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## CIMdata News

### ***BSH—Leveraging Siemens PLM to Enable Smart, Connected Products (Commentary)***

17 November 2016

#### *Key takeaways:*

- *The trend toward smart, connected products and the emergence of the Internet of Things are changing both product complexity and how businesses must operate and compete—resulting in both new opportunities and new challenges*
- *R&D leaders must own PLM as their strategic enterprise platform*
- *Companies need to establish a Product Architecture Management Strategy*
- *Companies must think and develop in a system of systems paradigm*

#### **Introduction**

Technology is rapidly changing the definition and design of products. They are no longer just electro-mechanical devices. Embedded electronics and software as well as cloud connections provide much of the functionality and differentiation between product models and variations. Products have become smart, connected devices that communicate with one another and to other systems using the Internet, hence the name Internet of Things (IoT). This change is effecting every kind of product from airplanes to cars and home appliances. Companies are scrambling to develop their connected strategy and implement working solutions. Home appliances manufacturers are rapidly progressing along this path, many products have touch panel displays, links to the Internet, and can be monitored for performance and service by their manufacturer.

Developing and delivering these new home appliances to the market is the endeavor of BSH Hausgeräte GmbH (BSH Home Appliances), the largest manufacturer of home appliances in Europe and one of the leading companies in the sector worldwide. Founded in 1967 as a joint venture between Siemens AG and Robert Bosch GmbH, BSH operates some 40 factories around the world. Its product offerings include large home appliances as well as a multitude of small appliances such as fully automatic

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espresso machines and hot water appliances (consumer products). Together with a global network of sales and customer service firms, the BSH conglomerate today is made up of about 80 companies in 50 countries, with a total workforce of more than 56,000 people. BSH invests approximately 4% of its revenues in research and development (R&D) It has around 3,500 R&D specialists in international production and development and more than 8,000 customer service specialists in about 50 countries.

BSH has a rich tradition in PLM investment, both in PLM enabling technology, but also investments in processes. Their PLM strategy and initiatives continue to evolve to address changing technologies and support the need to create the smart, connected products and systems being required by their customers.

## **Business Opportunities and Challenges**

- Technology and customer expectations are driving many changes:
- Products are becoming more complex and interconnected but smarter and more useful
- Embedded technology, e.g., software, is most often the differentiating factor
- Systems of systems, the only practical way to address the complexity, must be defined, designed, produced, and managed
- Massive amounts of data are being collected and must be aggregated and analyzed and then used to make actionable decisions
- Information is stored and shared using cloud infrastructure and solutions
- Available anywhere, anytime, on any device
- New collaboration and working paradigms are built on social media

The increase in product complexity in recent years is accelerating. Using embedded technology gives manufacturers a new way to add capabilities with enormous potential to profit since there is no additional material or manufacturing cost. But, it is forcing them to work differently and to develop or expand competencies in areas such as model-based systems engineering, agile software development, and supply chain management.

The good news is that these new capabilities are providing companies new opportunities to:

- Drive innovation with knowledge from analytics
- Sustain growth with software-based innovations and new services
- Keep price premiums, excite customers, and maintain brand value
- Create new business models

However, with new opportunities come new challenges including:

- New platforms, e.g., IoT, that are foreign to many companies
- Processes that span the product lifecycle, e.g., software updates of in-use products, rather than “fire and forget”
- Process re-engineering—not just process optimization
- Expanded security—more complex products and systems are more vulnerable
- Multiple eco-systems and the lack of clarity on what platforms will dominate in the future

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- Product development complexity is shifting to systems of systems so people have to think and work differently

