Enabling MBE across the Life Cycle through 3Di TDPs

Marc Lind
www.aras.com

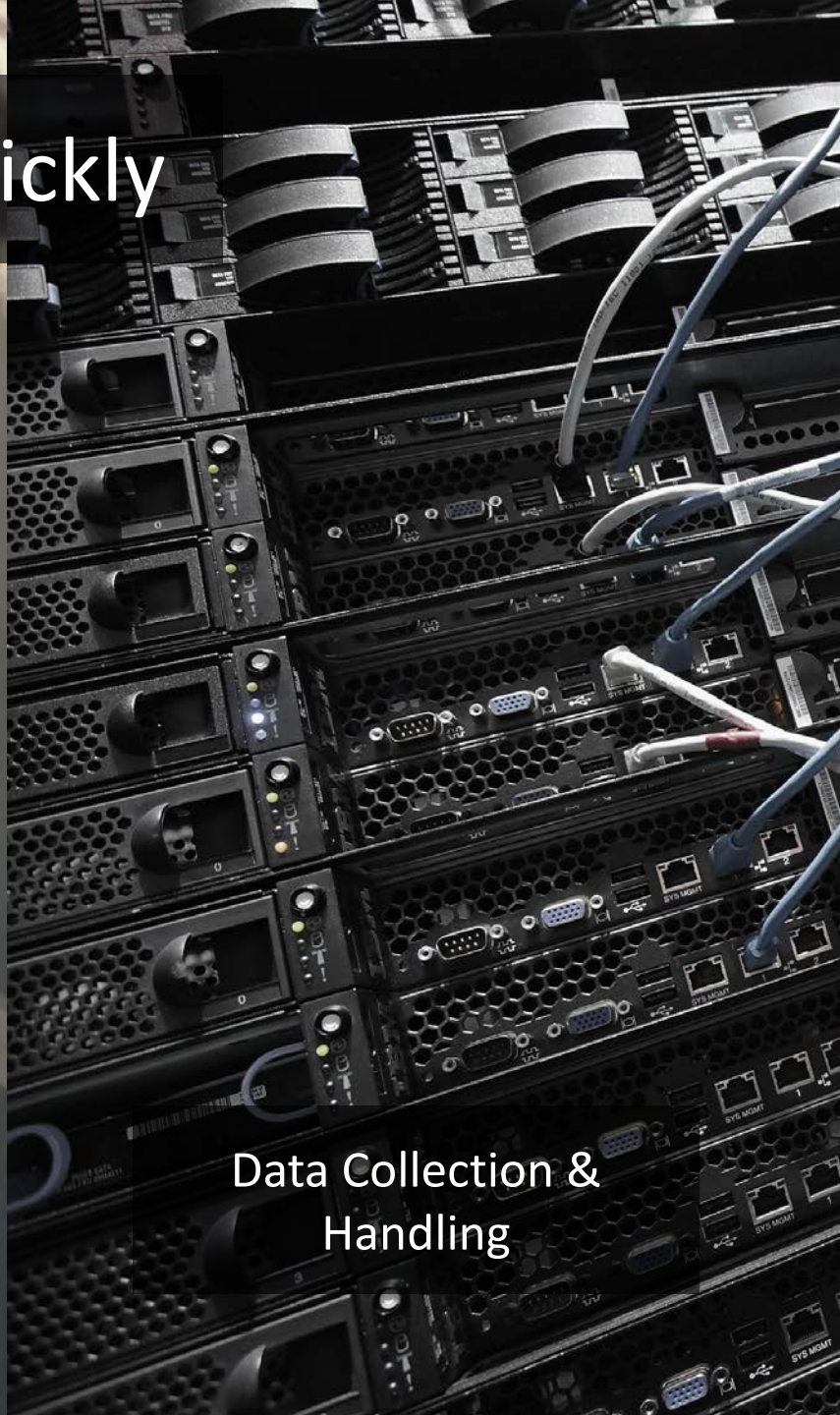
Industry Changing Increasingly Quickly

Materials Advancements & Additive Manufacturing

source: rolls-royce

Connected & Autonomous

source: ngc



Data Collection & Handling

Smart Connected Future = Even More Changes

New Technologies + Next Gen Capabilities

More Machine-to-Machine & Systems-of-Systems

Introduction of Artificial Intelligence / Machine Learning

Source: space-x


Mechanical
Electronics &
Wire Harnessing
Software & Firmware


Better Asset Readiness
Greater Agility in the Field
True Predictive Maintenance

Please fill out the following form. If you are a form author, choose Distribute Form in the Forms menu to send it to your recipients.

Highlight Fields

Model Tree

- model
  - MBD_19207_7012801
    - DATUM
    - MBD_19207_7012757
    - MBD_19207_7012761
    - 96906_MS16556-628
    - MBD_19207_7012758
    - MBD_19207_7012753
    - MBD_19207_7012752
    - MBD_19207_7012760
    - 96906_MS51932-59
    - MBD_19207_7012756
    - MBD_19207_7012749
    - MBD_19207_7012748
    - MBD_19207_7012800
    - MBD_19207_7012759
    - MBD_19207_7012765
    - MBD_19207_7070734
    - 96906_NAS1352-4-12
    - 96906_MS35743-11
    - 96906_MS24665-283
    - 96906_MS24665-283
    - 96906_MS51963-67

Options

- MBD0_TITLE_BLOCK
- MBD1_NONE
- MBD2A_GENERAL
- MBD2B_LEVER_POSITIONS

MBD2B_LEVER_POSITIONS

NOTES:

1. APPLICABLE STANDARDS/SPECIFICATIONS:
   A. ASME Y14.100-2013
   B. ASME Y14.5-2009
   C. ASME Y14.41-2012
   D. MIL-W-13855

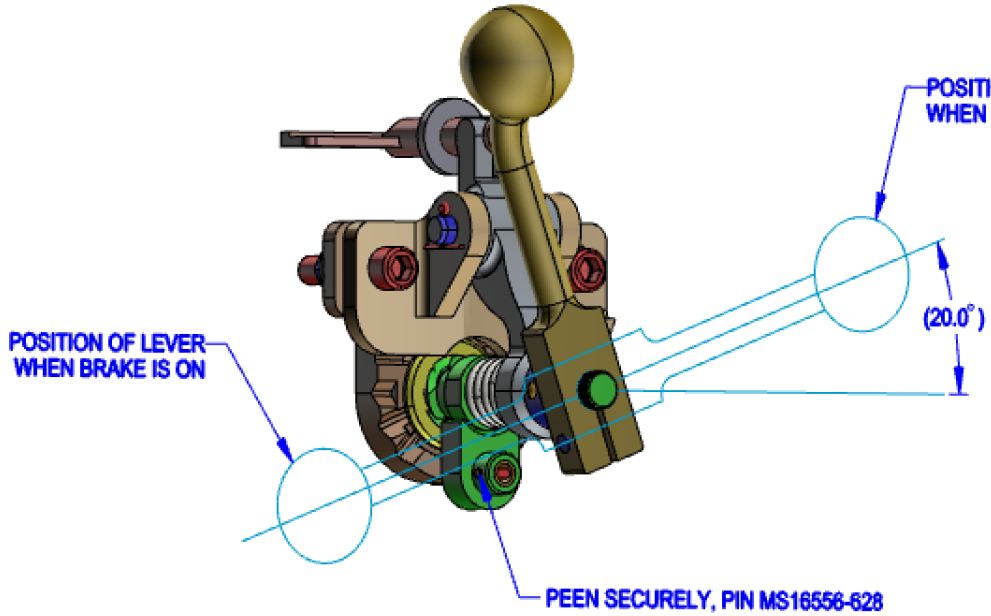
2. QUALITY ASSURANCE PROVISION REQUIREMENTS PER DRAWING NUMBER 12993884 APPLY.

THE NOTES DISPLAYED ABOVE ARE FOR REFERENCE ONLY. SEE VIEW STATE MBD0_TITLE_BLOCK FOR COMPLETE NOTES.

PARTS LIST

ITEM	DESCRIPTION	QUANTITY
1	7012757	1
2	7012761	1
3	MS16556-628	1
4	7012758	1
5	7012753	1
6	7012752	1
7	7012760	1
8	MS51932-59	1
9	7012756	1
10	7012749	1
11	7012748	1
12	7012800	1
13	7012759	1
14	7012765	1
15	7070734	1
16	NAS1352-4-12	1
17	MS35743-11	1
18	MS24665-283	2
19	MS51963-67	1
20	MS27183-15	2
21	MS51922-17	2
22	NAS1352-6-28	2

SHOW ALL | ISOLATE | HIDE | SHOW | ZOOM FIT



DISTRIBUTION STATEMENT A. APPROVED FOR PUBLIC RELEASE. DISTRIBUTION IS UNLIMITED.

