Our Mission...

Strategic management consulting for competitive advantage in global markets

CIMdata is the leading independent global strategic management consulting and research authority focused exclusively on PLM.

We are dedicated to maximizing our clients’ ability to design and deliver innovative products and services through the application of PLM.
Presenter Profile

Your presenter’s professional background

- Michael Fry, CIMdata Practice Director for Manufacturing Systems Engineering
  - Over 40 years of PLM and manufacturing industry experience. Focused on product development, manufacturing automation, and systems engineering. Extensive experience in client management, solution design, consulting, and business analysis.
  - While at IBM and later at Dassault Systèmes, worked with global manufacturing companies in the automotive, aerospace & defense, building products, fabrication, industrial equipment, and marine industries.
  - Most recently, worked at IBM in the predictive analytics discipline working on projects implementing the Internet of Things (IoT) and Industry 4.0 practices to provide data collection for cognitive computing and decision-making. This work was applied to machine tool operations, drone imaging and video capture, as well as jet engine failure prediction.

PLM – CIMdata’s Definition

PLM: enabled by a product innovation platform

- Strategic business approach
  - NOT just technologies
  - Consistent set of business solutions
- Collaborative creation, use, management & dissemination of product related intellectual assets
  - All product/plant definition information – the virtual product
    - AEC, MCAD, ERP, EDA, ALM, SE, requirements, simulations, analytics, portfolio, formulas...
  - All product/plant process definitions – the virtual processes
    - Processes that plan, design, produce, operate, support, decommission, recycle...
- An innovation platform that supports the extended enterprise
- Spans the full lifecycle, from idea/concept through life
Who We Are...

Focused on product lifecycle management—unbiased and independent

- Primary business – consulting services
  - Independent, comprehensive, and unbiased services
  - Full product lifecycle focus for PLM strategic guidance and support
  - Solution-independent, modular, and adaptable methodologies
  - On-going market and technology research
- Worldwide recognition for excellence since 1983
  - Experienced senior consulting professionals
  - Focused on client success across multiple industries
- Serving both industrial clients & PLM solution providers
- Global focus
  - Clients and offices in the Americas, EMEA, and Asia-Pacific

Our Role...

Our role in the PLM ecosystem—facilitating and energizing the PLM economy

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Our Global Footprint...
*Countries where CIMdata consultants have worked with clients*

Performing work on six continents!

Our Services...
*Creating, disseminating, and applying our intellectual capital*

Delivering strategic advice and counsel through a comprehensive, integrated set of research, education, and consulting services
Manufacturing Systems Engineering (MSE) Practice

Disruptive technologies to traditional Manufacturing creating an Exploding Market Potential

<table>
<thead>
<tr>
<th>Strategic Focus</th>
<th>Customer Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Use PLM enabling technologies to improve the digital product definition and integrate the flow of information and processes</td>
<td>• Develop new business models and opportunities</td>
</tr>
<tr>
<td>• Concentrate on new and emerging technologies</td>
<td>• Improve quality and compliance</td>
</tr>
<tr>
<td>• Internet of Things (IoT)</td>
<td>• Monitor, maintain, and optimize assets for better availability, utilization, and performance</td>
</tr>
<tr>
<td>• Industry 4.0</td>
<td>• Predict asset failure and identify poor quality parts earlier to better optimize operations and supply chain processes</td>
</tr>
<tr>
<td>• Predictive Analytics</td>
<td>• New revenue opportunities that focus on data, content, and interconnect</td>
</tr>
<tr>
<td>• Asset Maintenance</td>
<td>• Additive Manufacturing</td>
</tr>
<tr>
<td>• Additive Manufacturing</td>
<td></td>
</tr>
</tbody>
</table>

PLM Transformation

Services for Industrial Organizations—improving your PLM-related processes

CIMdata’s PLM consulting methodology—transforming your business for a competitive advantage!

A comprehensive set of services tailored to fit your specific needs...
Our PLM Transformation Clients...

*A sampling of CIMdata’s international industrial clients (1 of 2)*

- **A&D**
- **Auto**
- **Fab & Assembly**
- **High-Tech**

Our PLM Transformation Clients...

