

MPMLINK OVERVIEW

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Application Specialist

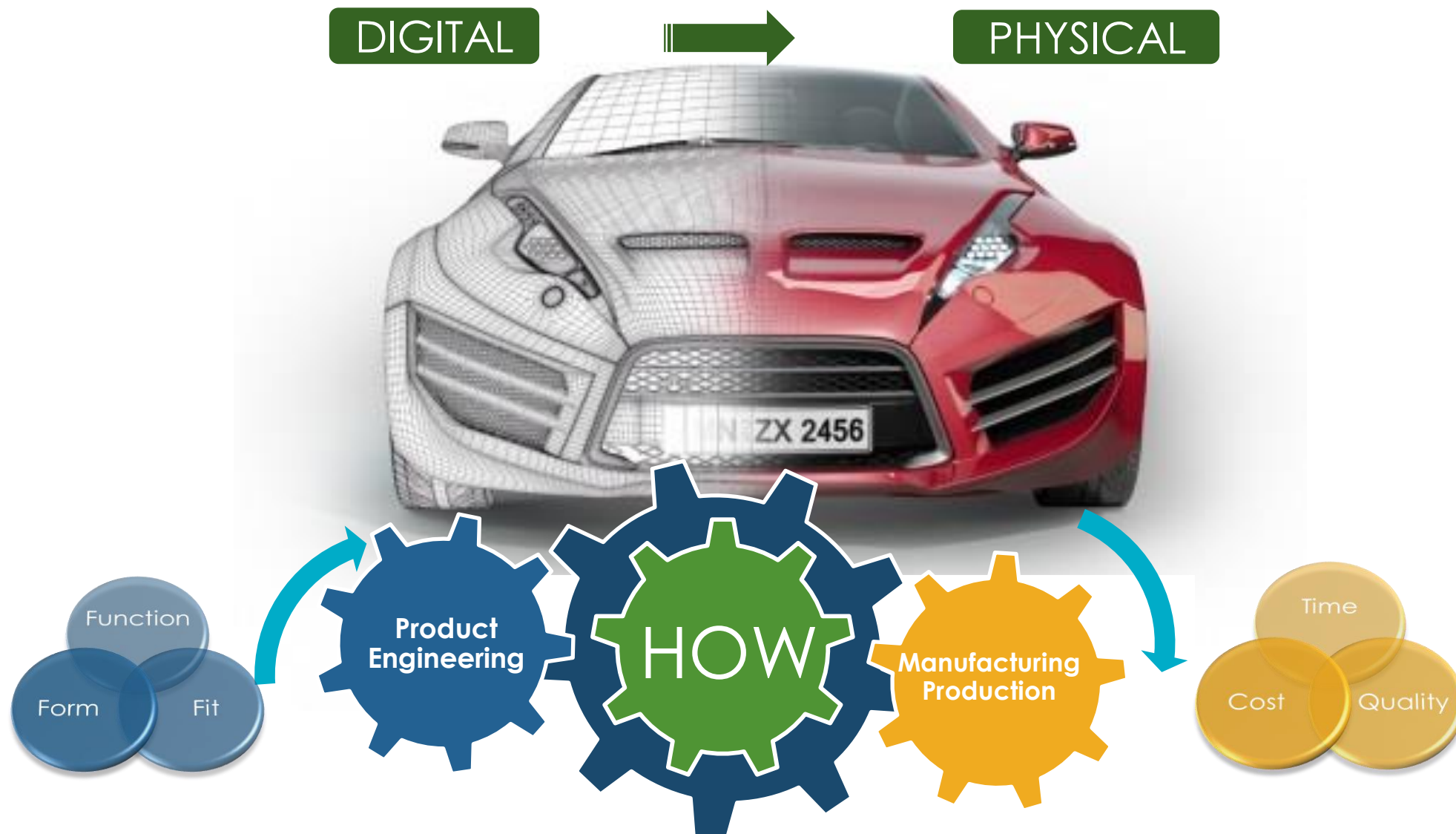
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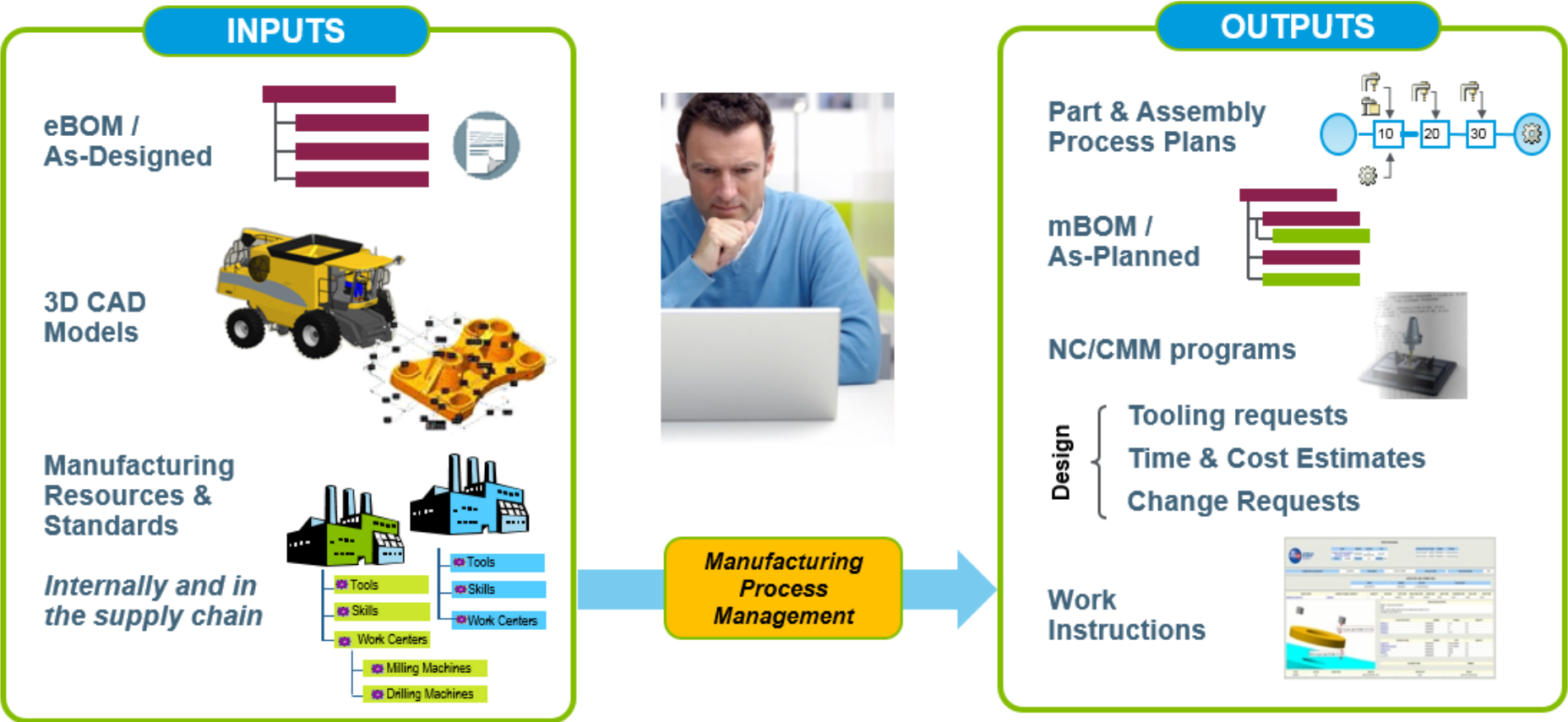
- What is Manufacturing Process Management?
 - Business process flow
 - Challenges
- PTC's MPMLink and the value it offers
 - Key capabilities
 - Associative EBOM / MBOM transformation
 - Digital process plans
 - Manufacturing resources and standards
 - Associative manufacturing illustrations
 - Dynamically generated work instructions
- Smart Connected Work Instructions
- Product Demonstration