APPLICATION

REVISION

REVISION	F
DESCRIPTION	
DATE (YYYY-MM-DA)	
APPROVED	JTD

MODEL VIEWS | Print Selected Views

- MBD0_TITLE_BLOCK
- MBD1_NONE
- MBD2A_GENERAL
- MBD2B_LEVER_POSITIONS

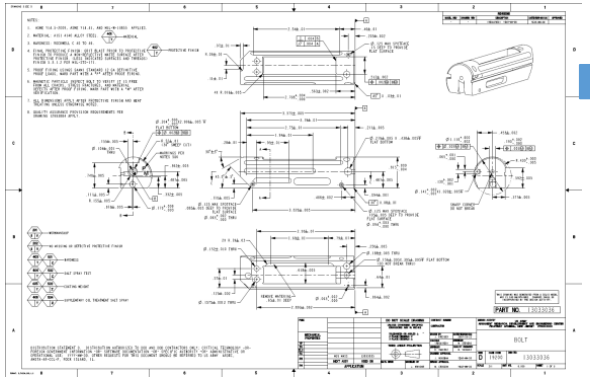
LOCKING ASSEMBLY

CAGE CODE	19207
DWG NO.	123456
DATE (YEAR-MO-DA)	2016-09-12
SHT NO.	4.60226

New Level of Urgency for MBE / 3Di PDF TDPs

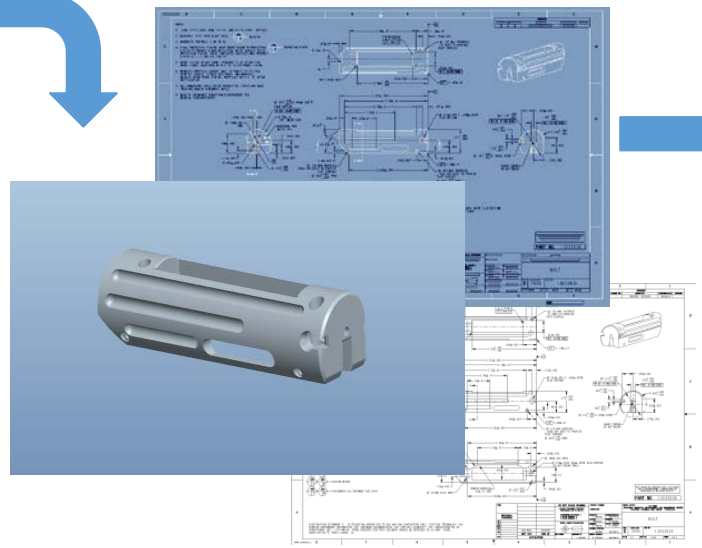
MBE / TDP Evolution

2D Drawing



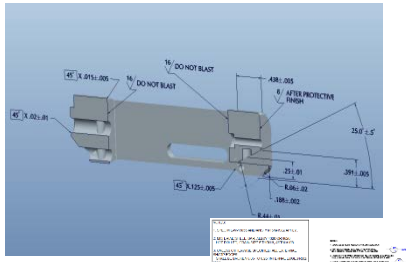
Past

3D TDP

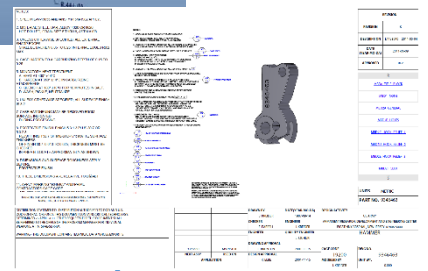


Present

Fully Annotated Models



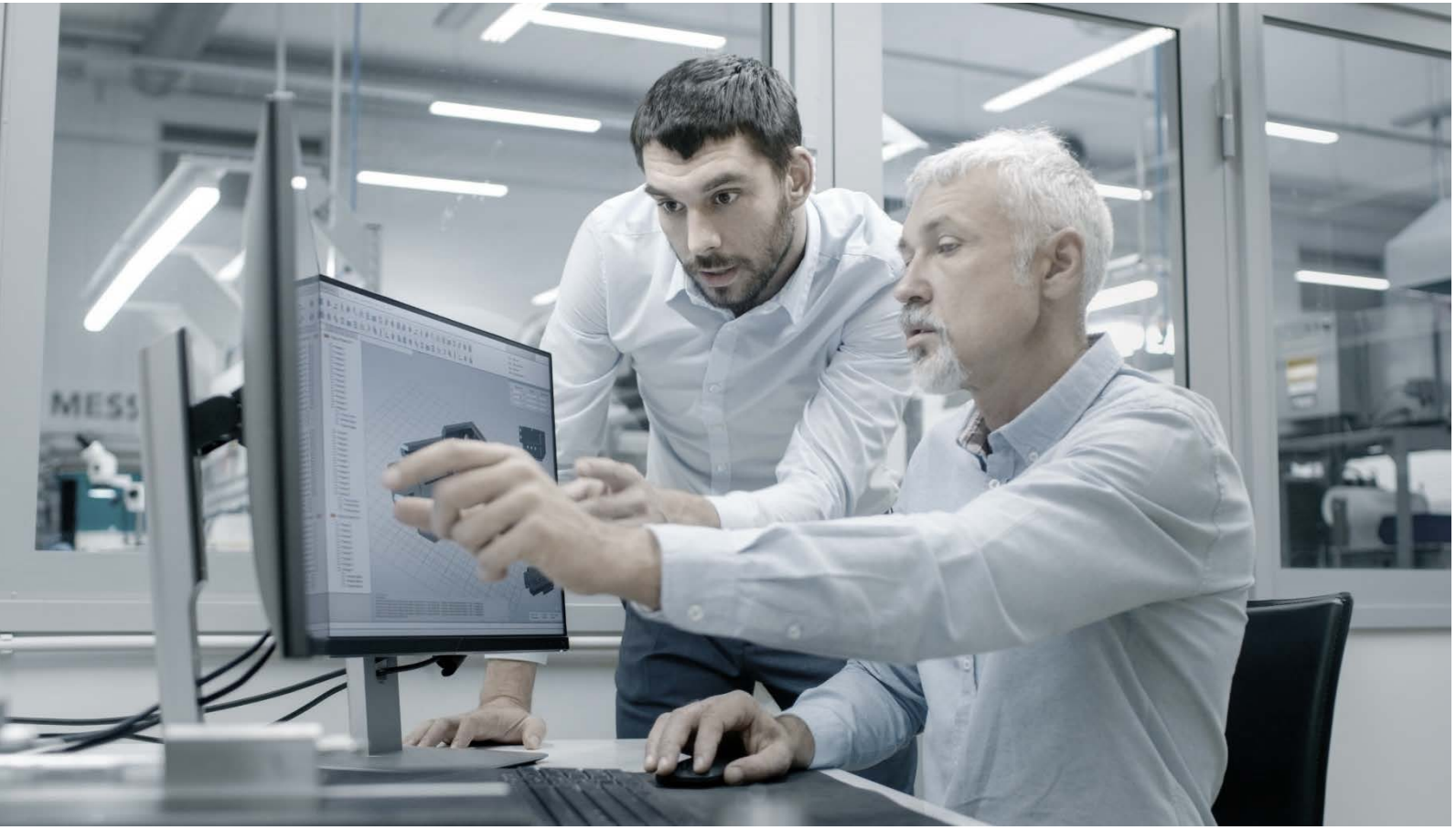
3Di pdf



Future

Source: 3D Intelligent (3Di) Technical Data in DOD | Jeff Windham, US Army ARDEC
https://www.nist.gov/sites/default/files/documents/2017/04/18/01_windham_3di_brief_mbe_summit.pdf

MBE / 3Di TDP Generation Challenges



Today's Issues

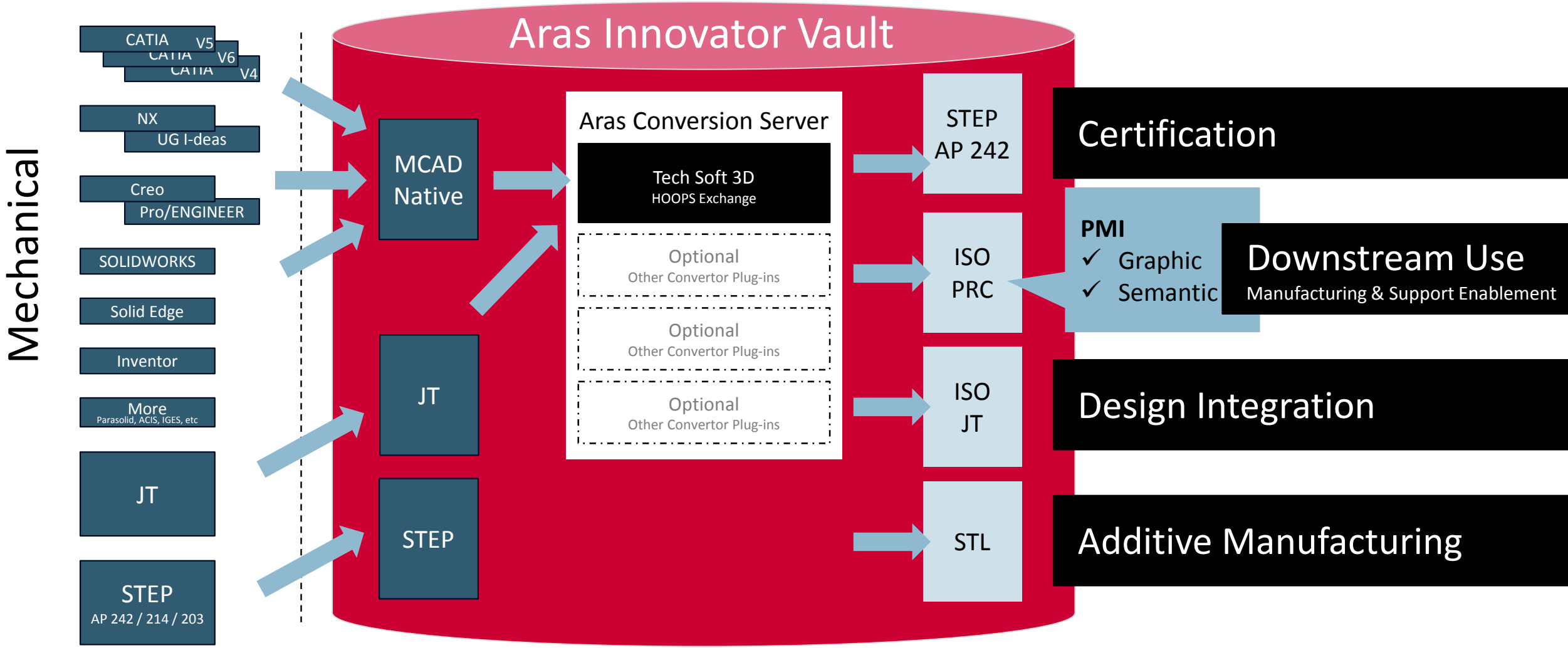
ISO JT
- Mechanical Only
- Can't combine with other info / formats
- No Semantic PMI