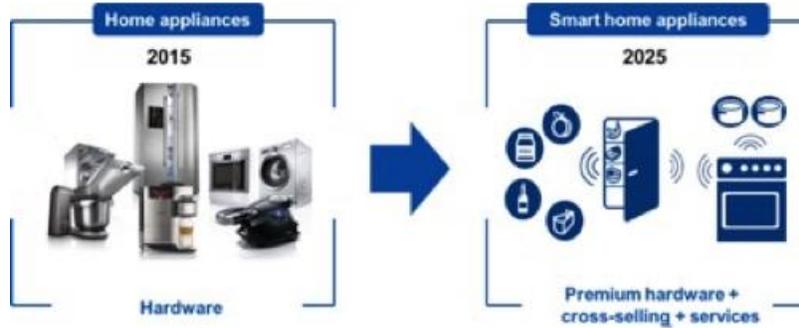


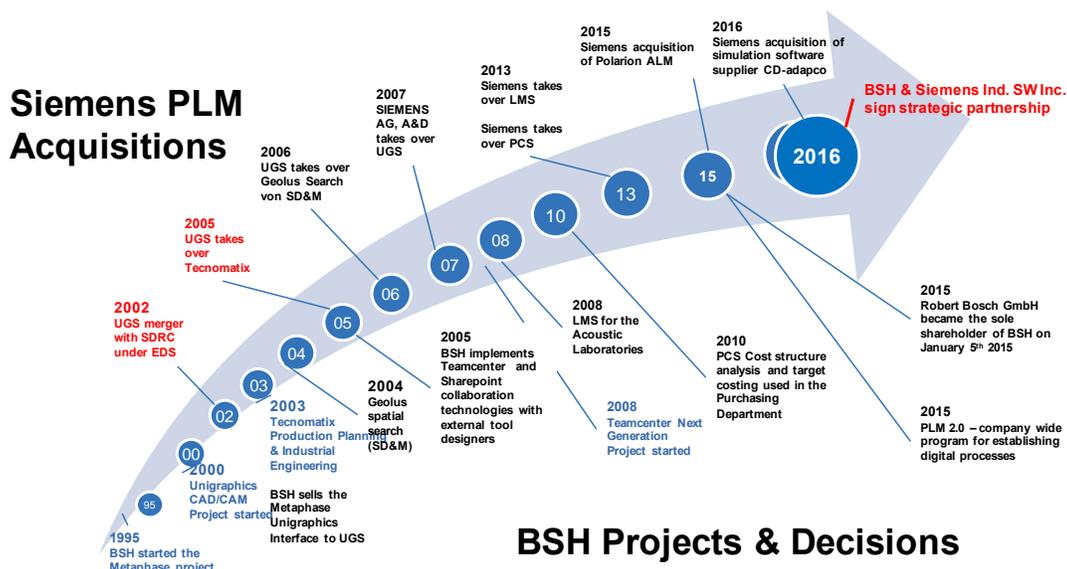
Figure 1-Evolution of Home Appliances  
(Courtesy of BSH)

Figure 1 illustrates the changes in products, technology, and systems that are driving the home appliance industry. While today’s products may be smart and connected, they are still primarily just sold as products. BSH’s future vision is that these smart connected products will be one part of a broader portfolio that includes new premium services, parts, and other elements. This transformation is common among companies that see the IoT as a strategic opportunity.

To meet these new challenges, manufacturers need to change the way they develop the products and services their customers expect. This includes not only the products, but the processes to be followed, and, in many cases, the company’s business model—shifting from a product focus to a system-centric focus.

## PLM 2.0 Purpose and Goal

BSH has had a strong, effective PLM strategy and programs for many years, including significant investments in technology and processes. They have a long partnership with Siemens PLM Software as Figure 2 illustrates. By frequently selecting tools from companies that Siemens PLM Software later acquired and incorporated into their PLM suite BSH was able to sustainably keep pace with PLM technology changes.



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**Figure 2-The History of BSH and Siemens PLM**  
*(Courtesy of Siemens PLM Software)*

To respond to challenges created by increasing use of embedded software described above, BSH's software development grew from small teams to many hundreds. This growth and new development area has necessitated better integration between mechanical, electrical/electronic, and especially software groups using improved management and processes.

However, BSH believes that while their past PLM efforts were good investments that have delivered value, their current environment is not sufficient to move to the next level required for long term success. Going forward, BSH will have to focus on:

- Consumer centricity
- Brand differentiation
- Pushing digital transition and user experience
- Strengthening innovation
- Broadening their product portfolio to meet the needs of regional markets
- Driving operational excellence
- Evolving their leadership style

To achieve these goals BSH plans to do advanced optimization and harmonization of their processes with a special focus on the product data environment. As one important step toward this goal, they have created an engineering backbone that spans the product lifecycle from virtual product development to support the re-use of virtual and digital product definitions through sales, service, and IoT. A second key step is establishing a Product Architecture Management Strategy (PAMS). A product architecture is a strategy to manage a product line or family. The systems engineering concept of RFLP is the typical methodology. Requirements drive the functional design which drives the logical design which drives the physical design. This links architecture to system-level design and the principles of system engineering. It has profound implications for how the product is designed, made, sold, used, repaired, etc. With the advent of connected devices and systems of systems, it is important to establish a PAMS to define and maintain consistency across the connected devices, solutions, and services.

