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End-to-End CAD Process

Raúl Rosa

April 16, 2019

Agenda

- Aras CAD Data Management Milestones
- State of Aras CAD Integration
- CAD Integration Options
- Design Process Support
- 3D Visualization & Collaboration
- CAD Change Process
- Future Options for Integration w/ CAD

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Aras CAD Data Management

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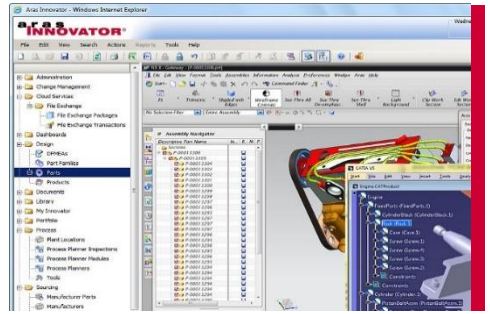
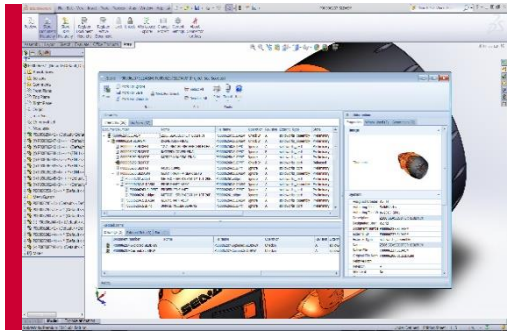
Aras CAD Data Management Milestones

Aras Innovator 9.3

Introduced

MCAD Integration support





CAD Partners

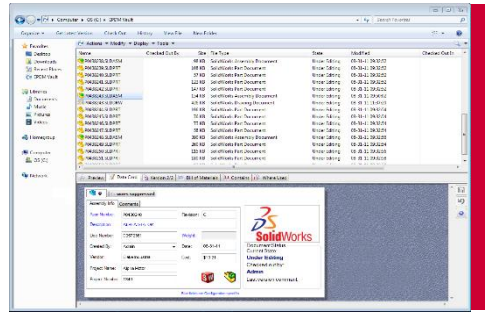
Started working with CAD Partners

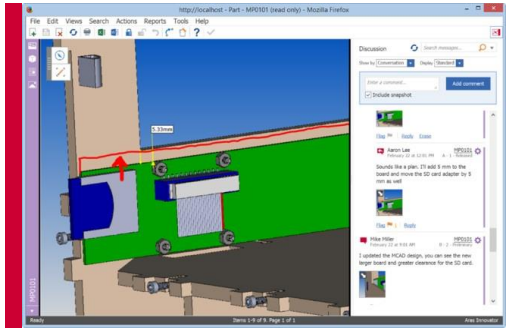
Aras Innovator 9.3

Aras Innovator 9.3

SW PDM Connector

Developed Aras SolidWorks PDM Connector.





Visual Collaboration

3D and PDF viewing with markups and discussions

Aras Innovator 11.0

Aras Innovator 12.0

Dynamic Product Navigation

Shattered representation with effectivity.

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State of Aras CAD Integration

- Integrated with major CAD Systems
  - Via Partner Connectors
- Key Features
  - Single integrated environment for managing multi-CAD data
  - Full CAD file Lifecycle Management
  - Part and BOM items extracted & synchronized with Aras PLM
  - CAD & Documents automatically linked to corresponding parts
  - Viewables automatically created for Visual Collaboration

CAD Integration Partners

XPLM

Essig PLM "formerly SofTech"

ITI International TechneGroup

T-Systems

FocusPlm Software engineering & Consulting

ELYSIUM

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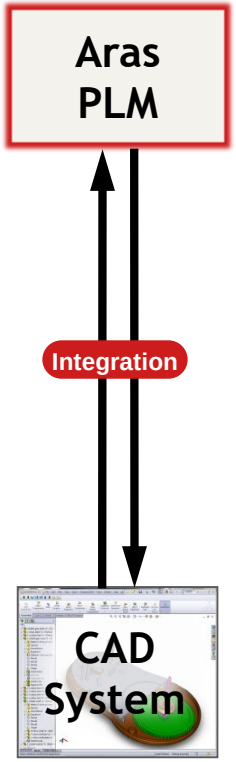
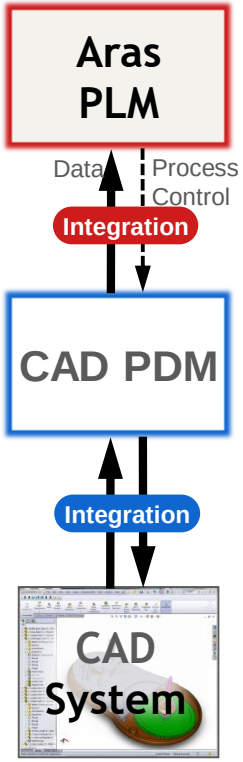
CAD Integration Options

Direct CAD Connector



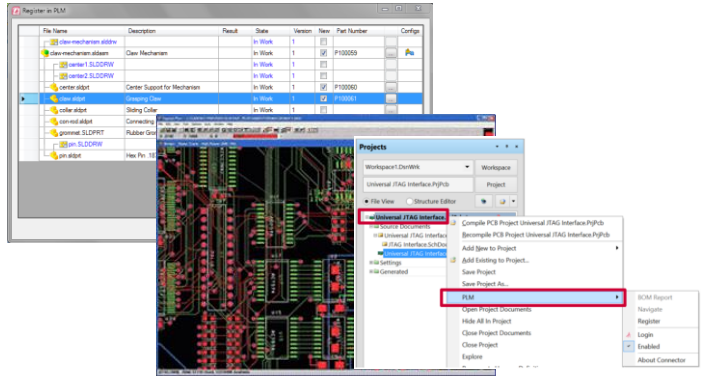
- CAD WIP
- CAD BOM
- Enterprise Change
- Enterprise BOM
- Release to Mfg.

CAD PDM Connector



- Enterprise Change
- Enterprise BOM
- Release to Mfg.

- CAD WIP
- CAD BOM



- SolidWorks PDM Professional
- Altium Vault
- Autodesk Vault

- Teamcenter
- Windchill
- Enovia

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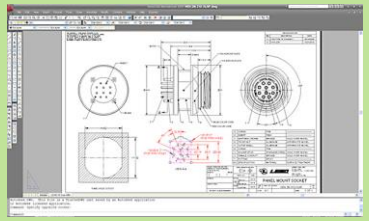
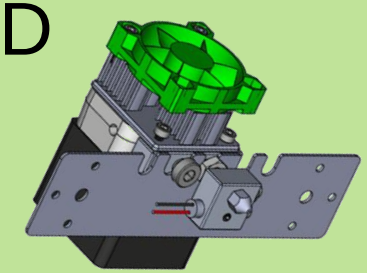
Full Suite of CAD Connectors

Mechanical CAD

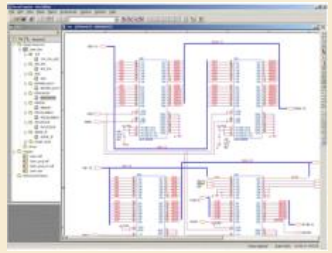


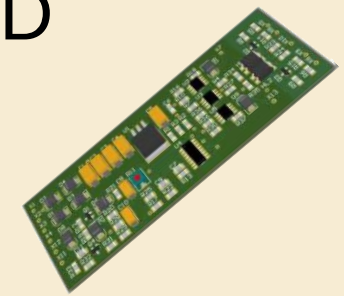


Connector
Connector
Connector

- Dassault CATIA V5/V6
- Dassault SolidWorks
- Siemens NX
- Siemens Solid Edge
- PTC Creo | Pro/ENGINEER
- Autodesk Inventor
- Autodesk AutoCAD

Electronic CAD

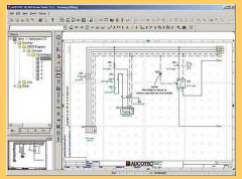


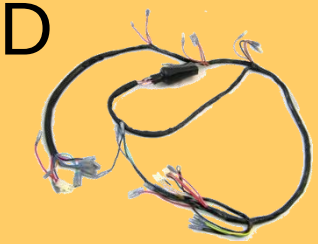


Connector
Connector
Connector

- Altium Designer
- Altium P-CAD
- Cadence Allegro
- Cadence OrCAD
- Mentor Board Architect
- Mentor Board Station
- Mentor Design Architect
- Mentor Xpedition
- Mentor PADS