MANUFACTURING PROCESS MANAGEMENT



Process of defining and managing the manufacturing processes to be used to fabricate parts, to assemble final products, and to perform inspection.



An engineer designs the product
A manufacturing engineer designs the manufacturing processes

MANUFACTURING PROCESS MANAGEMENT FLOW

Step 1: Define Manufacturing Strategy

- Evaluate design and program requirements
- Evaluate manufacturing capability and capacity
- Select manufacturing partner (internal or outsourced)
- Identify manufacturing risk (including long lead items)

Step 2: Advanced Manufacturing Planning

- Transform eBOM into mBOM
- Create process plans
- Initiate tooling & factory equipment requests
- Produce time, cost, material estimates, and feedback to design

Step 3: Optimize Process Plan

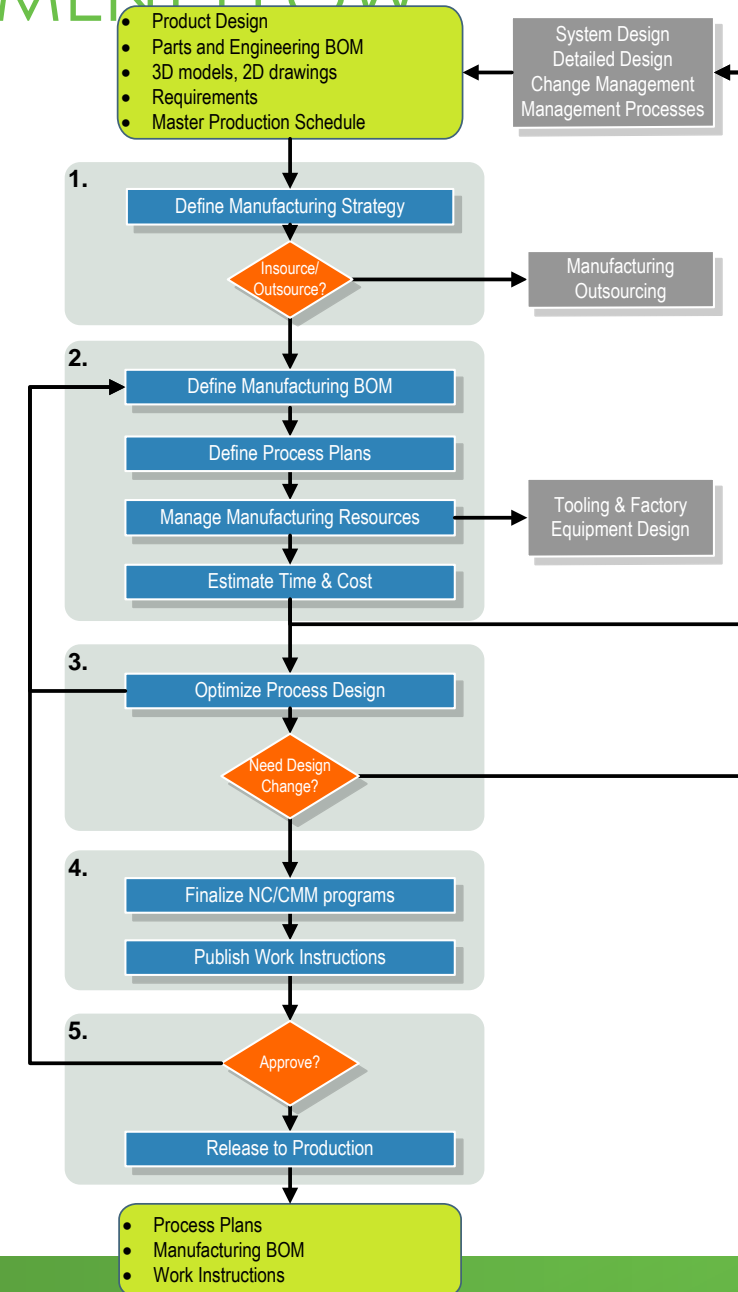
- Analyze process alternatives
- Balance activities across work cells and lines
- Simulate work cells, perform ergonomic studies
- Initiate change requests with design

Step 4: Finalize and Document Process Plan

- Finalize NC tool path programs, CMM programs

Typical pain points:

