Using MoSSEC to exploit modelling and simulation context data for overall aircraft design

Adrian Murton - Airbus Operations Ltd.
Judith Crockford - Airbus Operations Ltd.
Peter Schroll - Airbus Operations SAS

GLOBAL PRODUCT DATA INTEROPERABILITY SUMMIT 2018

ELYSIUM Parker Aerospace NORTHROP GRUMMAN BOEING

Agenda

- **Why do I need MoSSEC?**
- **What is MoSSEC?**
- **How is MoSSEC used?**
- **Summary**

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Lifecycle Model-Based Enterprises: Typical decision making questions

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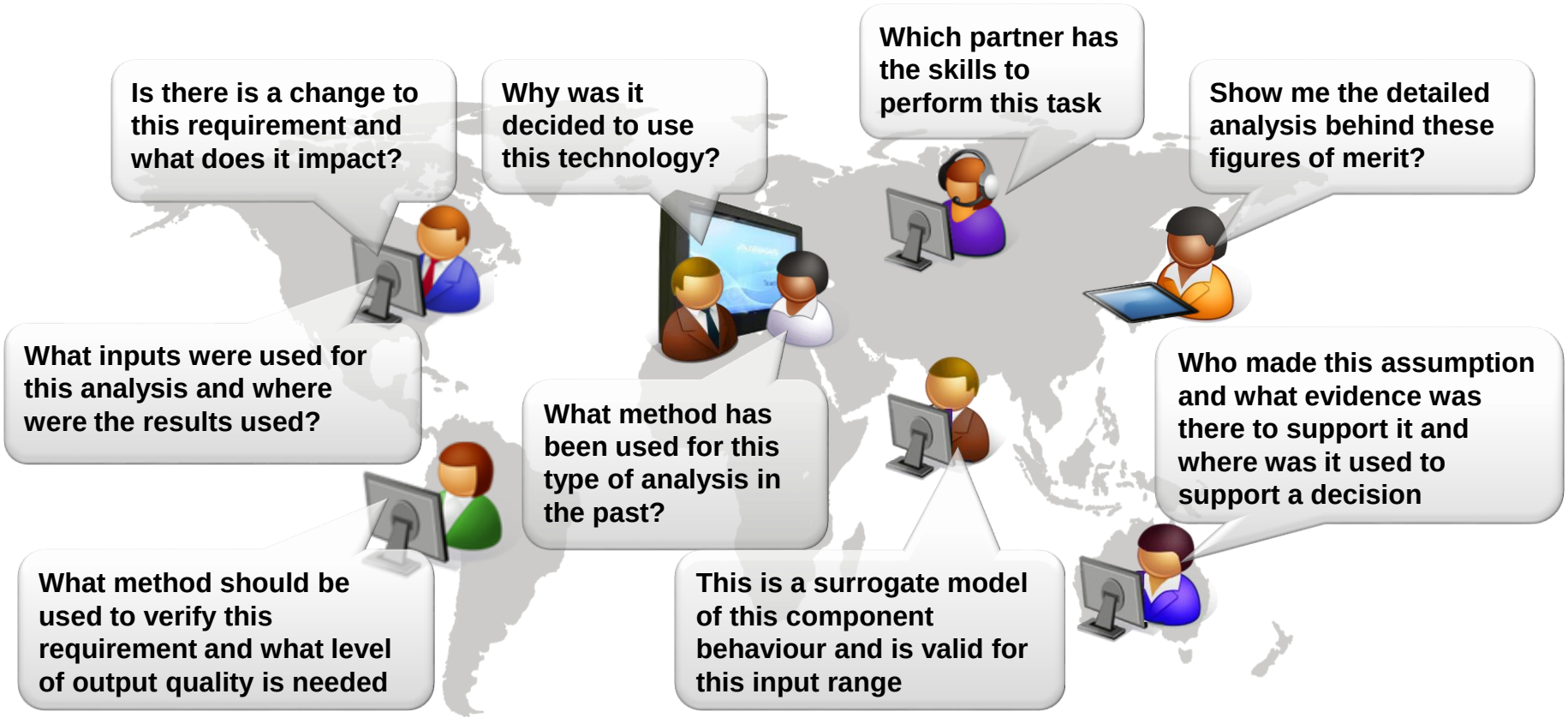
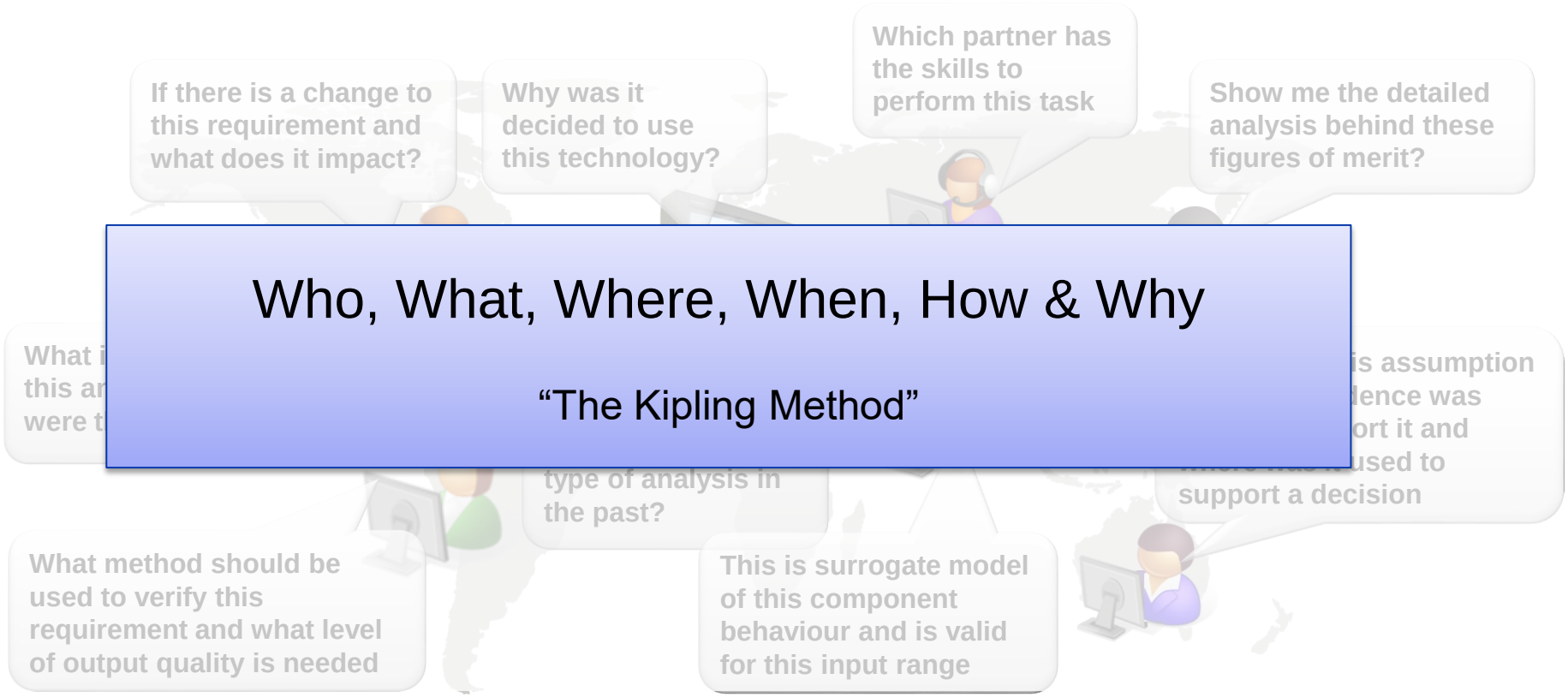