Electrical CAD





Connector
Connector

- AUCOTEC Elcad
- AUCOTEC Engineering Base
- EPLAN Electric
- Autodesk AutoCAD ecscad
- Autodesk AutoCAD Electrical

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Design Process Support

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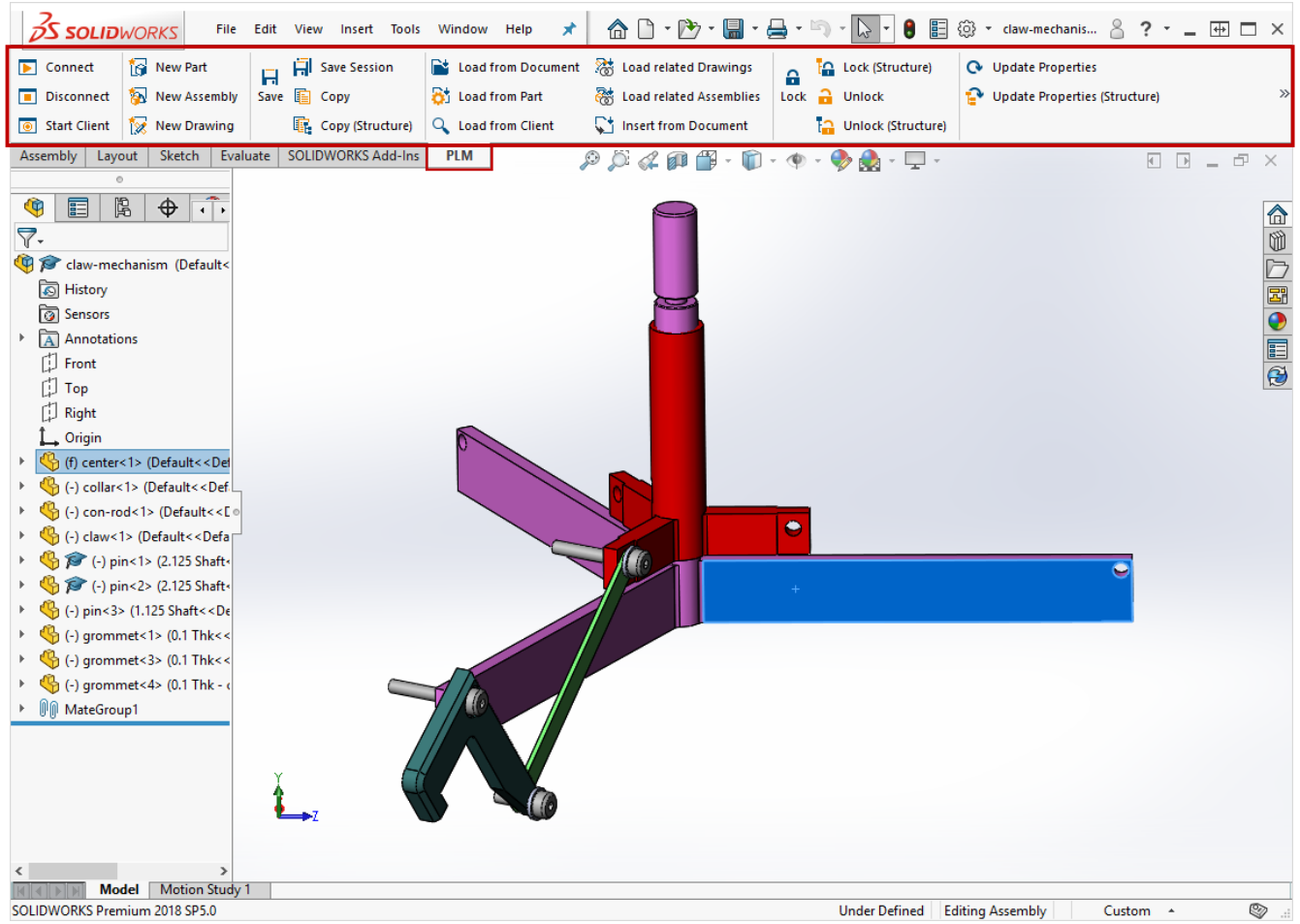
Non-Intrusive Integration w/ CAD

- Accessible within the CAD tool
- Access to PLM functions
  - Create
  - Store
  - Retrieve
- Focus on CAD



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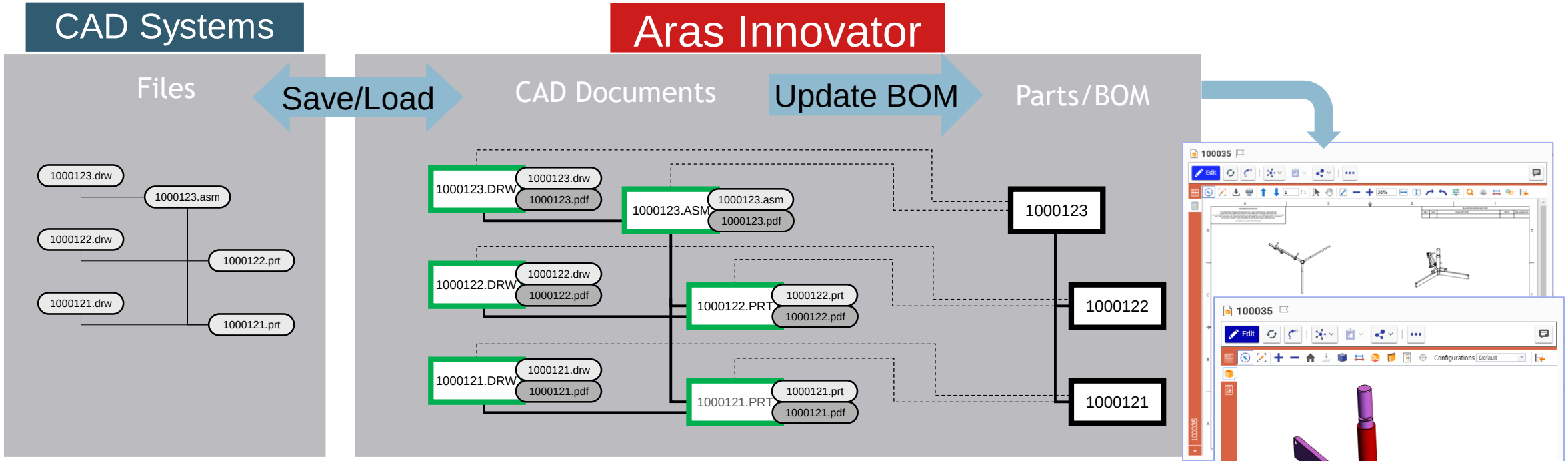
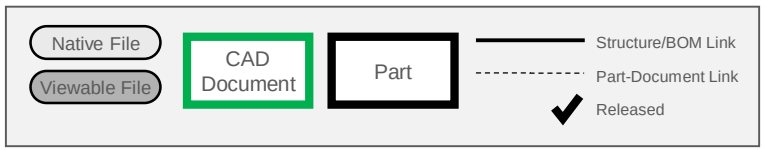
Aras CAD Data Management – Unified CAD Data Model



- Hierarchy of CAD system files understood, and extracted by CAD connectors
- CAD Documents created on a one-to-one basis with CAD files
- Native file attached to its CAD Document
- Viewable / neutral files generated automatically
- 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



