CMTrends

News and Perspectives for CM Professionals

April 2018
ISSUE 30

10th ANNIVERSARY!

CMTrends

S.W.A.T.

Seminars, Workshops, And Training

August 27 - 29, 2018

Las Vegas, NV

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10th ANNIVERSARY!

CMTrends

S.W.A.T.

Seminars, Workshops, And Training

You are Invited!

August 27 - 29, 2018 in Las Vegas, Nevada.

CM Trends is a premier forum for sharing new advances and practices in configuration management (CM). This event showcases the latest trends, industry standards, and corporate experiences in configuration management. CM Trends brings together leading configuration management professionals from commercial and government industries. By bringing people together, connecting and inspiring them, we can create the potential for positive change. CM Trends does not restrict itself to lecturing about one methodology, but instead exposes you to the full spectrum of configuration management and process improvement through diverse presentations, hands-on workshops, question and answer sessions, talking with exhibitors, and networking.

CMTrends: $1095
Discounted Class: $1095
OR Discounted Bundle (CMTrends & Class): $1975

This 2.5-day event is great for anyone responsible for configuration management or process improvement within his/her organization. All experience levels and backgrounds are welcome! CM Trends attracts an international array of attendees from both commercial and government organizations. CM Trends' diverse attendance is what makes this event great for networking and learning from others' experiences.

Learn more about CM Trends 2018 at: **www.CMPIC.com/configuration-management-seminar**
Register now: **www.CMPIC.com/registration**, 1-434-525-8648, info@cmpic.com

Discounted Post Event Classes

August 29 - 31, 2018 in Las Vegas, Nevada

Every year CMPIC hosts discounted CM certification and training courses to celebrate a successful CM Trends event. These courses (typically $1295) will be offered at $1095 to the public. Register now to learn more about one of the following:

Course 6, "SAE EIA-649C Principles & Applications" certification course. This is a new version expected to be released prior to the class start date.
Course 9, "CM Standards & Practices Update" refresher course
Course 15, "Security-Focused CM of Information Systems" certification course

Learn more at: **www.CMPIC.com/2018_CMTrends_Classes.htm**

REGISTER NOW

10th ANNIVERSARY!

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Seminars, Workshops, And Training

Location: Venue & Hotel

All CMTrends 2018 Seminars, Workshops, and Training classes will be held at:

Harrah's
3475 S Las Vegas Blvd
Las Vegas, NV 89109
www.harrahs.com

Harrah's Las Vegas Hotel is centrally located on Las Vegas Boulevard, and has many shopping, dining, and entertainment options within walking distance.

ROOM RATES: Single/Double: $89.00 per night plus tax (includes required facility fee) available Sunday, August 26 - Thursday, August 30, 2018. Weekend rate before and after this event is $159.00 per night plus tax (includes required facility fee). This weekday rate is set below the 2018 government per diem rate.

Make your sleeping room reservations soon. Room block typically fills up early. Email katie@cmpic.com if you encounter any problems making your sleeping room reservation.

INTERNET RESERVATIONS: Visit https://aws.passkey.com/go/SHCMT8 to book your room online.

PHONE RESERVATIONS: All reservations made via the telephone call center will be assessed a fee of $15 plus current sales tax, per reservation. This fee will not apply to reservations made via the internet. Hotel Reservations telephone number is 888-458-8471.

** This group discounted rate and room block ***will expire on Thursday, August 2, 2018.*** Reservations made after August 2nd will be on a space-available basis at the hotel's current selling rate.