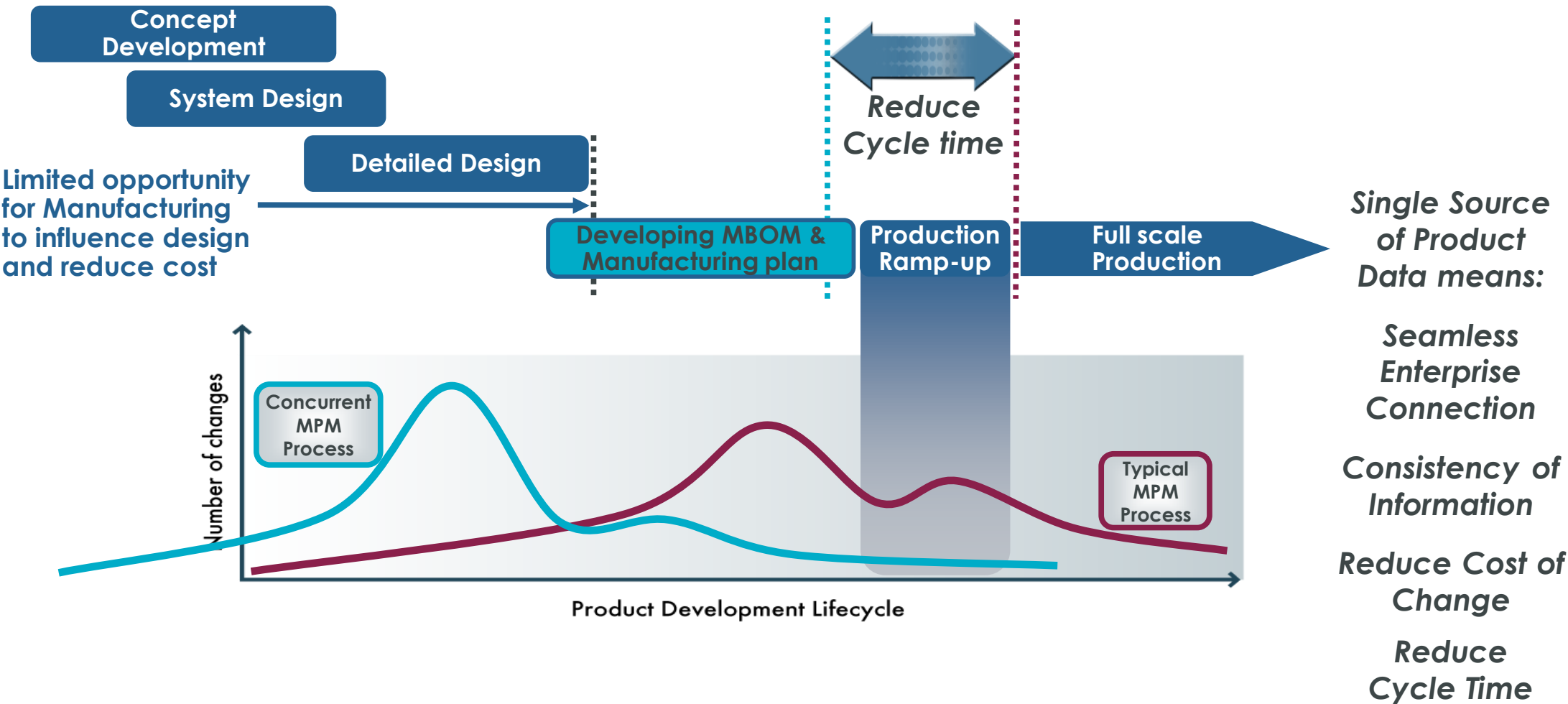
- **Manual processes – Excel, Word, legacy/home grown**
- **No data management of plans or manufacturing data**
- **Lack of integration to PDM and ERP**
- **Designers “throw it over the wall” to process planners**
- **Disconnected change management processes**
- **Too long to ramp up production**
- **Late and/or inaccurate work instructions**