One of the issues BSH has uncovered is that while functional groups such as sales, marketing, and finance have a clear understanding of their product platform and tools, such as management cockpits, product developers are recognizing that they are behind the curve in consolidating information needed to support product development decisions. They have a clear understanding of engineering and manufacturing for products that are mainly mechanical in nature but when electronics and software are added, the dependencies are not well understood. It is critical that embedded and cloud software management is incorporated within standard processes because software is the key driver of customer value in a smart, connected world.

BSH has reached a tipping point—their business is no longer just converting raw material into finished goods, they need to produce solutions that meet and exceed customer expectations in many dimensions while participating in a dynamic, even chaotic connected world. For core processes and technologies, the integration aspect outweighs the best-of-breed applications approach, due to integration cost and complexity. BSH believes it is important for strategic technology vendors (e.g., SAP, Microsoft, Siemens PLM Software) to work together and to understand their role in helping large companies reach

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their strategic goals.

BSH believes that for end-to-end processes to be established and work effectively, companies need to have integrated enterprise platforms. CIMdata supports this belief. For example, ERP is just one platform, not the ONLY platform. There will be multiple business platforms, e.g., ERP, SCM, PLM, etc., so it is important that business people in engineering have a platform strategy. They need a clear roadmap for a PLM platform that supports system-centric products. R&D and Engineering need to take strategic ownership of an integrated PLM platform while supporting a target enterprise IT architecture that clarifies the relationships between enterprise solutions and platforms, like ERP and SCM. Working at the platform level to define and implement connections should help reduce cost by shifting integration efforts towards enterprise solution providers, including PLM.

## Summary

Consumer products are evolving rapidly to incorporate embedded technology that delivers features people didn't even know they needed but are now nearly indispensable. More importantly, many smart connected products create opportunities for new business models. However, these new product requirements and increased product complexity place enormous pressure on product companies. If they cannot adapt to these new product development challenges, they run the risk of going out of business.

BSH is an excellent example of a forward thinking company, one of the leaders in their industry, with a successful implementation of PLM. However, BSH recognizes that past efforts and success are not sufficient to maintain their competitive position into the future. They are establishing enterprise IT platforms including PLM and ERP that will better enable them to leverage their intellectual assets and people more efficiently and more cost effectively. CIMdata believes that this platform approach is essential for long term success in developing and delivering the increasingly complex products and systems of the future. CIMdata agrees with BSH's view that R&D and Engineering must own PLM as their strategic enterprise platform and also establish a Product Architecture Management Strategy that can carry them forward.

## About CIMdata

CIMdata, an independent worldwide firm, provides strategic management consulting to maximize an enterprise's ability to design and deliver innovative products and services through the application of Product Lifecycle Management (PLM). CIMdata provides world-class knowledge, expertise, and best-practice methods on PLM. CIMdata also offers research, subscription services, publications, and education through international conferences. To learn more about CIMdata's services, visit our website at <http://www.CIMdata.com> or contact CIMdata at: 3909 Research Park Drive, Ann Arbor, MI 48108, USA. Tel: +1 734.668.9922. Fax: +1 734.668.1957; or at Oogststraat 20, 6004 CV Weert, The Netherlands. Tel: +31 (0) 495.533.666.

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## ***CIMdata to be Featured in Upcoming Webinar on How a PLM Platform Can Transform the Business of Engineering***

16 November 2016

CIMdata, Inc., the leading global PLM strategic management consulting and research firm, announces that its President, Peter Bilello, will take part in a webinar entitled "Can a PLM Platform Transform the Business of Engineering?"

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Mr. Bilello will be joined by Mr. Rolf Huesemann, Manager of Engineering Systems/PLM at Magna GETRAG Transmissions. The webcast will address the impacts of the business of engineering in the era of Industry 4.0 and show how industry leaders are using a PLM platform approach.