*A sampling of CIMdata’s international industrial clients (2 of 2)*

- **CPG/F&B/Process**
- **Medical/Pharma**
- **Emerging Ind.**
- **Other**

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Questions?

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- We’re hoping that the anonymity of the chat window might help participants ask more questions.
- If you want to ask a question on the record, we’ll certainly let everyone know you’re asking.
- If we don’t get to your question, we will reply back with an email reply.
- The most important thing is for us to hear from you.

Learning Objectives

*What you should understand at the end of the session*

- Blockchain applicability to PLM
- Blockchain construct
- Blockchain in non cybercurrencies
- Blockchain for Business a variation on proof of work
- Blockchain providers
- Blockchain PLM prototype starting position
- Blockchain working proposal
What is Blockchain?

Blockchain in 100 words

- What is blockchain?
  - Wikipedia
    - A blockchain is a continuously growing list of records, called blocks, which are linked and secured using cryptography.

- Some good links
  - https://www.youtube.com/watch?v=KP_hGPQVLpA
  - https://www.youtube.com/watch?v=l9jOjK30eQs
  - https://www.youtube.com/watch?v=-SMliFtoPn8

- Build a blockchain
  - Each transaction is put into a block
  - Many transactions are blocked together
  - Each block is connected to the block before and after it
  - Each block is added to the chain this is not changeable

PLM Blockchain

Blockchain use case for PLM

- Why blockchain for PLM?
  - PLM Transactions take place continually
    - Order tracking, payments, account tracking
    - ECn, change orders, design reviews, stage gates
    - Suppliers management
    - Customer communications
  - Every participant has their own version of the truth
    - Combined and validated they form a single version of the truth
  - Blockchain is non-proprietary and transparent
  - The goal is to see an engineering transaction end-to-end and reduce those vulnerabilities
Blockchain Benefits for PLM

- PLM Benefits of Blockchain
  - Secure, Permissioned
    - private, invitation-only ecosystems governed by a discrete set of stakeholders, such as a company, or group of companies
  - Distributed
    - Work across boundaries
  - Time and cost savings
  - Improved audit capabilities
    - Transactions are on the blocks
      - Used for review, approve, and access type transactions
  - Trust
    - Move from people and processes to mathematical algorithms

Examples of Blockchain

Remiss is not mentioning Bitcoin

- Bitcoin
  - bitcoin, bitcoin, bitcoin
- Bitcoin
  - bitcoin, bitcoin, bitcoin
    - bitcoin
- Chicken
  - chicken, chicken, chicken

My Bitcoin wallet address if you want to send me some:
1Kf1tuAxrnwukYKrVEYAkWQghBXHmN8cf
Examples of Blockchain

Blockchain in action what can we borrow for PLM?

- Ethereum (applicable to PLM)
  - open-source, public, blockchain-based distributed computing platform featuring smart contract (scripting) functionality. Ethereum also provides a cryptocurrency token called "ether," which can be transferred between accounts and used to compensate participant nodes for computations performed.
- Financial
- Insurance
- Government
- Supply Chain Management
- Healthcare

Manufacturing Use Cases of Blockchain

Where can we go?

- Manufacturers now have a real time view of activity logs and can keep track of the flow of goods between companies
- Proof of authorization no counterfeiting of parts
- Governmental regulatory compliance
- Additive manufacturing (3D printing)
- Distributed manufacturing
- IoT tracking and identification
- Documentation
  - technical manuals
  - assembly instructions
- High value low volume parts (jet engines)
Blockchain for Business Applications (PLM)

**Blockchain for PLM advantages**

- Shared engineering data and trusted transactions (ledger)
- Trusted Collaboration
- Permissioned
  - User ID, Licensing, Data access, ITAR
- Consensus by:
  - Multi signature
  - Proof of stake (validate by % of networks value)
  - Practical Byzantine Fault Tolerance (PBFT) algorithm
- Smart contracts
  - Set of rules for a transaction
- Digital Rights Management

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Application of Blockchain for the PLM Business

**A Blockchain for study**

- Lighting Network
  - Deployed January 2018
- Peer-to-Peer system for making micro Engineering changes
  - Could be used for peer-to-peer iterations before release design reviews and engineering changes
  - Omni-directional
  - No delegating of budgets (no need to add to blockchain design reviews are complete)
  - Pre “funded” which sits on the blockchain (pre agreed transactions from peer-to-peer)

Enjoy the design process, recipe management until you enjoy the product!
Does Blockchain have a place in PLM?

