

# Publication and Validation Strategies to enable a Model Based Ecosystem



Connecting the Digital Thread™

- Anark Corporation
- International TechneGroup Incorporated

GLOBAL PRODUCT DATA  
INTEROPERABILITY  
**S U M M I T**  
**2019**



# Today's Speakers

Global Product Data Interoperability Summit | 2019

- **Tony Provencal - ITI**
  - **Director of Technical Sales & Services**
- **Jim Merry – Anark**
  - **Senior Director, Enterprise Sales**
- **Jim Martin – Anark**
  - **Director of Marketing & Sales Enablement**

# Agenda/Objectives

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- **Evolution of digital authority**
- **Standards based content publishing**
- **Validation strategies and challenges**
- **Considerations for new standards formats**

**ITI solves complex product data interoperability problems, so that our customers can focus on making great products.**

Customer Initiatives	ITI Solutions	Locations
Model Based Enterprise Product Lifecycle Mgt. Advanced Simulation Digital Manufacturing	Conversion Integration Validation Migration	Milford, Ohio USA (HQ) Cambridge, UK Munich, Germany Tel Aviv, Israel Bologna, Italy

Founded in 1983 | 140 Employees

# Anark Corporation

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**Leading provider of technical content management software** and solutions, with activity-based visual collaboration and connected digital workflows.

**Empowering the Digital Thread and MBE revolution** within Aerospace & Defense, Energy, High Tech, Automotive, Transportation, Marine, and Medical Equipment sectors.

**Growing company** with worldwide network of technology and integration partners.

**Anark Corporation HQ** in Boulder, Colorado, with offices in the Washington DC, Detroit, Chicago, San Francisco, and Bangalore.



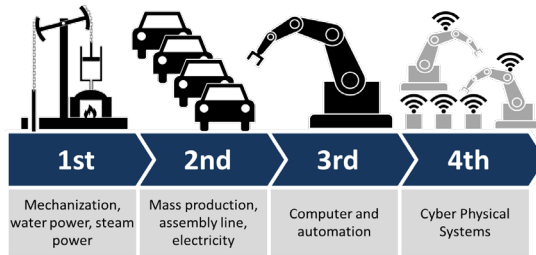


# Smart, Connected, Collaborative

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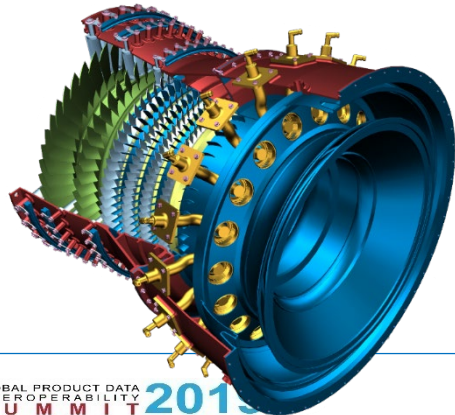


**Intelligent Information Management (IIM)** defines all the strategies, methods, and tools utilized to capture, create, store, secure, analyze, deliver, and automate data. IIM is all about Data AND Content, not Data OR Content. - *AIIM*



**Industry 4.0** fosters what has been called a "smart factory". Over the Internet of Things, cyber-physical systems communicate and cooperate with each other and with humans in real-time both internally and across organizational services offered and used by participants of the value chain. - *Industrie 4.0 Working Group*