Mr. Bilello has more than 25 years of experience in the development of business-enabling IT solutions for research, engineering, and manufacturing organizations worldwide. During this time, he has been directly involved with consultation on the selection, integration, and implementation of large-scale PLM solutions. He has authored numerous papers and research reports on PLM and related topics, and his articles, commentaries, and perspectives have appeared in publications throughout the Americas, Europe, and Asia.

The webinar will be one-hour long and those attending will learn about: the market dynamics driving the PLM platform approach; how a platform can accelerate digital thread, IoT, Industry 4.0, and other strategic initiatives; and real world examples of how PLM platforms are being used to speed process transformation and efficiencies.

The webinar, hosted by Aras, will take place on Thursday, December 1, 2016 at 11:00 am EST. To register, please visit <https://attendee.gotowebinar.com/register/7454810160994432258?source=CIMdata>

## About CIMdata

CIMdata, a leading independent worldwide firm, provides strategic management consulting to maximize an enterprise's ability to design and deliver innovative products and services through the application of Product Lifecycle Management (PLM) solutions. Since its founding in 1983, CIMdata has delivered world-class knowledge, expertise, and best-practice methods on PLM solutions. These solutions incorporate both business processes and a wide-ranging set of PLM-enabling technologies.

CIMdata works with both industrial organizations and providers of technologies and services seeking competitive advantage in the global economy. In addition to consulting, CIMdata conducts research, provides PLM-focused subscription services, and produces several commercial publications. The company also provides industry education through PLM certificate programs, seminars, and conferences worldwide. CIMdata serves clients around the world from offices in North America, Europe, and Asia-Pacific. To learn more about CIMdata's services, visit our website at [www.CIMdata.com](http://www.CIMdata.com), follow us on Twitter: <http://twitter.com/CIMdataPLMNews>, or contact CIMdata at: 3909 Research Park Drive, Ann Arbor, MI 48108, USA, Tel: +1 734.668.9922. Fax: +1 734.668.1957; or at Oogststraat 20, 6004 CV Weert, The Netherlands, Tel: +31 (0) 495.533.666.

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## ***CIMdata to Host Free Webinar on Deploying Knowledge Systems for Reliability Design***

15 November 2016

CIMdata, Inc., the leading global PLM strategic management consulting and research firm, announces an upcoming free educational webinar, "How do you ensure your Connected Intelligent Products can be trusted? Deploy Knowledge Systems for Reliability Design." The webinar will take place on December 15, 2016 at 11:00 a.m. (EST) and will last for one hour.

Design-for-reliability applied to complex systems and systems-of-systems needs a seamless connection between the processes and tools of systems engineering and reliability engineering. A seamless connection is a crucial first step for enabling the enterprise design-for-reliability capability that is imperative for developing connected, intelligent systems that are likely to be reliable. It is also important

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to have an information management system for failure knowledge capture and reuse that not only feeds back product failure knowledge from previous generation products, but also from the verification and validation cycles of the current development. This failure knowledge management system must be connected to the processes and tools of both systems engineering and reliability engineering to avoid missed failure modes and realize robust designs.

According to the webinar host, CIMdata's Director, Quality & Reliability Engineering, Dr. Venkatesh "Venki" Agaram, "The problem of reusing pre-existing knowledge about failure modes could be solved effectively through the definition of an ontology, which enables a common understanding of the domain specific concepts without the need for interpretation, while making the ontology-held knowledge explicit and machine-readable."

Dr. Agaram has more than 35 years of experience spanning research and development, virtual engineering, reliability of simulations, complex materials systems, controlled mechanical systems, design for six sigma, structured innovation, innovation culture enhancement, regulatory compliance, recall mitigation, process modeling, market strategy, business transformation, and business development. At CIMdata, Dr. Agaram leads the effort to transform industry practices resulting in a more effective association between knowledge management and quality & reliability engineering, to improve the robustness of smart connected products and processes.

The webinar will provide attendees with an overview of Semantic Web Technology companies and their ability to provide failure knowledge capture and reuse systems and integrating them with systems engineering and reliability engineering offerings.

The webinar will be useful to reliability engineers, reliability engineering managers, systems engineers, systems engineering managers, IT Leadership responsible for product development tools and systems, product managers and consultants from PLM solution providers, and anyone who wants to learn more about deploying knowledge systems for reliability design.

