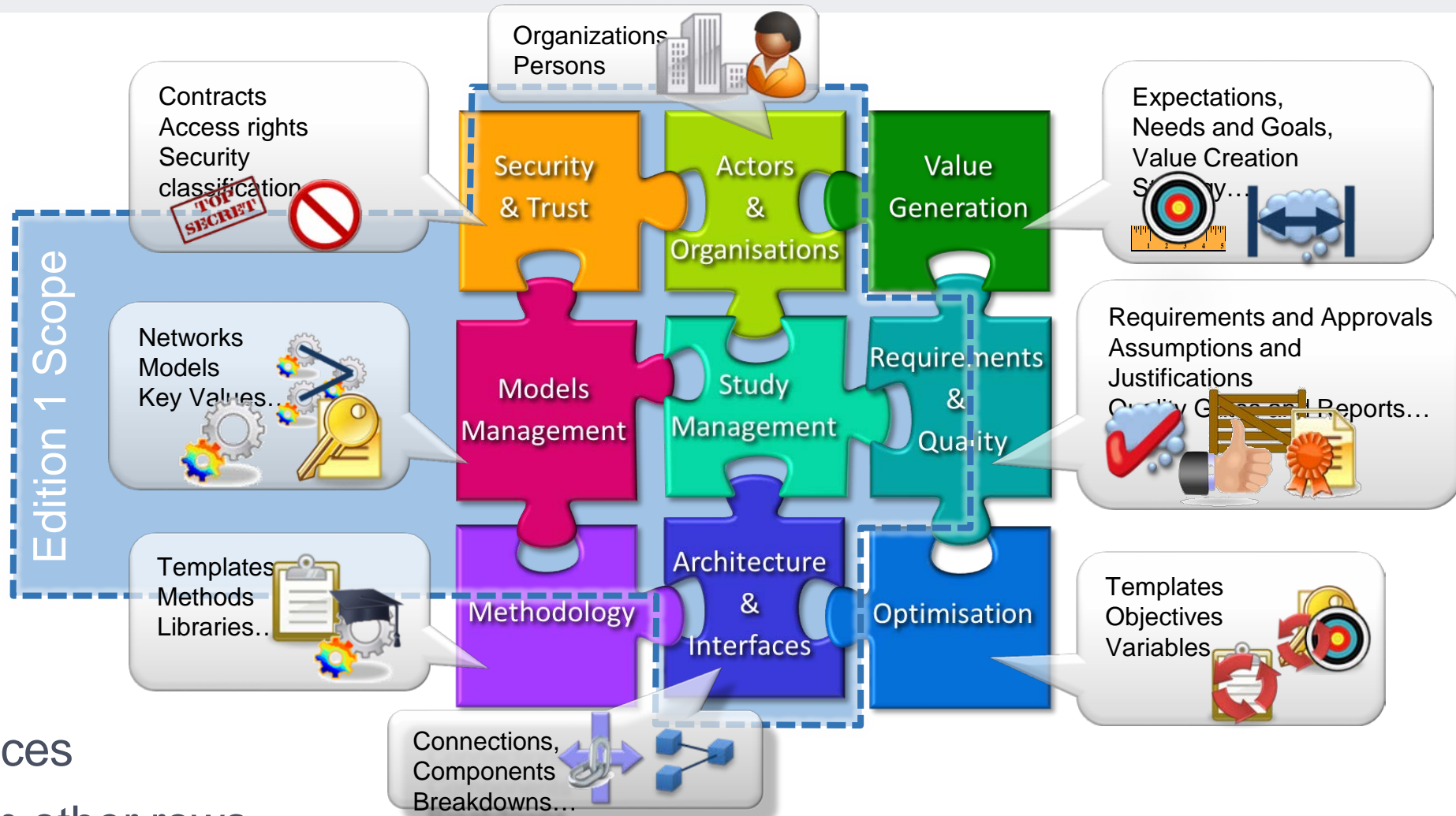


MoSSEC Business Object Model coverage



MoSSEC Technical Aspects: Technical Content - Proposed Scope of V1

- ✓ Studies
- ✓ Models
- ✓ Requirements/Quality
- ✓ Security & Trust
- ✓ Architectures & Interfaces
- + supporting objects from other rows



MoSSEC: Further information

- **MoSSEC public website**
 - <http://www.mossec.org/>
 - Overview
 - Resources
 - News
 - Links
- **MoSSEC private website**
 - <http://private.mossec.org>
- **To be added to the members list contact:**
 - Adrian.Murton@airbus.com
 - Gregory.Pollari@rockwellcollins.com

The image displays three overlapping browser windows showing the MoSSEC website. The top window shows the 'Resources' page with a navigation menu and a list of links. The middle window shows the 'Quick Links to ISO documents for MoSSEC' page, listing documents such as ISO-TC184-SC4, PWI submitted, and WhitePaperAnn. The bottom window shows the 'Modelling and Simulation information in a collaborative Systems Engineering Context' page, featuring a diagram of the MoSSEC Business Scenarios and a 'Latest News' section with updates on NWI and WP release, website updates, and MoSSEC website updates.



MoSSEC: *Modelling and Simulation information in a collaborative Systems Engineering Context*

An ISO standard:

- To improve decision making for complex products.
- For sharing the systems engineering context (*Who, What, Where, When, How, Why*) of modelling and simulation data between Internal teams/domains and Extended Enterprise
- Supported by industrial partners (e.g. Airbus, Rockwell Collins, Boeing, BAE Systems) and vendors (e.g. Eurostep, Dassault Systèmes, MSC Software, Siemens)



Status:

- A first definition used extensively on EU research projects
- ISO New Work Item approved December 2016



Summary



- **Behavior definitions and simulation models is an integrated part of real Product Lifecycle Management and needs to be treated as such**
 - Configuration Management needs to be holistically applied
 - Change Management needs to be holistically applied
- **PLCS (ISO 10303-239)**
 - Is the PLM standard of ISO that can serve as the life cycle environment of MLM
 - Do not cover simulation constructs as such but needed life cycle meta data.
- **MoSSEC**
 - NWI of ISO TC184/SC4
 - Based on ISO 10303 239, 242 and 233
 - For sharing the systems engineering context (*Who, What, Where, When, How, Why*) of modelling and simulation data between Internal teams/domains and Extended Enterprise