Lifecycle Model-Based Enterprises: Typical decision making questions



Who, What, Where, When, How & Why

"The Kipling Method"

Lifecycle Model-Based Enterprises: Improving decision making across an organisation

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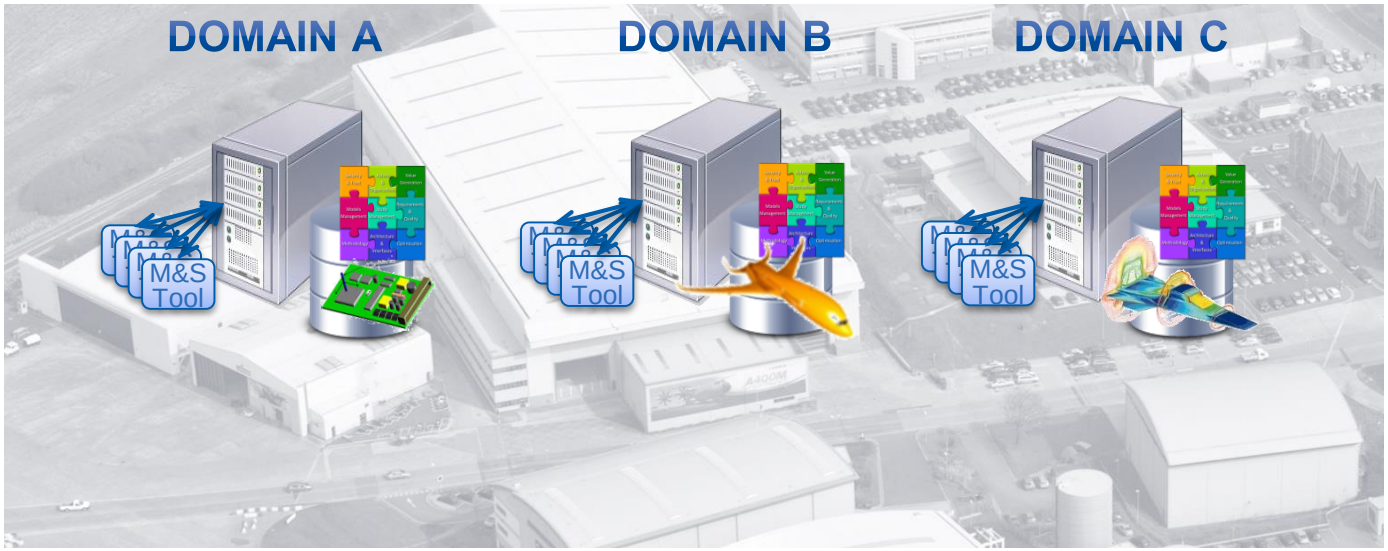
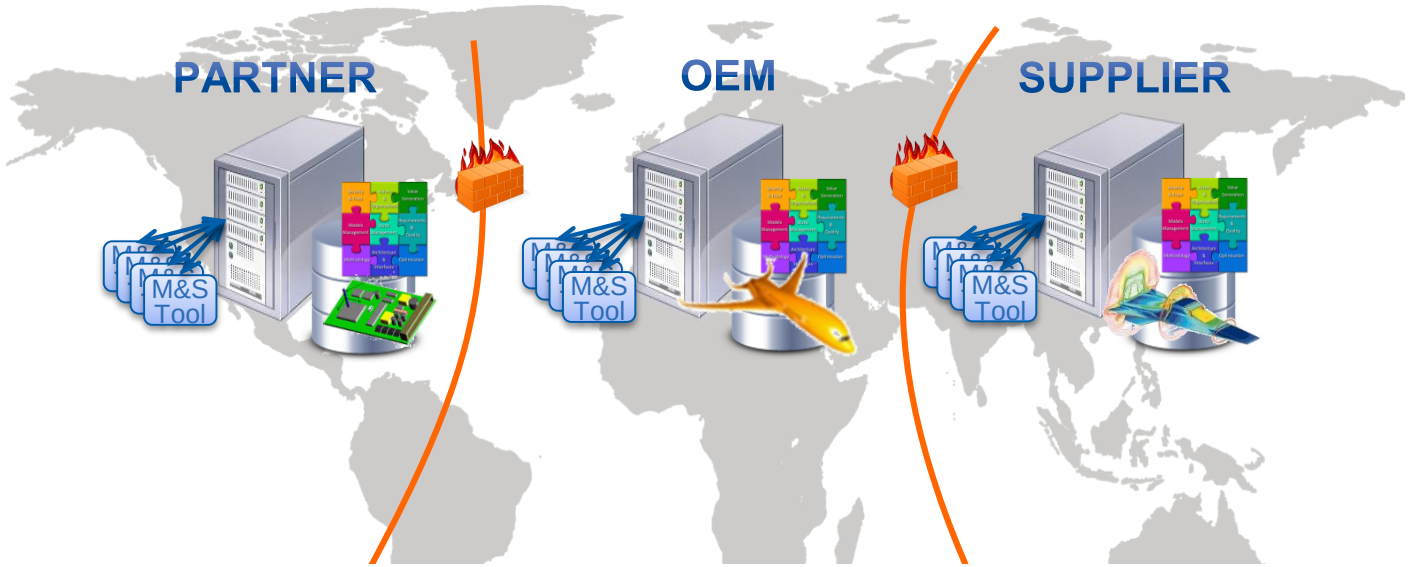