During the webinar attendees will have the opportunity to ask questions about the topics discussed. To find out more, visit: <http://www.cimdata.com/en/education/educational-webinars/webinar-want-to-trust-your-connected-intelligent-products-deploy-knowledge-systems-for-reliability-design>. To register for this webinar, please visit: <https://attendeegotowebinar.com/register/2531069543865397762>.

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CIMdata works with both industrial organizations and providers of technologies and services seeking competitive advantage in the global economy. In addition to consulting, CIMdata conducts research, provides PLM-focused subscription services, and produces several commercial publications. The company also provides industry education through PLM certificate programs, seminars, and conferences worldwide. CIMdata serves clients around the world from offices in North America, Europe, and Asia-Pacific. To learn more about CIMdata's services, visit our website at [www.CIMdata.com](http://www.CIMdata.com), follow us on Twitter: <http://twitter.com/CIMdataPLMNews>, or contact CIMdata at: 3909 Research Park Drive, Ann Arbor, MI 48108, USA, Tel: +1 734.668.9922. Fax: +1 734.668.1957; or at Oogststraat 20, 6004 CV Weert, The Netherlands, Tel: +31 (0) 495.533.666.

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## ***Siemens to Acquire Mentor Graphics (Commentary)***

14 November 2016

*Key takeaways:*

- *Smart, connected products have become the norm in a wide range of industries, requiring product companies to evolve their product development strategies and tools to respond*
- *Leading product lifecycle management (PLM) software and services providers have been evolving their offerings to respond, often through acquisitions*
- *Siemens AG continued this trend by announcing their intent to acquire Mentor Graphics, a leading provider of electronic design automation (EDA) solutions, which will further bolster the PLM offerings of Siemens PLM Software*

Music players, smart phones, autonomous vehicles, and all manner of smart, connected products are driving changes in product development processes and tools in a wide range of industries. Increasingly, the value consumers derive from the products they buy is coming from the software content in those products. Product companies must respond and are adopting PLM enabling solutions as part of that response. Just a few years ago, the focus was on mechatronics, a word coined in Japan to describe the melding of mechanical and electrical components to deliver a new customer experience. Today, it is the electronics, and the software that drives those experiences, that are essential to competing in the global economy.

In response to this trend, over the last few years, Siemens PLM Software has expanded their offerings through a series of strategic acquisitions. In 2012, they greatly expanded their already strong simulation and analysis (S&A) portfolio by acquiring LMS, an independent leader in S&A and product testing. Earlier this year, they plugged a hole in their S&A portfolio by spending nearly \$1 billion to acquire CD-adapco, a leading provider of computational fluid dynamics (CFD) software. In 2015, they doubled down on their investment in Polarion Software, an independent provider of software development tools.

On November 14, 2016 Siemens AG announced their intent to acquire Mentor Graphics Corporation, a US-based leader in EDA solutions, for \$4.5-4.6 billion, a 21% premium over the market price at the time of announcement. Statements by Siemens executives in the announcements signal their belief that software will be a driving force for the company's strategy going forward. Siemens also recently announced their intent to spin out their \$15 billion healthcare business as part of this change of strategic direction.

CIMdata applauds this acquisition and believes that it provides Siemens with a number of strategic advantages. Most importantly, it gives Siemens a strong position in the EDA space, a critical strength in the smart, connected product era. It could cause some issues for some customers using other EDA tools, but Siemens has proven successful at navigating "openness" issues for their software customers over the years and this will help them with this new acquisition. Combining Mentor Graphics with the rest of the Siemens PLM Software portfolio, especially the software development assets of Polarion, is a huge step forward and gives them unprecedented breadth in their portfolio to answer product development challenges today and in the future. The acquisition also builds on two other Siemens strengths. They are the leader in the digital manufacturing market, and adding the Valor portfolio from Mentor Graphics builds on their existing offerings supporting electronic product development. With this purchase, they

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also get Mentor's simulation business, expanding their CFD capabilities with a focus on electronics.

Of course, the devil is in the details but activist investors have been pushing Mentor to make some big moves, and now they have—by being acquired. Siemens has shown the ability to bring acquisitions into the fold and to convince the acquired leadership to stay on board, essential to making such moves pay off sooner rather than later. CIMdata looks forward to learning more about this acquisition in the coming weeks, and to understand just how Siemens broad Industrie 4.0 vision will be complimented by this stunning move.

