

BEDIFFERENT

ACE

Copenhagen



Traditional PLM

VS.

The Alternative Approaches



Movie: PDM vs. PLM - the Battle of Monsters

Monolithic?

Extend?

Complement?

Promoted Control Hierarchy?



Session Topics

- ▶ Traditional PLM Approach
- ▶ Alternate PLM Approaches
- ▶ Company Examples
- ▶ PLM Approach Summary



BE DIFFERENT

Traditional PLM

Observations and Definitions



- ▶ **This is the 2-System view of the world**
 - ERP is the master and then PLM for everything else
 - The goal is 1 system for CAD, Workflow, BOM, Quality, Manufacturing, Phase-Gate, Document Management,
- ▶ **But historically this normally just means PDM, because the focus is 3D CAD Centric**
 - High effort and high investment have been required to develop automation tools around the legacy high-end 3D CAD Apps
- ▶ **Obvious Result: company can have only 1 solution – “brand loyalty” with the CAD vendor**

Traditional PLM

Observations and Definitions



- ▶ **CAD focused PLM means that only 10% of employees are directly involved with / impacted by the PLM**
- ▶ **CAD-BOM is forced to be the E-BOM. means you are modeling parts in 3D that are a waste of time**
- ▶ **Drawing centric world – we use CAD to create a Drawing**
- ▶ **Difficult to take 3D CAD data models, rules, user interfaces, etc. to other problems**
- ▶ **Normally have a queue of departments waiting for their processes to be automated**

Traditional PLM

What drives this Approach?



- ▶ CIO is driving system rationalization; want less databases, less vendors, less complexity
- ▶ 3D systems such as Dassault V6 are becoming more closed; it may not be possible to chose another path
- ▶ 3D CAD vendors are a powerful political influence
- ▶ We already spent so much... can't stop



- ▶ CIO is busy with ERP, or Social, or CRM and tired of engineering & manufacturing fights

- ▶ **Products are changing (more change, more faster!)**
 - More complex (variants)
 - Increasing electronics and software content

- ▶ **Increasing compliance requirements**

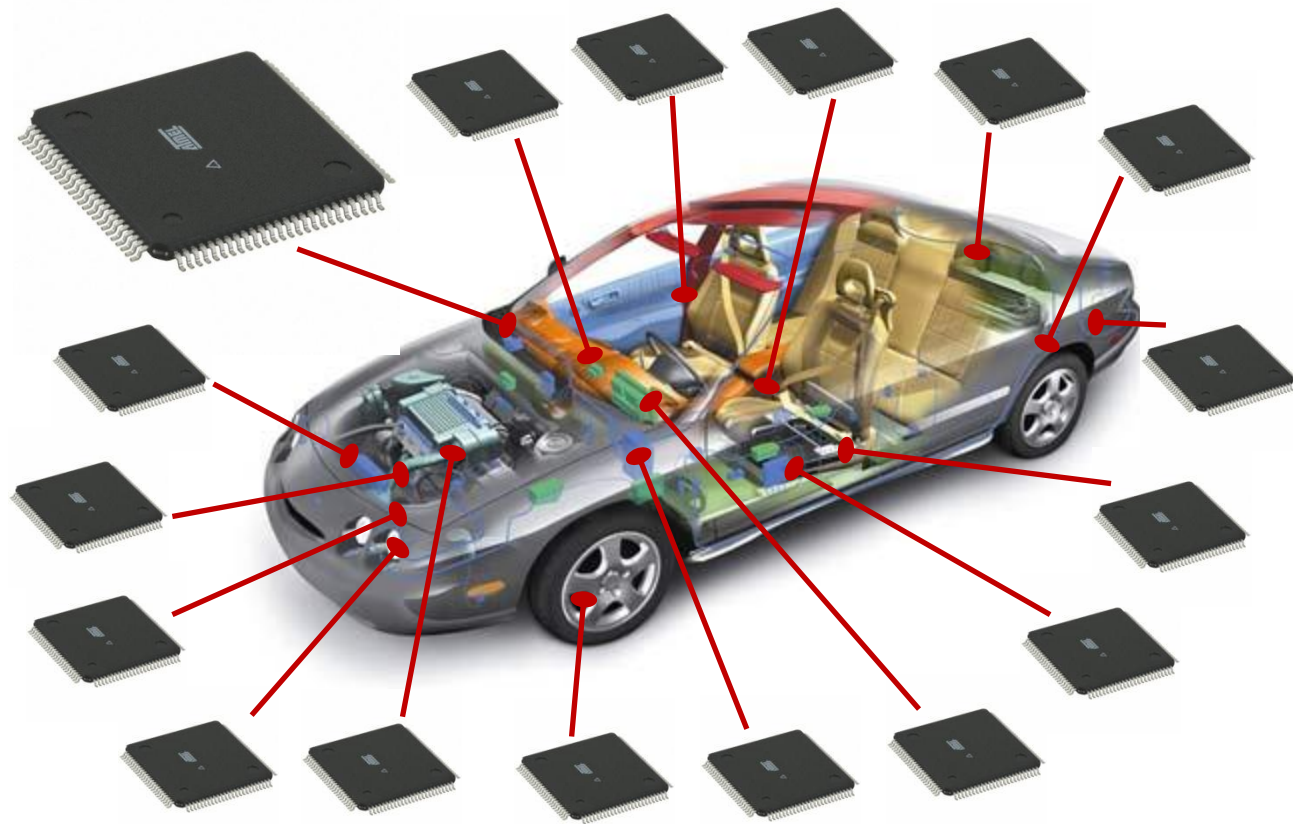
- ▶ **Global dominance of a brand is now short-lived**
 - Business processes: time-to-market, supply-chain, quality, manufacturing, sales, marketing,... are more important than the exact spline on the curve of a single bracket.