- Needs efficient distribution and retrieval
  - Of system-of-systems definition
  - Across multiple organisations, platforms and locations
- To facilitate a joined-up “big-picture” view

Lifecycle Model-Based Enterprises: Improving decision making across an extended enterprise



- Needs efficient distribution and retrieval
  - Of system-of-systems definition
  - Across multiple organisations, platforms and locations
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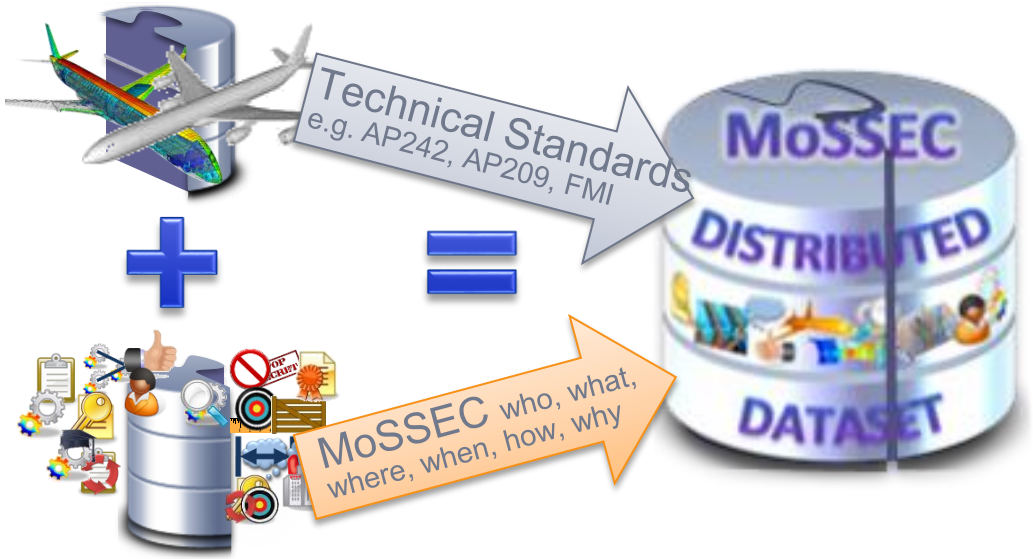
Combining Modelling and Simulation Data with Collaboration Data

Modelling and Simulation data

- Managed by PLM/SPDM tools
- Exchanged with technical standards



Together this supports a lifecycle model-based enterprise

Collaboration data

- Managed by MoSSEC Compliant Tools
- Exchanged with MoSSEC standard

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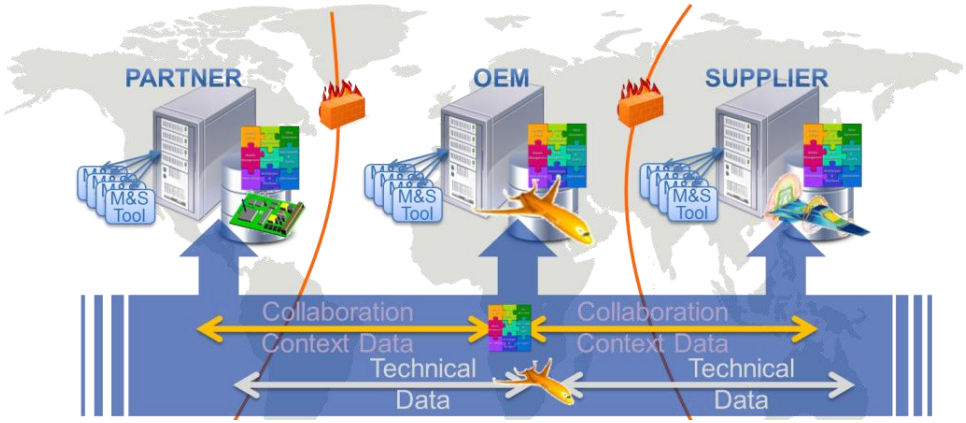
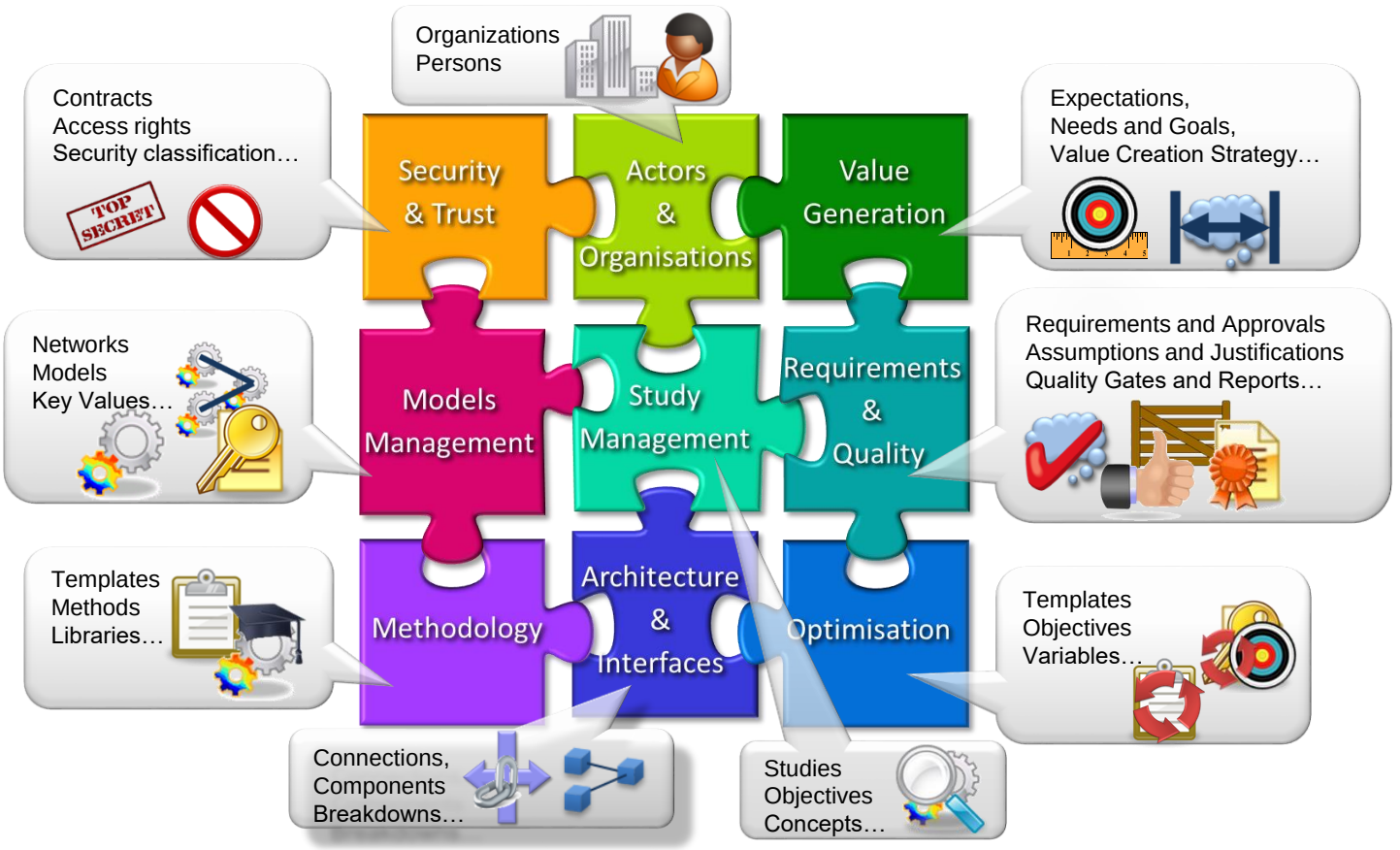
MoSSEC: A work-in-progress ISO Standard