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## ***Siemens PLM Software's Components Conference: A Critic's Perspective***

16 November 2016

*Key takeaways:*

- *Third party software solution providers attest to their reliance on Siemens PLM Software's technology components, such as Parasolid*

After fighting some brutal rush hour traffic in the greater Boston area on October 11, 2016, I breathed a sigh of relief and took my seat at the first Siemens PLM Components Conference in Boston's trendy Aloft Seaport hotel to see Mr. John Whetstone, Director of Product Management and Marketing at Siemens PLM Software welcome a select audience of attendees. While most software product conferences target end users, this unique gathering focused on the technical and business leadership of solution providers that build and deliver those products—software products, built using Siemens PLM Software's components.

Just looking around the room, I concluded it was a potential paradise for anyone seeking possible employment with an innovative, high tech PLM or BIM solution provider. The room was peppered with industry notables representing some of the leading mechanical and architectural, engineering, and construction (AEC) providers from around the world. I anticipated that conference breaks would be very interesting, networking with the range of attendees from North America, Europe, and Asia.

To kick off the conference, Mr. Whetstone introduced Mr. Jim Rusk, Senior Vice President, and CTO of Siemens PLM Software. Mr. Rusk delivered a keynote address setting the tone and spoke of the technology forces driving product and process innovations around the globe. His message resonated with the audience in that each of them faced the challenge of those same technology forces in their own companies and products. They all need to deal with the dramatic emergence of the Internet of Things (IoT) and a 300% increase of connected devices over the past five years. The cloud and mobile technology are proliferating and forging new business models. 3D printing technology is revolutionizing

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the product development and manufacturing process. Toss in the advances in knowledge automation and advanced robotics—and the impact on both the technical and business process directions all these companies face, as well as their customers, is daunting.

Mr. Rusk’s advice was summed up as: “Software solutions must rapidly comprehend and adapt to technological transformations in order to drive innovations.” And what better way than to leverage existing, world class foundational components in 3D modeling, constraint solving, path planning, interoperability, and graphics. Many of the day’s speakers attested to their software solution’s reliance on Siemens components and being able to focus on delivering their own brand of application expertise.

Next, Mr. David Mitchell, Siemens PLM Software’s CTO of Cloud Services, took center stage to expound on a myriad of innovation approaches and the impact of cloud technology. The variations were somewhat mind boggling, proving that today’s entrepreneurs were trying a vast number of strategic ways to deliver value. The most eye opening topic he addressed was the “Unicorn Club” of companies—software companies started since 2011 that are now valued at over \$1 billion by public or private market investors.

The day continued with presentations from a range of industry leaders such as Mr. Jon Hirschtick, Founder and Chairman of Onshape, Mr. James Dagg, CTO at Altair, Mr. Jon Stevenson, Senior Vice President of Global Software, Stratasys, and Mr. Sean Flaherty, Chief Strategy Officer of Nemetschek. Each discussed their company’s products and technology in the context of today’s driving trends. One was struck by the challenge of weaving all the varied technologies together into an innovation solution that would meet customer expectations. At the end of the day, it was apparent to me that while the richness of any one technology component be it for 3D geometry, graphics, or constraint solving was important, the interplay between components and application domain expertise was critical for a successful solution.

Siemens PLM Software’s leadership in the components market and the dynamic content of this first PLM Components conference showcased that interplay. Going forward, I see the significant role it can play to help shape the future of PLM and BIM solutions.

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## Acquisitions

***GE Digital Acquires ServiceMax to Extend Predix and Analytics Across Field Service Processes***

14 November 2016

GE Digital today announced it has acquired ServiceMax, a leader in cloud-based field service

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management (FSM) solutions, for \$915 million. The acquisition provides GE Digital with enhanced capabilities to advance its Industrial Internet vision, enabling customers to immediately gain more value from their assets and find greater efficiency in their field service processes.

Service has always been a core part of GE's strategy and capability and was an early target for the company's work in analytics and productivity. GE has invested in the build out of digital twins for industrial assets. In addition the company has accelerated productivity improvements through digitizing service processes. The ServiceMax product offering was an essential element to driving GE internal productivity. With this acquisition GE plans to add analytics and insights into the ServiceMax logistics, workforce optimization and deployment models. GE estimates there is a market-wide opportunity to improve service productivity by \$25 billion through the use of analytical tools.