New PLM Environment

- ▶ F-22 Raptor = 1.7 million lines of code
- ▶ F-35 Joint Strike Fighter = 5.7 million lines of code
- ▶ 787 Dreamliner = 6.5 million lines

- ▶ Today's Luxury Automobile

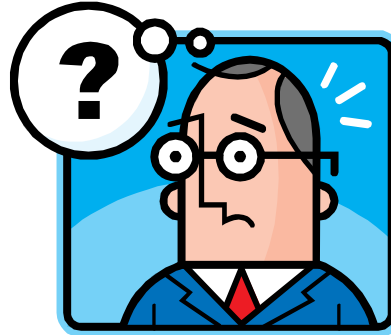
- 30-50+ chips
- >100 million lines of code
- More than 30,000 parts overall



sources spectrum.ieee.org/green-tech/advanced-cars/this-car-runs-on-code

Alternative PLM Approach

Observations and Definitions



Alternative PLM Approach

Observations and Definitions



- ▶ **We do not need a monolithic PDM/PLM that must do everything**

- ▶ **Could be a federated system view of the world**
 - Long term plan is a SOAP/XML (SOA Web Services) framework with a Master Data Model allowing many best-in-class point applications to be integrated

- ▶ **Could be a phased strategy towards a single system**
 - Don't risk replacing all systems at one time
 - Multi-year rollouts with 30-60-90 day intervals of new functionality added to the enterprise platform – slowly replace

Alternative PLM Approach

Observations and Definitions



- ▶ **Item Centric vs. Drawing Centric - many Items do not have 3D representations**
- ▶ **Content is EDA, SW, TechPubs, and sometimes 3D CAD**
- ▶ **Total user community for the PLM includes non-engineers, business users, supply chain partners, customers, ...**
- ▶ **The discussion is about Supply-Chain, Manufacturing, Quality, Systems Engineering, Compliance, but not which CAD system to use**
- ▶ **The 3D CAD vendor no longer sets the enterprise business software strategy**

Alternative PLM Approach

What drives this Approach?



- ▶ **Mergers and the consumers driving change ever faster**
- ▶ **Availability of SOA Frameworks – creates flexibility**
- ▶ **New IT tools allow rapid deployment of Apps**
- ▶ **Sometimes CAD is not the biggest problem**
- ▶ **Big differences between CAD and Enterprise are real**
 - **Business rules**
 - **Pace of change**
 - **Data models**



Alternative PLM Approach

What drives this Approach?