- ISO Committee Draft approved June 2018 (ISO/AWI 22071, AP243)
  - Draft International Standard planned end of 2019
  - International Standard planned mid 2020
- Contributing web services specification for the STEP Extended Architecture

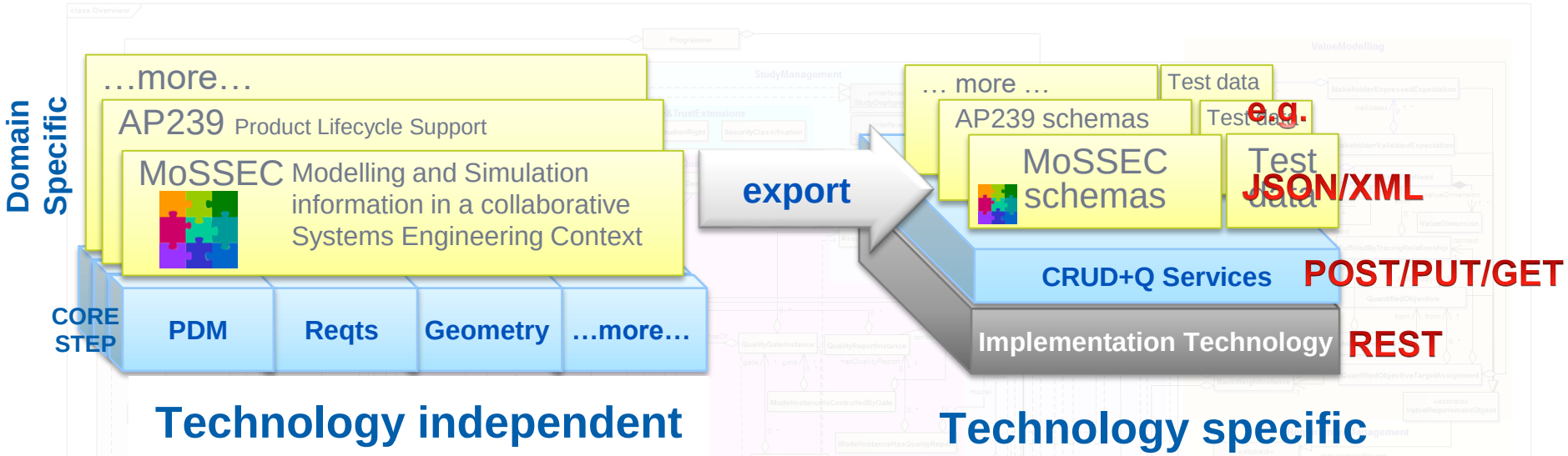
- Supported by industrial partners (e.g. Airbus, Rockwell Collins, Boeing, BAE Systems)
- Supported by vendors (e.g. Eurostep, Dassault Systèmes, MSC Software, Siemens)



MoSSEC: Business Object Model coverage



MoSSEC: Building on Related Standards



- ISO 10303 STEP modular architecture (model based)
  - Mapping to Core, shares subset with AP239 (PLCS), harmonized with AP242 ed2
  - Allows for alternative technology specific implementations – future proofing
- Model Based definition enables test suite export for implementers and forums

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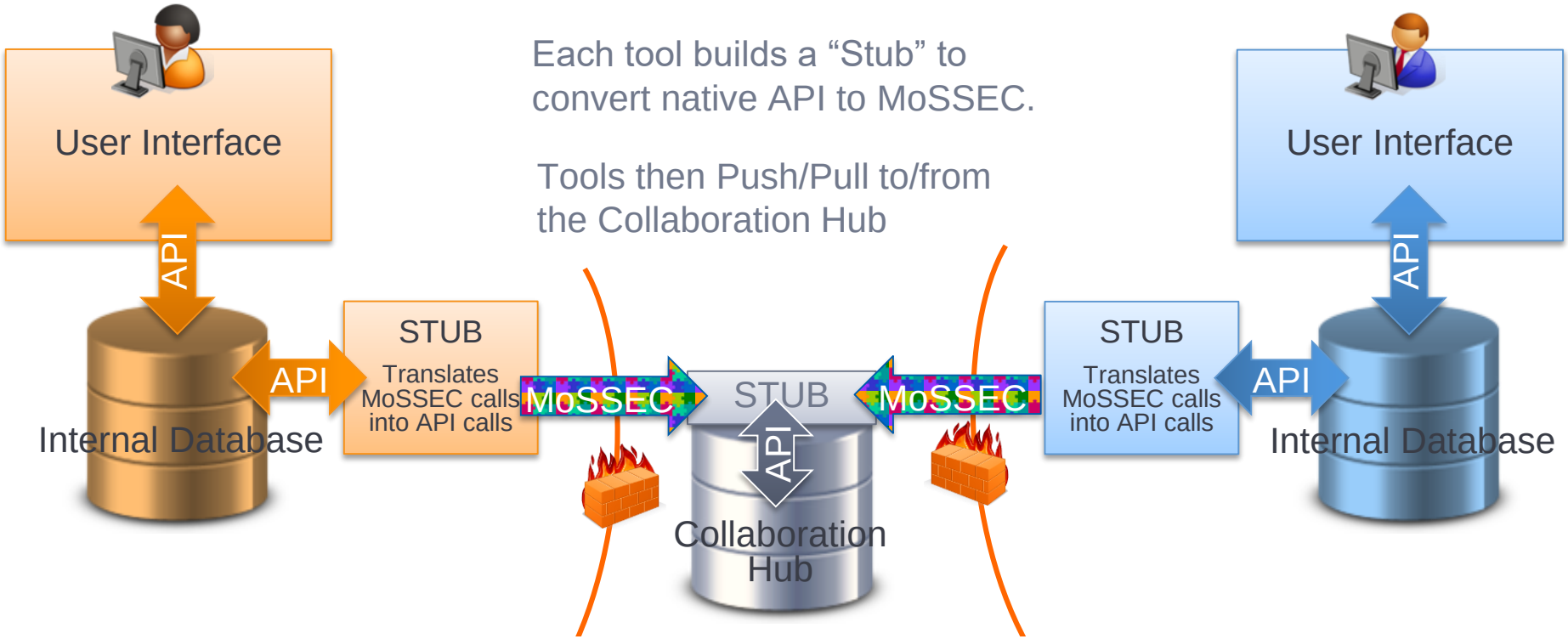
Implementation Scenario – Intermediate Collaboration Hub communication