ServiceMax's platform provides a full suite of applications, including inventory and parts logistics, scheduling and workforce optimization, and work order management. As a result of this transaction, customers will be able to access these offerings from a modern rapid application development cloud and field-ready mobile platform that combines the strength of GE's deep domain expertise and advanced industrial portfolio with ServiceMax's field service expertise. The company plans to leverage the Predix platform to further the development of additional industrial applications focused on service delivery.

"This acquisition builds upon our ongoing efforts to enhance our overall technology stack around the Predix platform and advance our Industrial Internet vision," said Bill Ruh, CEO, GE Digital. "Improved productivity is critical for the Industrial Internet and digitizing field services is a cornerstone of a successful digital industrial strategy. This transaction, along with our previous acquisitions of Wurldtech and Meridium, is directly aligned with our strategy to drive growth both inorganically and organically by building the capabilities to support the digital industrial transformation through Predix, APM and the Digital Thread."

The addition of ServiceMax's complementary capabilities and highly-talented team better positions GE Digital to develop and accelerate the commercialization of Predix applications, delivering service products through a single, robust platform. This platform will address the service needs of enterprises across the entire service delivery process and provide the critical expertise and technologies needed to accelerate GE Digital's existing services solution roadmaps. Coupled with the recent acquisition of Meridium, GE Digital will now provide a full suite of applications centered on driving comprehensive asset management for the Industrial Internet.

In addition, this transaction brings to GE Digital an immediate vertical customer base as well as significant recognition in the market and enhances GE Digital's ability to commercialize its field services solutions. ServiceMax will have access to new verticals and will be able to utilize GE Digital's scale and comprehensive Predix platform to enhance and strengthen their offerings for customers.

Dave Yarnold, CEO, ServiceMax, said, "The transaction will help position ServiceMax to reach its next phase of growth by having access to GE's broad and advanced industrial portfolio, deep domain expertise and substantial customer footprint. We look forward to benefitting from GE's experience, capabilities and resources as we expand into new markets while continuing to deliver the best tools to help customers maximize productivity and efficiency."

Acquisitions are part of the GE Digital strategy to accelerate efforts in leading the Industrial Internet. The company will provide an update on their strategy and demonstrate progress at their flagship Minds and Machines event November 15-16 in San Francisco.

The acquisition of ServiceMax is expected to close in January, subject to customary closing conditions,

including receipt of applicable regulatory approvals.

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## ***Perforce Announces Acquisition of ALM Provider Seapine Software***

17 November 2016

Perforce Software today announced its acquisition of Seapine Software, a leading provider of application lifecycle management (ALM) solutions, based in Mason, Ohio.

This acquisition expands the Perforce portfolio of developer and designer tools beyond enterprise class version management and code review, and provides customers with additional capabilities across the development pipeline. Seapine's ALM solution accelerates development and delivery cycles through more efficient management of the product development process.

"The Seapine suite of products strongly complements the Perforce portfolio and both companies address many of the same enterprise product development needs including traceability, auditability, and predictability of the development process for high value assets," says Janet Dryer, Perforce CEO. "The depth and experience the Seapine team has in ALM and building efficiency and quality into the development pipeline is a welcome addition to the Perforce team."

Seapine's ALM solutions help companies manage the process of developing high-quality complex products—often in regulated industries, such as life sciences, automotive and financial services. Seapine's solution consists of scalable team-based tools for superior requirements management, issue tracking, software configuration management, automated software testing, load testing, and test case management. When used together, these tools provide end-to-end traceability of artifacts, resulting in increased product quality and development predictability.

"We found the technology, teams, and application development expertise at these two companies to be a great fit," says Rick Riccetti, CEO, Seapine Software. "Our leadership team is excited about the opportunity to expand the capabilities and the reach of the Seapine portfolio with the resources and support of an organization like Perforce."