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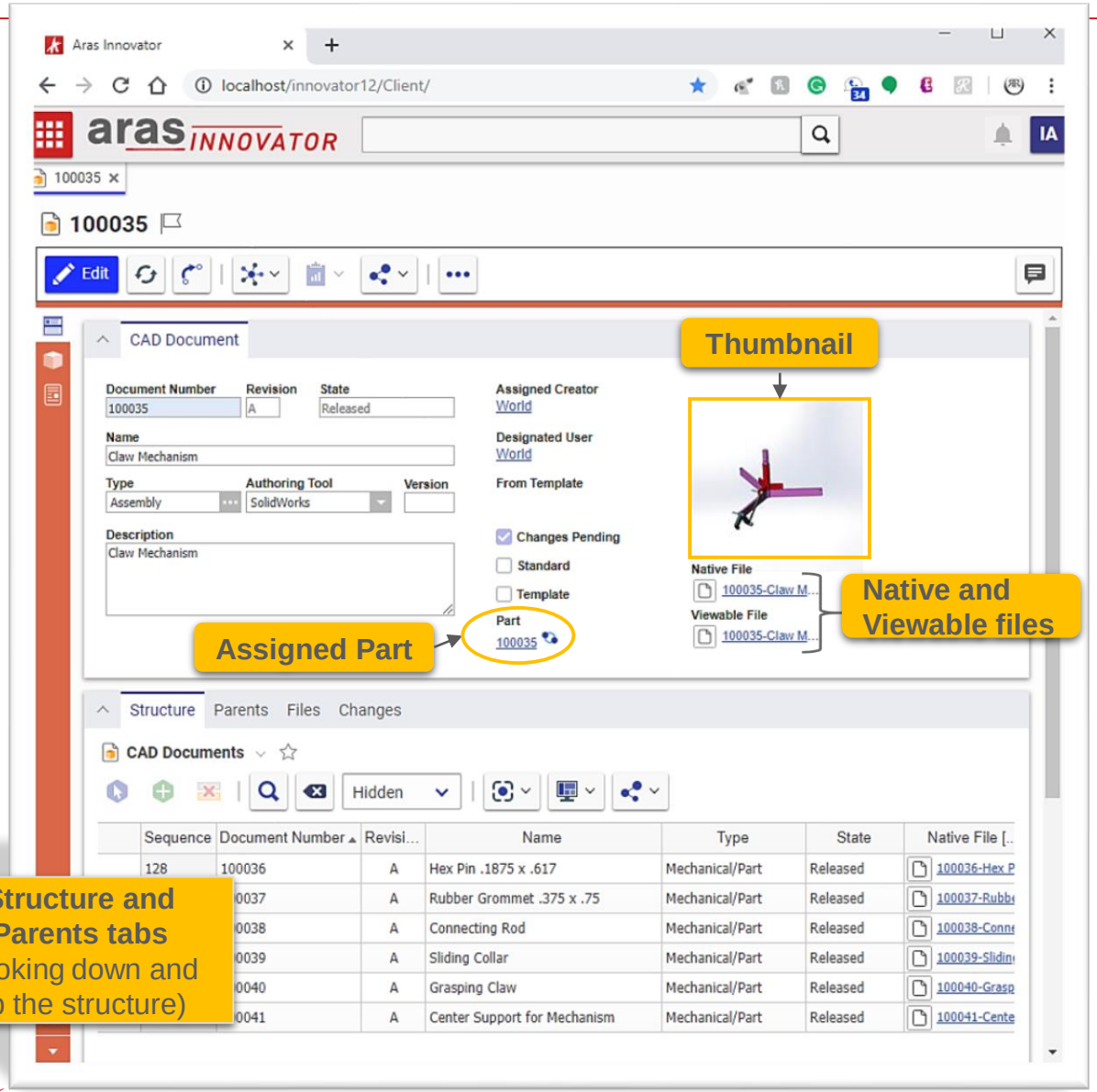
“CAD Document” Item in Aras



- CAD Document Item for each CAD file
- Native file attached to its CAD Document
- Viewable / neutral files generated automatically
- Part Item Assigned
- Structure and Parent Tabs
- Additional files can be attached to Files tab (CADFiles null relationship)

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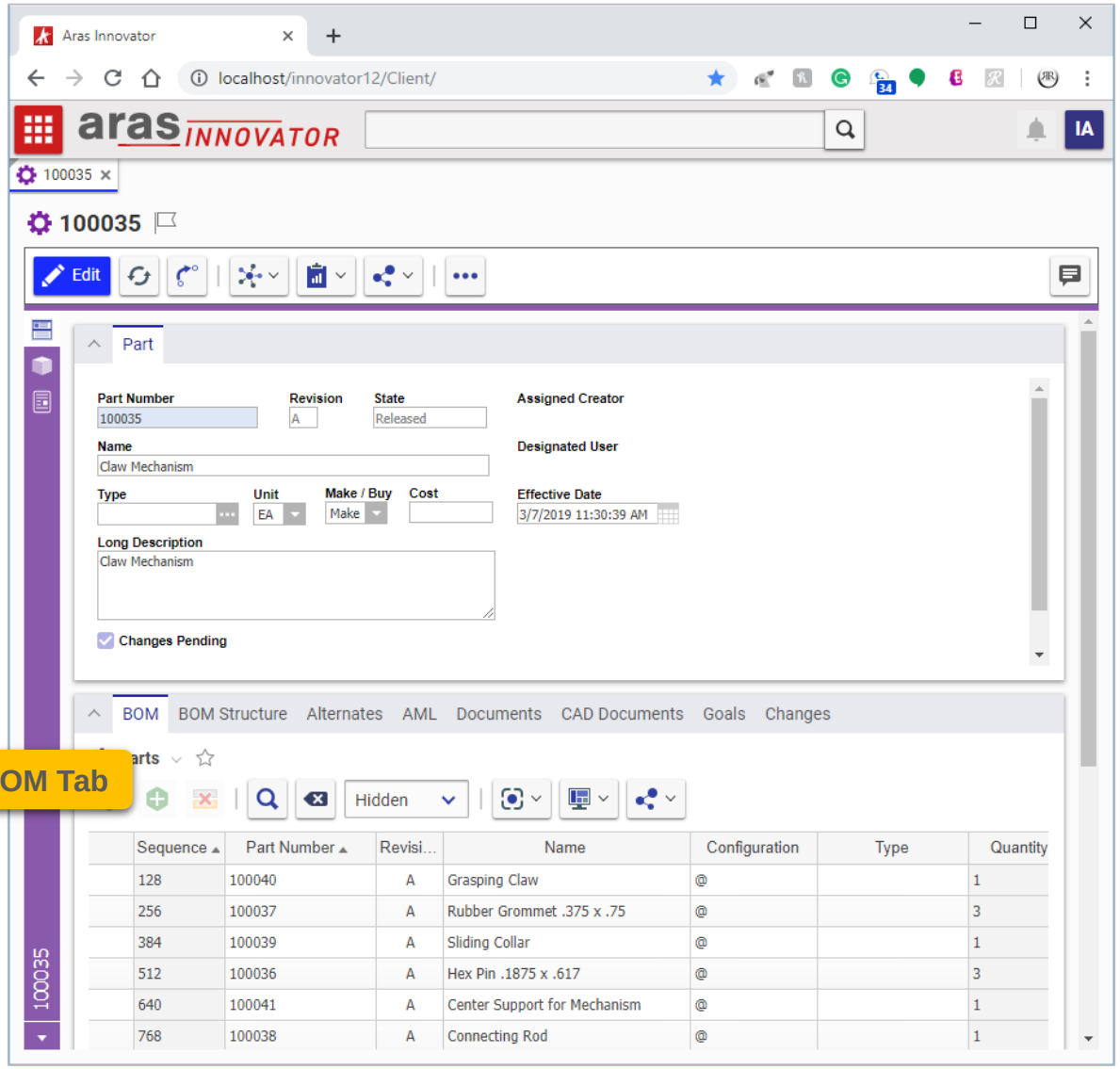
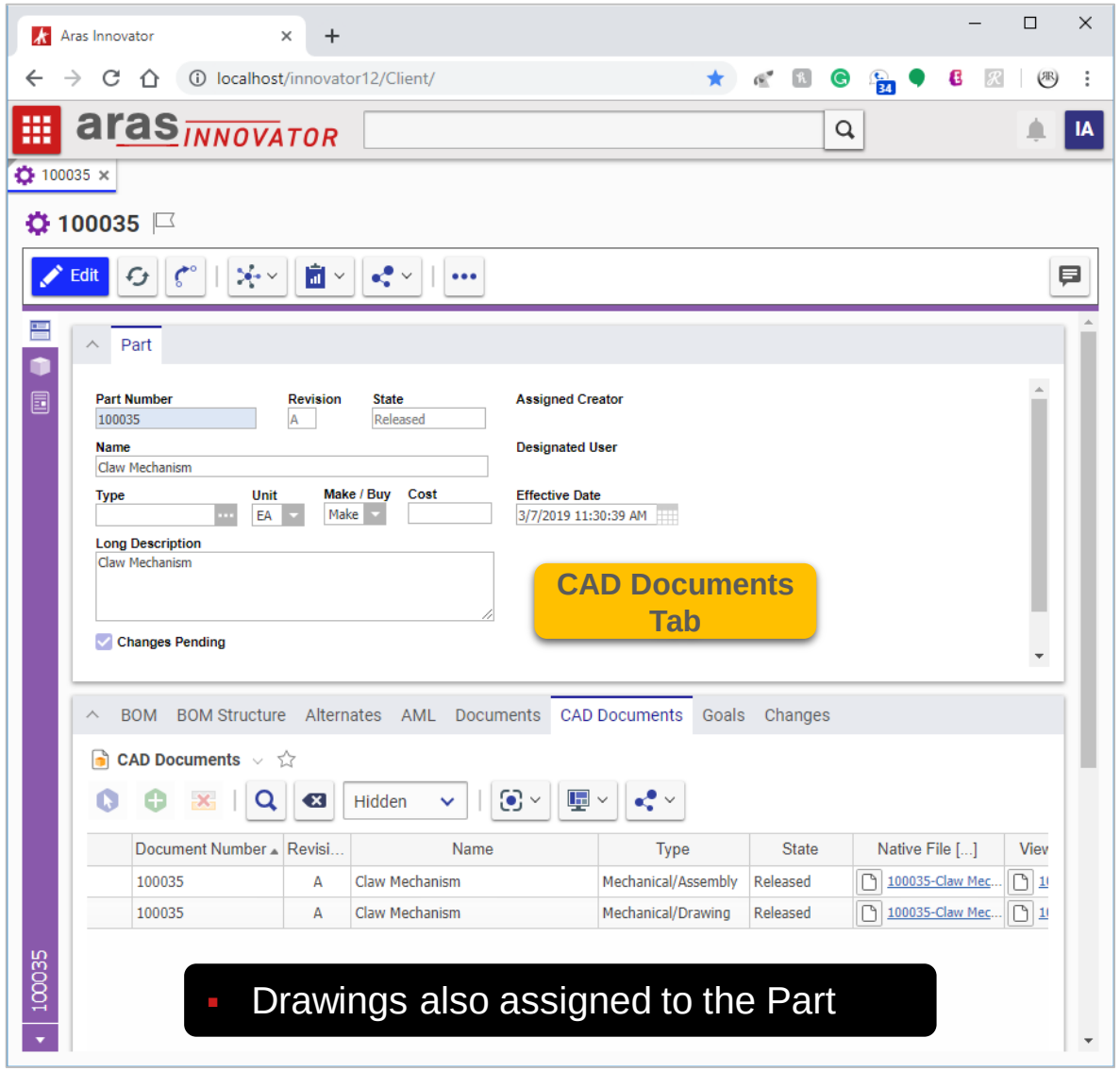
“Part” Item in Aras





