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Making Information Perform: Evolving the MIP from databases to services

Doug Sim, Dstl, GBR

Pawel Jasinski, RUAG Defence, CHE

Dstl publication reference: DSTL/CP61053.

Aim

- Ensure MIP's future
  - Funding Pressure
  - Evolving Technology
  - Responsive to Military Timescales
- Understand MIP
  - Goals, Objectives, Constraints
- Propose MIP Transformation
  - Service Oriented Solution
  - Flexible Work Teams
  - Rapid Delivery of Capability

Agenda

- What is MIP?
  - Why do they exist, how do they work, what do they deliver?
  - What are their problems?
- Transforming MIP
  - What does the solution look like?
    - How do we produce it?
  - Prototyping
    - How do we know it works?
- Conclusions
- Questions

Multilateral Interoperability Programme

- Who are they?
  - 29 Nations plus NATO
- What do they do?
  - Develop Standards to support information exchange
    - System to System
    - NOT Man readable
  - Command and Control (C2) Interoperability
- What do they deliver?
  - C2 Standard based on database replication
    - Information Exchange Data Model and an Exchange Mechanism
  - Current version uses the JC3IEDM† and the DEM

† The JC3IEDM is covered by NATO STANAG 5525

MIP: What do they Deliver?

- Deliver a set of specifications inc. data models, business rules, test cases and operational handbooks
- The current solution is a data model which covers;
  - Land Centric
  - Air
  - Maritime
  - Command and Control
  - Logistics
  - Planning
  - Reporting
- And an exchange mechanism
  - Database Replication
  - Contracts set-up between Parties
    - Replicates Information as it changes
  - High Efficiency

MIP: How do they do Business?

- How do they Work?
  - Meet four times a year in two weekly working groups
    - Some work done between WGs but not by all nations
    - Led by the Programme Management Group (PMG)
    - Four main bodies deliver the products
      - Operational Working Group (OWG)
      - System Engineering Working Group (SEWG)
      - Data Modelling Working Group (DMWG)
      - Test and Evaluation Working Group (TEWG)
  - The work is overseen by the MIP Steering Group who meet once every 2 years for one week

MIP: Work Flows

1. Request

2. Tasking

OWG

3. Operational Requirements

SEWG

4. System Requirements

DMWG

5. Data Model

TEWG

6. Test Cases

Clarification

PMG

Release

Testing

MIP

Implementation

NATO Reference Model

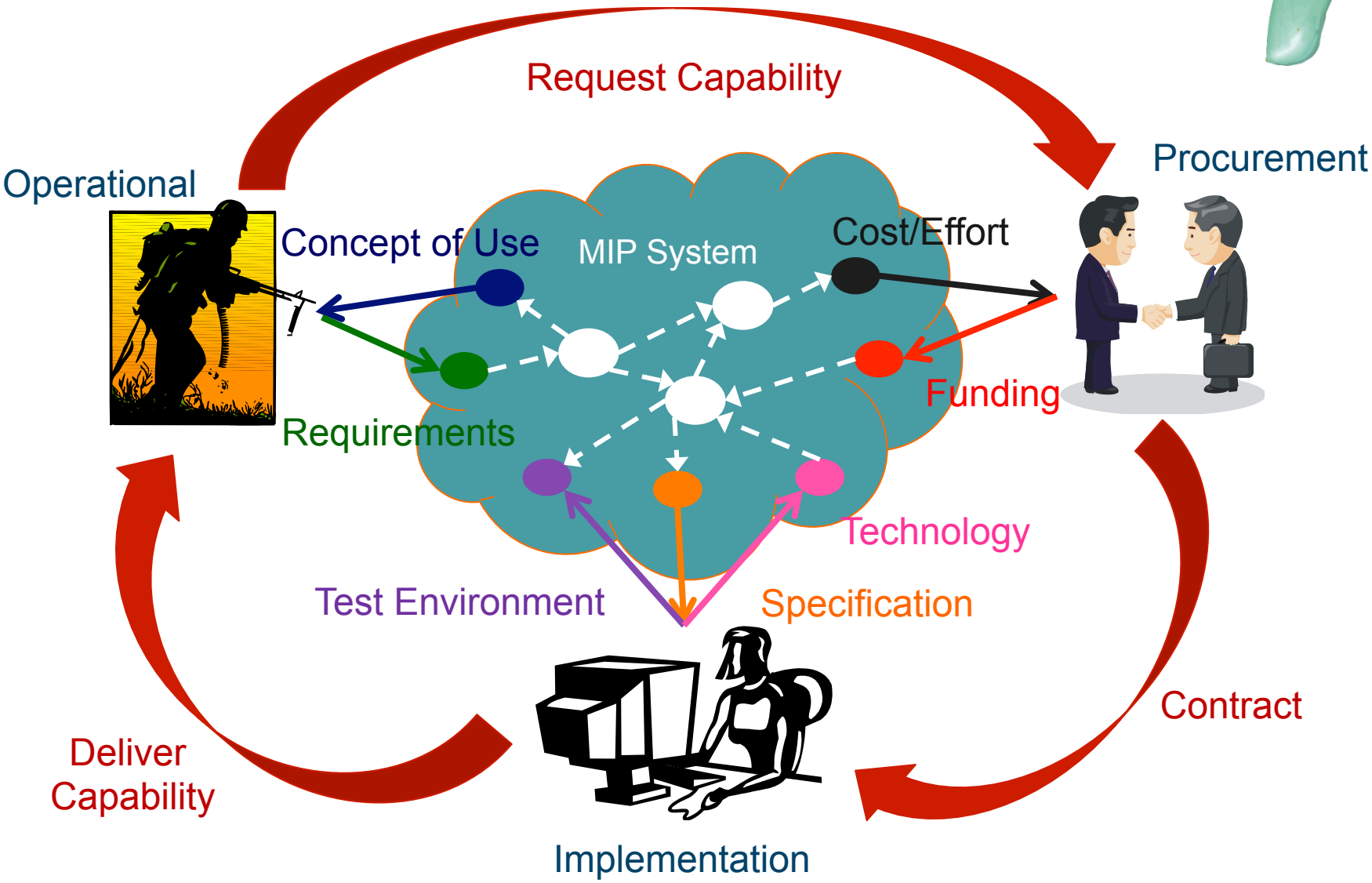
MIP: Problems

- Solution Complexity
  - Large Generic Data Model
    - Over a thousand business rules
    - Hundreds of entities and relationships
  - Individual IERs are simple
    - Not cost effective unless whole system change
- Future Systems will use new technologies/approaches
  - Solution isn't appropriate for Service Oriented Approaches
  - New Technologies such as DDS
- Agility
  - Cannot respond quickly to changes in C2 Environment

Transforming MIP

- Problem Recognition
  - Nearly 2 years ago (6 Working Groups = 12 weeks)
    - PMG Recognised something needed to change
    - Workshops held to identify potential ways forward
    - Identified the need to restructure the MIP
      - Greater Flexibility to respond to operational demand
      - Maintain Relevance to the Future Battlespace
      - Fewer Resources
      - Retain consensus building
  - Two stage solution required
    - IPT-3 maintain extant solution to meet operational demand
    - IPT-F explore future ways of working and solutions
      - Provide Recommendation to MSG June 2012

The MIP Scope



IPT-F: How do we Produce it?