Each tool builds a “Stub” to convert native API to MoSSEC.

Tools then Push/Pull to/from the Collaboration Hub

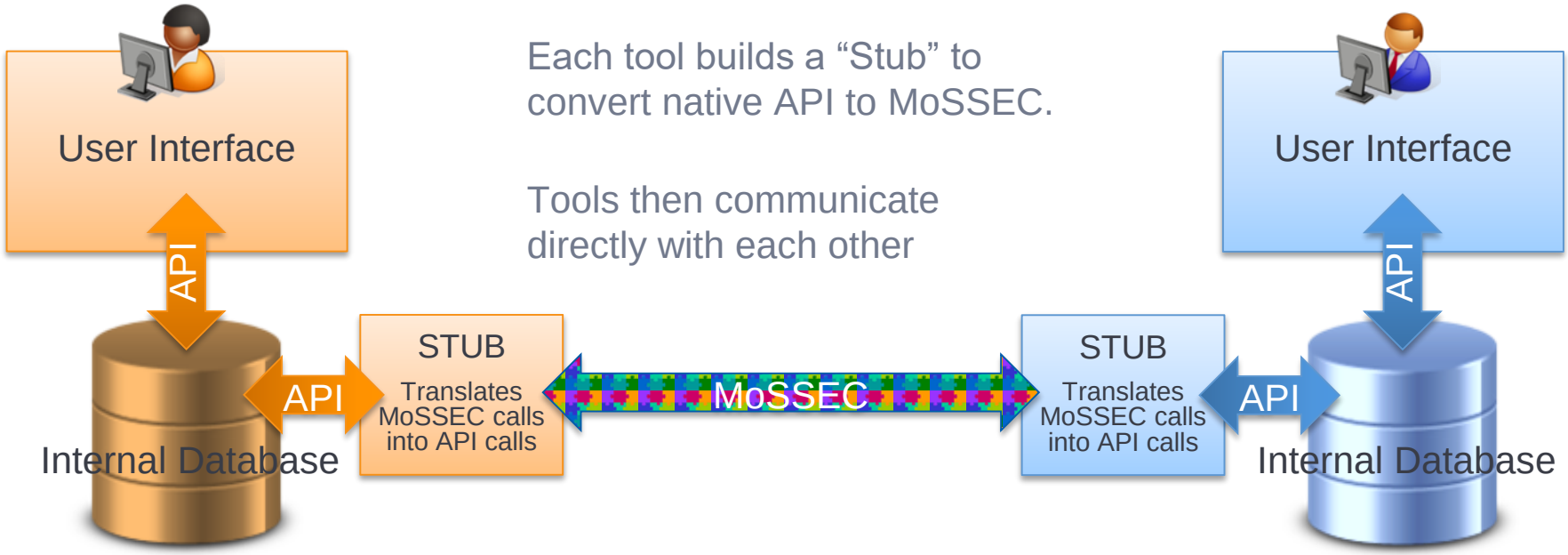
Implementation Examples:

Windchill (PTC)

SimManager (MSC) ⟶ ShareAspace (Eurostep)

Non COTS (various)

Implementation Scenario – Direct Tool communication



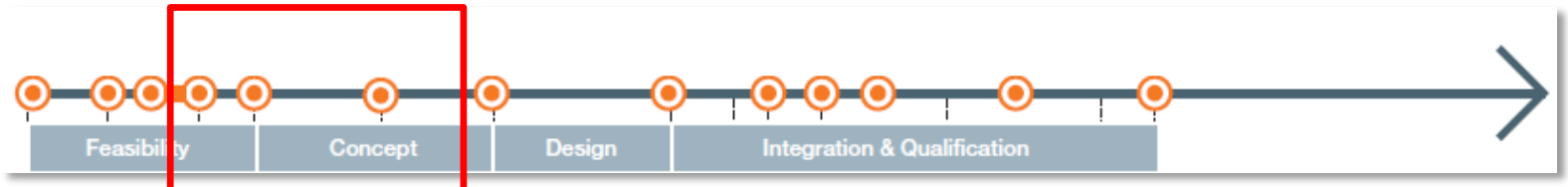
Each tool builds a “Stub” to convert native API to MoSSEC.

Tools then communicate directly with each other

Implementation Examples:

3DX (Dassault Systemes)	⟷	TeamCenter (Siemens)
3DX	⟷	SimManager (MSC)
Non COTS (various)	⟷	SimManager