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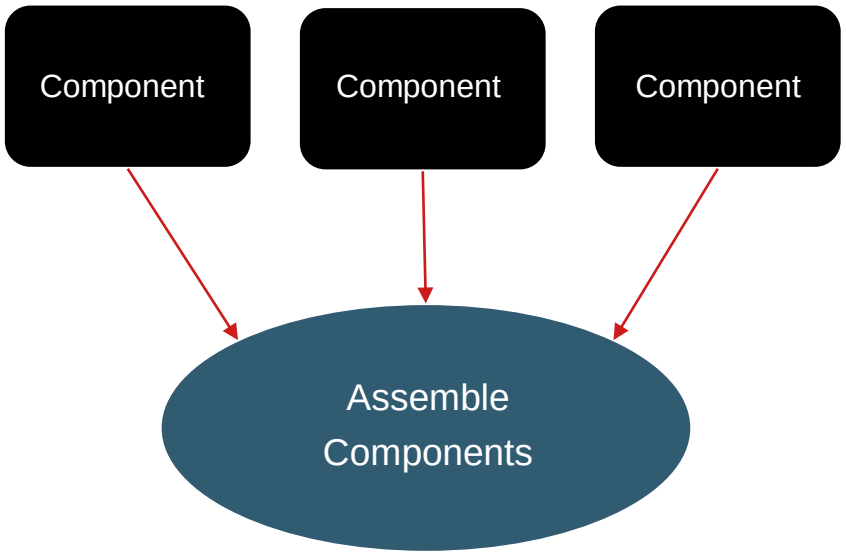
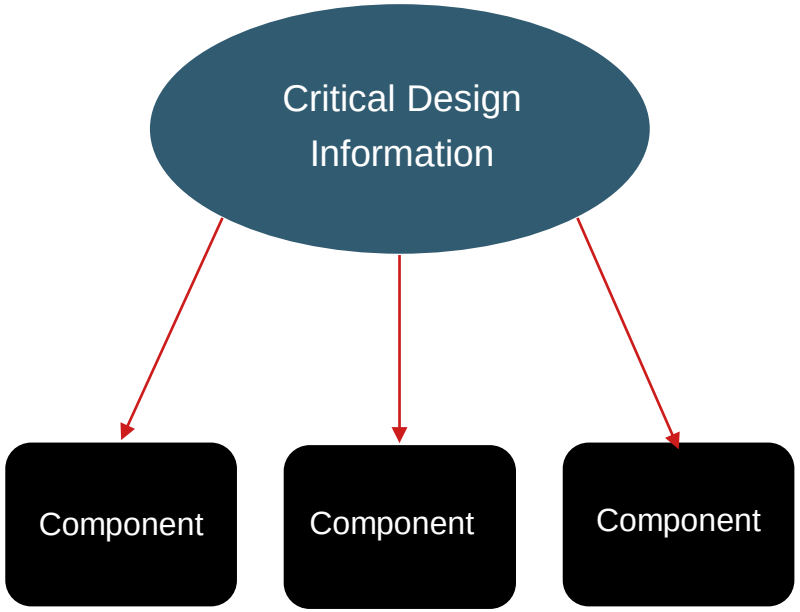
Design Process Support

Traditional Design Process (Bottom-Up)



Top-Down Design Process



- Aras Innovator supports both approaches

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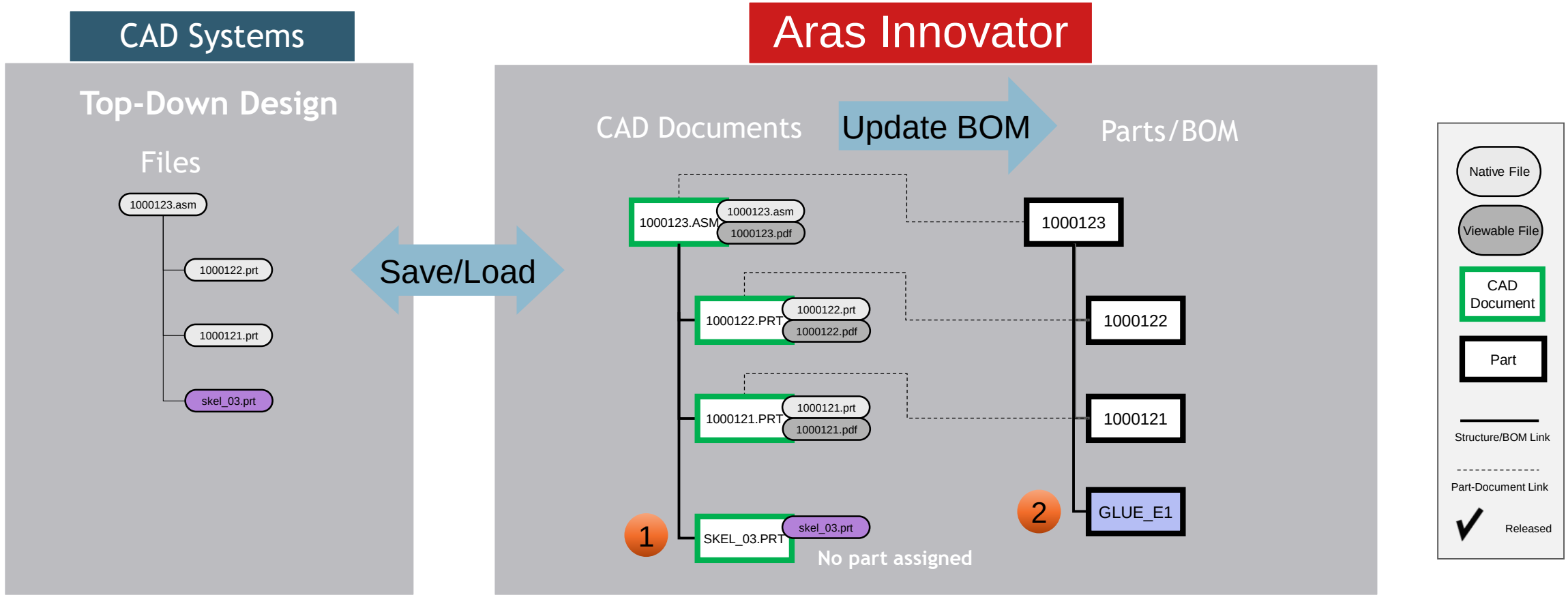
Top Down Design Support



- Layout / Skeleton
- Critical Component Location
- Design Intent

1. Filtering out of CAD-only components
2. Intelligent handling of BOM-only components
   - Ability for Independent Part Item creation and association