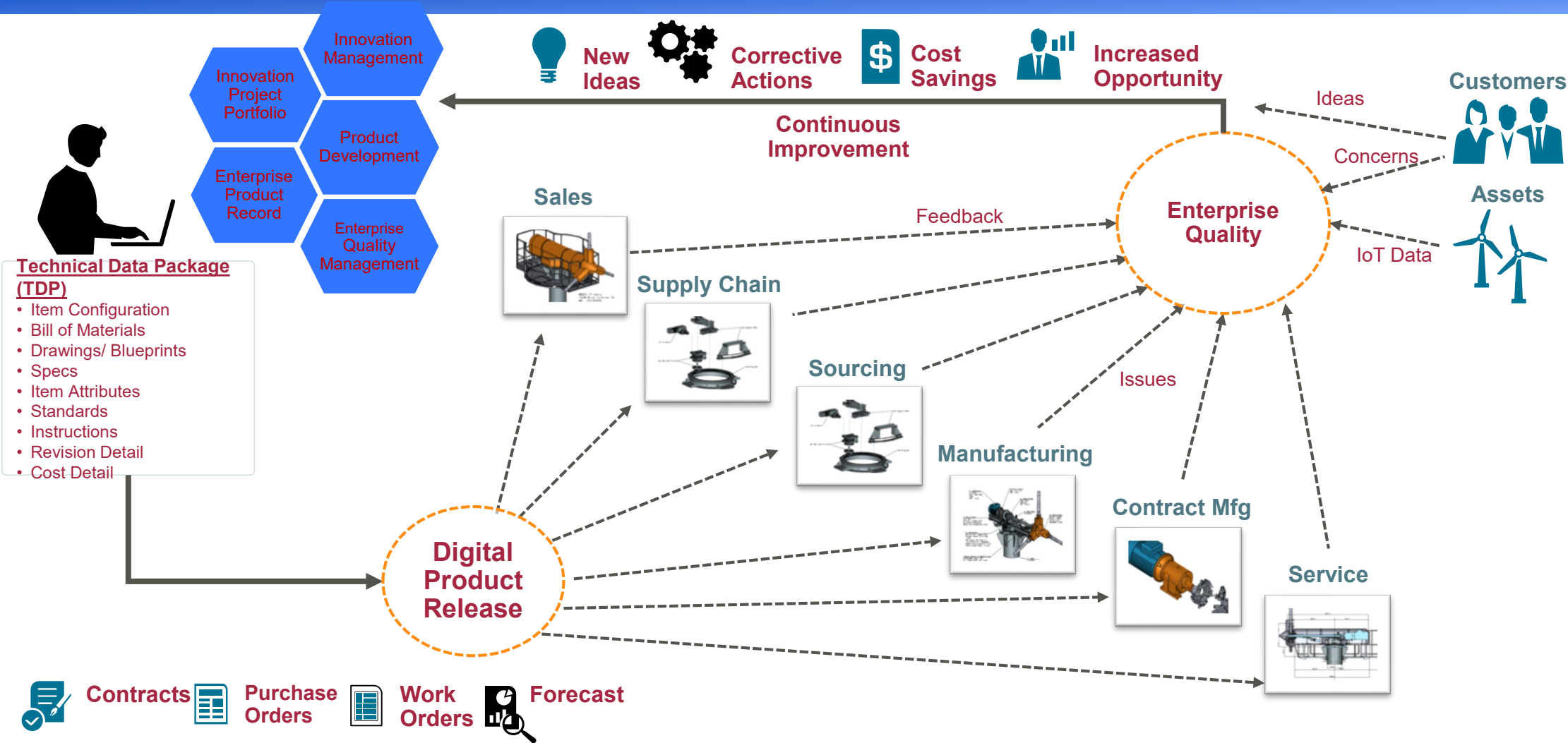
**The Digital Thread** refers to the communication framework that allows a connected data flow and integrated view of the asset's data throughout its lifecycle across traditionally siloed functional perspectives. - *Industry Week*

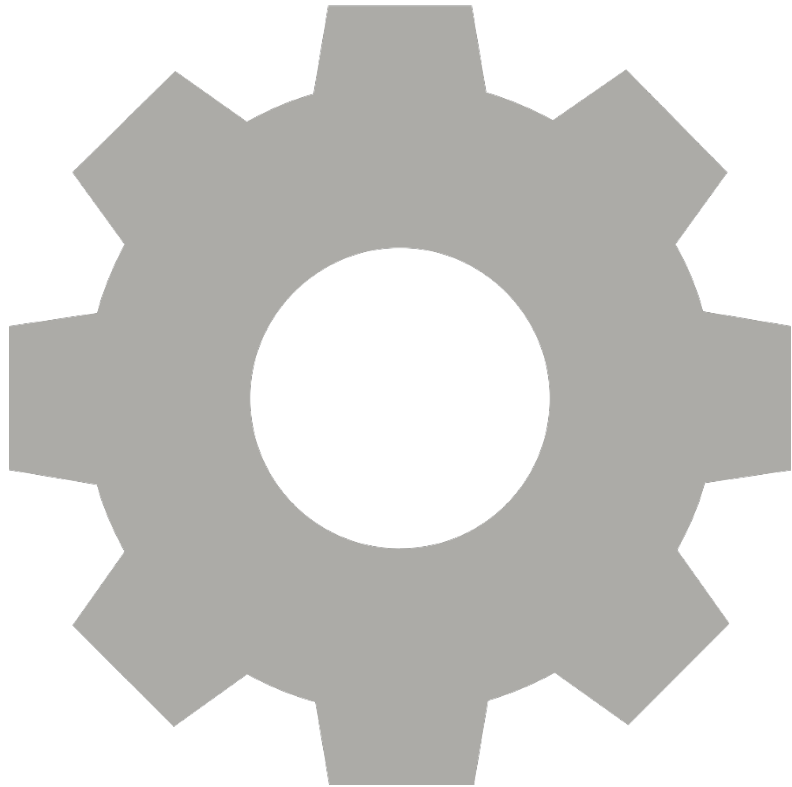


**Model-Based Enterprise (MBE)** is a fully integrated and collaborative environment founded on 3D product definition detailed and shared across the enterprise; to enable rapid, seamless, and affordable deployment of products from concept to disposal. - *DMDII*

# Technical Data Packages and the Digital Thread

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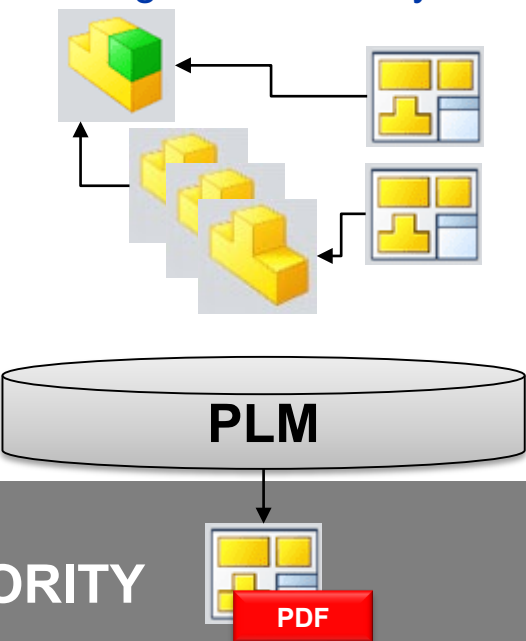
## Generation and Validation of Targeted Standardized Content