STEP AP 242
- Poor CAD support
- Lack of PLM support

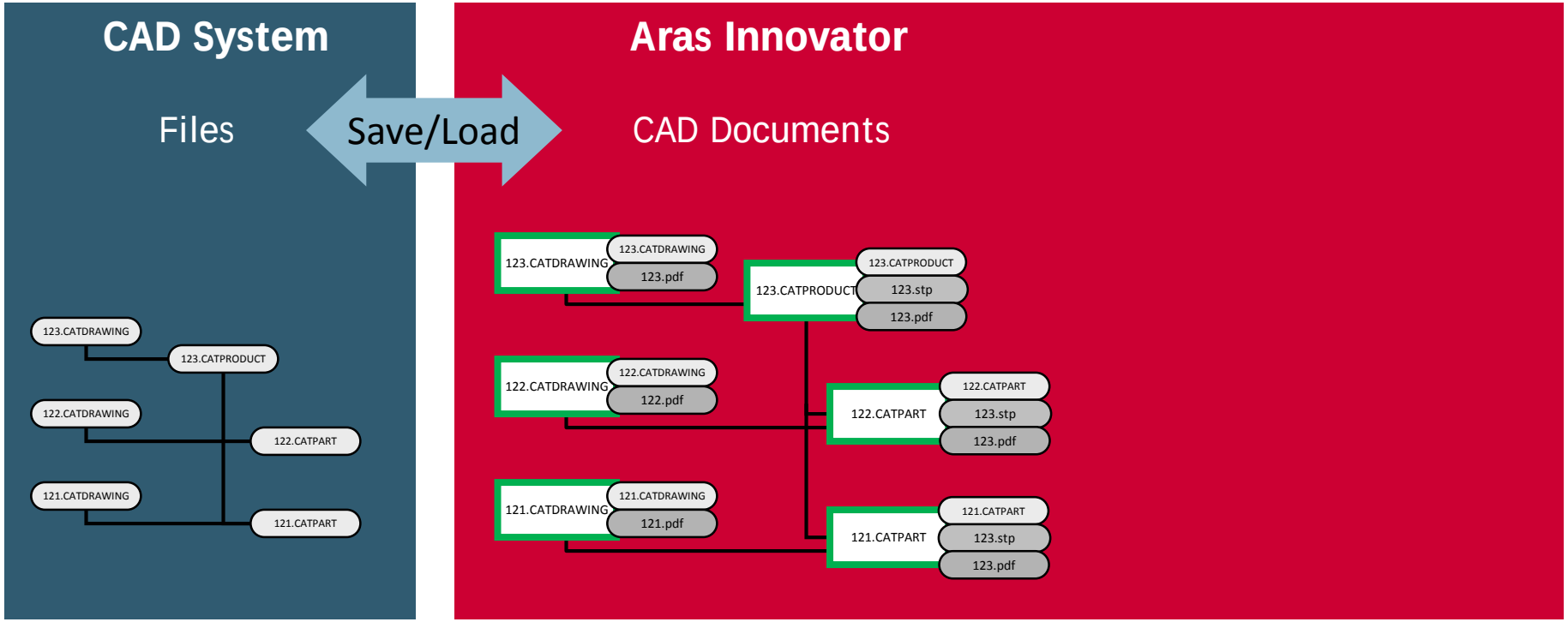
ISO PRC / 3D PDF
- Poor CAD support = U3D not PRC

CAD System Generation
- Slows Design Productivity
- Pain to associate in PLM
- Still need other design elements (i.e. Elec, Sw/Fw, etc, etc)

MBE / TDP Generation Improvements

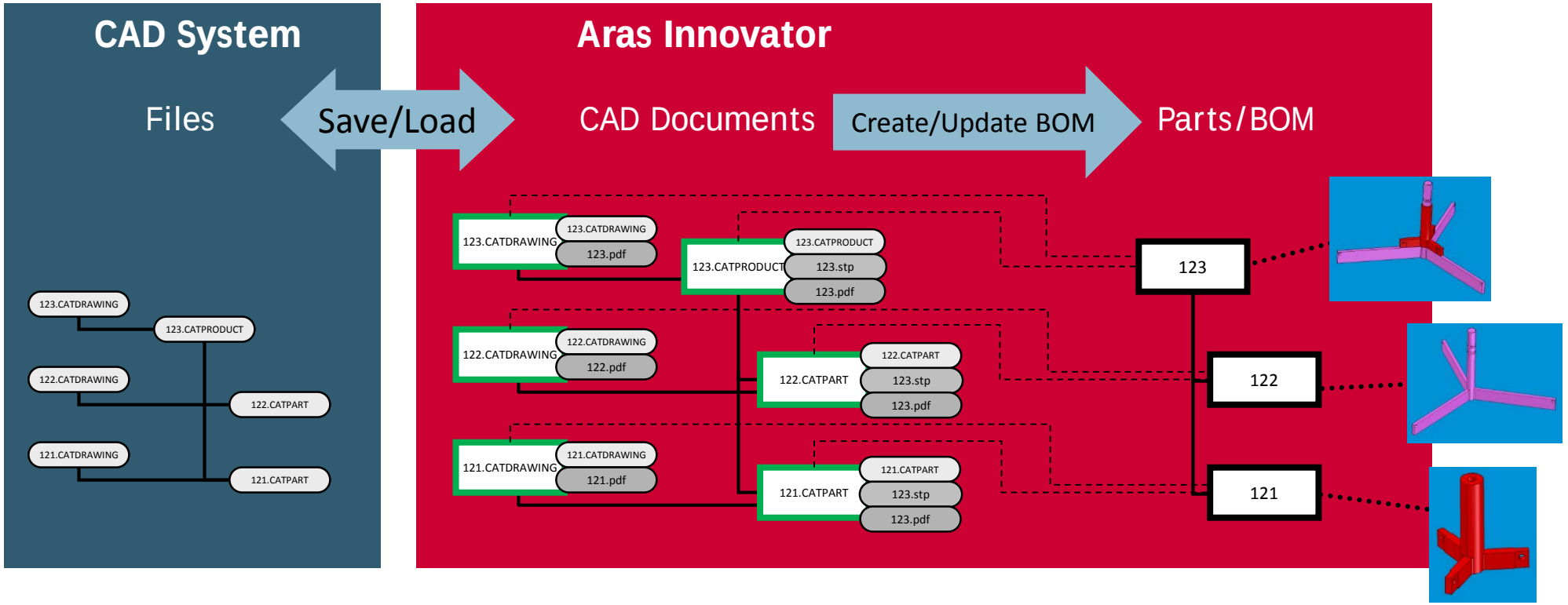


MBD / MBE Definition

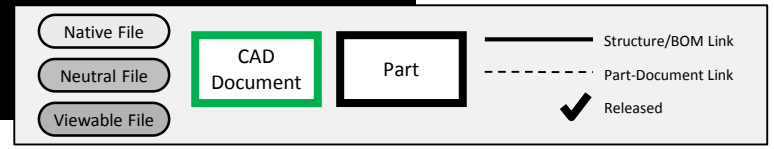


- CAD Documents created on a one-to-one basis with CAD files
- Native file attached to its CAD Document
- Viewable / neutral files generated automatically

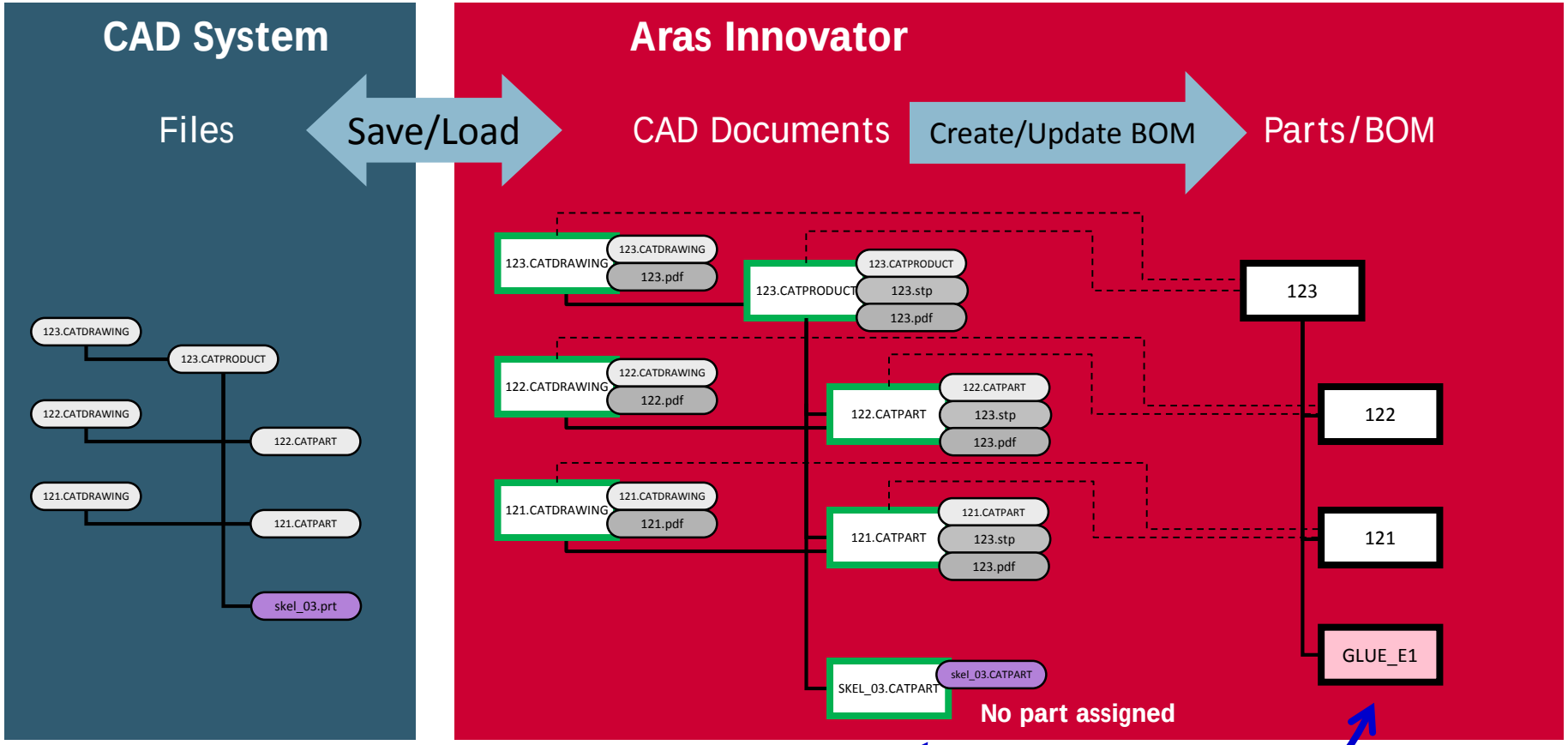
MBD / MBE & BOM Definition



- Part assignment on basis of one Part per 3D model
- Drawings also assigned to the Part
- BOM uses CAD Document structure as a Template to Create and Update BOM structure