Blockchain has a place in PLM if we can answer yes to the following questions:

1. Does my business network need to manage contractual relationships?
2. Do we need to track transactions that involve more than two parties?
3. Is the current system overly complex or costly, possibly due to the need for intermediaries or a central point of control?
4. Can the network benefit from increased trust, transparency, and accountability in recordkeeping?
5. Is the current system prone to errors due to manual processes or duplication of effort?
6. Is the current transaction system vulnerable to fraud, cyber-attack, and human error?

Blockchain providers

Industry leaders from Business insider

- IBM Blockchain Technology
- Microsoft Azure Blockchain Technology
- Amazon AWS Blockchain Technology
- R3 Corda Blockchain Technology
- Accenture
- Oracle Cloud
- Deloitte
- Wipro
- Wipro
- TATA
- Salesforce
- Dassault Systèmes
- Oracle
- Aras
- Siemens
- Autodesk
### Key Attributes of PLM Blockchain usage

**Does the technology apply?**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distributed and sustainable</td>
<td>The data of record transactions are shared, updated with every transaction, and selectively replicated among participants</td>
</tr>
<tr>
<td>Secure, private, and indelible</td>
<td>Permissions and cryptography&lt;br&gt;prevent unauthorized access to the network and ensure&lt;br&gt;participants are who they claim to be</td>
</tr>
<tr>
<td>Transparent and auditable</td>
<td>Participants in a transaction have access to the same records&lt;br&gt;they can validate transactions&lt;br&gt;verify identities or ownership&lt;br&gt;Transactions are time-stamped and can be verified</td>
</tr>
<tr>
<td>Consensus-based and transactional</td>
<td>Network participants must agree that a transaction is valid&lt;br&gt;Use consensus algorithms</td>
</tr>
<tr>
<td>Orchestrated and flexible</td>
<td>Business rules and smart contracts (that execute based on one or more conditions) can be built into the platform&lt;br&gt;Blockchain business networks can evolve as they mature to support end-to-end business processes and a wide range of activities</td>
</tr>
</tbody>
</table>
Blockchain Beginning

*Decide where to begin blockchain code*

- Determine the benefits of Blockchain vs Today’s PLM application
- Pick a use case that adds value
  - Agreement in the network
  - Provenance (audit trail need)
  - Tamper evident
  - System of record
  - Security
- Metrics
  - What’s the goal
  - What’s success
- Choose a provider
  - Permissioned network, security
  - Identities of users
- Develop the prototype Chaincode
- Test and iterate

Blockchain PLM Knowledge Council

*Want to be involved?*

- Create a CIMdata Blockchain for PLM Knowledge Council
- Contact
  - Mike Fry MSE Practice Director
  - m.fry@CIMdata.com
  - +1 970.946.5785

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Concluding Remarks

Summary statement

- Blockchain is not just for cyber currencies
  - Insurance
  - Supply chain management
- PLM

- Blockchain does have a place in PLM
- We are on the cusp of something new and we need to become knowledgeable and generate some bitcoin

CIMdata PLM Leadership

PLM Industry’s most comprehensive non-biased education & training offering

This CIMdata offering is comprised of a set of well defined events & assessment-based PLM education and training certificate programs.

The certificate programs are available to industrial companies who are considering and/or implementing PLM, and to PLM technology and service solution providers.
2018 PLM Certificate Class Schedule*

Join us, and get educated about PLM

More information and other CIMdata Education programs at:

May 21-25 – Ann Arbor, MI USA
June 11-15 – Amsterdam, The Netherlands
October 1-5 – Boston, MA USA
December 3-7 – Santa Clara, CA USA
Custom & on-site programs by request

Special Discount: 15% off!
Sign up and pay by March 1st, 2018

*Dates may be subject to change

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