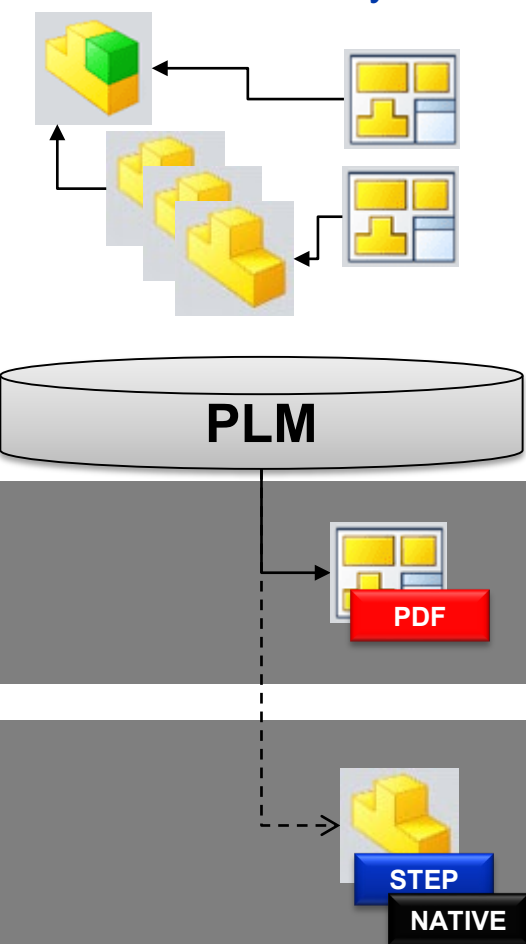
# Evolution of Digitization, Authorization, & Trust

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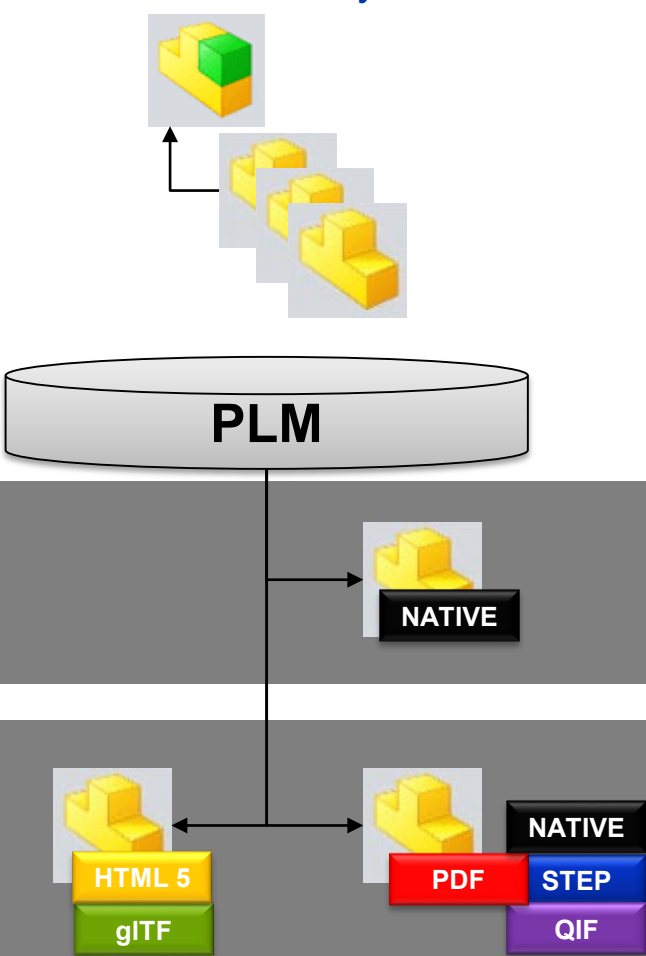
Drawing Centric Ecosystem