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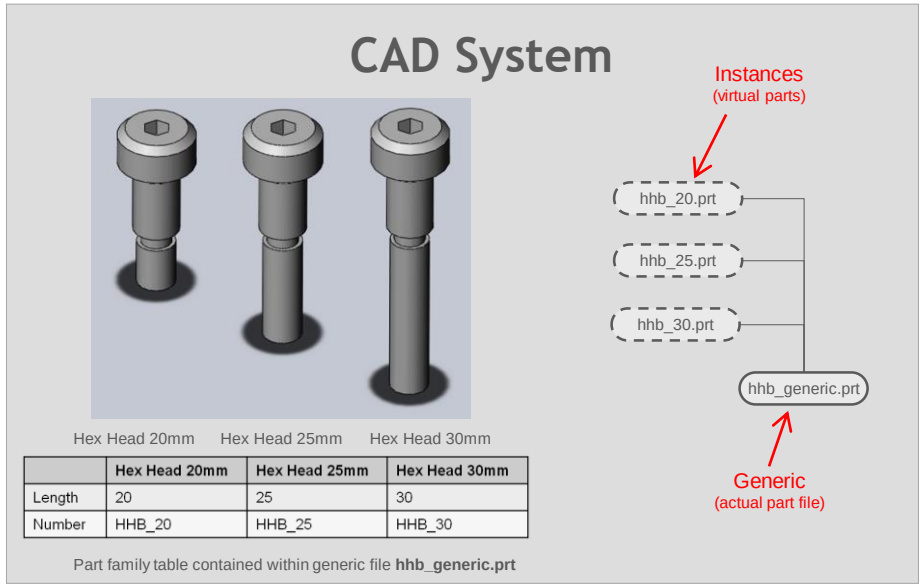
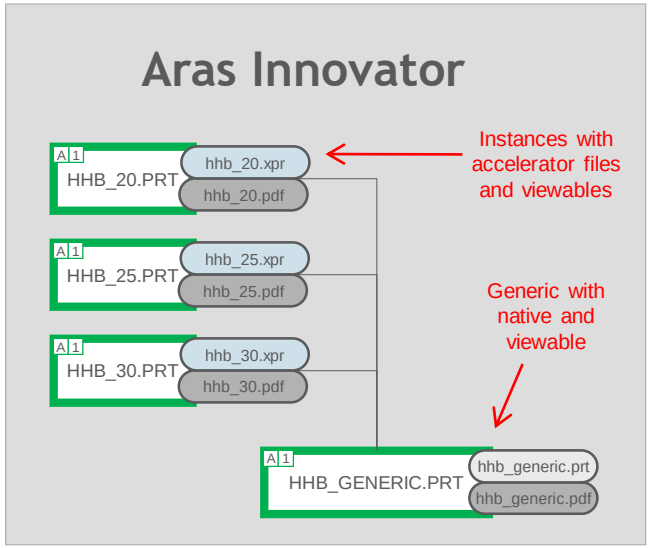
Design Process Support Tools

- Part Family Management :
  1. “Pro/E Family Table” style
     - CAD Documents created for the Generic and for each Instance
     - Only the Generic contains a native CAD file; instances contain accelerator files
     - One-to-one relationship between CAD Document and Part item
  2. “SolidWorks Configuration” style
     - CAD Document created only for the actual CAD file
     - One-to-many relationship between CAD Document and Part items, one for each configuration



	Hex Head 20mm	Hex Head 25mm	Hex Head 30mm
Length	20	25	30
Number	HHB_20	HHB_25	HHB_30



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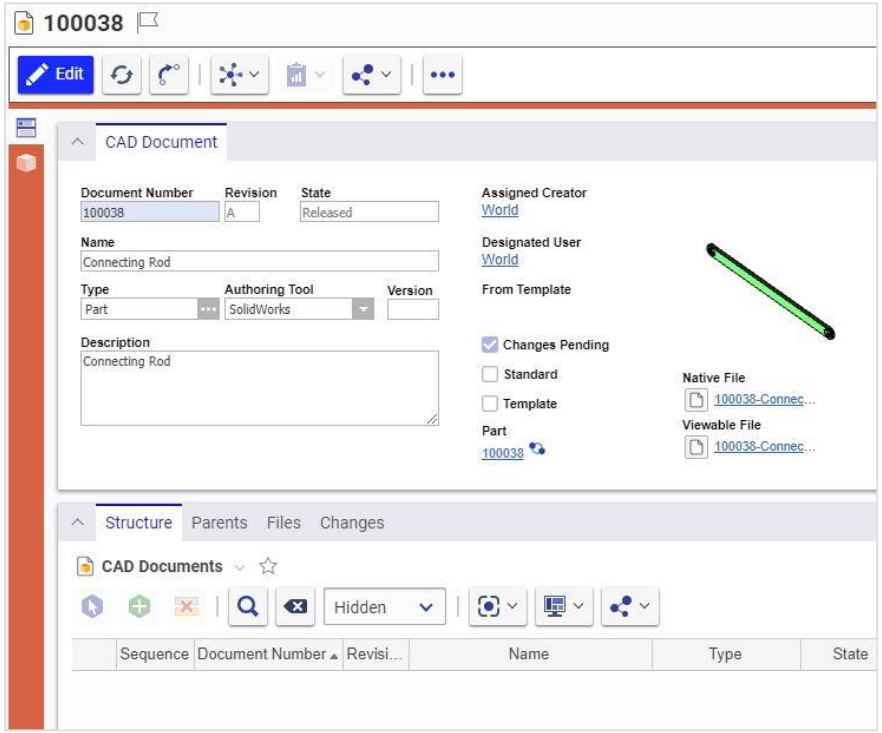
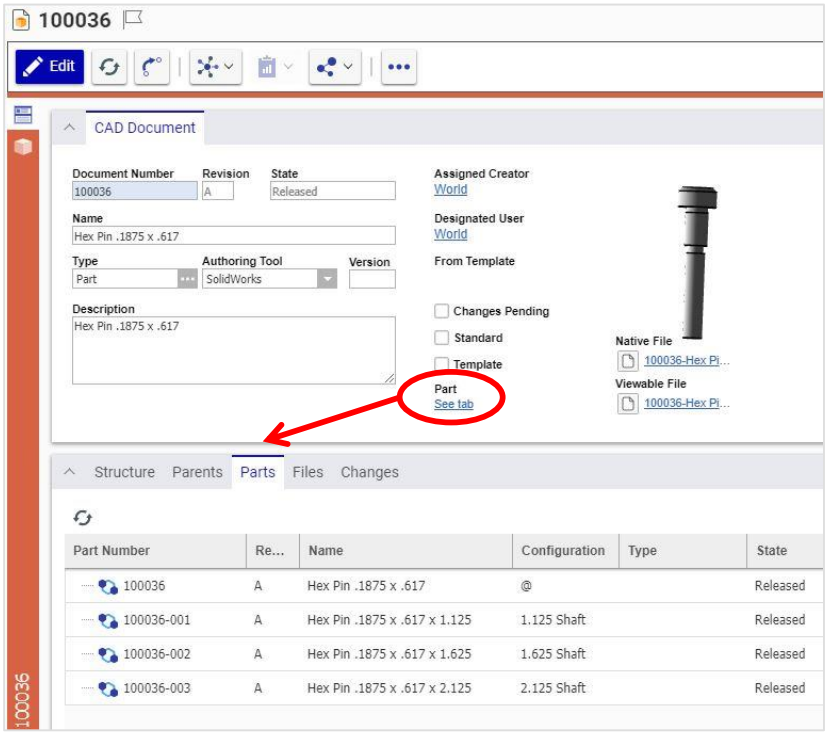
Support for Multiple Parts

- Normally, the Part CAD relationship is 1:1
- For special cases like SolidWorks configurations, 1:n mapping is possible (multiple Parts for one CAD Document)
- If more than one relationship is detected, the form style automatically changes to show a Parts tab instead of a single Part field

Case 1: For 1-1 Mapping (normal case)



Case 2: For 1-n Mapping (special cases)



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Design Process Support Tools cont.