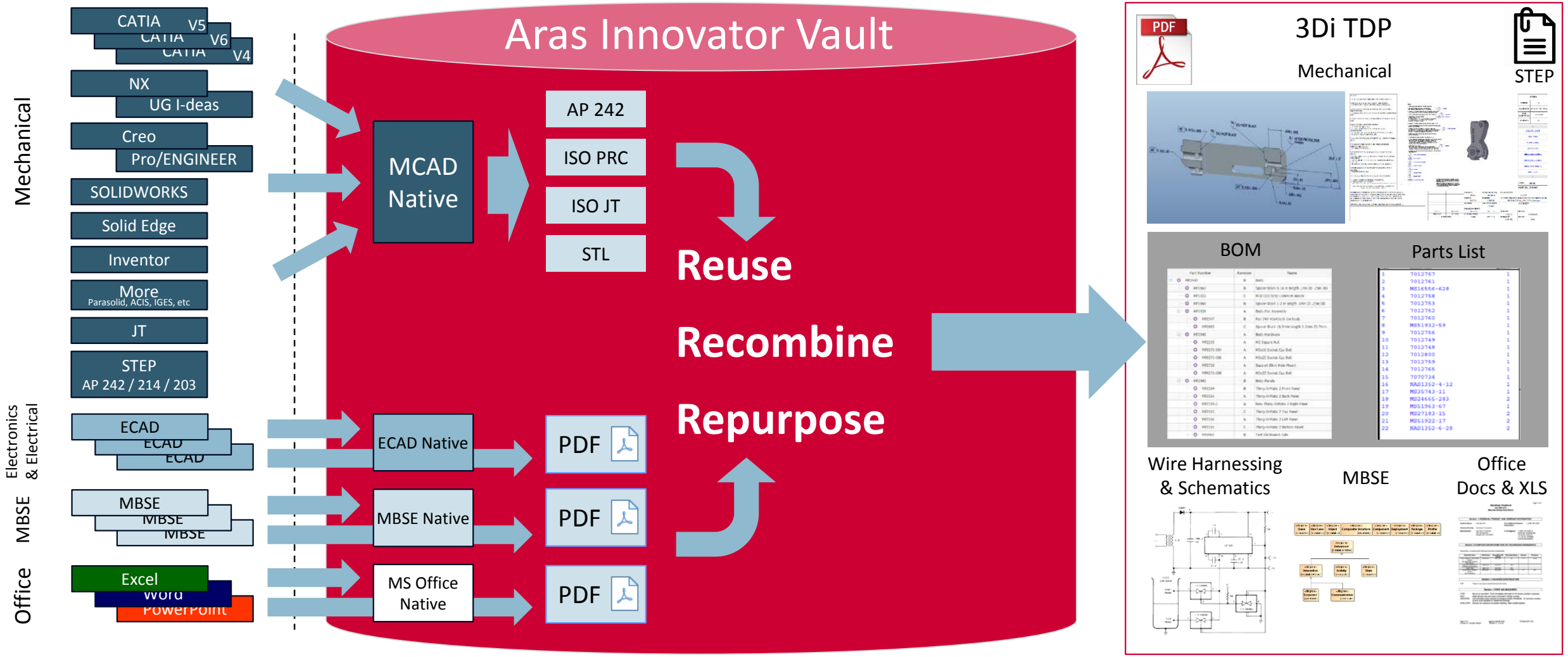


MBD / MBE & BOM Definition



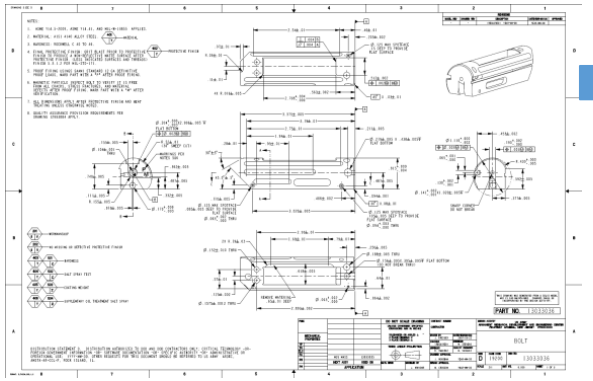
- Filtering out of CAD-only components
- Intelligent handling of BOM-only components

MBD / MBE Enablement



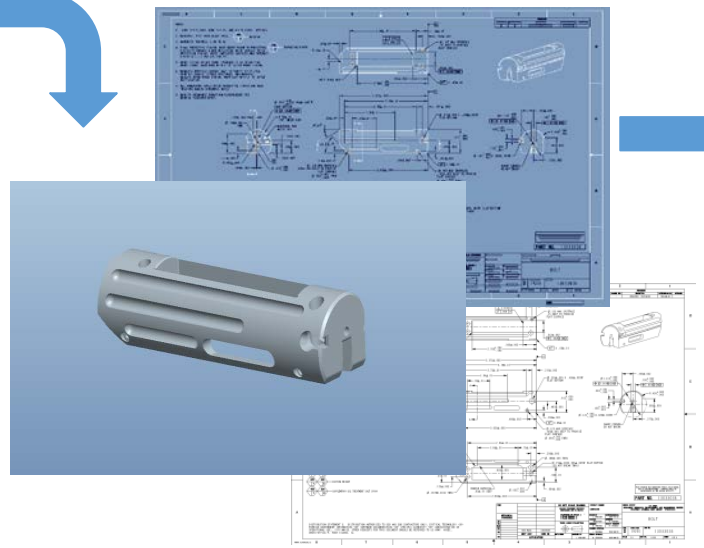
MBE / TDP Next Steps

2D Drawing



Past

3D TDP



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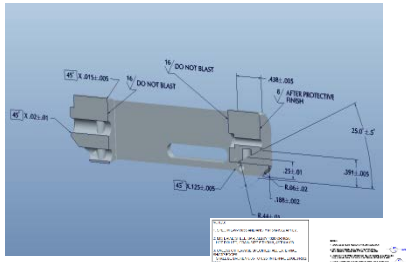
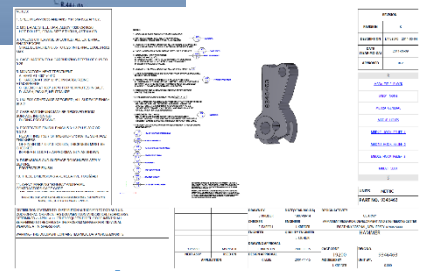


3Di pdf



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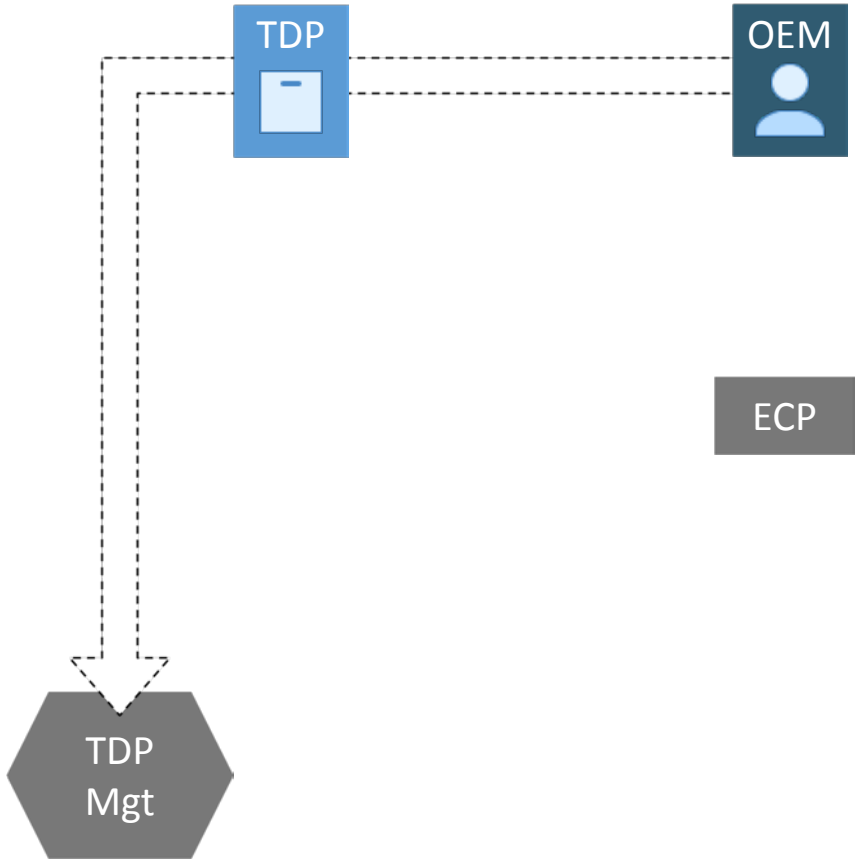
TDP Management Today

LEGACY PROCESS



ISSUES	PROBLEMS
Very Manual	Time Consuming & Difficult
Lacks Capabilities	Can’t Take Full Advantage of 3Di PDF
Limited Change Control	TDPs can get Out of Date / Wrong Version
Poor Search	Hard to Find what You Need