Model Centric Ecosystem



Model Based Ecosystem

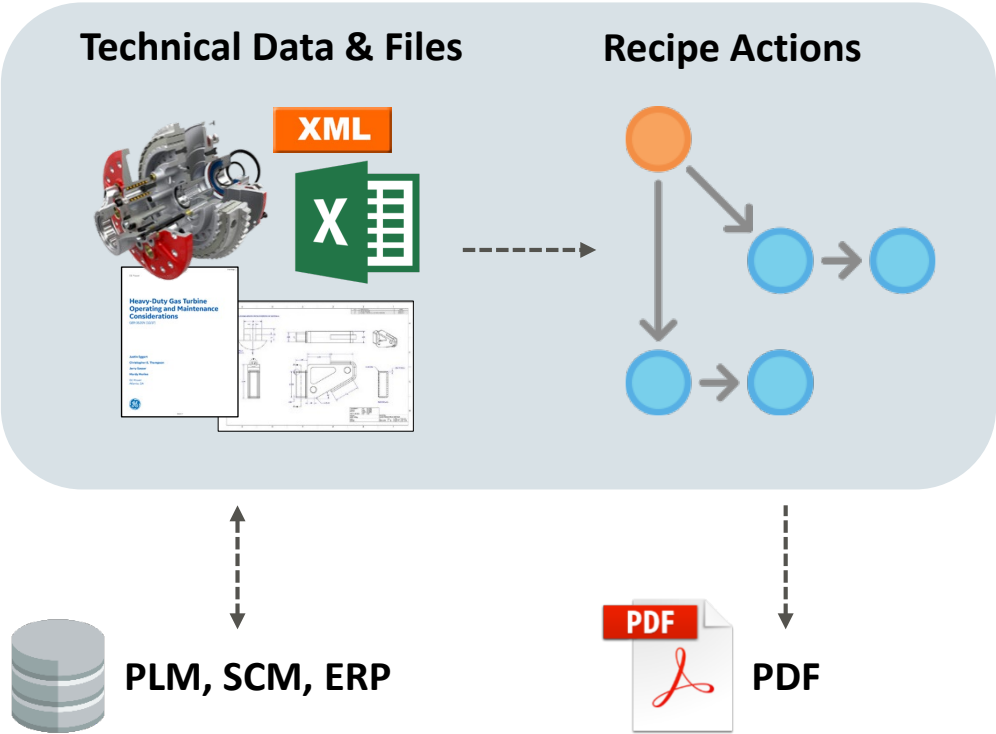


# Anark Content Services for the Digital Thread

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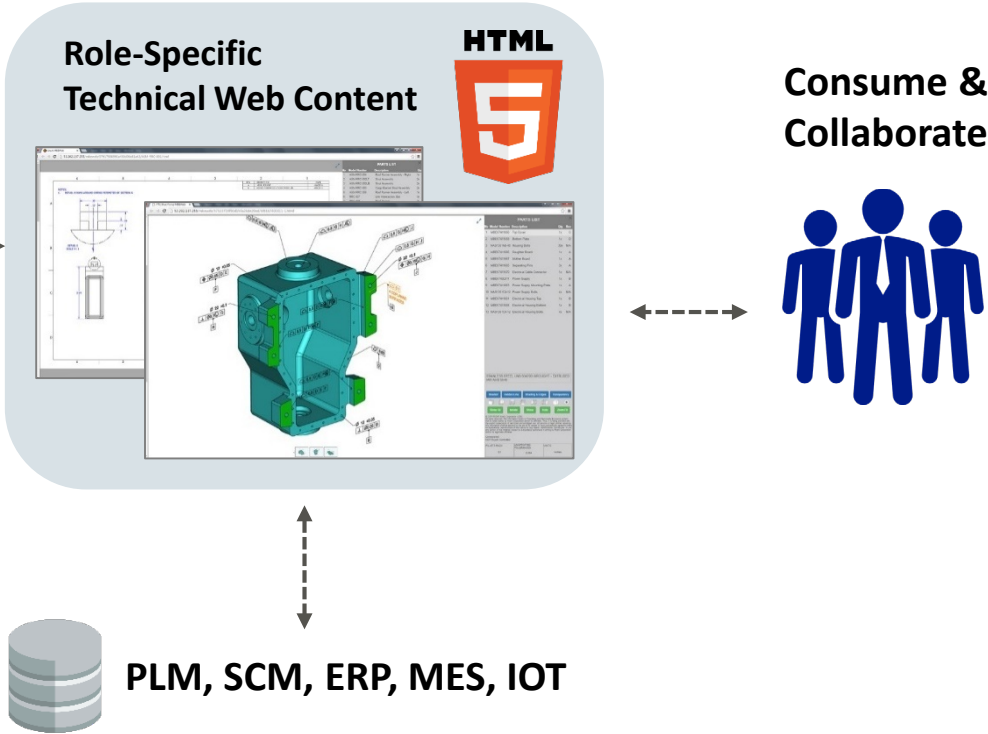
## ANARK CORE™ SERVER