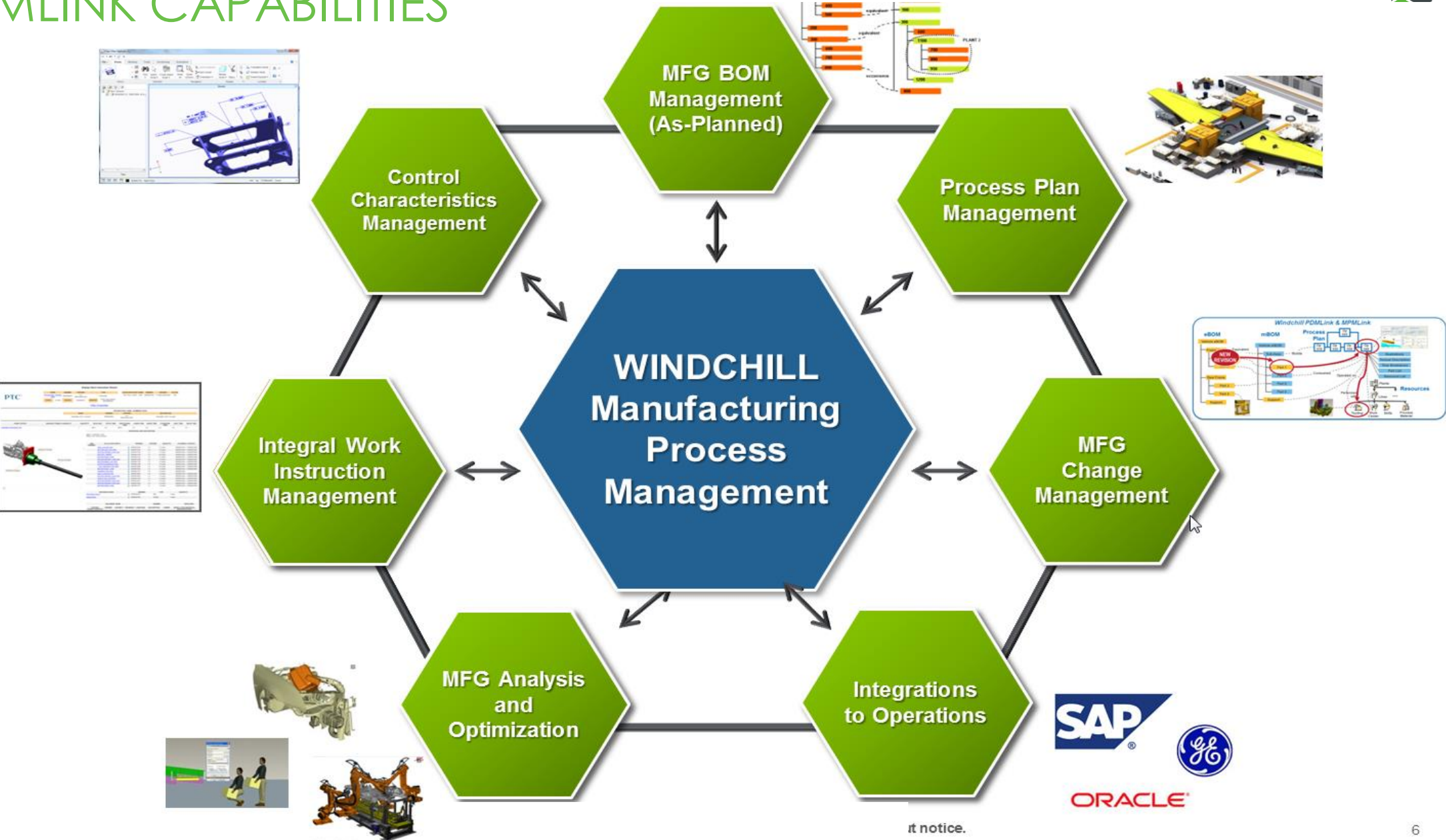
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ENGINEERING TO MANUFACTURING DIGITAL THREAD VALUE