Typical application area – Aircraft Design Trades



Typical Product Development Cycle

Single domain

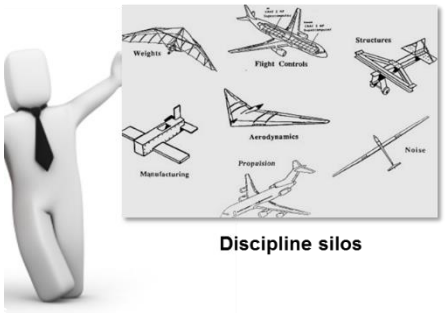
Exploring rapidly loads of concepts

Multi-domain

Trade-Off analysis across a set of concepts involving rapid domain M&T

Multi-domain

Designing one concept in detail



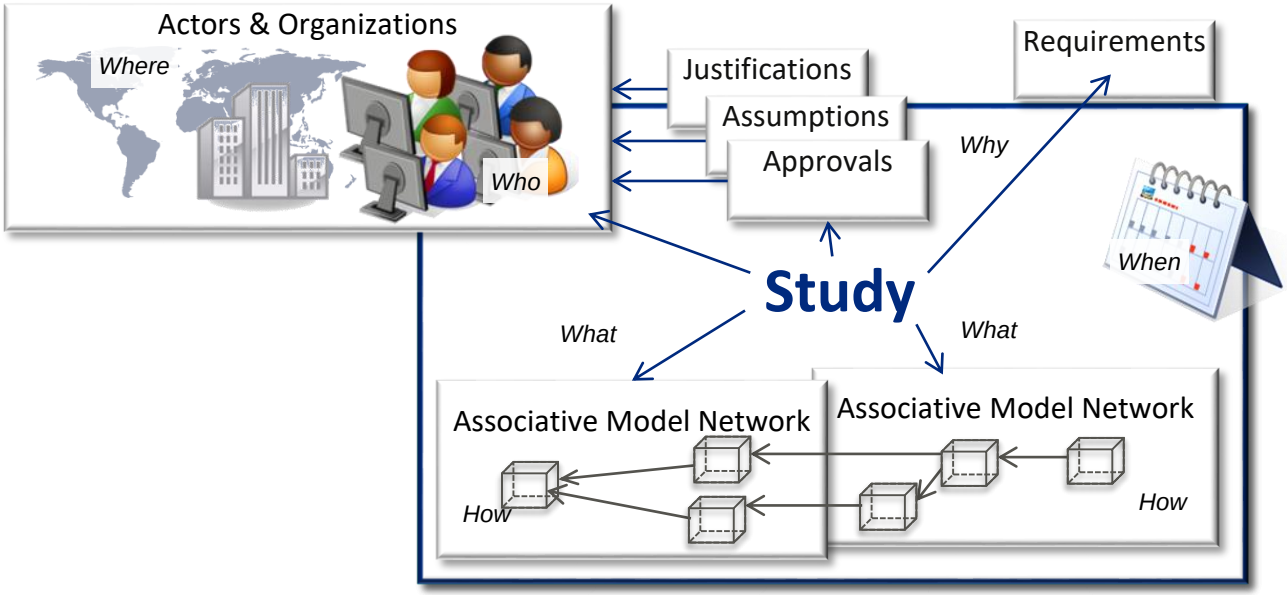
Discipline silos

No means to steer trade process

Key information trapped in reports

Incoherent & not traced data

Fractal Studies and Associative Model Networks - context illustration