Publishing Automation Services



## ANARK CORE™ MBEWEB

Content Management & Collaboration Services

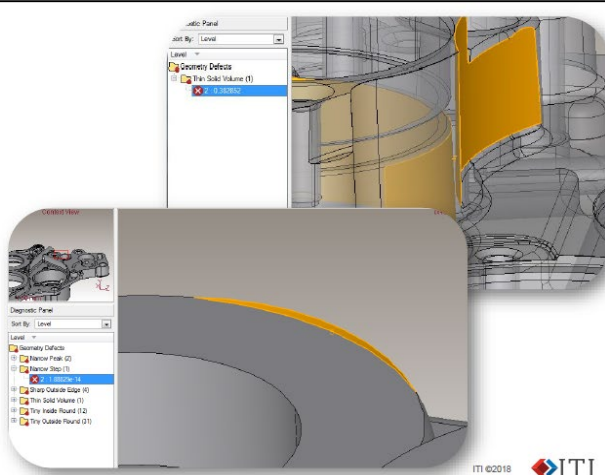


# CADIQ Validation Use Cases

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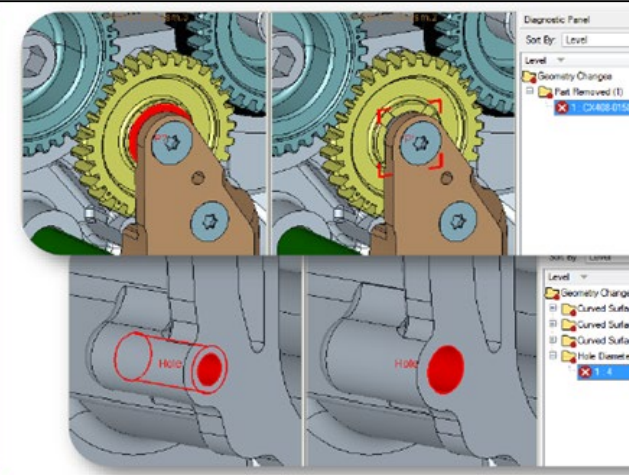
## Quality Checking Identifying Defects

- Structure & Integrity
  - Non-solid model, non-parametric model, large model, degenerate entities, over-used edges, etc...
- Manufacturability
  - Narrow solid, narrow space, narrow valley, solid void, tiny rounds, narrow step, deep hole, etc...



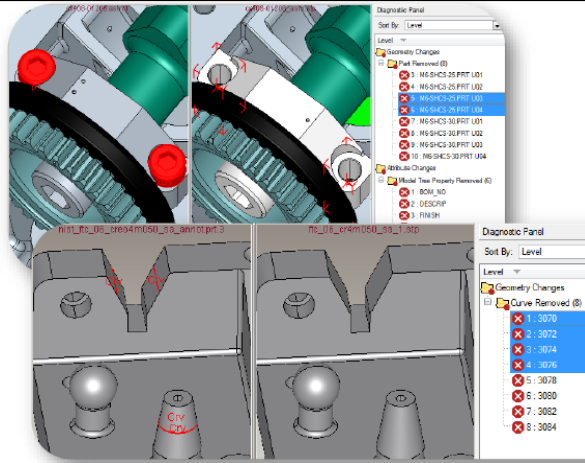
## Revision Comparison Identifying Changes

- Features & Attributes
  - Features/components added/removed
  - Parameters added/removed
  - Parameter changes
- Geometric Entities
  - Flat surfaces, curved surfaces, holes, added or removed
  - Surface location, orientation, length, diameter changes



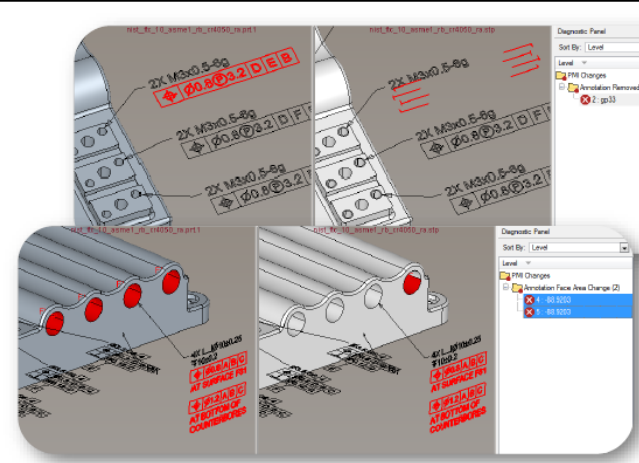
## Derivative Validation Identifying Differences

- Shape & Structure
  - Parts, surfaces, curves, points, etc... added or removed
  - Parts, surfaces, curves, points, etc... changed
- Properties & Attributes
  - Model tree nodes added, removed, or changed
  - Volume, area, color, entity count changes



## Derivative Validation Identifying Differences

- Semantic
  - Annotation added or removed, annotation type change, annotation face area change, merged annotations, etc...
- Graphic
  - Saved view added or removed, annotation location change, annotation view direction change, etc...



# Roadmap of Validation Practices

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## Model-Based Enterprise Maturity Index