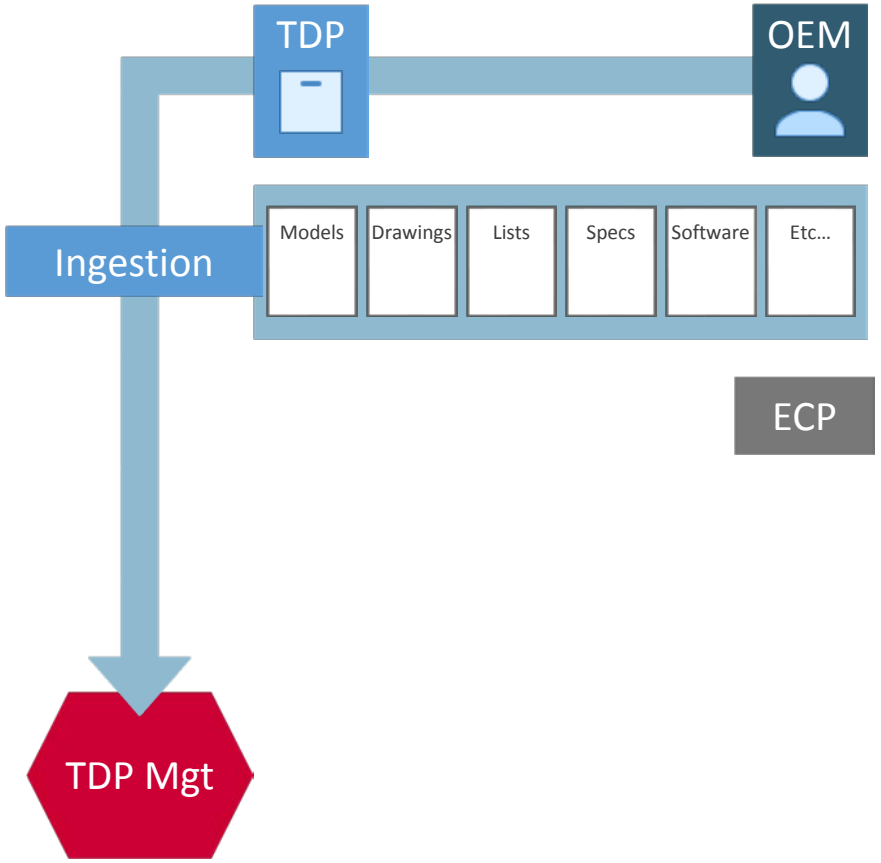
TDP Modernization Requirements

- CM-enabled and Highly Flexible
  - MIL-STD-31000 (Rev B and in future C, D, E as needed!) with 3Di PDF and ability to extract PMI metadata
  - Adapt quickly to meet new requirements, regulations, standards and process changes
  - Must enable Agile approach to deployment
- 100% Open
  - Must provide unencumbered access to managed data and related services
  - Ability to federate & integrate to wide variety of legacy COTS tools & new/future systems
- Enterprise scalability, reliability and data integrity
  - IL5 security, web-based, scale out / scale up, high availability
  - Able to run on DOD IT infrastructure or DOD Cloud or Hybrid as needed
- Fully Upgradable (even when Customized)
  - Resilient, immune to IT technology changes
  - Enable new technology insertion
- Easy to Use & Learn

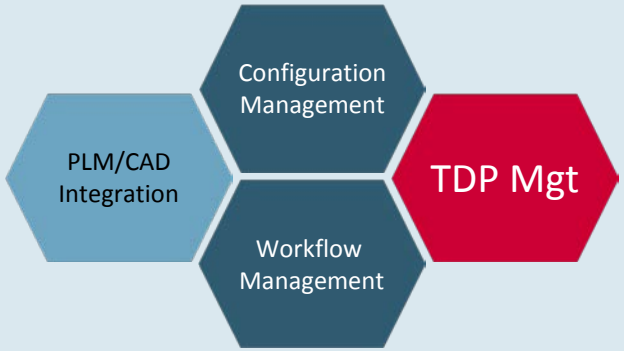
TDP Modernization for MBE

NEW PROCESS

- Program Specific TDP
- 3Di PDF, all Major CAD, JT
- Web-based



NEW PLATFORM CAPABILITIES

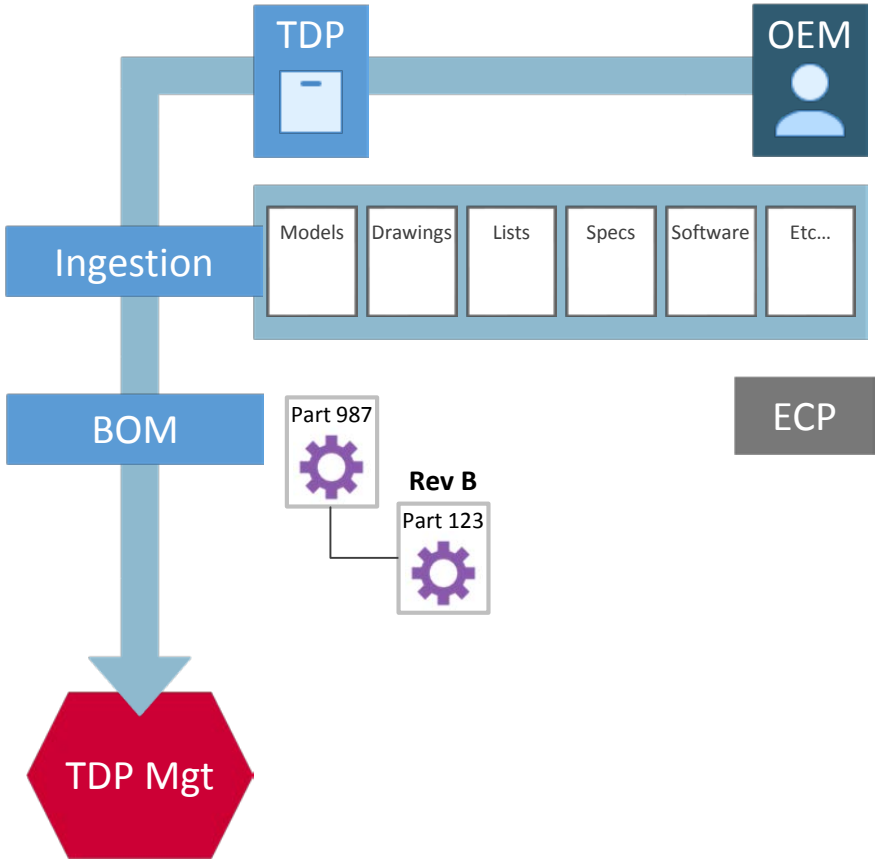


TDP Modernization for MBE

NEW PROCESS

- Program Specific TDP
- 3Di PDF, all Major CAD, JT
- Web-based

- As Delivered/Maintained
- Automated Processes
- Manage Effectivity



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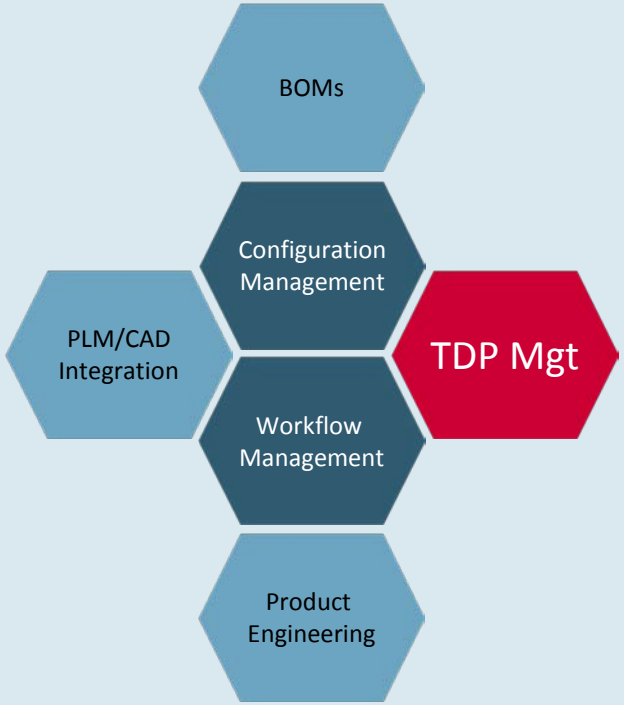

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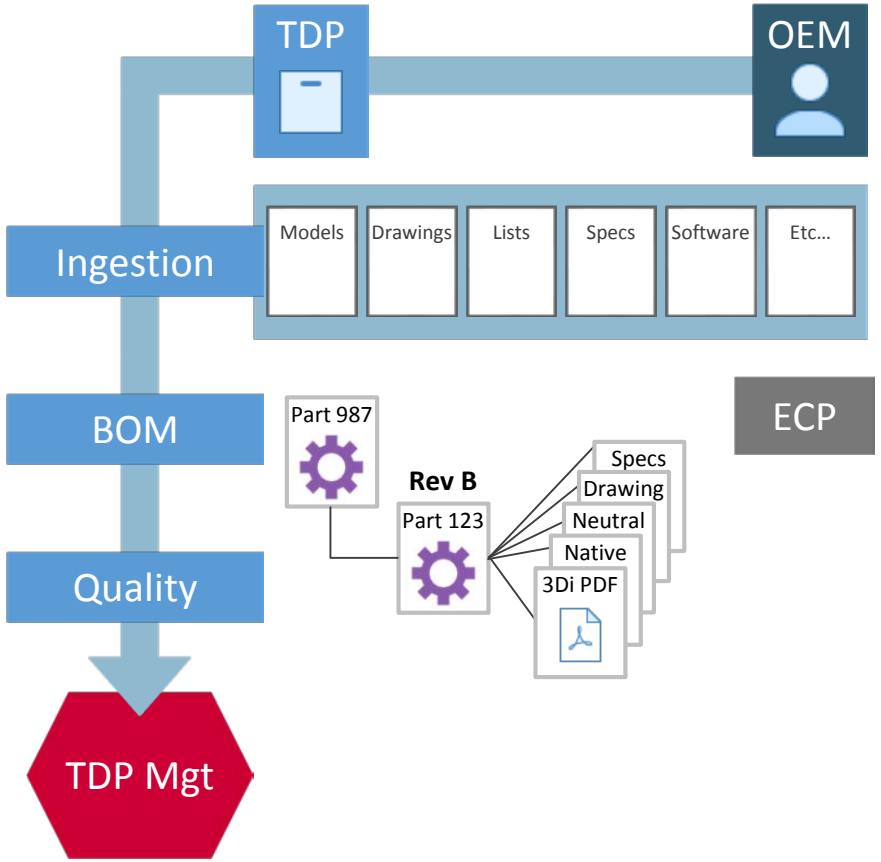
- Manage Effectivity