- Structure Resolutions
  - As Saved
  - Released
  - Or Current
- Bi-directional Intelligent Property Mapping
  - CAD File to CAD Document Item
  - CAD Document to Part Item
- CAD Start Part / Template management

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Enterprise Visualization & Collaboration

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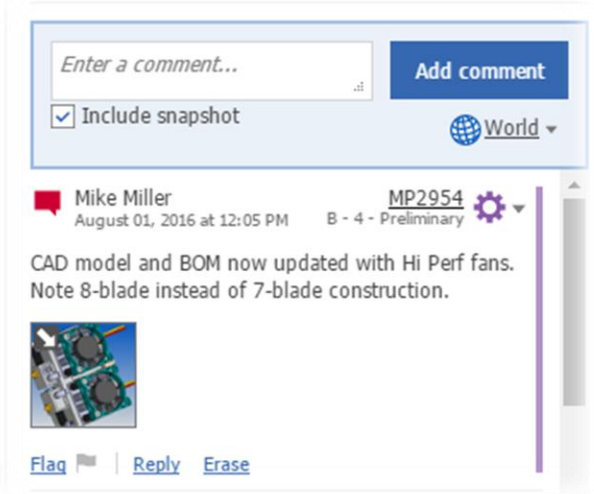
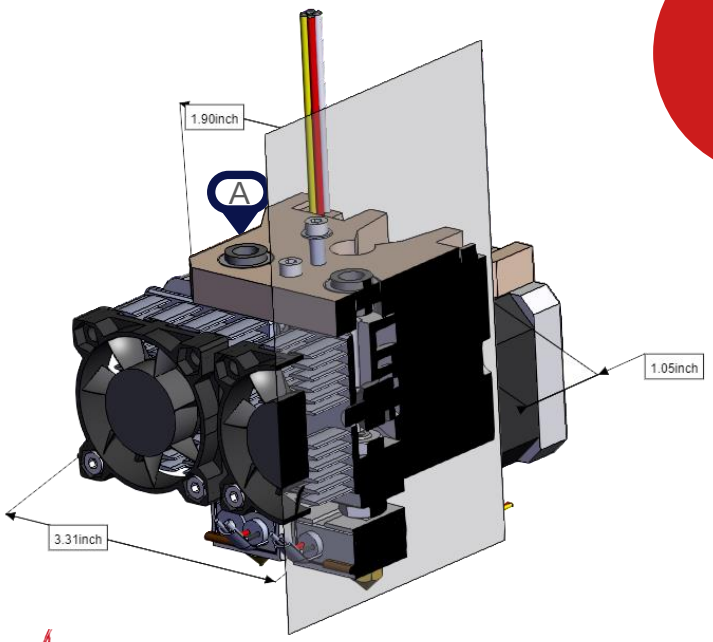
3D Visualization Capabilities

Web Viewer

Markup & Annotation



Discussion Threads



Ad-hoc Measurement

View Manipulation

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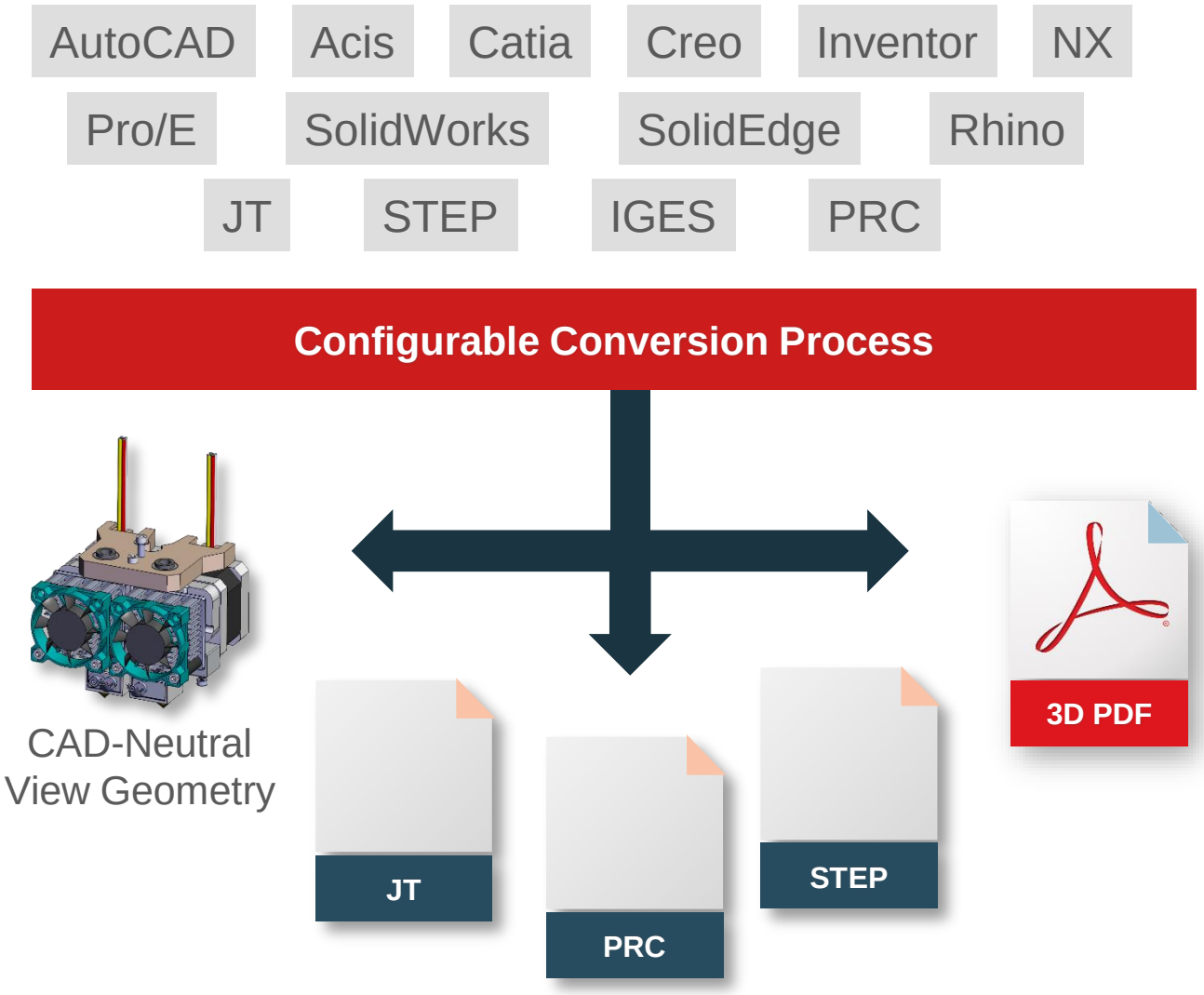
Current Capabilities – cad integration

CAD Integration

- Automated conversion process
- CAD-Neutral Views
- Standard exchange/archival formats (JT, STEP, PRC)
- 3D PDF



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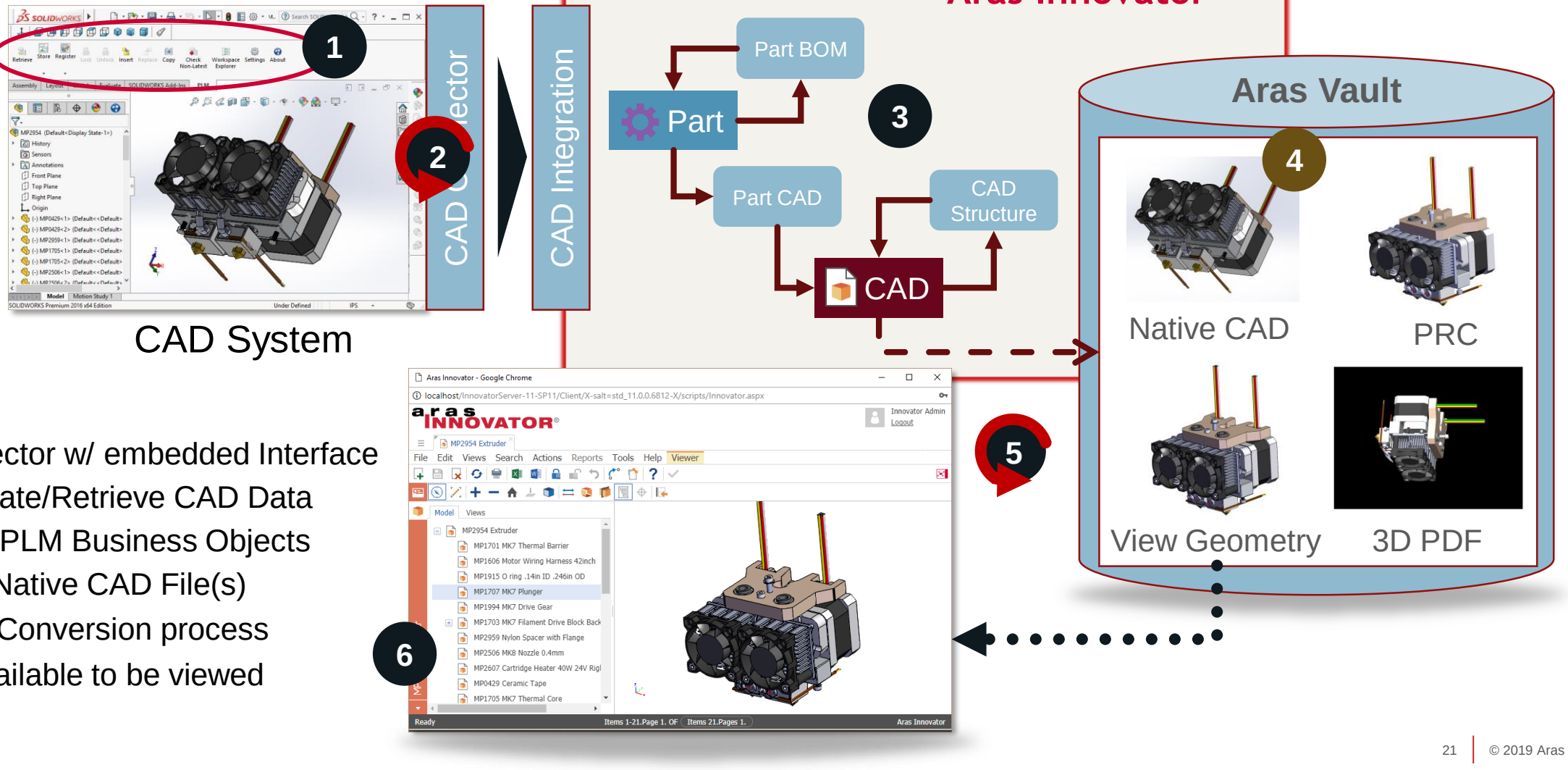
CAD Conversion Capabilities