▶ **We Can Not Wait Anymore**

Real World Scenarios



- ▶ **Look at some real-world scenarios**
- ▶ **Then summarize what the different approaches might be**

Real World Scenarios



- ▶ Spin-out of life sciences products division from Kodak --\$3B revenue
- ▶ Inherited from Kodak IT: TeamCenter for CAD management and MatrixOne for enterprise PLM
- ▶ 2010 replaced the enterprise PLM with Aras, but continued using TeamCenter for CAD
- ▶ Why
 - Business level problems more urgent to solve
 - Changing CAD management was viewed as too much risk
 - Will revisit the CAD management decision after PLM rollout is past phase 3.
 - CAD situation also changing due to acquisitions. Started with NX, now have Pro/E, SolidWorks, and Mentor.



Real World Scenarios

- ▶ **Manufacturer of swage fittings for gas lines \$1B revenues**
- ▶ **Company reputation and market position is highest quality swage fittings - Quality is Hi-Priority !**
- ▶ **SmarTeam for CAD management for many, many years, but not able to get past CAD file check-in / check-out**
- ▶ **Quality group tired of waiting, and used Aras to create a “Quality PLM System” – no formal integration to PDM.**
 - **Quality BOM**
 - **FMEA**
 - **Control Plan**

Swagelok[®]



Real World Scenarios

- ▶ 2 Business Units – High-End Printers vs. Copiers
- ▶ Internal competition on PLM strategies



- ▶ East Coast (copiers) uses CAD File management in TeamCenter
- ▶ West Coast (printers) uses CAD File management in WindChill
- ▶ Both tried to push the PDM system to enterprise level
- ▶ Printer business is faster growing, higher margins, needs to be more nimble → Unlocked their PLM project to move 10x faster by deciding to split the architecture into PDM and PLM. Federated approach. Rapidly rolled out Quality, BOM, ECO, and Compliance
- ▶ East Coast still stuck. Bugged down by CAD-driven behaviors, data models, and thinking

Real World Scenarios



- ▶ **Transmission Manufacturer**
- ▶ **Auto transmissions are increasingly electronic & software**
- ▶ **CAD File management with TeamCenter & Pro/IntraLink**
- ▶ **PLM delayed by lack of flexibility and functionality**

- ▶ **Chose to use a separate PLM system to gain momentum and postpone the CAD PDM change decision**
 - Aras for enterprise PLM: EBOM, ALM, ECO, Quality (CAPA)
 - After 2+ years, Enterprise PLM business issues are stabilized, and now starting to move CAD management out of legacy PDM into the PLM with direct integrations



Real World Scenarios



- ▶ **CAD management in legacy Enovia PDM system**
- ▶ **High-level of CAD automation implemented – cannot change**
- ▶ **Not possible to implement BOM management in Enovia**
 - Drawing Centric vs. Item Centric
 - Different users, different data models, different rules
- ▶ **CIO chose to build a promoted control hierarchy:**
 - Enovia produces a CAD BOM (document structure)
 - Aras for enterprise: EBOM, MBOM, ABOM authoring, change management with serial effectivity and BOM Audit / Validation



Alternative PLM Approach Scenarios

▶ Extend

- Need minimum additional functionality above current systems (typically workflow or phase-gate processes)
- Use federation to allow PLM processes to reference PDM objects

XEROX

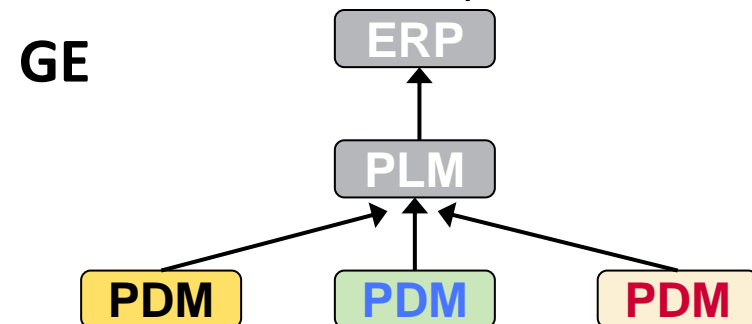
▶ Complement

- Not 3D CAD centric, Enterprise PLM has no CAD content. Like **Swagelok** with Quality PLM or **Freudenberg** with APQP

▶ Promoted Control / Hierarchy

- Advanced CAD automation (PDM) from CAD Vendor cannot be replaced
- CAD data is critical to business
- Product definition is more than CAD
- Lifecycle Promote data up the Hierarchy

▶ Incremental Phase Rollout



What's Next?

- ▶ **Open Discussion at the Workshops**
- ▶ **Aras roadmap discussion Wednesday afternoon**