- Verify Contents
- Approve Release
- Sync to ERP & Other Sys



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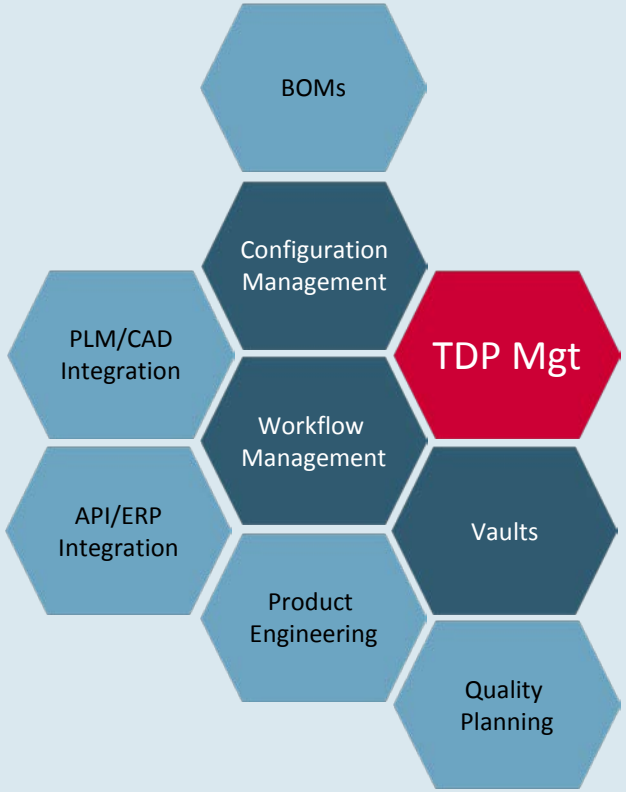

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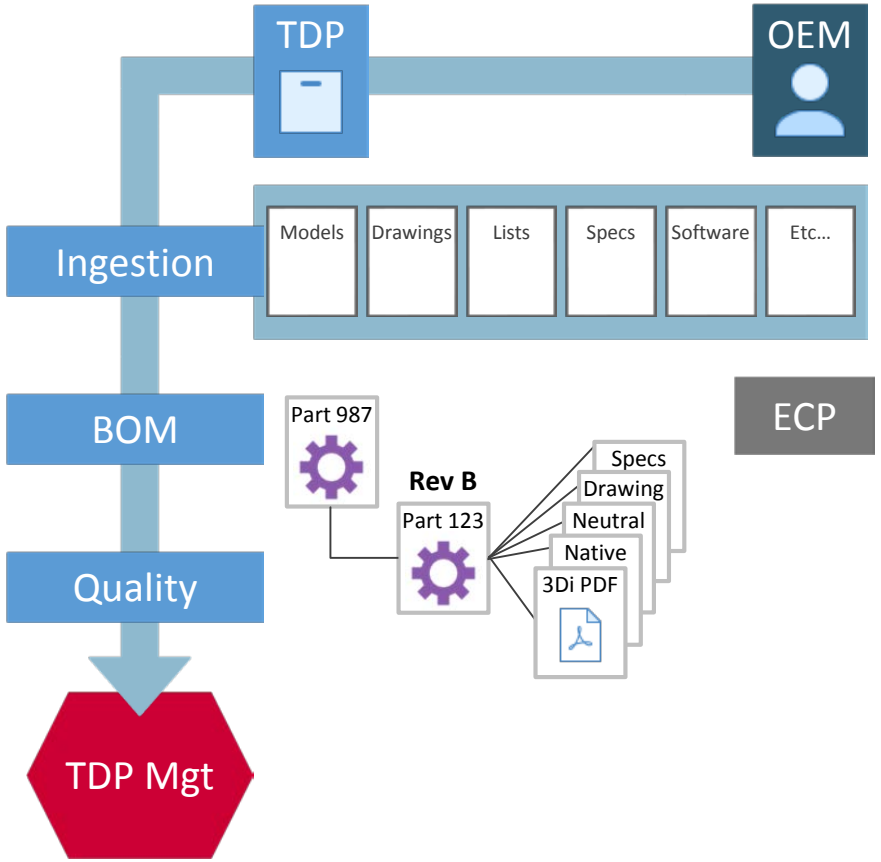
- Secure Search
- Visualization
- Reports / Analysis



NEW PLATFORM CAPABILITIES

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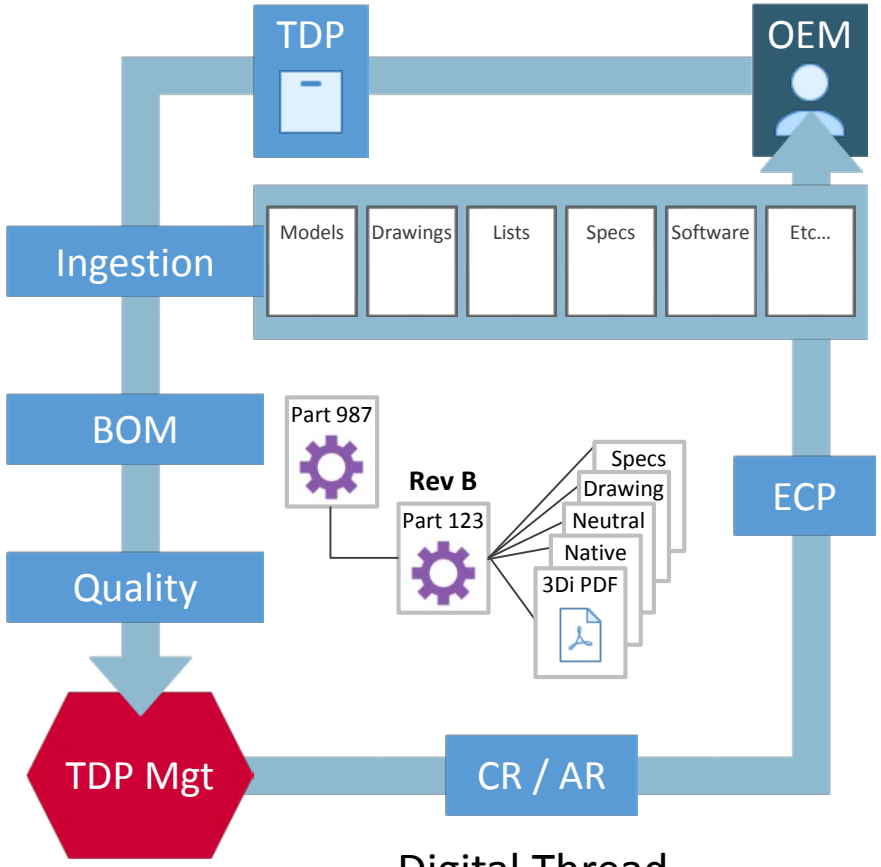
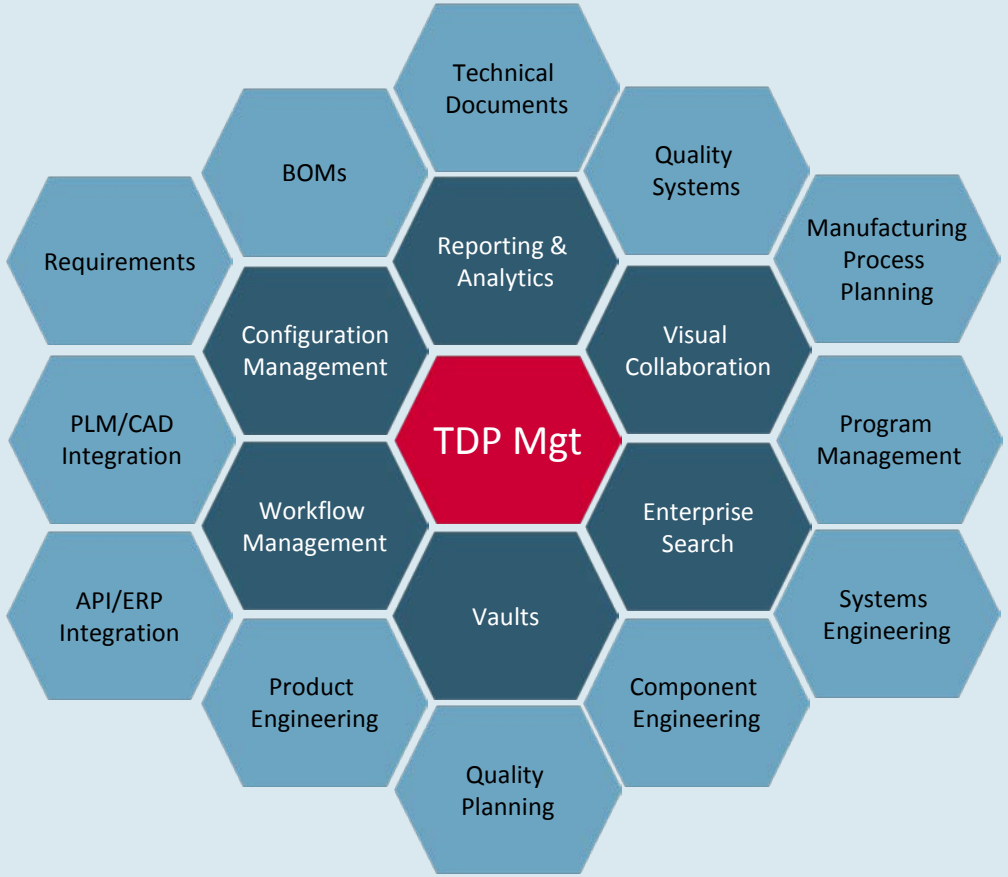