Title	Drawing Centric	Model Centric	Trusted Model Centric	MBD Centric	Authorized MBD Centric	Internal MBE Centric	Extended MBE Centric
Level	Level 0	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
2D Draw Geom	May Define Geometry	Presents Model Geom	Presents Model Geom	Presents Model Geom	Presents Model Geom	Presents Model Geom	Presents Model Geom
2D Draw PMI	Defines All PMI	Defines Most PMI	Defines Most PMI	Presents Model PMI	Presents Model PMI	Presents Model PMI	Presents Model PMI
3D Model Geom	May Define Geometry	Defines All Geometry	Defines All Geometry	Defines All Geometry	Defines All Geometry	Defines All Geometry	Defines All Geometry
3D Model PMI	No PMI	May Define Some PMI	May Define Some PMI	Defines All PMI	Defines All PMI	Defines All PMI	Defines All PMI
Derivatives	None	3D Precise Geom Only	3D Precise Geom Only	3D Precise Geom + PMI 3D Graphic Geom + PMI	3D Precise Geom + PMI 3D Graphic Geom + PMI	3D Precise Geom + PMI 3D Graphic Geom + PMI	3D Precise Geom + PMI 3D Graphic Geom + PMI
Data Mgmt	File-Based Vault	Document-Centric PDM	Document-Centric PDM	Part-Centric PLM	Part-Centric PLM	Digitally "1" PLM	Extended PLM
Authority	2D Drawing Authorized	2D Drawing Authorized	2D Drawing Authorized	2D Drawing Authorized	3D Model Authorized	3D Model Authorized	3D Model Authorized
Geom Quality Checking	Manual Drawing Check	Ad-hoc Geom Check	Automated Geom Check w/ Quality Certificate	Automated Geom Check w/ Quality Certificate	Automated Geom Check w/ Quality Certificate	Automated Geom Check w/ Quality Certificate	Automated Geom Check w/ Quality Certificate
PMI Quality Checking	Manual Drawing Check	Manual Drawing Check	Manual Drawing Check	Ad-hoc 3D PMI Check	Automated PMI Check w/ Quality Certificate	Automated PMI Check w/ Quality Certificate	Automated PMI Check w/ Quality Certificate
Derivative Validation	None	Ad-hoc Geometry Only Validation	Automated Geometry Validation w/ Certificate	Auto Geom Val w/ Cert Ad-hoc PMI Validation	Automated Geom + PMI Validation w/ Certificate	Automated Geom + PMI Validation w/ Certificate	Automated Geom + PMI Validation w/ Certificate
Revision Comparison	2D Drawing Overlay No 3D Model Compare	2D Drawing Overlay Ad-hoc Geom Compare	2D Drawing Overlay Auto Geom Compare	2D Drawing Overlay Auto Geom, Ad-hoc PMI	Auto Compare Geom + PMI w/ Documentation	Auto Compare Geom + PMI w/ Documentation	Auto Compare Geom + PMI w/ Documentation
LOTAR	2D Neutral Drawing File Vaulting	2D Neutral Drawing File Vaulting	2D Neutral Draw Vault 3D Geom Only LOTAR	2D Neutral Draw Vault 3D Geom Only LOTAR	3D Geom + PMI LOTAR Validation	3D Geom + PMI LOTAR Validation	3D Geom + PMI LOTAR Validation

## Key Points

1. Automation

2. MBD

3. PMI Validation

# Key Validation Planning Considerations

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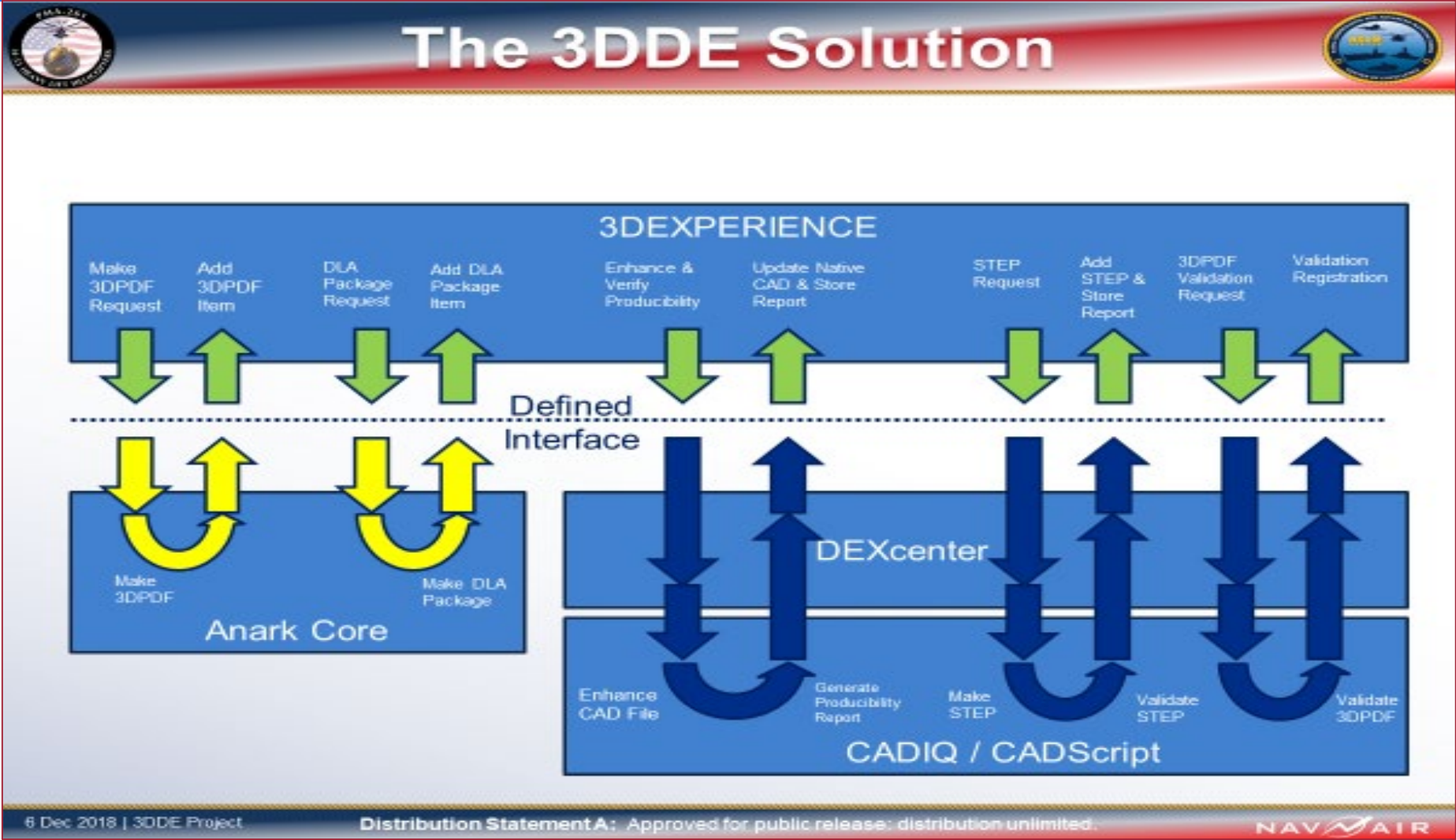
- **Automation**
  - PLM driven
  - High volume/scalability
  - Can start with geometry only
- **MBD**
  - Translation/Precise vs Transformation/Graphical
  - Human consumption vs. Machine consumption
  - Transformation = decoder ring required
- **PMI Validation**
  - Semantic properties
  - Cross highlighting
  - View based visibility