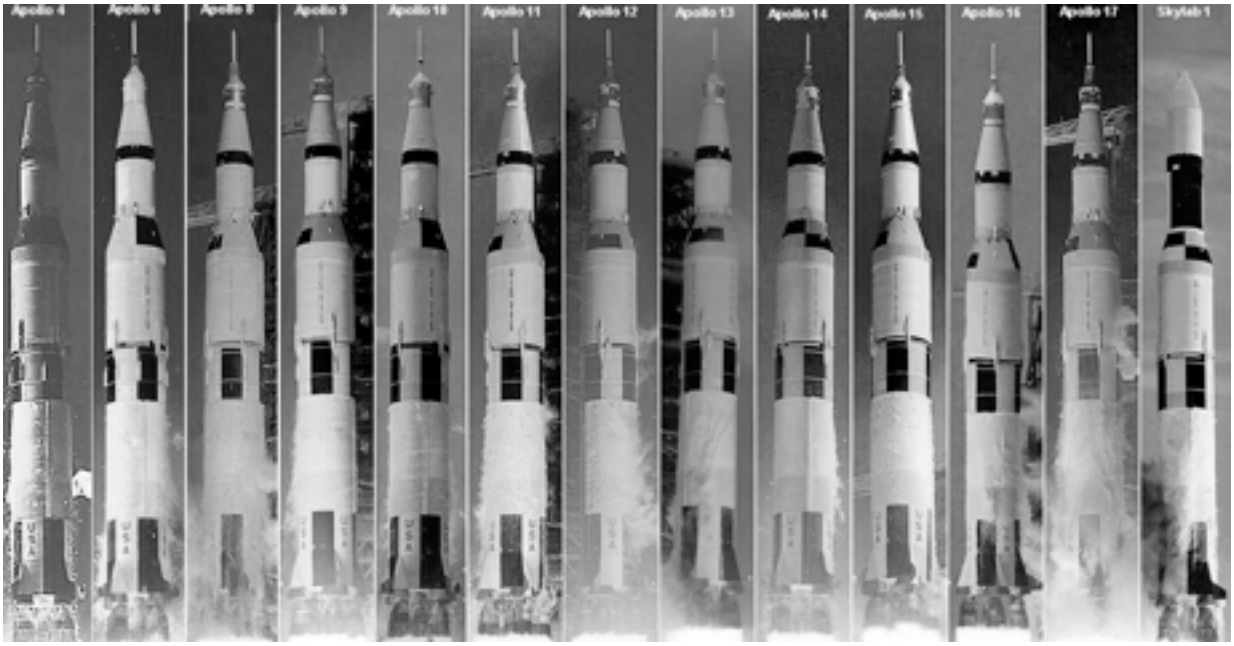
CHECK IN/CHECK OUT: Check in time is 4:00 p.m. and checkout time is 11:00 a.m.

SERVICES & AMENITIES: Complimentary in-room Wi-Fi & hardwired internet access, in-room safe, 14 on-site dining options, spa, swimming pool, monorail access, on-site parking (discounted self-parking rate of $5/day available during event dates; $18/valet).

CM Origins Part 5 – PDM and PLM Systems

By Kim Robertson

Without the evolution of computers and databases discussed in CM Origins Part 4 Product Data Management (PDM) and Product Lifecycle Management (PLM) systems would be much harder to create and use. Manual Configuration and Data Management (MCDM) methods used throughout history required complex indexing of information. This was most evident on systems like the Saturn 5.



Saturn V family – Public Domain

The environmental impact of manual indexing and paper systems is staggering. A rough estimate of the weight of the Saturn V 1973 Skylab 1 configuration is 2,948.35 metric tons (3,249.99 US Tons). At the time of development and manufacture the rule of thumb for data deliverables was when the weight of the paper was equal to the weight of the launch vehicle contract data deliveries were almost complete. Not counting document revisions, we can calculate a rough estimate of the number of trees consumed using a simple calculation.

1 US ton of paper = 400 reams of paper
1 ream of paper = 6 percent of a mature pine tree.
400 reams = 400 x 0.06 = 24 trees
Total trees used = 32.5 US tons x 24 trees per US Ton = 780 mature pine trees

CM Origins Part 5 – PDM and PLM Systems

If you add in the number of document revisions, remember this was a time before word processing when everything had to be typed, you can multiply this by a historical factor of 7 revisions per document and arrive at 5,460 mature pine trees being used before the data deliveries neared completion.

By comparison 11 mature pine trees are needed for a 1,300 square foot home typical in 1973. Summing it all up the weight of the paper for the Skylab 1 Saturn V CDRLs was roughly equivalent to:

5,460 mature pine tree/11 mature pine tree/house = 496.36 average sized homes circa 1973.