PMG

Integrated Product Team

Work Package Team

Work Package Team

Operational Subject Matter Experts

System Engineers

Information Modellers

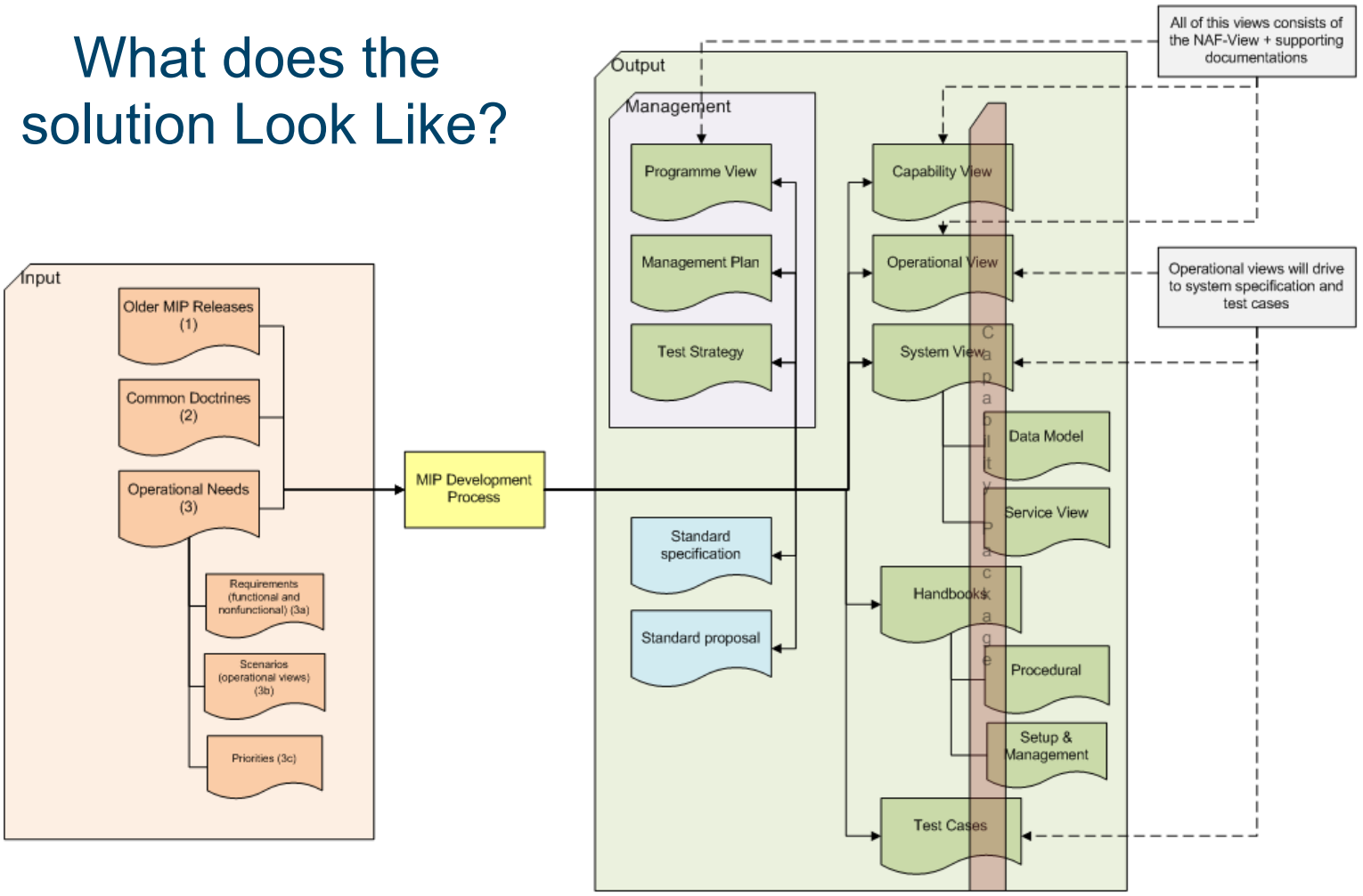
Conflict

Validation/Test

System Architect

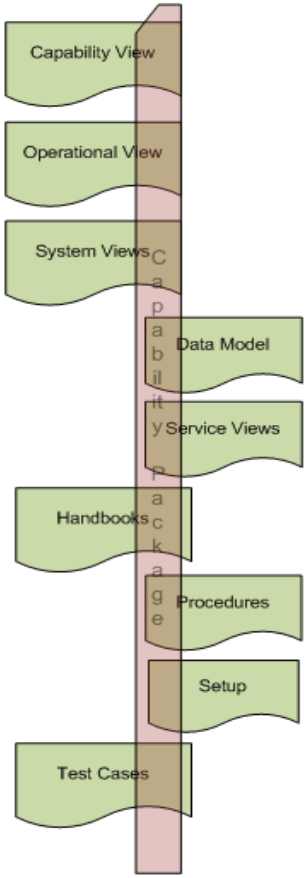
Transforming MIP

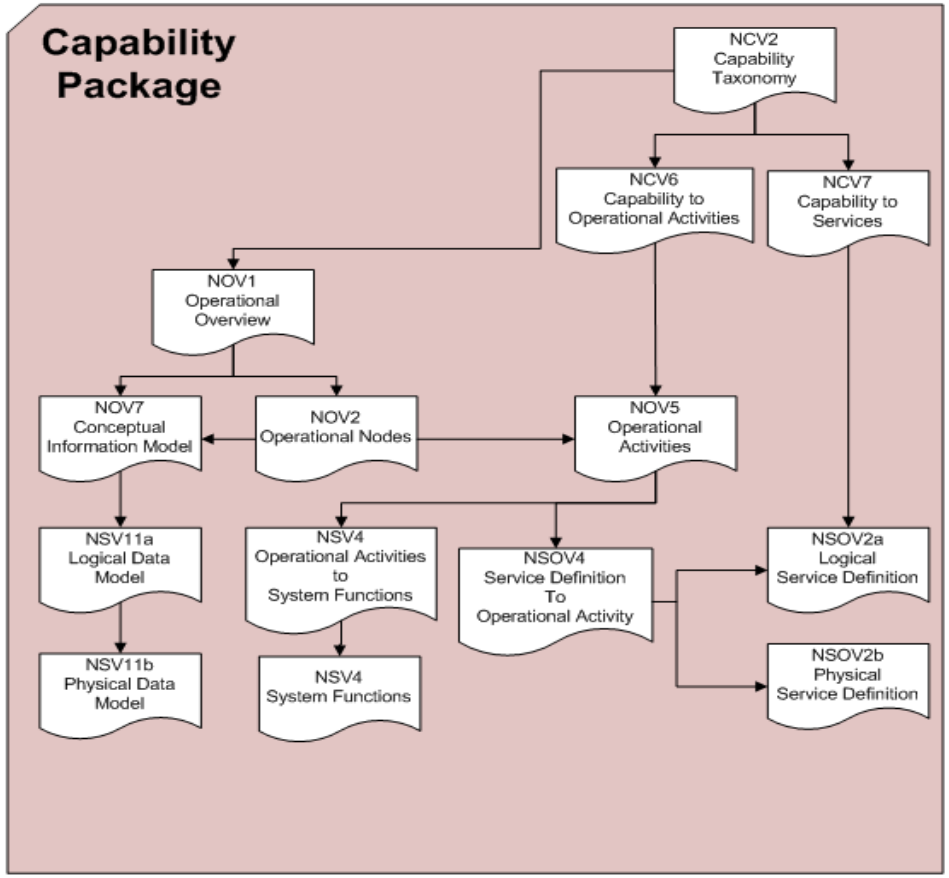
What does the solution Look Like?