**“Fit for purpose” validation is required in designing effective validation workflows.**



# The NAVAIR 53K Project

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Informed Reality (IR)

- Anark content with responsive templates can be accessed directly in browser-enabled wearables such as Realwear or Glass, for hands-free, informed reality (IR) experiences

Virtual Reality (VR)










- Anark IIM technical web content can delivered as rev-controlled, authoritative visualization data and attributes to virtual reality (VR) applications through microservices

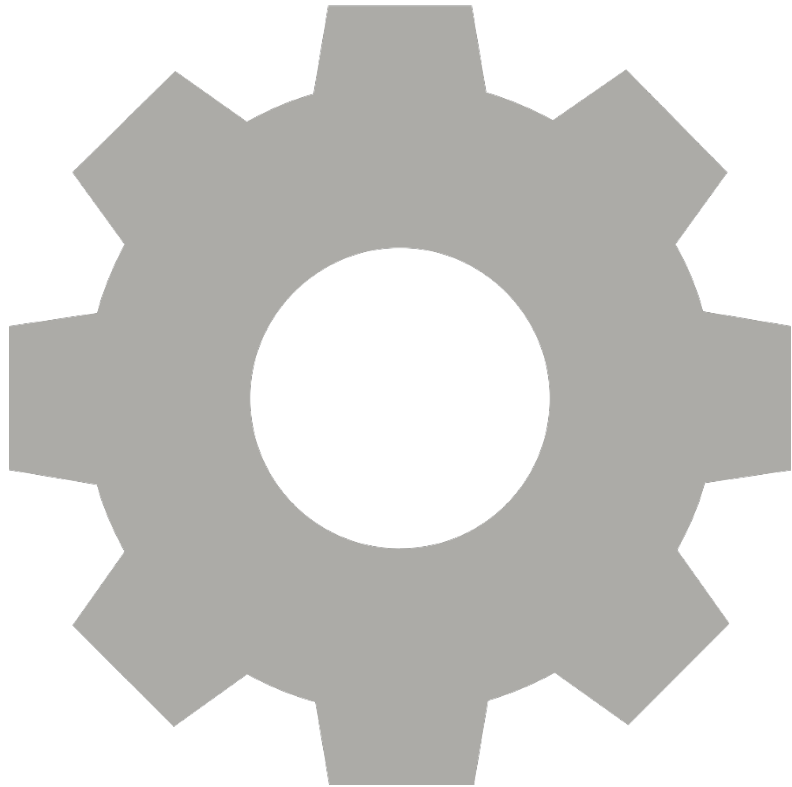
Augmented Reality (AR)

- Anark IIM technical web content can delivered as rev-controlled, authoritative visualization data and attributes to augmented reality (AR) applications through microservices

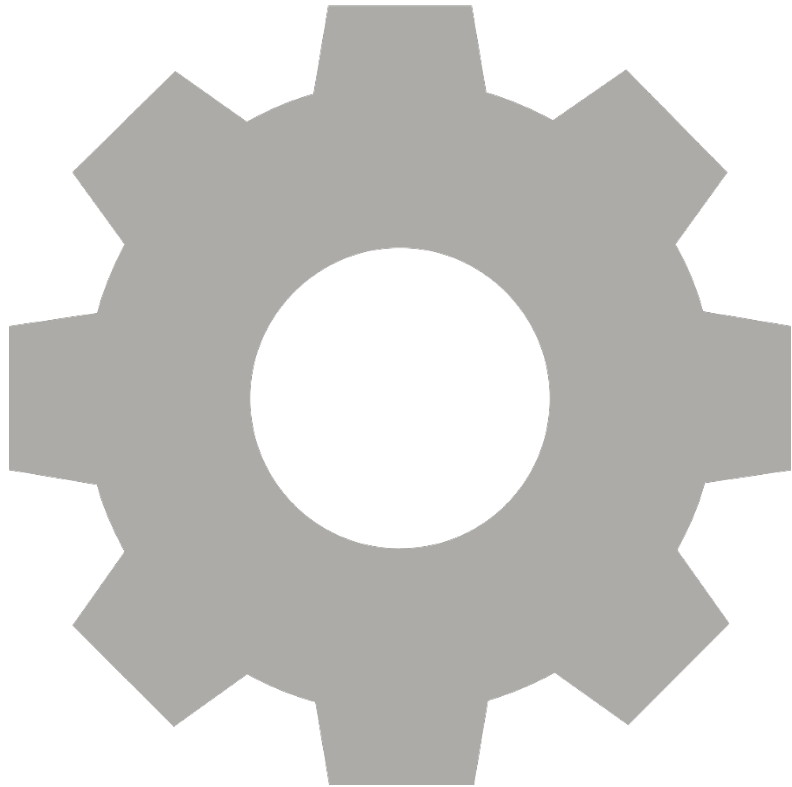
# Anark Open Standards for Technical Content