Fractal Studies and Associative Model Networks - context illustration

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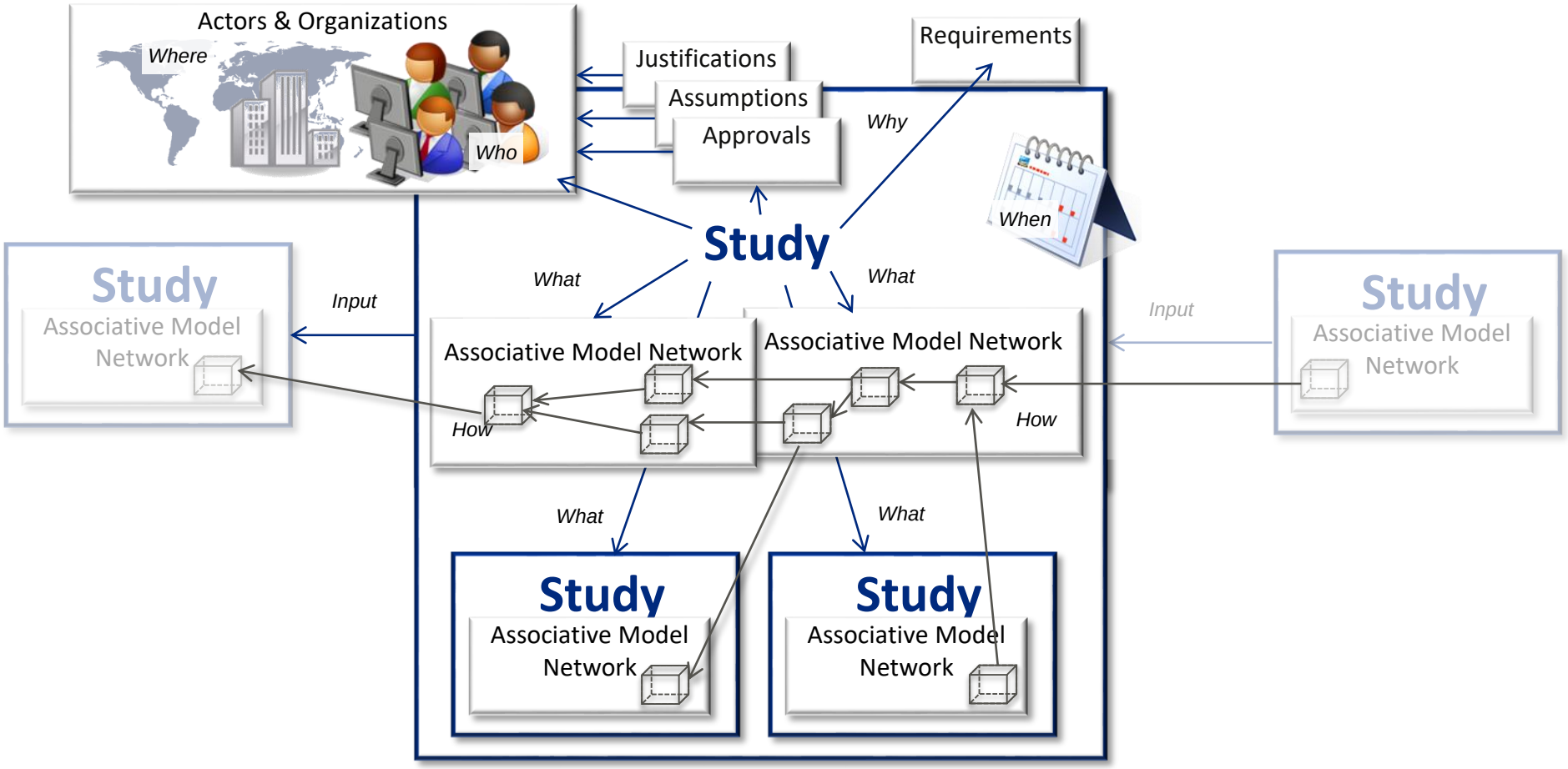
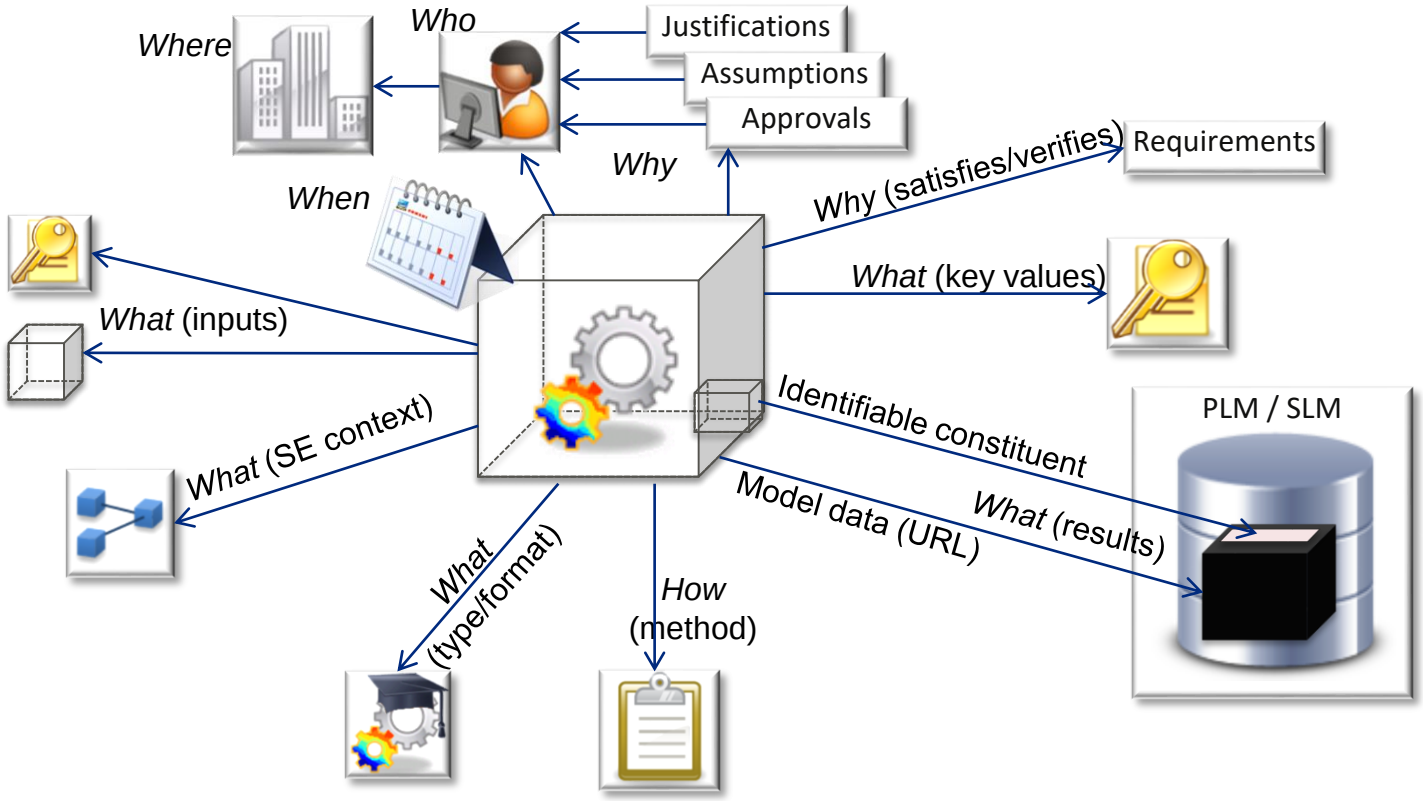
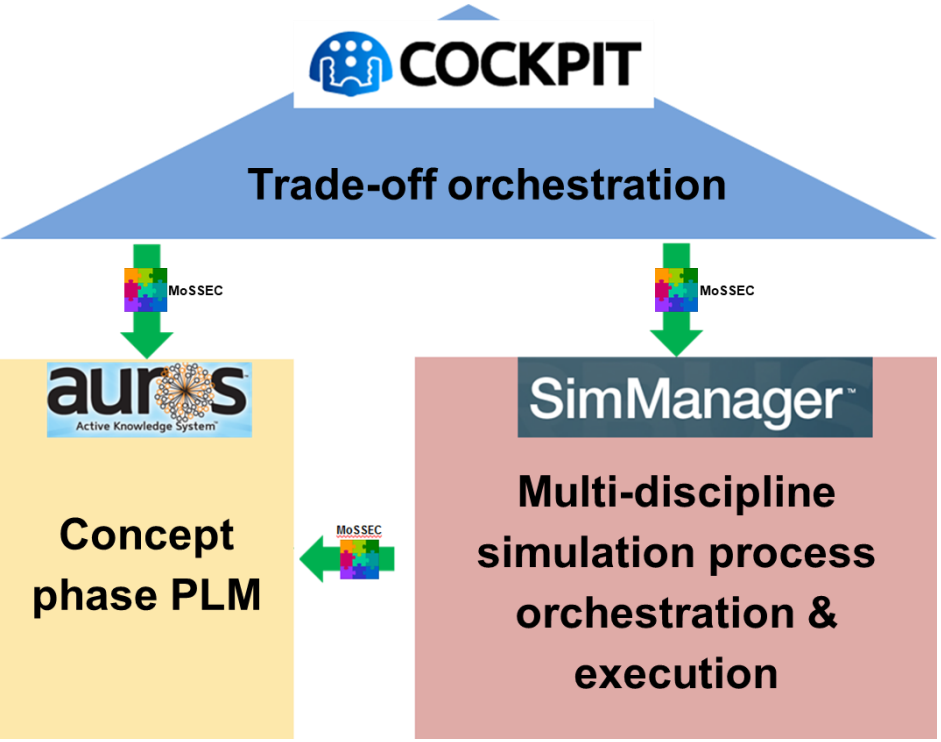


“Model Instance” context illustration



Using MoSSEC in overall aircraft design - Video



Platforms

- Architects Cockpit
- Concept phase PLM
- SPDM platform

Phases

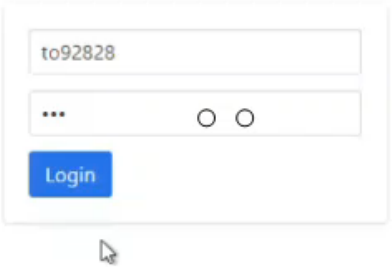
- Trade Study setup/publishing
- Trade Study acceptance
- Trade Study progress visualization