Transforming MIP

What does the solution Look Like?

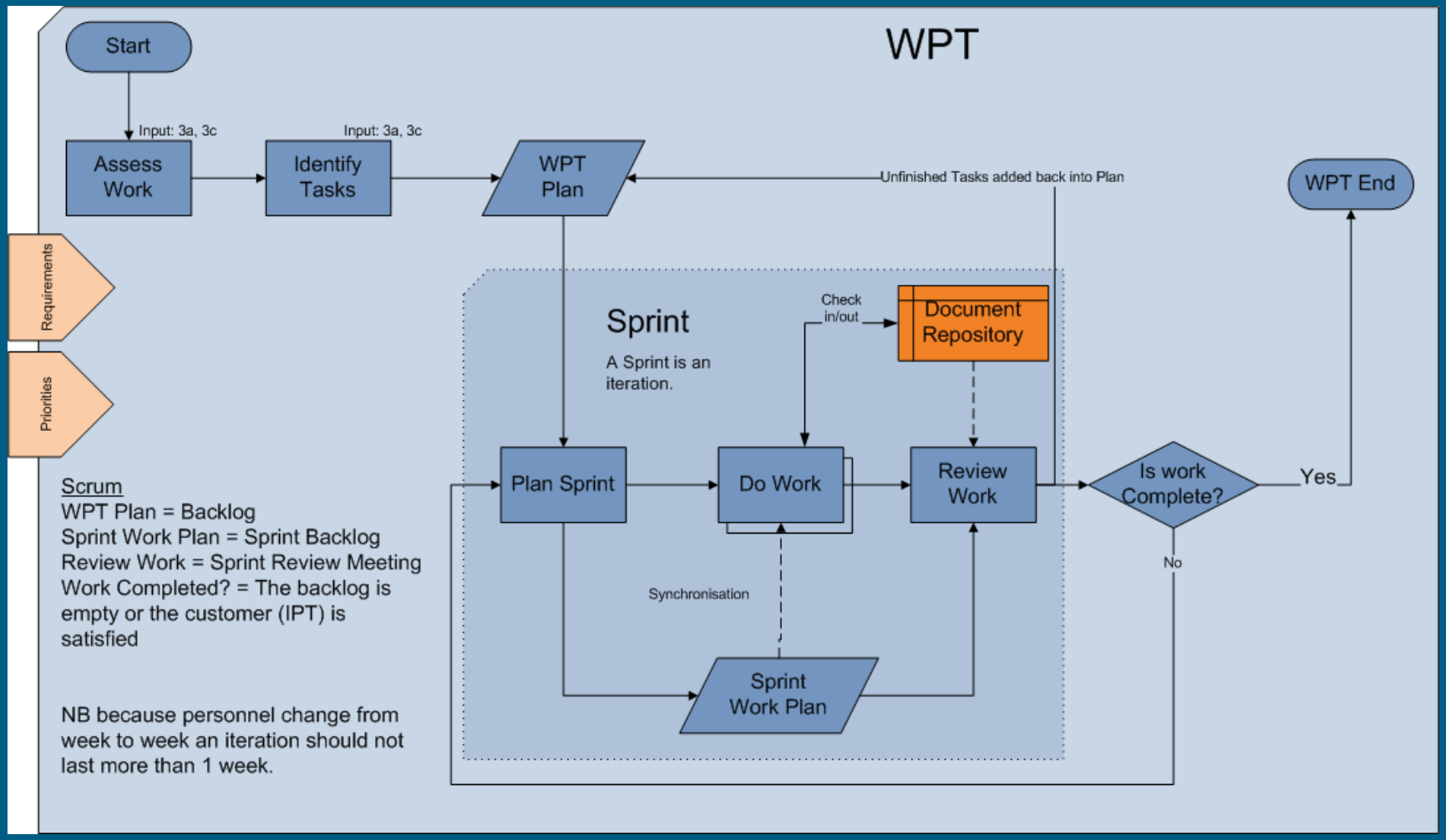




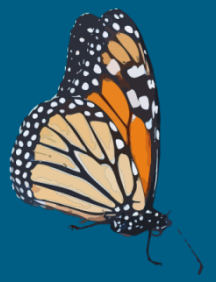
IPT-F: How do we Produce it?

- Approach Adopted
  - System Architecture
    - NAF Views developed in SparxEA
    - Configuration Management required to integrate the WPT sub models into overall IPT model
  - Model Driven Architecture
    - Platform Independent Model is created based on the JC3IEDM
    - Subsets required to deliver an individual Capability Package are generated by transforms from the PIM
  - Work Package Teams
    - Rainbow teams of short duration using Agile Methods: Scrum

IPT-F: How do we Produce it?