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	Content Standards	3D	Standards Orgs
Web	 		 
Document		 ISO 14739-1:2014	 



**Thank You**



## Supporting Slides



# Anark Core Platform Products

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**Anark Core Workstation:** Desktop software for defining server-side “recipes” for publishing automation workflows, and SME authoring for technical content generation.



**Anark Core Server:** Server-side publishing automation software for recipe-based technical content publishing, with a lightweight, agile integration architecture using REST services.



**Anark Core MBWeb:** Web content management software that hosts template-based technical content, with faceted search, content-aware DRM, and visual collaboration capabilities.



**Anark Core SDK:** Integration software development kit for connecting Anark Core software components to other enterprise data sources and workflow engines.



**Anark Core Reference Integration for *PLM*:** Reference integrations for Teamcenter, Windchill, ENOVIA, and SW PDM, for workflow-driven, recipe-based publishing with Anark Core Server.



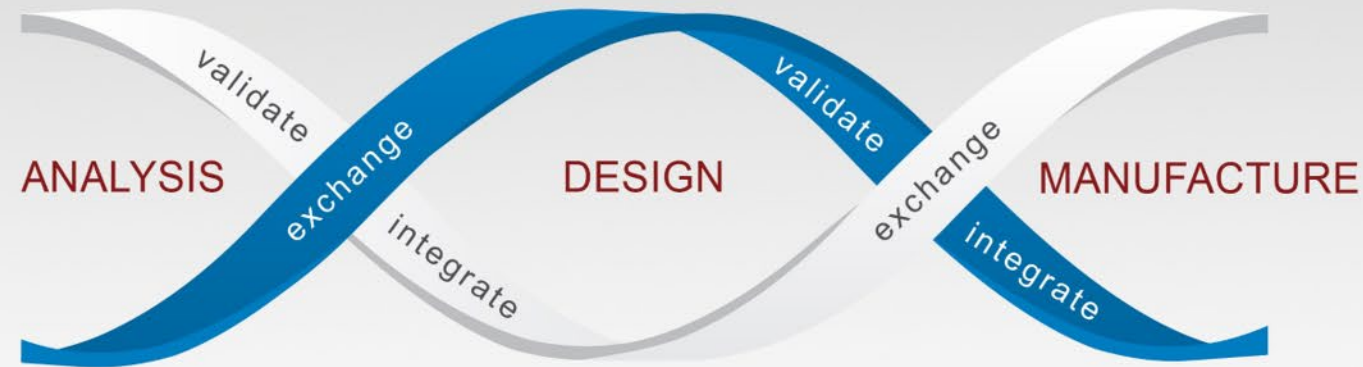
**Anark Core Integration for *MCAD*:** Native integrations for Creo, NX, CATIA, SolidWorks, and Inventor, available for Anark Core Workstation and Anark Core Server.

# ITI – CAD/CAM/CAE Interoperability Solutions

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## Enabling effective product data re-use across design and manufacturing engineering systems

***CAD Quality and Validation***  
***Supplier/OEM Data Exchange***  
***Legacy CAD Migration***  
***CAD to CAE Integration***  
***Design to Manufacturing Integration***



**Clearing obstacles for the Model Based Enterprise**



# PLM Solutions and Services

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**Integrate the CAD design, engineering part, ECR/ECO,  
and release to production processes**

***Integration***

***Migration***

***Consulting***



**Vendor Partnerships:**

**aras**  
ISV CERTIFIED  
Partner 2016

**DASSAULT  
SYSTEMES**

Solution  
Partner  
  
PLM

**SIEMENS**

PTC  
**PartnerAdvantage**  
SOFTWARE / Platinum

# CADIQ Products

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**CADIQ:** Desktop software for defining “job templates” for validation, and dedicated user usage for investigating differences between 3D models.



**CADIQ Server:** Server-side software, for on-demand and workflow driven validation and reporting driven by another automation platform such as PLM.



**CADIQ System Interfaces:** API based interfaces for CATIA, NX, Creo, SOLIDWORKS delivering OEM accuracy for evaluating native CAD graphical and semantic content.



**CADIQ File Interfaces:** Library based interfaces for PDF/PRC, STEP, JT, QIF and more, for evaluating ISO standard and industry neutral format content.



**CADIQ Reference Integration for *PLM*:** Reference integrations for Windchill, for user-driven and workflow-driven, recipe-based publishing with Anark Core Server.

# ITI – Corporate Partnerships

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## CAD, PLM and OEM Partnerships