This environmental impact is compounded by the need to keep paper copies of the latest revision of all engineering in file cabinets at the originator's place of business for use in manufacturing, inspection and validation/verification activities. Using the rule of thumb used at the time 10 copies of each drawing were generally available on-site. This increases the environmental impact to 54,600 mature pine trees or 4,963.6 average size houses for the last Saturn V.

The need for paper copies is also why the "un-holy six" letters exist in section 5.1 of ASME Y.14.35M. The "un-holy six" letters are "I, O, Q S, X and Z". It was found by the U.S. Department of Defense that hard copy filing errors resulted due to the fact these letters resemble the numbers "1, 0, 0, 5, 8 and 2" and drawings such as 12345Z could be filed as drawing 123452. Eliminating these letters resulted in a significant reduction in hard copy file errors. DOD-STD-100 in 503.2, Revision Letters, identifies only five of these. The letter "X" was added later.

Computer Aided Design (CAD), Computer Aided Manufacture (CAM) and Computer Aided Engineering (CAE) systems generate massive amounts of data. When the cost of searching for the correct piece of data became onerous PDM systems were developed to lower the cost. PDM is critical when parts sourced through supply chain or developed and manufactured in-house are added to an electronic bill of material (EBOM). PDM systems used Data Exchange and Interoperability (DEI) addressed in SAE EIA-836 to link with other applications to provide improved enterprise-wide solutions.

Improvements in PDM architecture evolved to include Variances, Engineering Change Requests (ECRs), Engineering Change Orders (ECOs) as well as analysis, reports, models, specifications and other files associated with the CAD/CAM/CAE data. While PDM is used in this article other synonyms that could also be used are Configuration Data Management (CDM), Engineering Data Management (EDM), Product Information Management (PIM), and Technical Data Management (TBM) systems.

CM Origins Part 5 – PDM and PLM Systems

PDM as a term shouldn't be confused with the term "product management." "Product management" also includes business aspects, such as marketing, product policy and the introduction of new products. (Peltonen, H., Concepts and an Implementation for Product Data Management. Acta Polytechnica Scandinavica, Mathematics and Computing Series No. 105, Espoo 2000, 188 pp. Published by The Finnish Academies of Technology. ISBN 951-666-538-1. ISSN 1456-9418).

The International Classification of Goods and Services for the Purposes of Registration Marks (10th ed. 2011 – WIPO) identifies 45 classes of Goods and Services. Every one of them used PDM to a greater or lesser extent. I've seen effective home grown PDM systems in dBase-III, MS Access, as well as full up implementations of PDM and PLM offered by firms listed at **http://www.capterra.com/product-data-management-software/**

Many enterprises have product models that do not include Operations and Maintenance (O&M) and Logistics (O&ML) phases. This is shortsighted. Even food products have O&ML activities tied to distribution, recalls and expiration dates. Expiration date logistics are flowed to the seller and consumer with little manufacturer involvement after the expiration date is applied. Other classes of goods require extensive O&ML efforts. This is where PLM is critical. PLM can be viewed as PDM over the Product's Lifecycles. PLM as a concept was first introduced in 1931 by Otto Kleppner with the first graphical representation of a product lifecycle. The model we generally see now was leveraged off Otto's work in 1957 by someone known only as "Jones" wo worked for Booz, Allen and Hamilton.