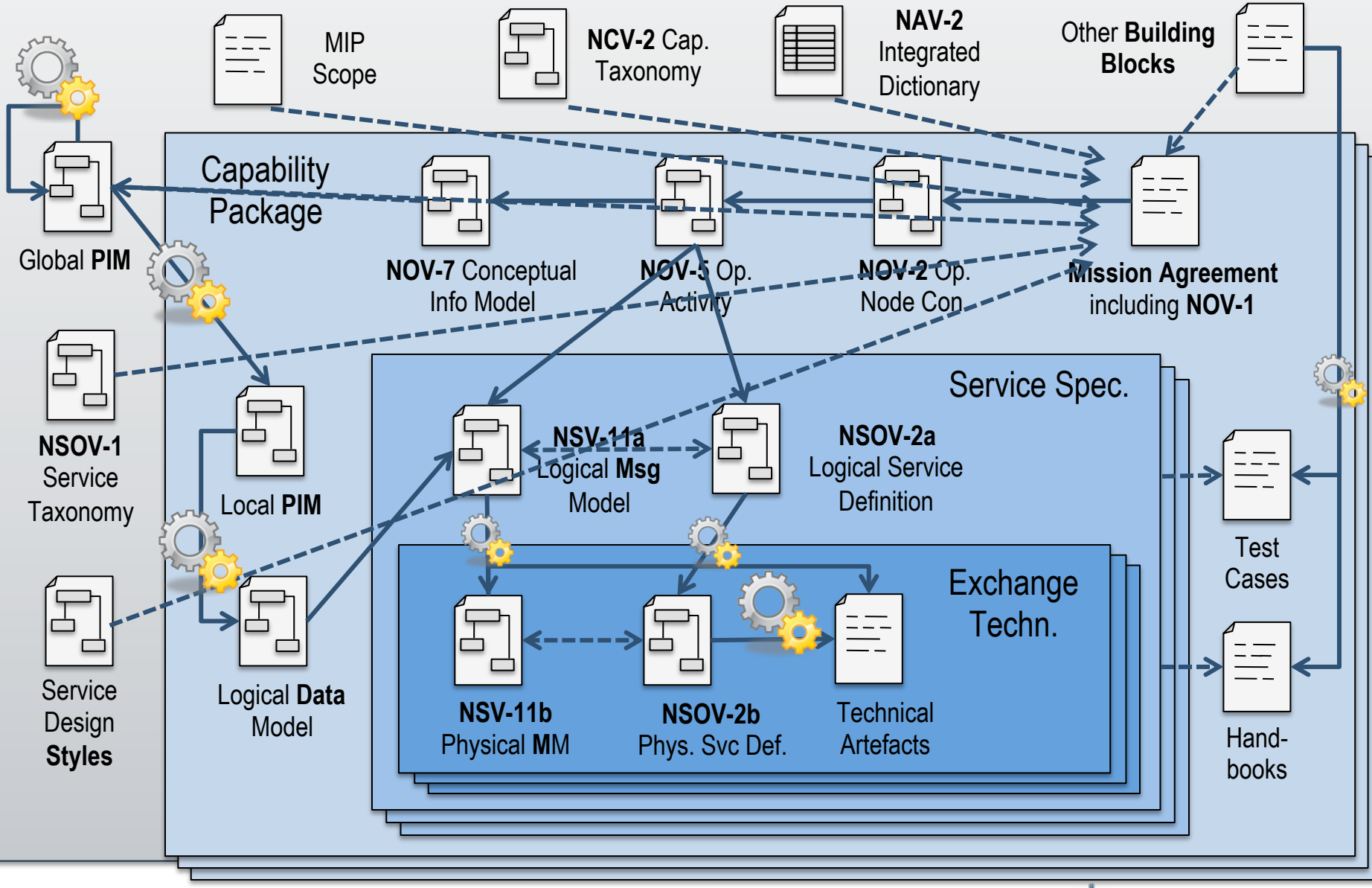


How do we know it works?



- Prototyping - Will it fly!
  - Prototype Working Group established to validate methodology
  - Scope of the prototype: elaborate, specify, implement and test Blue Force Tracking Capability
  - But, how do you verify incomplete cooking recipe?
    - Learning by doing – fill the gaps with intuition, common sense, experience or just plain old trial and error
  - Developed set of necessary NAF Views, use MDA transformations

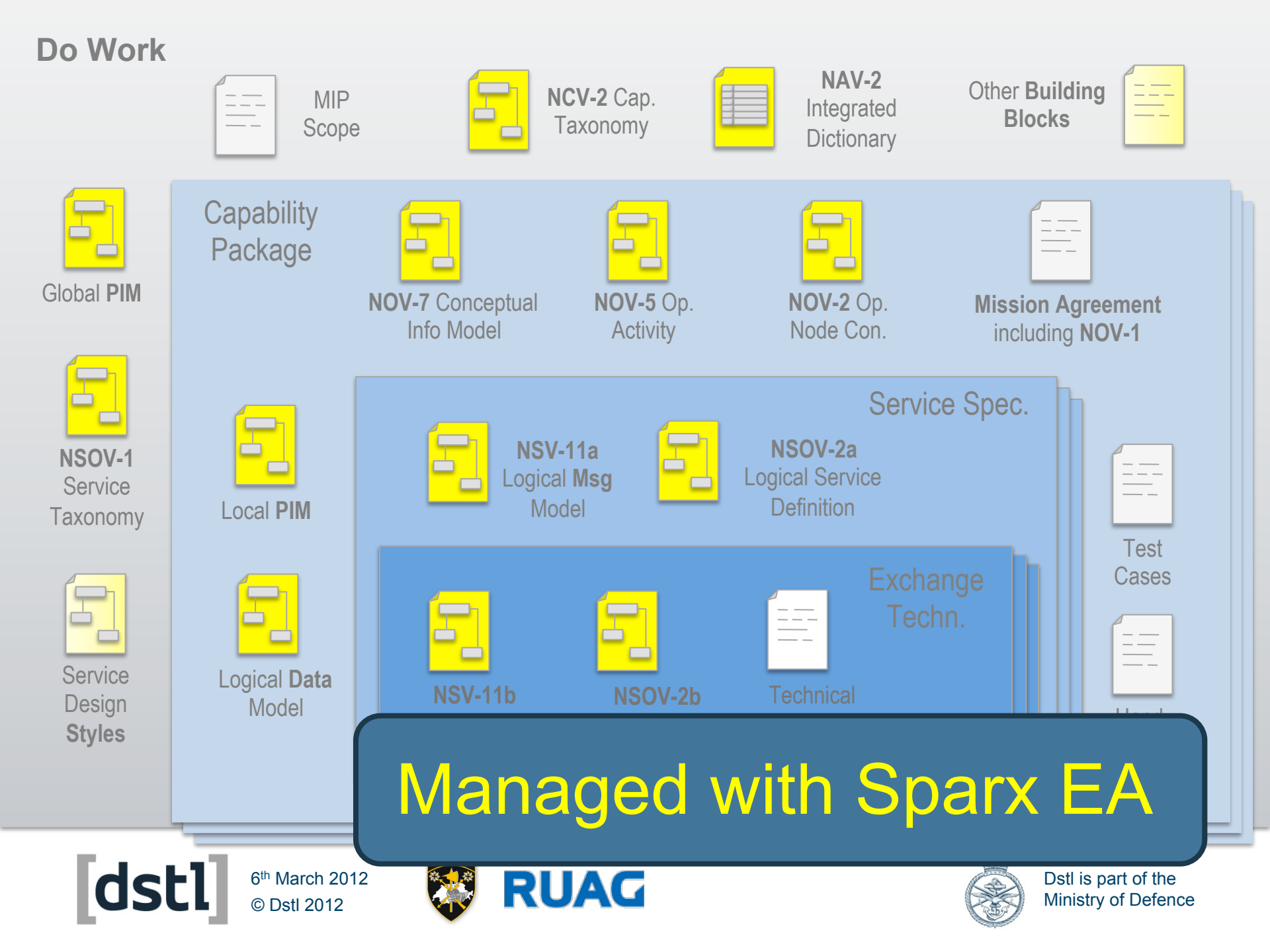
Do Work



IPT-F: How do we Produce it?