Information sharing

- MoSSEC web services

AIRBUS

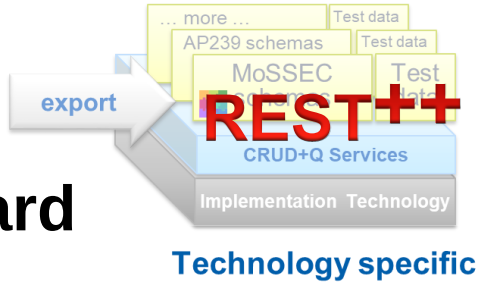
COCKPIT



A tool to enable system architects to set-up and manage collaborative trade studies

Benefits/Observations

- **Development lifecycle**
  - Initial Development
    - Mapping to internal data model
    - Services development
  - Subsequent Development
    - Implementation reuse



- **Technology Independent model of Standard**
  - E.g. SOAP to REST without changing model

- **Standardized semantics and services**
  - Improved Collaboration, Traceability, decision making

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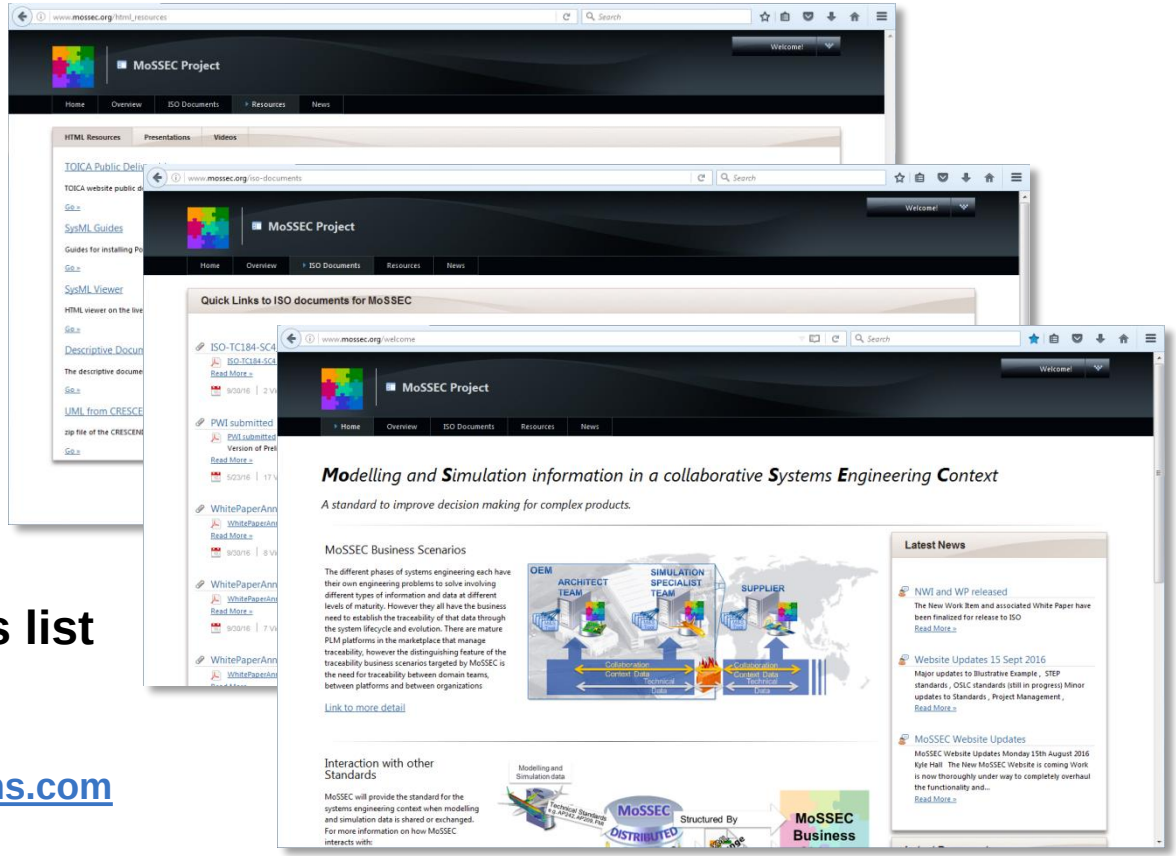
MoSSEC: A Unique Combination of Features

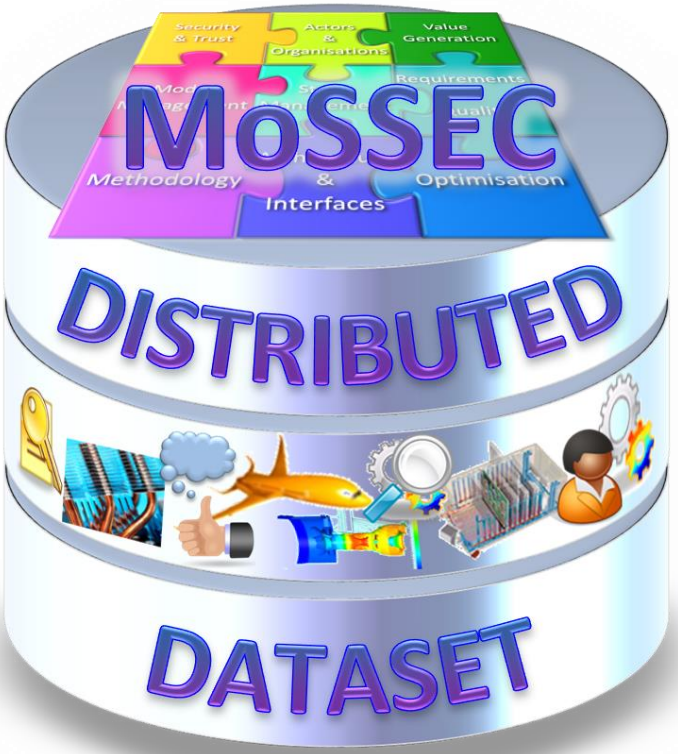
- **Links Modelling and Simulation to the Systems Engineering Context**
  - Uses objects at a business level
- **Efficiently shares context information**
  - Uses web services defined using the business object specification

- **Builds on existing standards**
  - Uses STEP Extended Architecture mapping to ISO 10303 AP239 PLCS and the Core Technical Capabilities
  - Exploits AP239 usages such as Long Term Archiving and Retrieval (LOTAR)
- **Supports Lifecycle Model-Based Enterprises**

MoSSEC: Further information

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





Any Questions?