MPMLINK CAPABILITIES



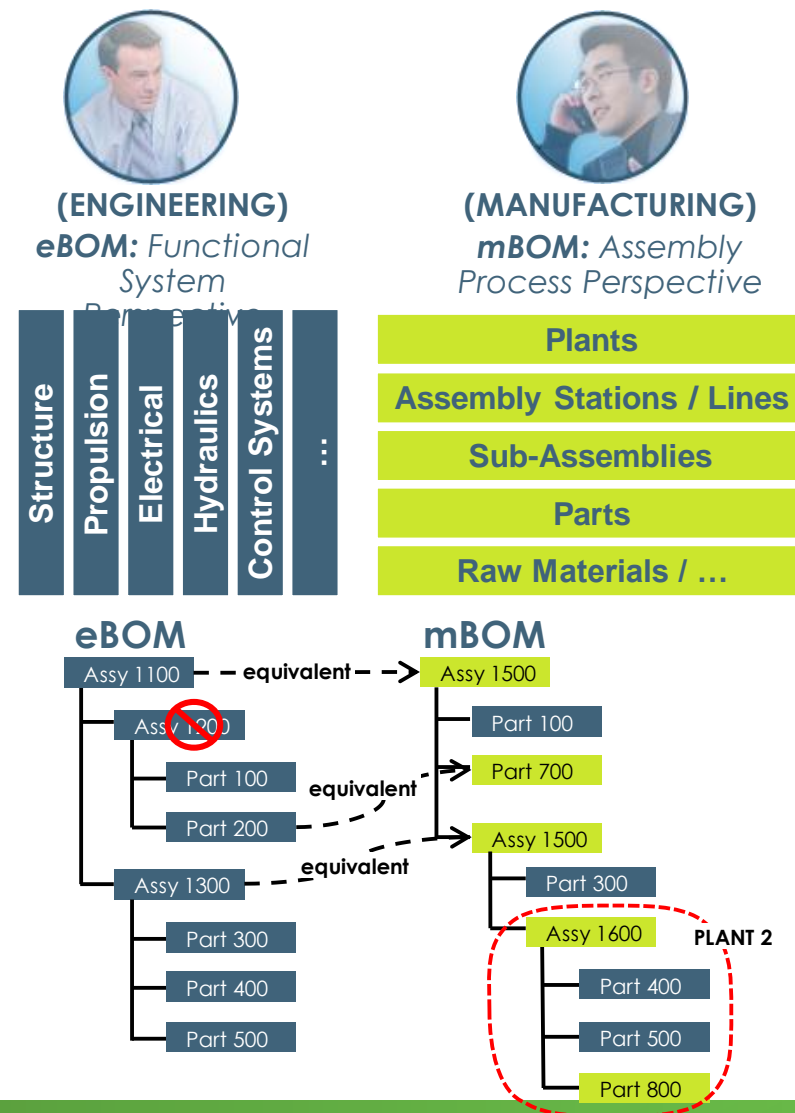
it notice.

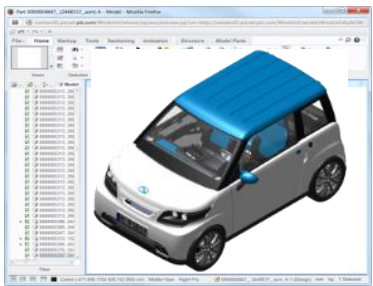
ENG and MFG have different perspectives of the product

- eBOM \neq mBOM
- eBOM rarely fits mfg constraints
 - Different plants, production volume...
- Using mBOM in engineering creates a significant burden on design teams

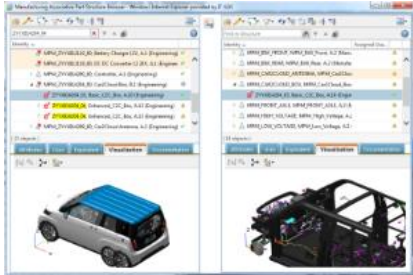
Shortened development schedule

- Manufacturing can't wait until the complete eBOM is released to create an mBOM, which is critical to start mfg planning

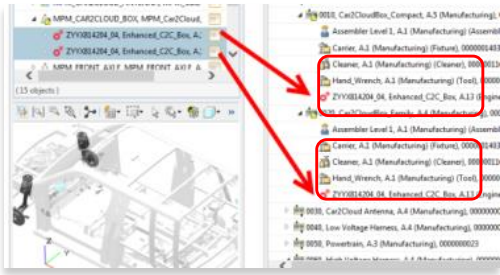




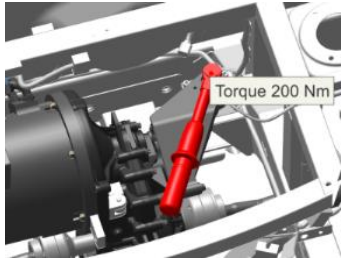
1. Design (3D)