- Choice of the tool: Sparx Enterprise Architect,
  - Open, flexible, established community, broadly adopted
- MDA with Sparx EA is not only possible but practical
  - Change Proposal (CP) Processor – evolution of PIM
  - Business Object Change Processor (BOCP) – Model to Model Transformations
  - Fabian's Tool – Conceptual->Logical
  - Wsdl Generator – where the rubber hits the road
  - Document Generator – it has to be readable

Do Work



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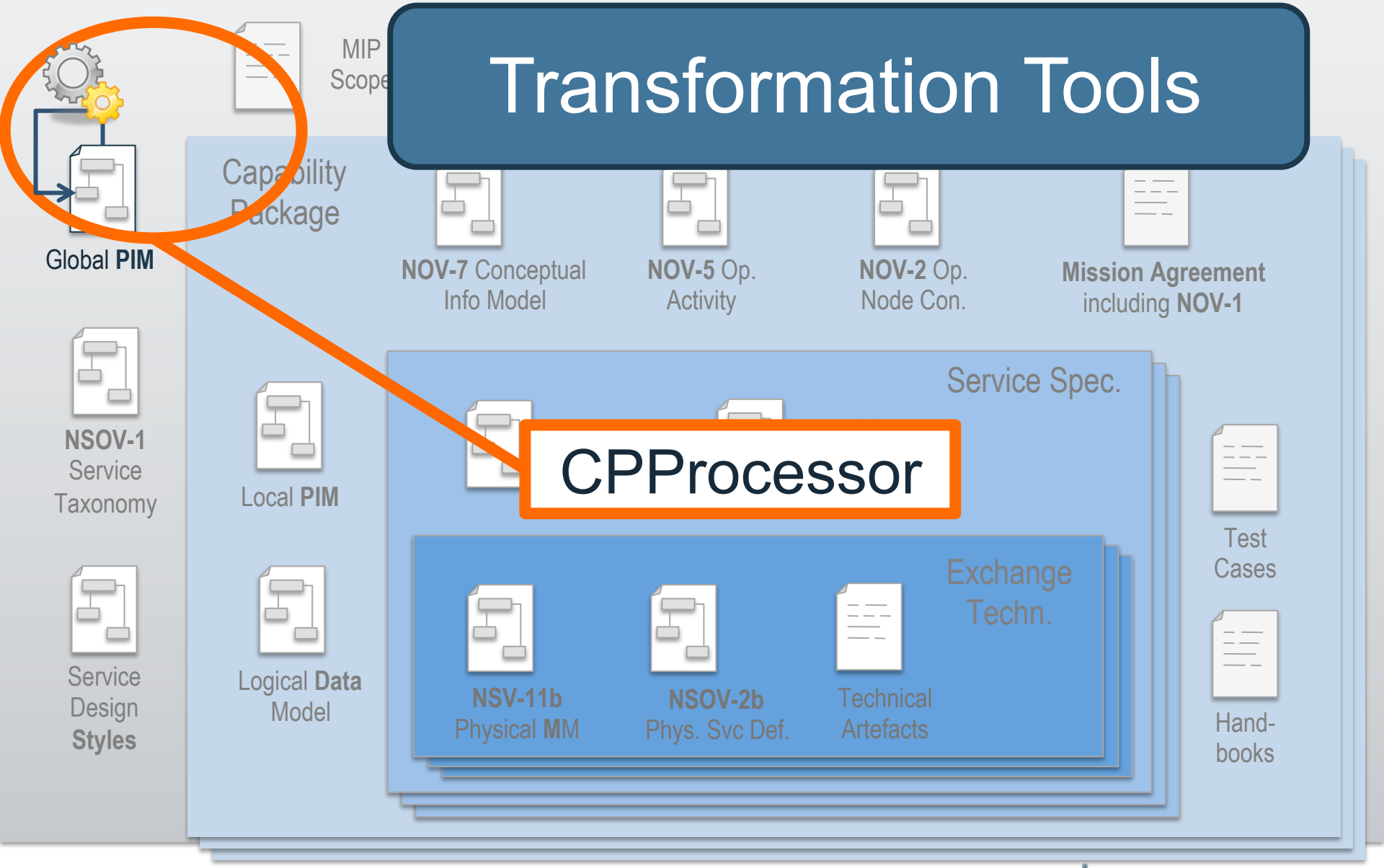
Transformation Tools



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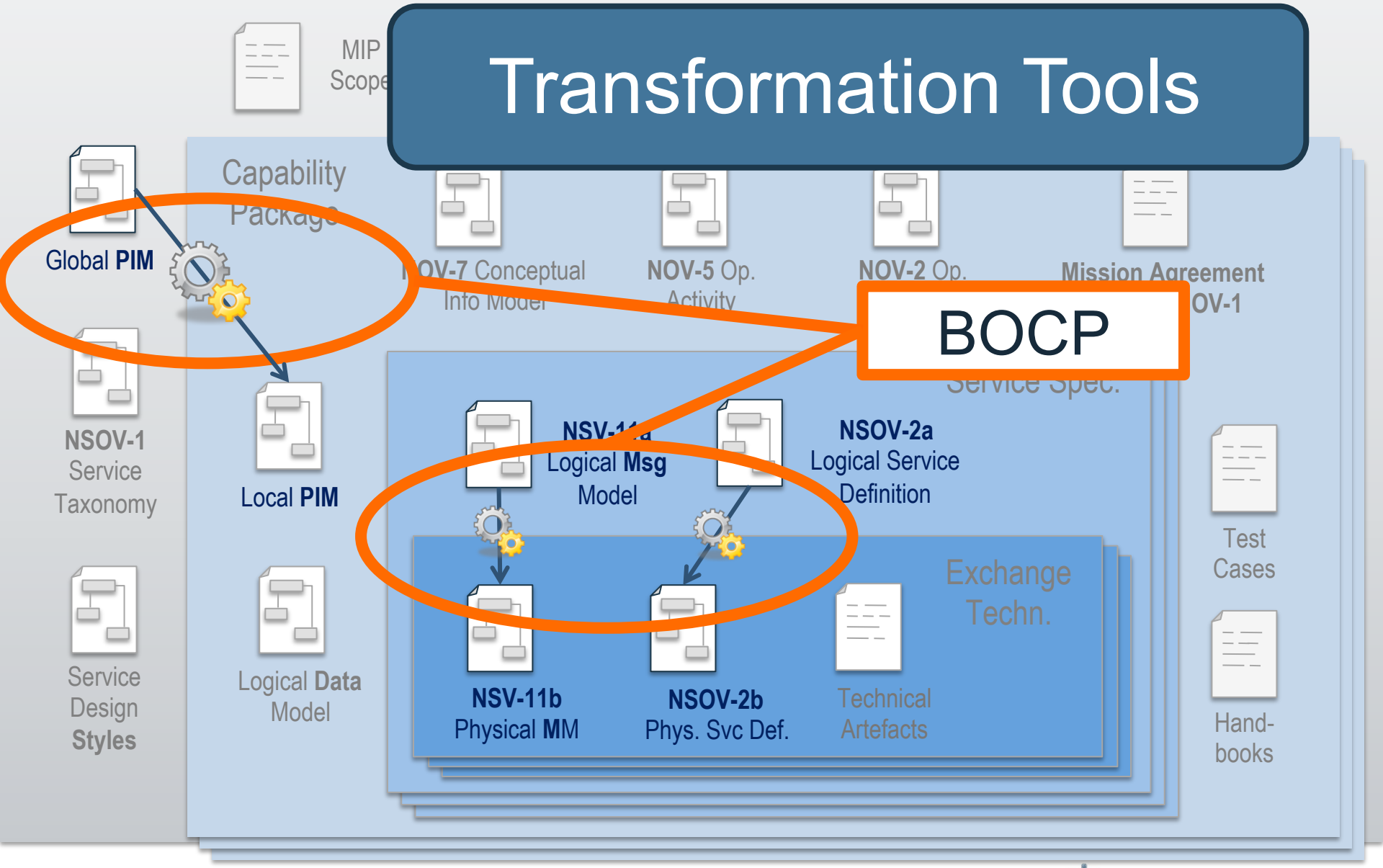