CAD Conversion



1. CAD Connector w/ embedded Interface
2. Create/Update/Retrieve CAD Data
3. Creation of PLM Business Objects
4. Storage of Native CAD File(s)
5. Automated Conversion process
6. 3D Data available to be viewed

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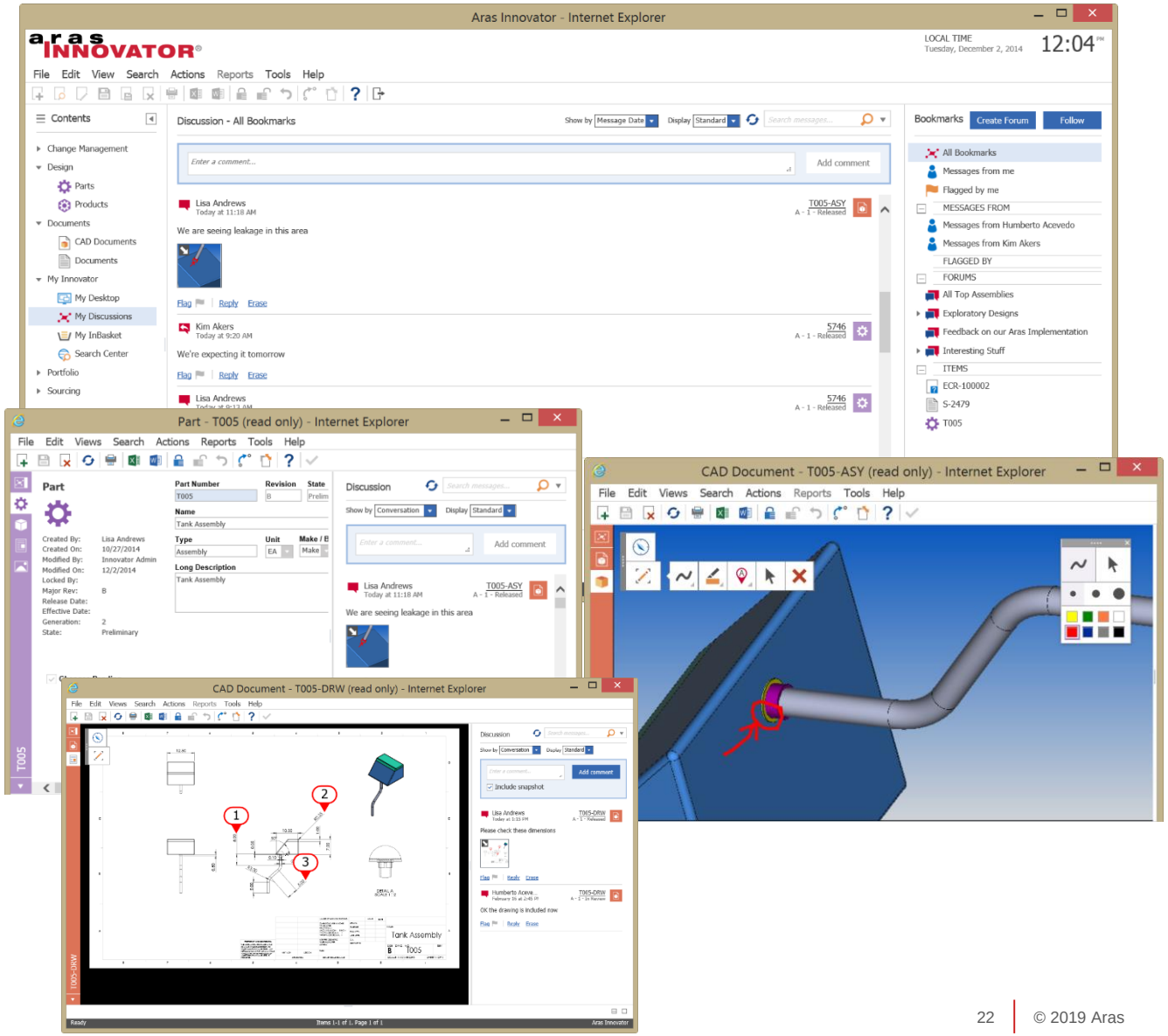
Aras Visual Collaboration

- **Easily see your product content**, including:
  - 3D Models
  - Drawings, Schematics
  - Office Documents
  - Images, Photos
- **Create file markup** which is linked with text **comments** into a **discussion thread** visible to other users
- Pure HTML5, no plugins
- No cost to Aras subscribers



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Change Management

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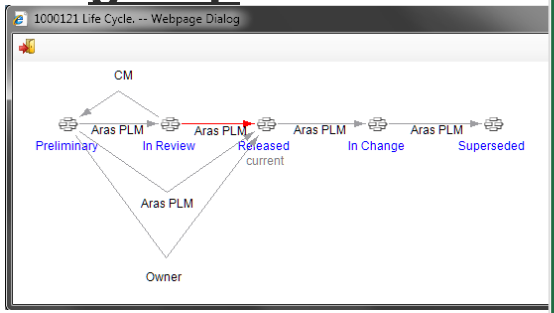
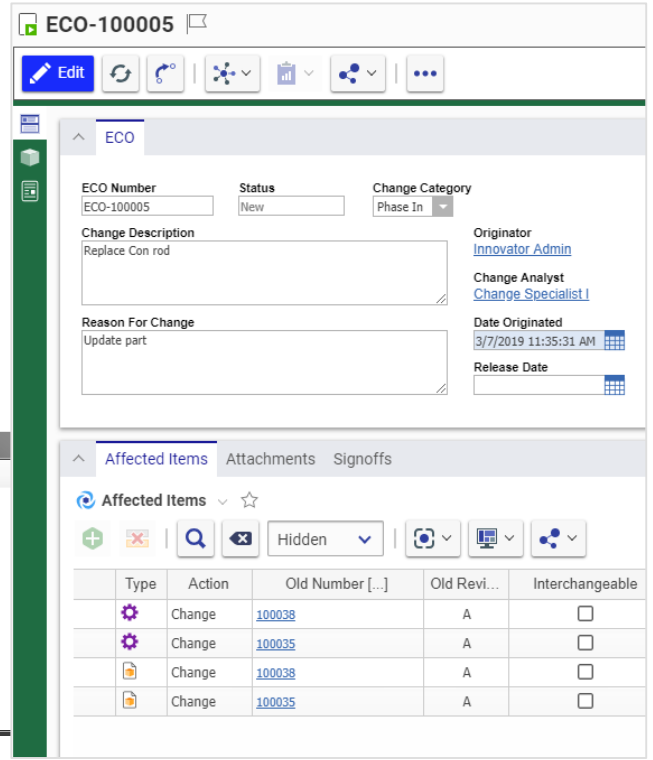
CAD Change Process

- Variety of options for CAD change management
  - Full CMII process using ECRs and ECNs
  - Simple ECO process
  - Express ECO/DCO process
- Change Items (ECNs, ECOs, DCOs, etc.) managed in **group**
  - As Affected Items
  - Notification and approval handled simultaneously
- Lifecycles and Revisioning
  - CAD Documents have an associated Life Cycle definition
  - CAD Documents support both Manual and Change-based (ECO) Revisioning
- CAD Connectors obeys the permission driven by Life Cycle states, resulting from change process