2. Create mBOM (3D)



3. Create Process Plan

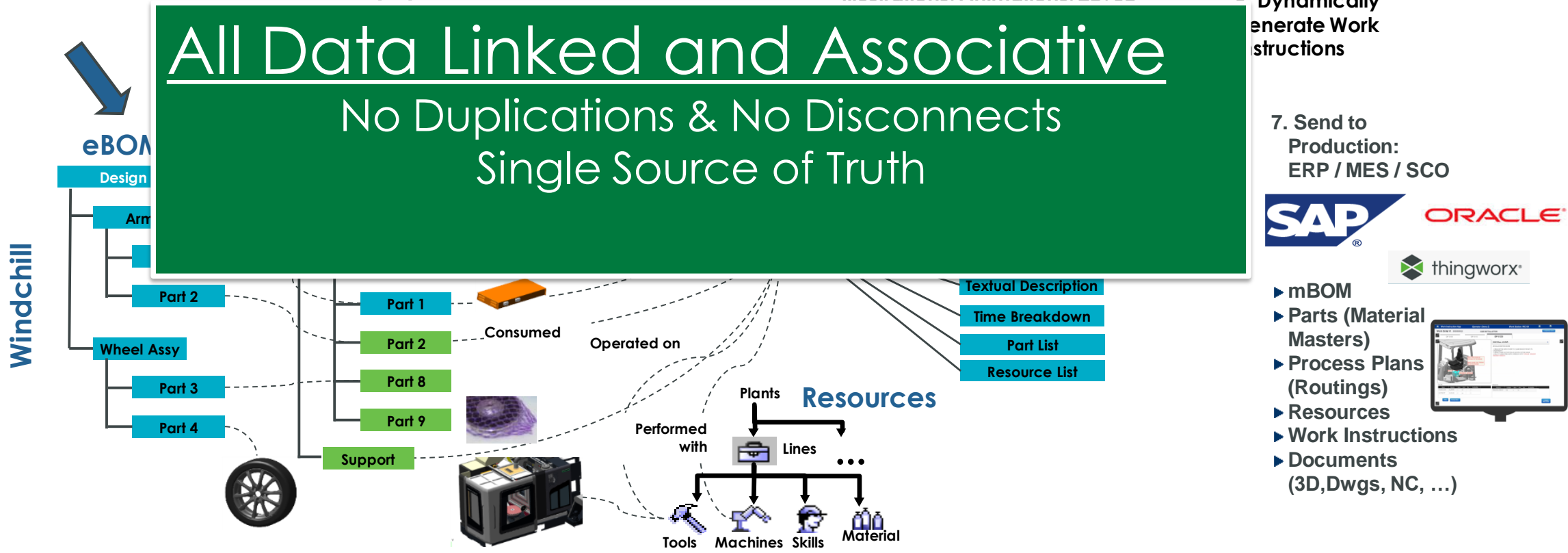


5. Create for each Operation:
Illustrations. Animations. 2D/3D

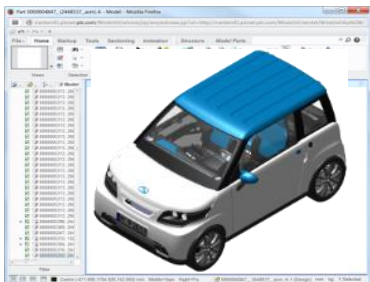


4. Dynamically
generate Work
Instructions

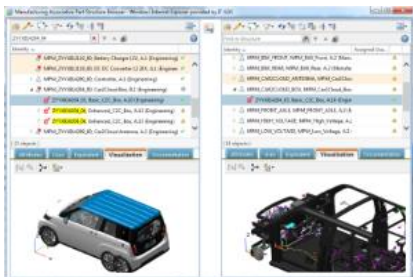
7. Send to
Production:
ERP / MES / SCO



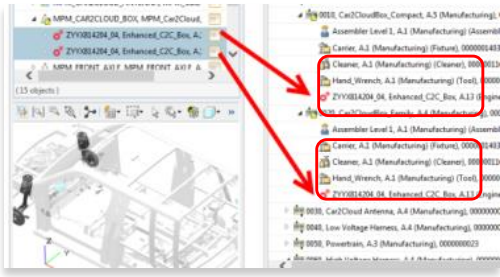
ENGINEERING TO MANUFACTURING - DIGITAL THREAD FLOW