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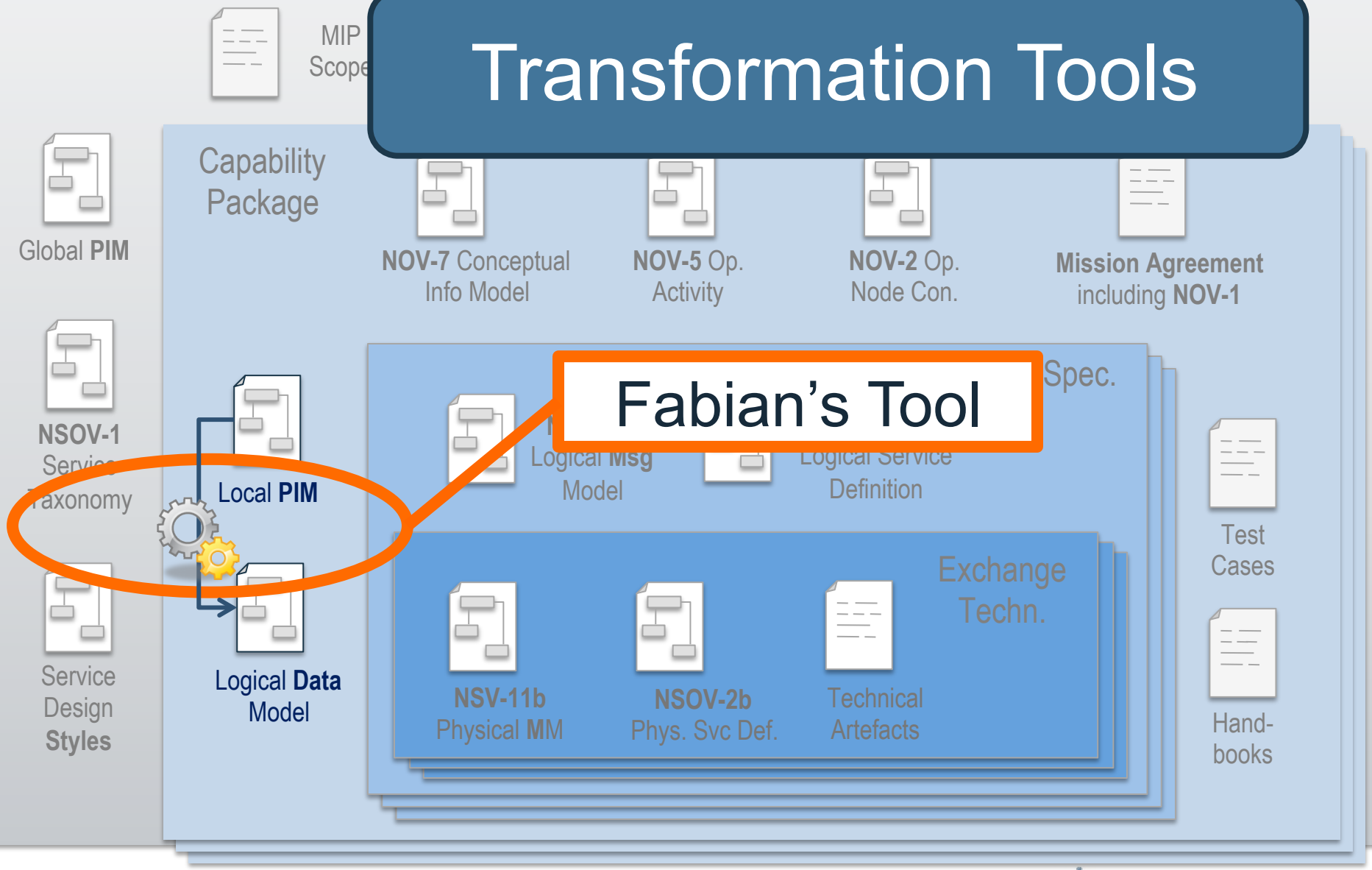