Digital Thread

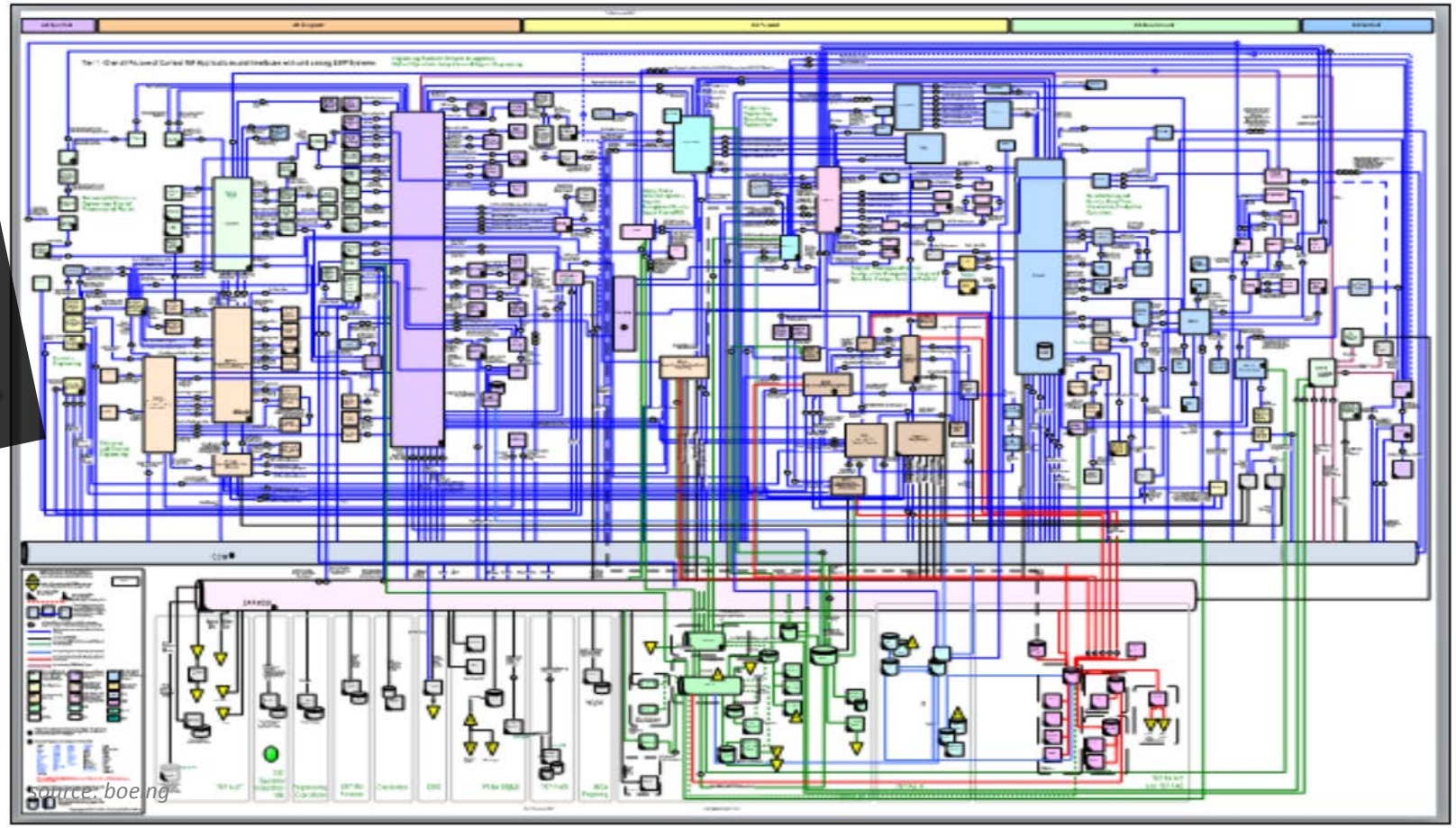
NEW PLATFORM CAPABILITIES



Is MBE for TDPs Achievable?

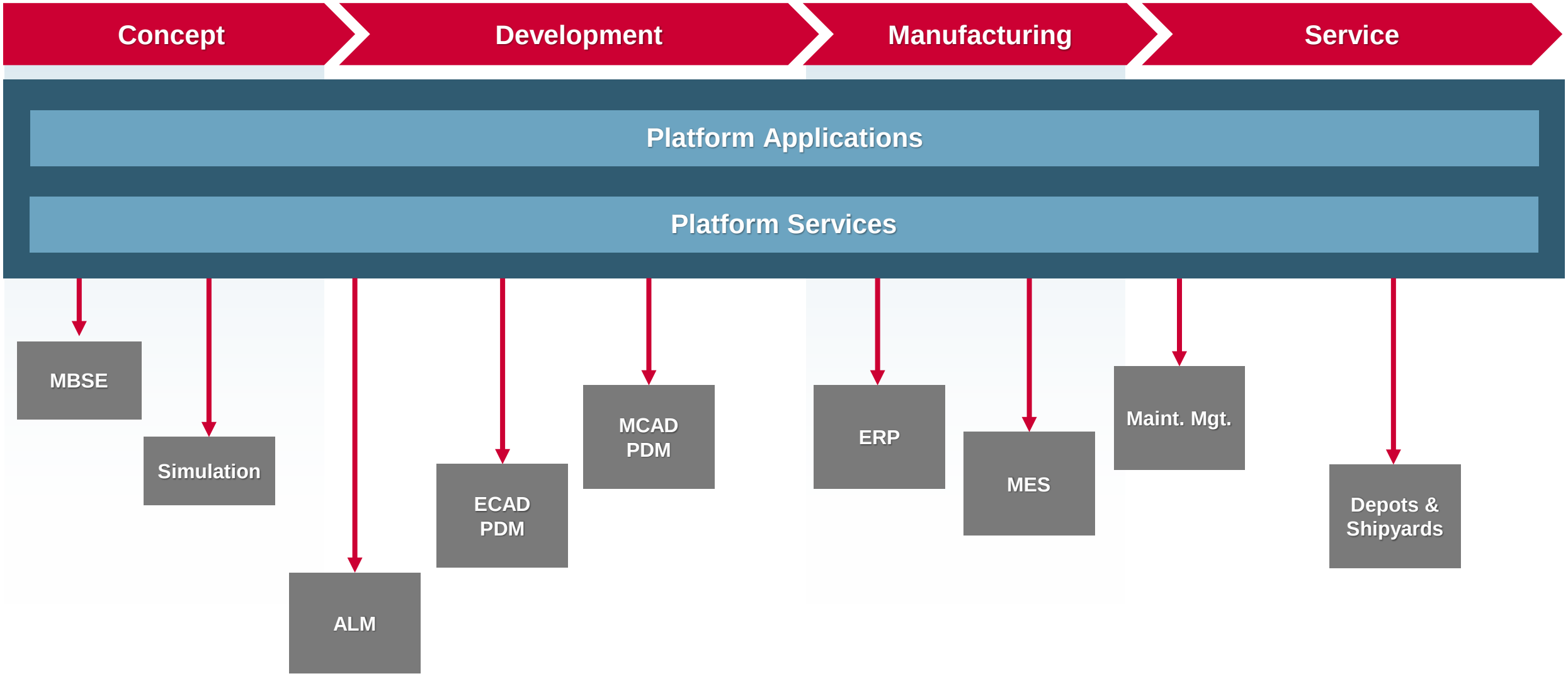
Thousands of Existing Systems & Petabytes of Data
Users around the World