1. Design (3D)

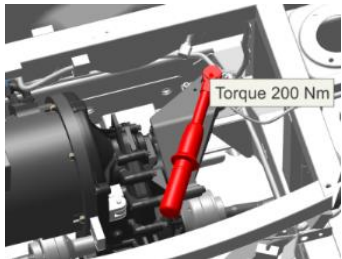


2. Create mBOM (3D)



3. Create Process Plan

4. Allocate Parts & Resources



5. Create for each Operation:
Illustrations, Animations, 2D/3D
Drawings, in-process machining
state.

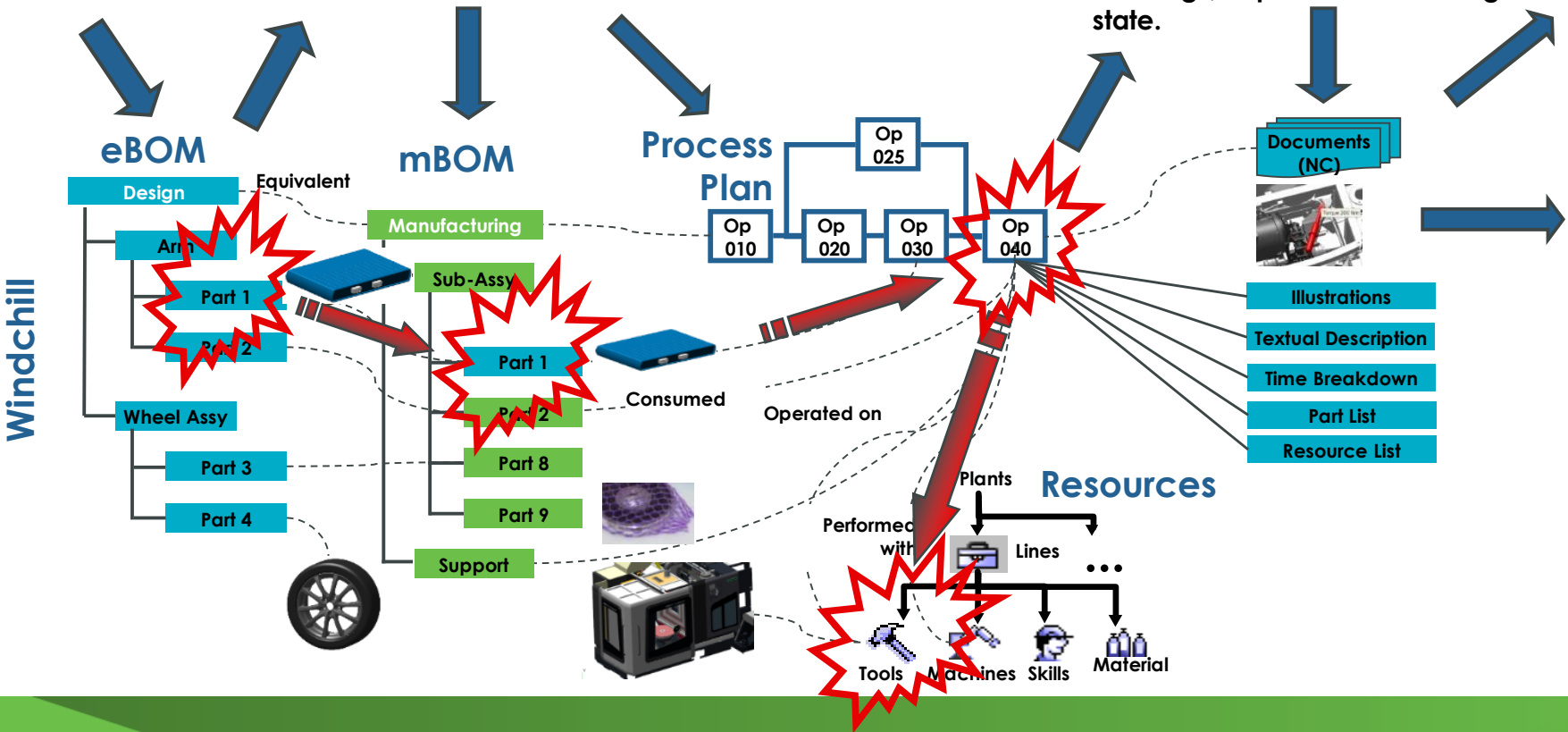


6. Dynamically
generate Work
Instructions

7. Send to
Production:
ERP / MES / SCO



- mBOM
- Parts (Material Masters)
- Process Plans (Routings)
- Resources
- Work Instructions
- Documents (3D, Dwgs, NC, ...)



SMART CONNECTED WORK INSTRUCTIONS

Bi-directional connection to:

Connected - Tailored - Actionable



People (operator):

- Single sign-on
- Role-based



Mfg systems (ERP/MES):

- Work orders
- Operations, parts, resources
- Competencies check



PLM / MPM / CAD:

- 2D / 3D
- Part and process plan details
- Standard operating procedures

Quality / data capture:

- Traceability, genealogy
- Operator feedback

Industrial tools:

- Torque, angle, battery life, ...
- Position and orientation