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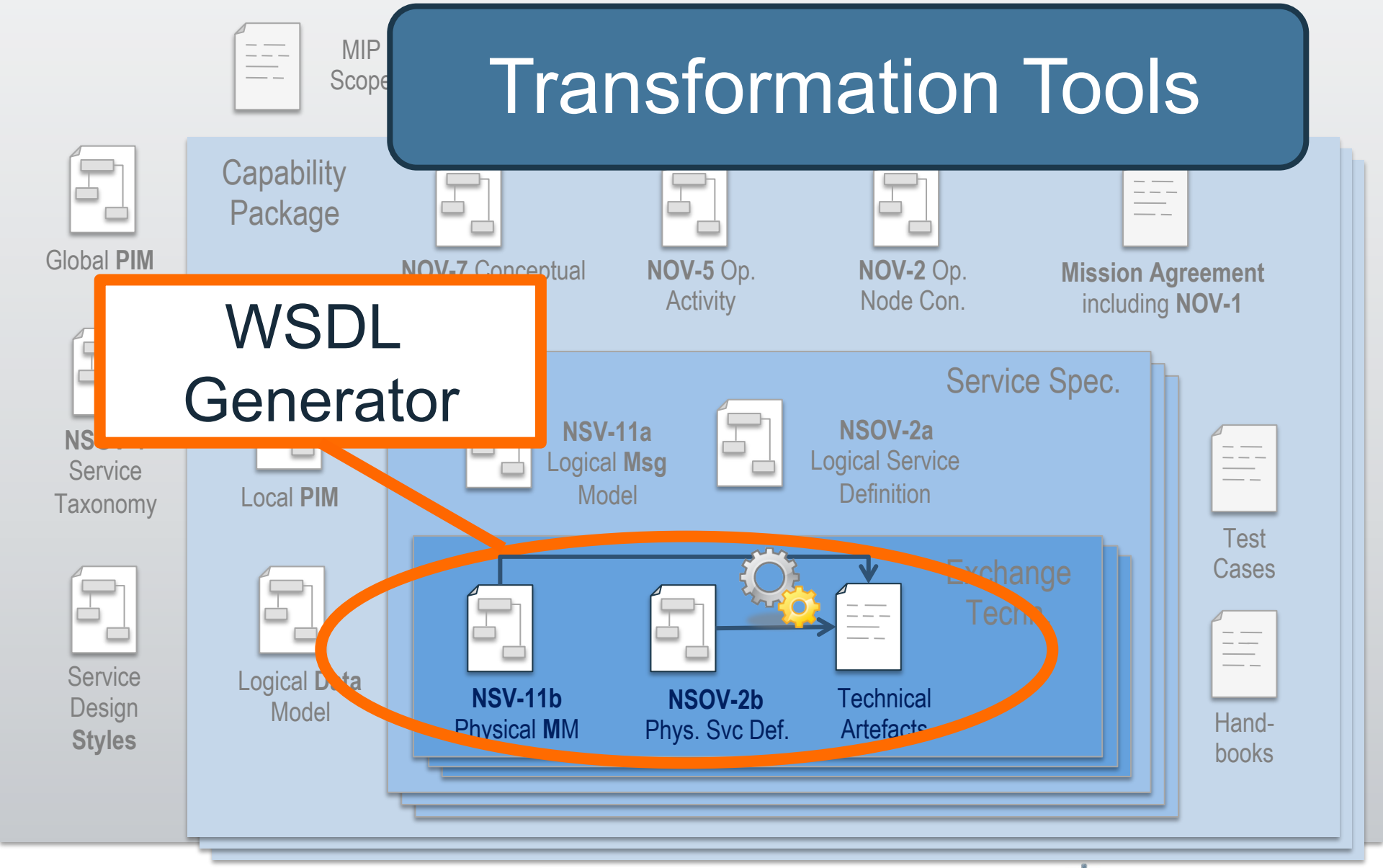

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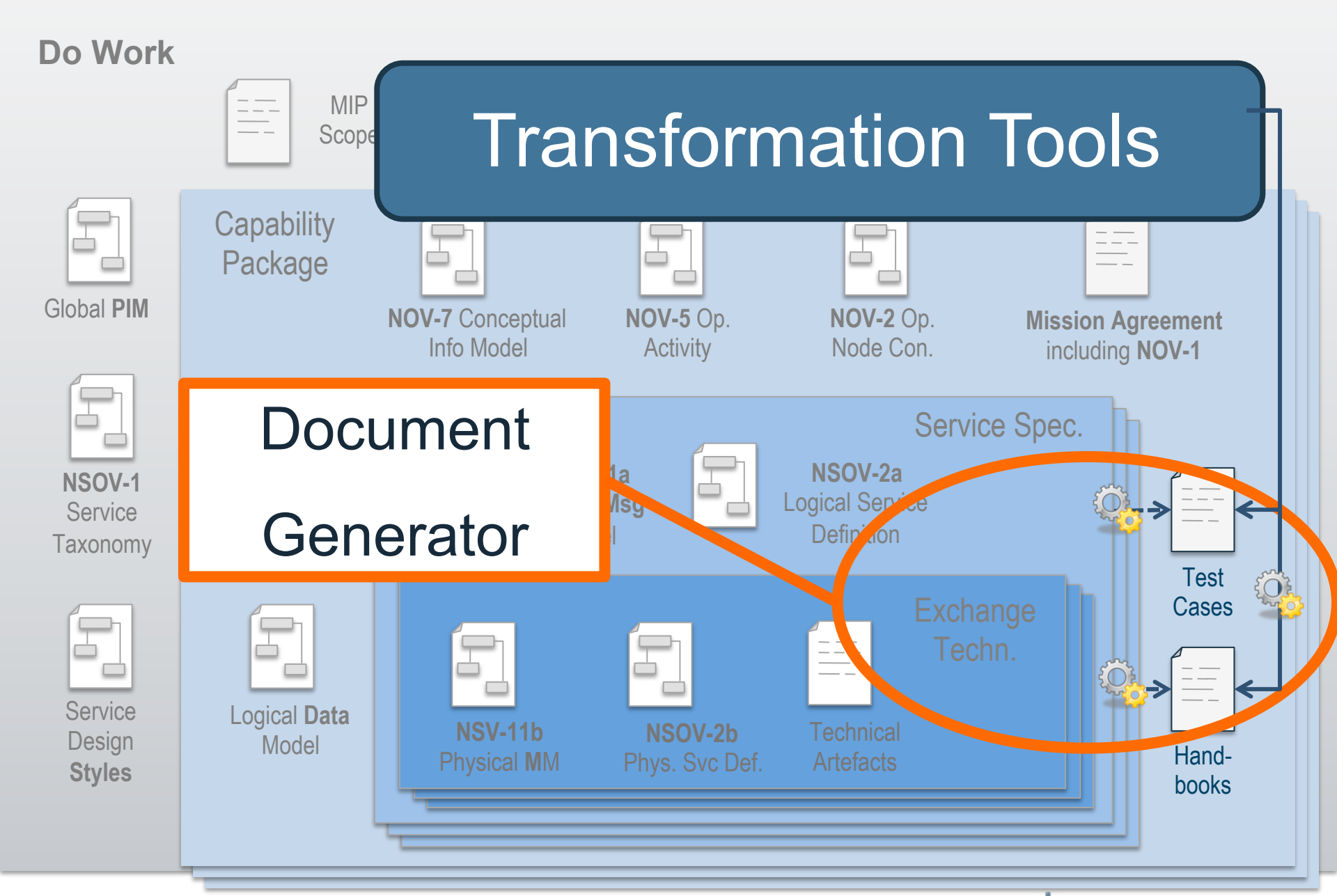