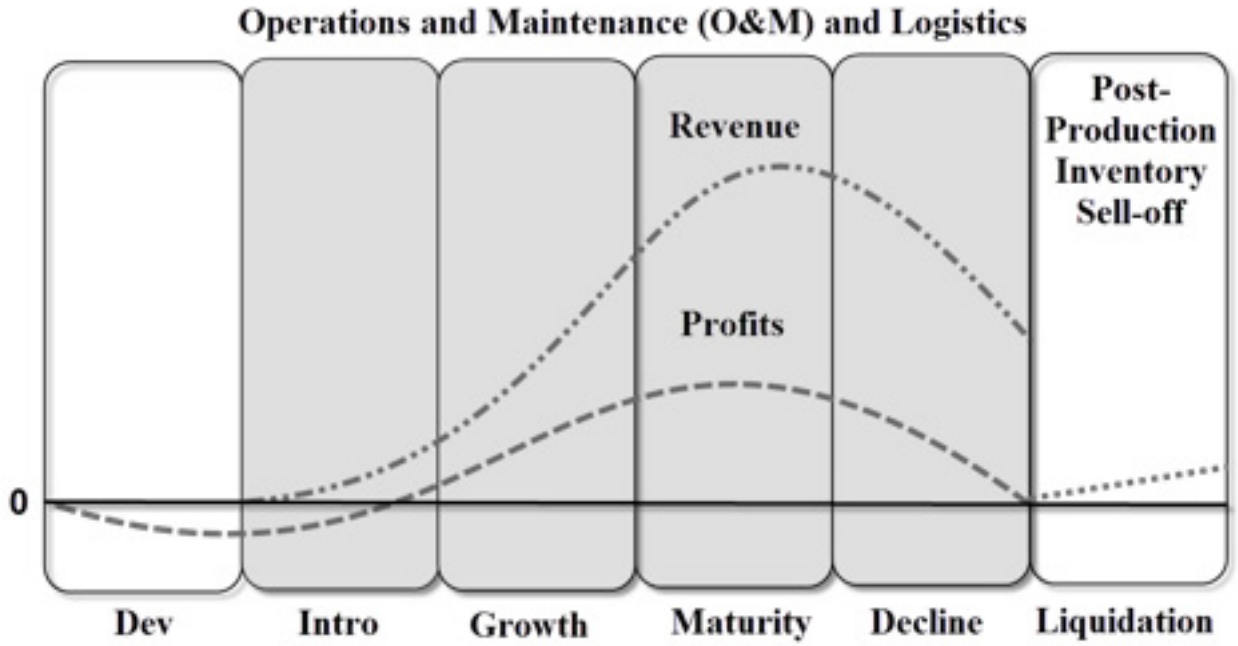
It is generally accepted that PLM was first reduced to practical application by Rockwell International in 1982 on the B-1B bomber system with its Engineering Data System (EDS). American Motors Corporation adopted the methodology in 1985 in its Jeep Grand Cherokee development (François Castaing, Vice President for Product Engineering and Development). Chrysler adopted the PLM approach when they acquired American Motors Corporation in 1987 and it gave them a competitive advantage that lasted well into the late 1990's due to the resultant development costs almost 50 percent lower than its competitors.

EIA-649, Configuration Management Standard, and see if we can figure this one out. Somewhere around page 2 you should find Table 1, Phases of a Product's Life Cycle.

1. Conception
2. Definition
3. Build
4. Distribution
5. Operation
6. Disposal

CM Origins Part 5 – PDM and PLM Systems

This differs slightly from the Product Management view of Product Lifecycles When you throw in Revenue and Profits.



Products Lifecycles

The term Lifecycle is a common one and may not be fully understood. Generically it looks like the Products Lifecycle illustration. Many may not have seen the Liquidation block before. I thought it important enough to include as it is an important aspect of commerce. When Henry Ford stopped production of the Model-T Ford, shut down the production line and retooled for the Model-A Ford he forced Ford dealers to buy the remaining Model-T inventory and parts or they would lose their dealership franchise. Another example is General Electric's recent decision to stop manufacturing home appliances forcing inventories into post-production parts liquidation. We see similar liquidation actions in other commodity areas as well.

If you are interested in a more detailed history of PLM, "Product lifecycle management - From its history to its new role" (Page 360, Int. J. Product Lifecycle Management, Vol. 4, No. 4, 2010 is an excellent source of information). It can be found at: **https://www.researchgate.net/publication/264814281_Product_lifecycle_management_-_From_its_history_to_its_new_role**

Kim Robertson is a NDIA Certified CM practitioner, consultant and trainer with over 30 years of experience in contracts, subcontracts, finance, systems engineering and configuration management. He has an advanced degree in operational management with a government contracts specialty and is the co-author of Configuration Management: Theory Practice and Application. He can be reached at Kim.Robertson@ValueTransform.com

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This group adresses where Configuration Management (CM) processes and automation are heading in all government and commercial industries. It focuses on solving problems and implementing CM process improvements while addressing the career needs of CM professionals. Applicable to hardware, software, IT, facilities and/or process environments.