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Benefits of Aras CAD Management

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Aras CAD Management Benefits

- ✓ Standard, High-Performance CAD Integration Platform
- ✓ Full set of Connectors for all popular MCAD and ECAD tools
- ✓ Enterprise CAD data access with visual collaboration
- ✓ Clear data ownership by discipline
- ✓ BOM update process which includes automation from CAD
- ✓ Unified Part / CAD change process across disciplines
- ✓ Advanced design management capabilities
- ✓ Single system for all engineering data

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Ideas for the Future

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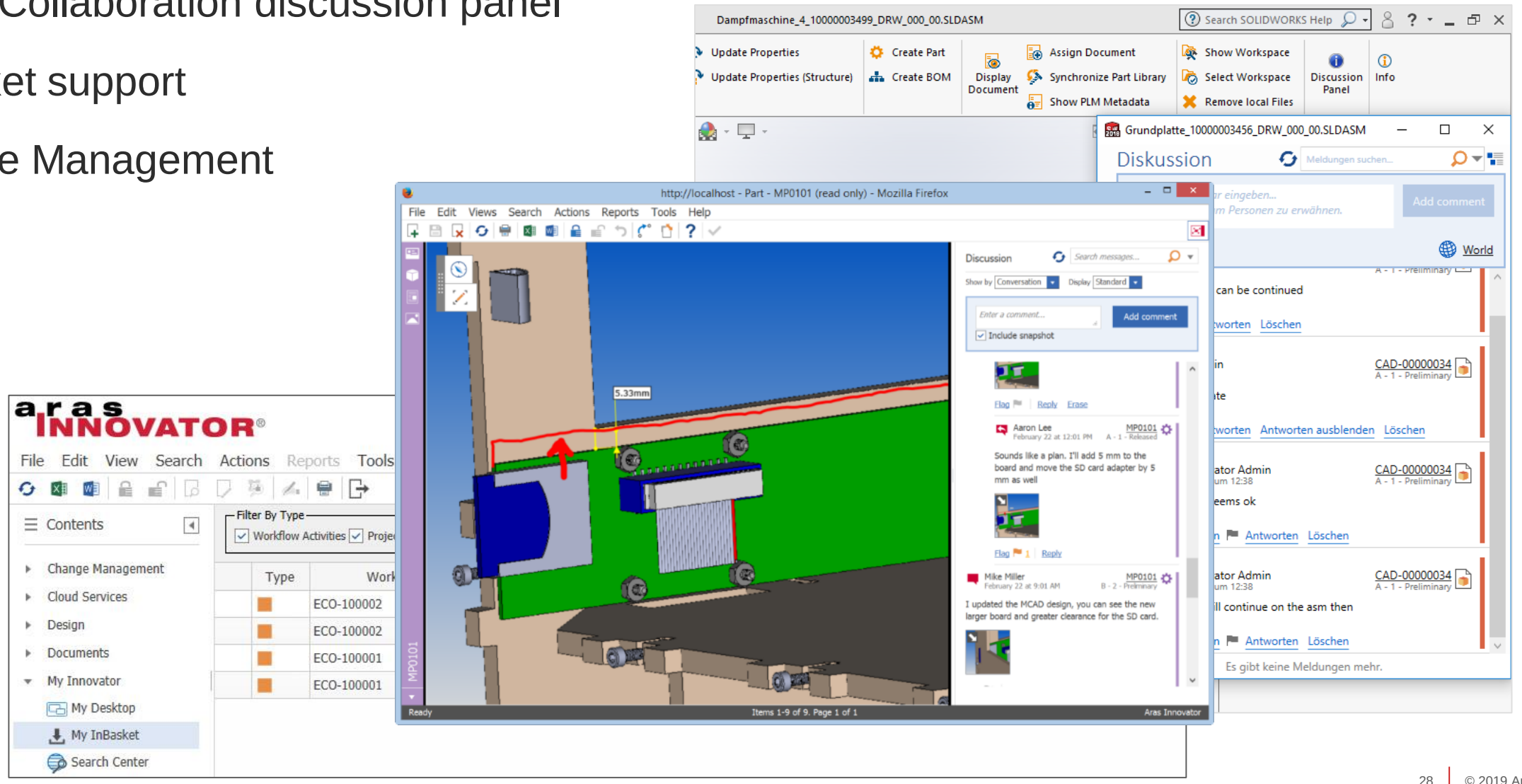
Future Options for Integration w/ CAD

- Visual Collaboration discussion panel
- InBasket support
- Change Management



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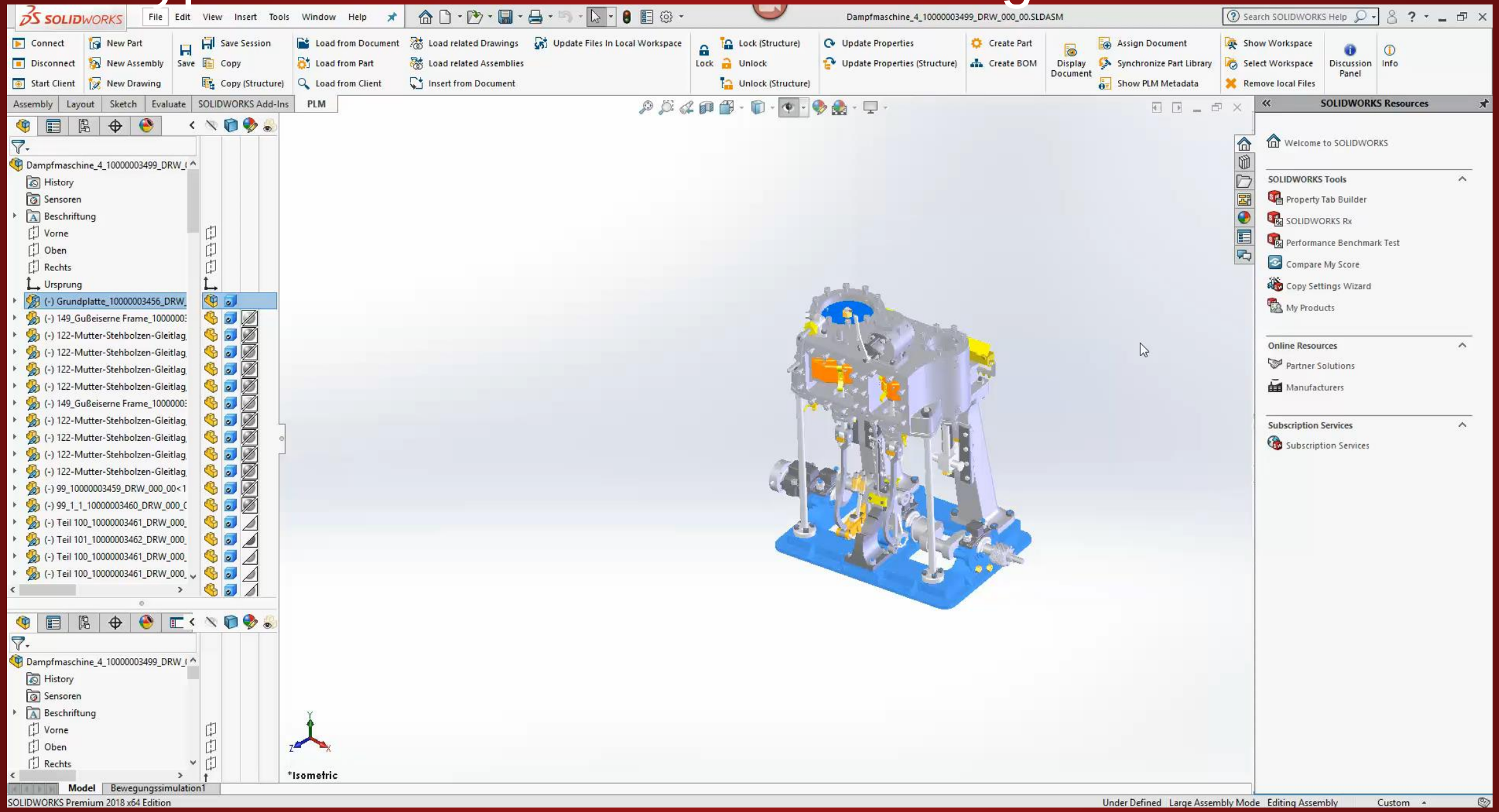
Prototype of Visual Collaboration Integrated in CAD



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Let’s keep the conversation going…

Thank You

Raúl Rosa

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