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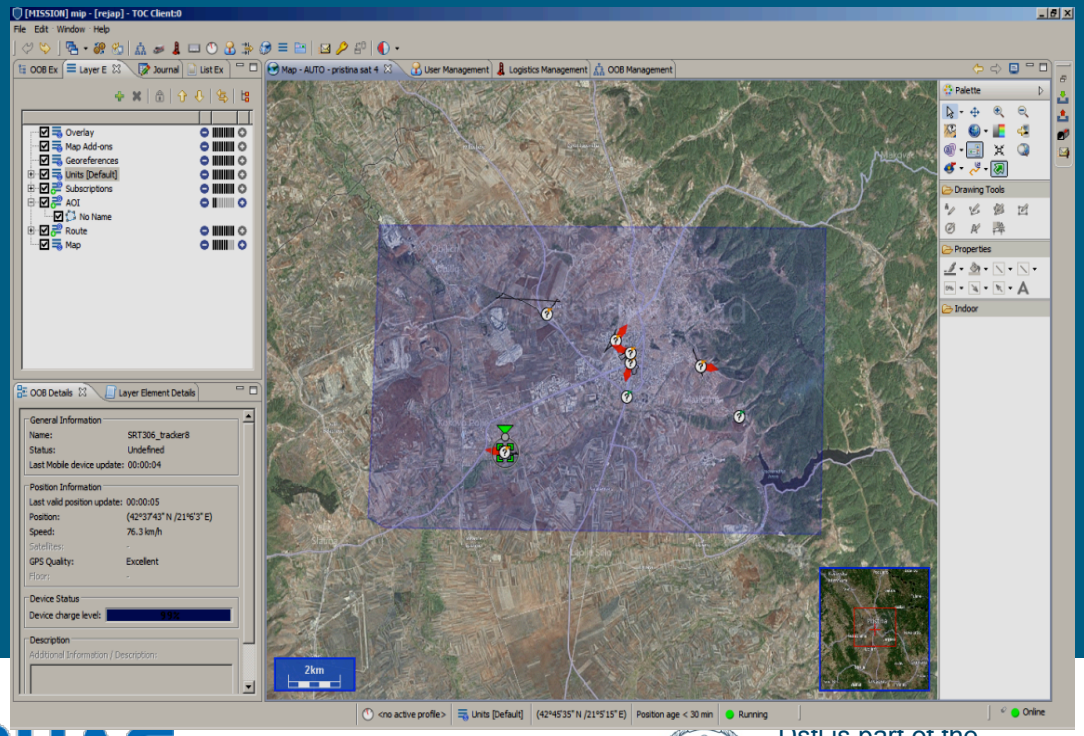
How do we know it works?

- Prototyping – Will it Fly!
  - We have total of 6 national implementations:
    - Germany, Norway and Poland (DDS)
    - Netherlands, Sweden and Switzerland (Web Services)
  - Set of defined 19 Functional test performed
  - Some non functional testing performed in non formal fashion



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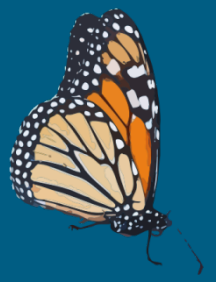


- Prototype – lesson learned
  - Modular is better than monolithic
  - Traceability is possible
  - New technology requires new way of thinking (DDS)
  - Overall quality and confidence level of IPT-F work improved
  - Prototyping provided quality of insight impossible to achieve with pure conceptual fashion
  - Feedback provided directly to Methodology and Tools team and captured in a Handbook

Way Forward

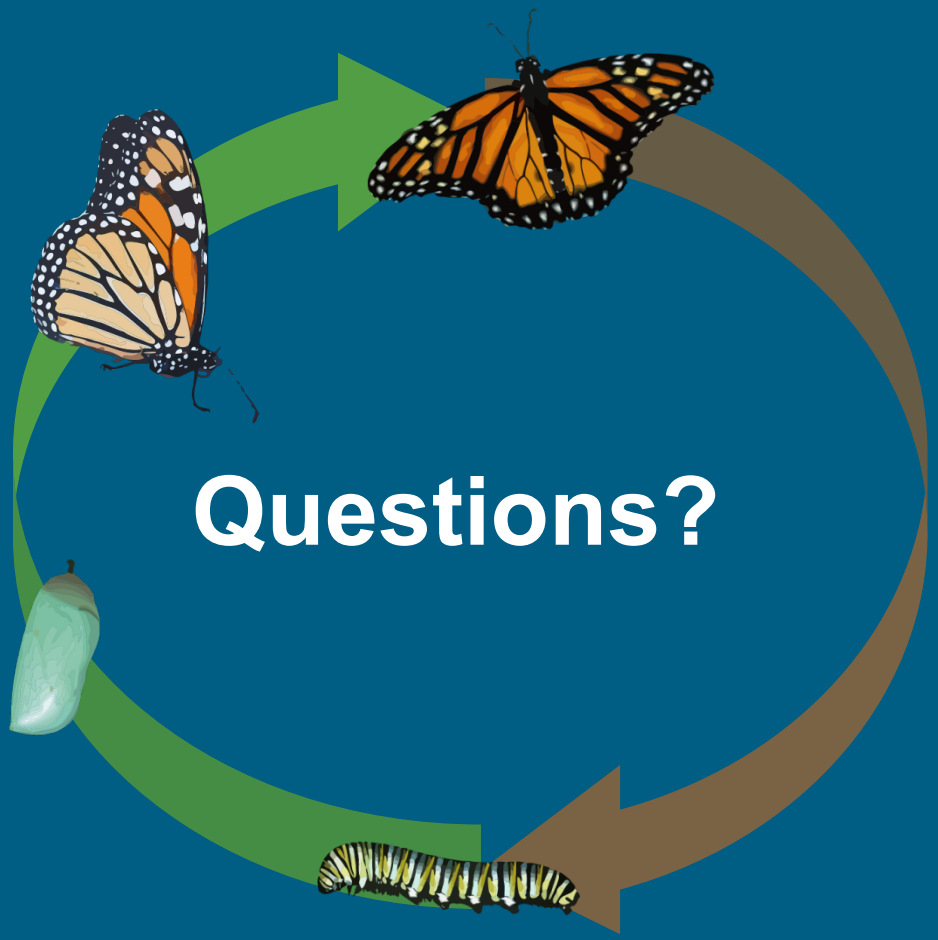
- More Prototyping
  - Iterative approach to developing the methodology of IPT worked
  - Second Prototype Working Group already in progress with exclusive focus on elaboration and specification
- Methodology
  - It is not trivial, huge learning curve
  - Tools are not perfect
  - More automated transformations
  - Change Management
- Not perfect but ready to be used
- Propose new IPT way of working to Steering Group in May

Conclusions

- Business transformation is not plain sailing
  - Differences of Opinion
  - Resistance to Change
- Holistic Analysis of the enterprise
  - Helps to achieve consensus
  - Clarifies the need to change
- Scrum is an effective way of working outside of its traditional domain, software development
- NAF is an effective mechanism to manage change
    - Required modification to make it suitable for our needs
      - Logical/Physical Service Views

Conclusions

- IPT-F promises:
  - A leaner, mode easily understood data interface specification
  - Cheaper to implement
  - Easier to maintain
  - Modularity (no big bang) and extensibility
    - Increments are Business not Technology Driven
  - Improved Reliability
  - Loose coupling with exchange technology



Questions?