RIP & REPLACE NOT REALISTIC

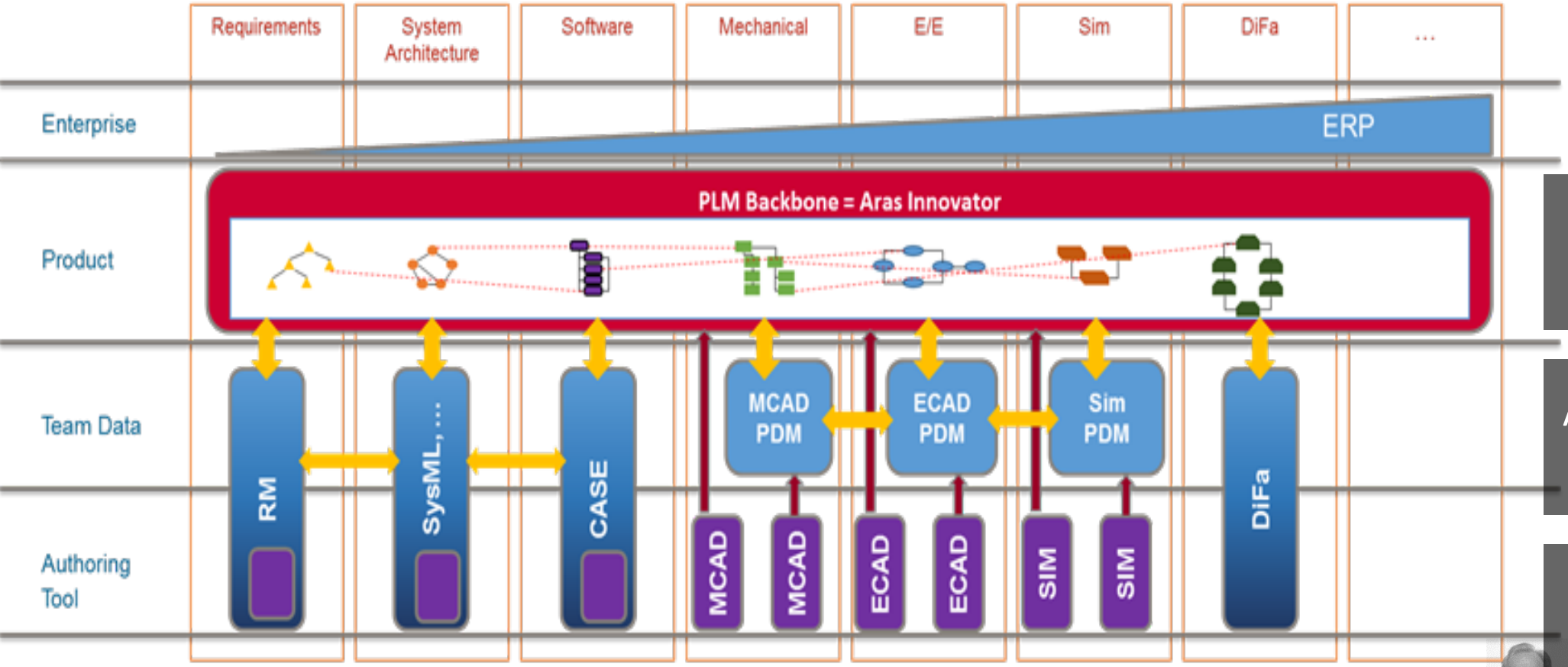


Source: boeing

Platform Overlay Approach



Platform Overlay Architecture



Not just Files Mgt, but Applications

Avoids Rip & Replace Risk / Disruption

Move Agile, Much Faster

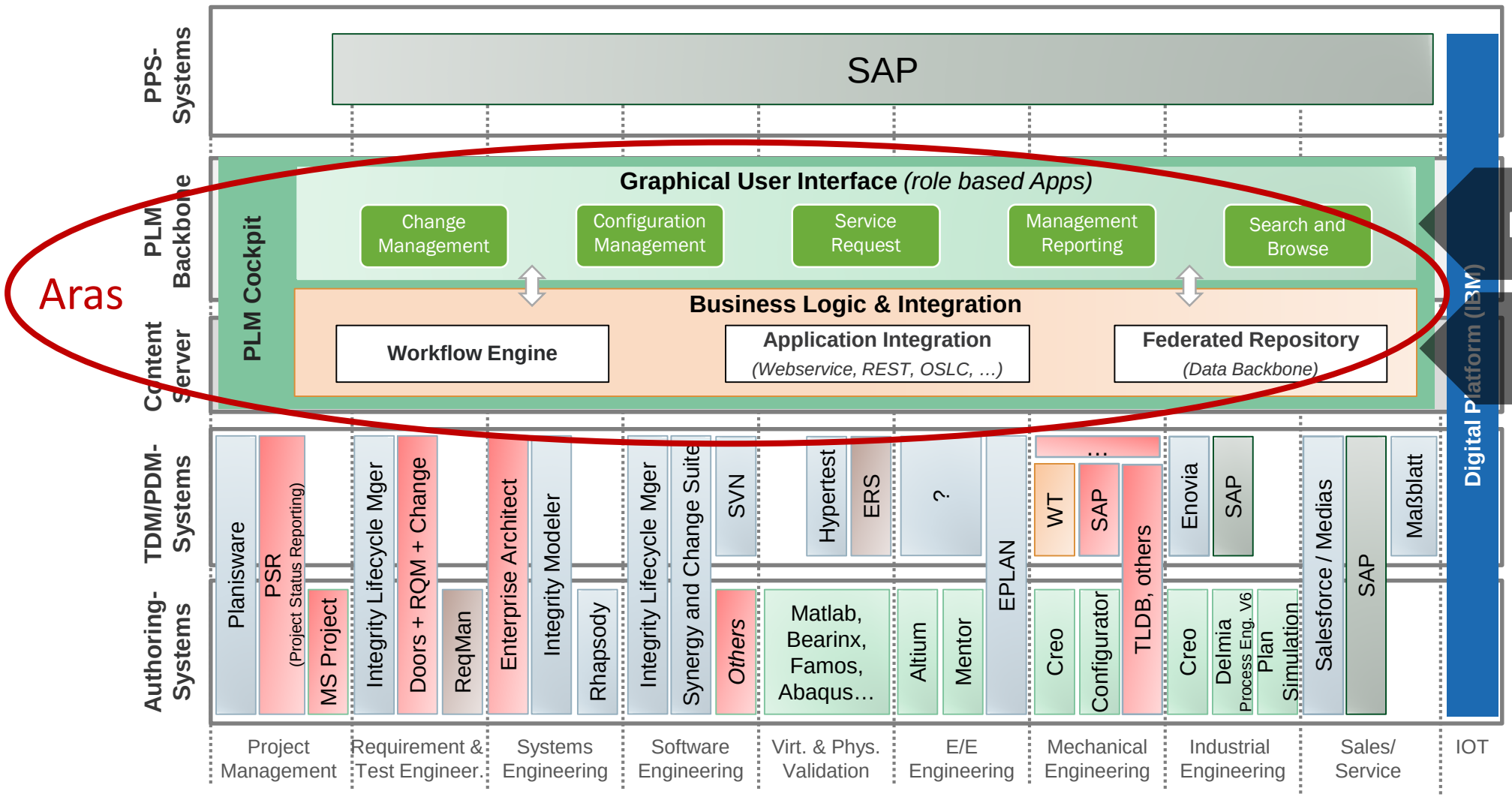
Dr. Martin Eigner
TECHNISCHE UNIVERSITÄT KAISERSLAUTERN

TDM and authoring tool tighly connected

TDM
Authoring tool
freely integratable

Real World Example Architecture

Aras Platform at Schaeffler for 20,000 Users



Platform Requirements for TDP Modernization

PLATFORM REQUIREMENTS	CANNOT HAVE	MUST HAVE
Ability to **ingest data** through API and Services	Proprietary APIs	Transparent & Interrogatable APIs
Integration ability to manipulate processes and data through exposed API / Services	Incomplete or Hidden API Function Calls	FULL API Capabilities Exposed
	Proprietary Data Models	Open Data Model
Extensibility ability to build / extend functionality leveraging COTS framework	Static / Hard Coded Data Model	Dynamic Data Model
Ability to **exfiltrate data** out of API / Services	Obfuscated Data	Open Data Access

Why is TDP Modernization for MBE Necessary?

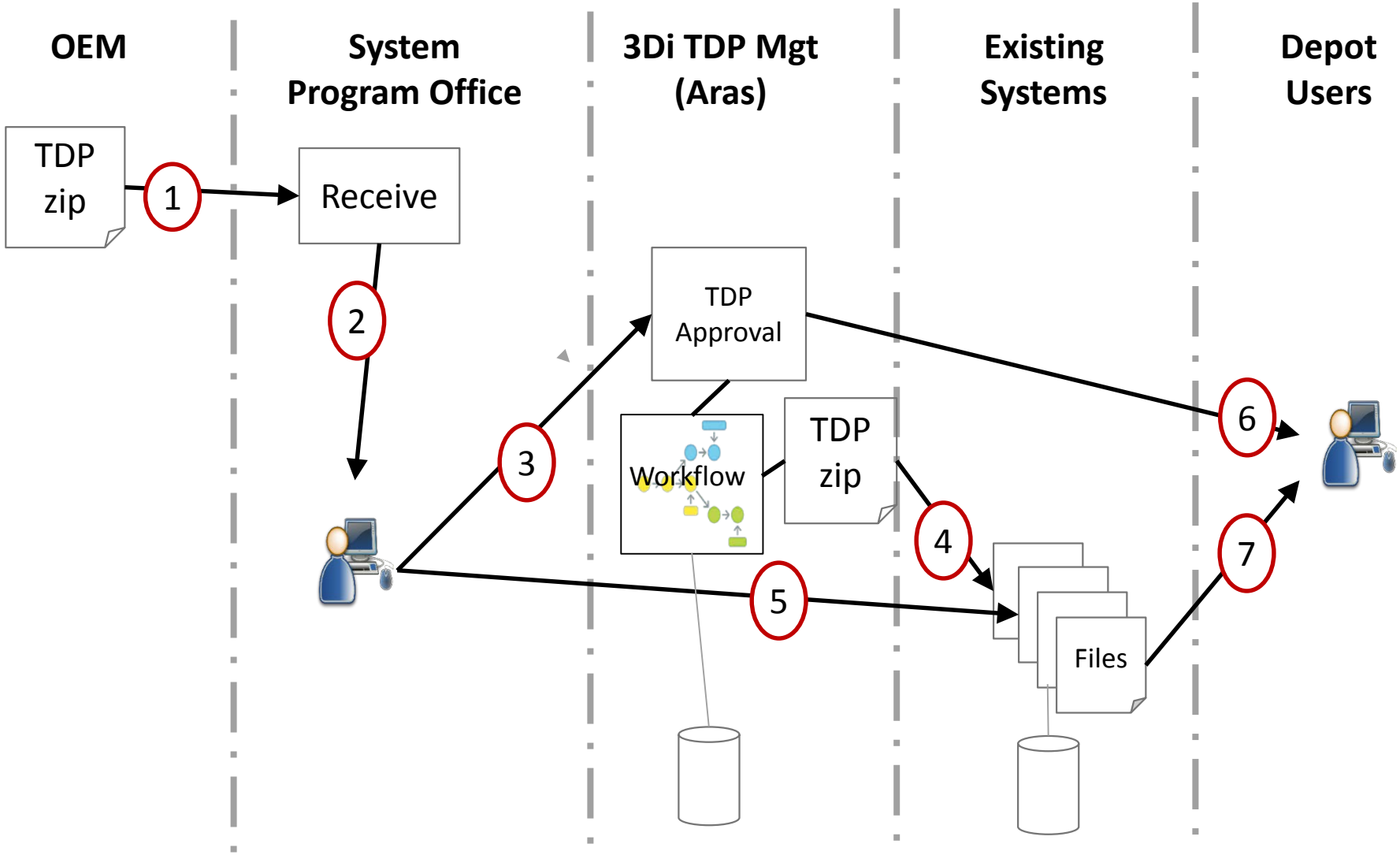
Smart Connected Technology

Industrial Internet & Industry 4.0

Cognitive Computing / Machine Learning

Open, Accessible and Intelligent Product Data is a Critical Foundation to Enable Digital Transformation

3Di TDP Management Demo



Call to Action

Aras is actively engaging in TDP modernization initiatives for MBE with 3Di PDF

Contact:

Marc Lind | Aras
mlind@aras.com