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What is a Digital Twin?

By Marc Lind

The original Exploring the Digital Twin article was published on the Aras Blog.

What is a Digital Twin?
It's one of those questions that if you ask 3 people, you'll get 5 answers.

It's clearly a hot topic. It was on Gartner's Top 10 Strategic Technology Trends for 2017 and IDC predicts that by 2018 companies who invest in Digital Twin technology will see a 30% improvement in critical processes.

When you get into the way these analysts are actually defining the term and its benefits (even the Wikipedia definition), they're fairly limited and somewhat unimaginative.

The term Digital Twin was coined back in 2002 by Dr. Michael Grieves while at University of Michigan. He obviously thought about The Digital Twin Concept extensively back then which shows in his definition. Of course the practical application of Internet of Things (IoT) technologies was in its infancy so it's a bit academic.

More recently, Prof. Dr.-Ing. Martin Eigner at Technische Universität Kaiserslautern in Germany has really expanded on the Digital Twin in the context of the IoT, Industry 4.0 and IIoT. His presentation from the PLM Future 2016 conference really does a nice job of explaining the Digital Twin (slide 9) and how it fits into the enterprise architecture.

Effectively, the Digital Twin is an exact virtual representation of a physical thing. It's as if the physical product or system was looking in a virtual mirror.

Grieves describes it as a mirroring (or twinning) of what exists in the real world and what exists in the virtual world. It contains all the informational sets of the physical 'thing' meaning its cross-discipline – not just a mechanical / geometric representation, but also including the electronics, wiring, software, firmware, etc. #NOTjustCADmodel

And if you believe the recent Forbes article by Bernard Marr What Is Digital Twin Technology – And Why Is It So Important? then, "All indications seem to predict we are on the cusp of a digital twin technology explosion."

What is a Digital Twin?

The original Exploring the Digital Twin article was published on the Aras Blog.

So why is the Digital Twin so Important?

Well, many people talk about Digital Twins in the context of monitoring, simulation and predictive maintenance which are all incredibly valuable and potentially transformative in their own right, however, there would seem to be much more to it.

As products of all types move to include connectivity, sensors and intelligence we can't just think about the data streaming back from the field. Without accurate "Context" – Digital Twin – time series data generated during production and ongoing operation is difficult or even impossible to understand and analyze.

In addition, the ability to interpret and act upon these data often require traceability to prior information from related revisions – Digital Thread – we'll have to talk about that later.

To complicate matters further as artificial intelligence / cognitive computing is introduced the necessity for the Digital Twin becomes even greater. If Knowledge = Information in Context, then without a Digital Twin, machine learning won't work as intended, will be rendered ineffective or worse… potentially leading to risky misinterpretations or misdirected actions.

Because without Context – Digital Twin – the IoT-enabled value proposition is severely limited and could introduce real liability.

These are just a few of the obvious points we've been thinking about at Aras. I'm sure there are a lot more.

What's your take? Will every product have a Digital Twin in the future? Or is this concept headed for the hype cycle trash heap?

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North Charleston, SC June 11 - 14 & July 16 - 19, 2018
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- ***EIA-649B Principles & Applications* Certification, Course 6**

Andover, MA May 1 - 3, 2018
Las Vegas, NV August 29 - 31, 2018 649C is expected to be taught during this session!

- ***CM Assessor* Certification, Course 7**

North Charleston, SC July 31 - August 2, 2018
San Diego, CA November 6 - 8, 2018

- ***SCM: Strategies, Techniques and Tools* Certification, Course 8**

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Contact Us
CMPIC LLC
P.O. Box 2131
Forest, VA 24551

ph: 1-434-525-8648
fax: 1-434-382-0677
email: info@cmpic.com
web: www.CMPIC.com