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## ***Siemens to Expand its Digital Industrial Leadership with Acquisition of Mentor Graphics***

14 November 2016

- Siemens to acquire design automation and industrial software provider Mentor Graphics for \$37.25 per share
- Mentor Graphics is a pioneer and leader in design automation software ranging from Integrated Circuit (IC) and System-on-Chip (SoC) design to automotive electronics solutions
- Siemens becomes unique digital industrial player to offer mechanical, thermal, electrical, electronic and embedded software design capabilities on a single integrated platform

Siemens is further building its Vision 2020 to shape Digital Industrial Enterprise by expanding its unique portfolio for industrial software. Siemens and Mentor Graphics today announced that they have entered into a merger agreement under which Siemens will acquire Mentor for \$37.25 per share in cash, which represents an enterprise value of \$4.5 billion. The offer price represents a 21% premium to

## CIMdata PLM Industry Summary

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Mentor's closing price on November 11, 2016, the last trading day prior to the announcement. Mentor's Board of Directors approved and declared advisable the merger agreement, and Mentor's Board of Directors recommends the approval and adoption of the merger agreement by the holders of shares of Mentor common stock. Mentor shareholder Elliott Management has committed to support the transaction.

This acquisition decisively extends Siemens' leading Digital Enterprise Software portfolio with Mentor's well established electronics IC and systems design, simulation and manufacturing solutions. These capabilities are essential for today's smart connected products such as autonomous vehicles. The combination provides mechanical, thermal, electronic and embedded software tools which will allow Siemens' customers to further accelerate their innovation, drive production efficiencies and optimize the operation of their products in the field. Now, for the first time, quality, efficiency, flexibility, safety and speed can be optimized across technical domains, throughout the entire lifecycle and for the entire extended enterprise.

"Siemens is acquiring Mentor as part of its Vision 2020 concept to be the Benchmark for the New Industrial Age. It's a perfect portfolio fit to further expand our digital leadership and set the pace in the industry," said Joe Kaeser, President and CEO of Siemens AG.

"With Mentor, we're acquiring an established technology leader with a talented employee base that will allow us to supplement our world-class industrial software portfolio. It will complement our strong offering in mechanics and software with design, test and simulation of electrical and electronic systems," said Klaus Helmrich, member of the Managing Board of Siemens.

Mentor is headquartered in Wilsonville, Oregon, U.S., and has employees in 32 countries worldwide. In its fiscal year ended January 31, 2016, Mentor had over 5,700 employees and generated revenue of approximately \$1.2 billion with an adjusted operating margin of 20.2%. Siemens expects these attractive margins to continue in the future and contribute significantly to the Product Lifecycle Management (PLM) software business of Siemens Digital Factory (DF) Division, which Mentor will join. Mentor serves a large, diverse customer base of marquee systems companies and IC/semiconductors companies with over 14,000 global accounts across communications, computer, consumer electronics, semiconductor, networking, aerospace, multimedia, and transportation industries. Mentor is viewed as a global leader in strategic industry segments including IC design, test and electronic systems design and analysis; and emerging markets including automotive electronics.

"Combining Mentor's technology leadership and deep customer relationships with Siemens' global scale and resources will better enable us to serve the growing needs of our customers, and unlock additional significant opportunities for our employees," said Walden C. Rhines, chairman and CEO of Mentor. "Siemens is an ideal partner with financial depth and stability, and their resources and additional investment will allow us to innovate even faster and accelerate our vision of creating top-to-bottom automated design solutions for electronic systems. We are excited to join the Siemens family, as it is clear they share the same values and focus on customer success, and are pleased that this transaction provides immediate and certain value to our stockholders."

Siemens expects to achieve synergies through a combination of revenue growth and anticipated margin expansion, with a total EBIT impact of over €100 million within 4 years from closing the transaction. Additionally, the transaction is expected to be EPS accretive within three years from closing. Closing of the transaction is subject to customary closing conditions and is expected in Q2 of calendar 2017. Mentor will be part of the PLM software business of Siemens' DF Division. DF is the industry leader in automation technology and a leading provider of PLM software.

“By adding Mentor’s electronic design automation solutions and talented experts to our team, we’re greatly enhancing our core competencies for product design that creates a very precise digital twin of any smart product and production line,” noted Helmrich.

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## Company News

### ***3D Systems Demonstrates Digital Manufacturing Solutions as Cost Effective Alternatives to Traditional Manufacturing***

15 November 2016

3D Systems showcased today how advancements in its digital manufacturing technologies can offer viable, enhanced alternatives to traditional manufacturing processes. By providing access to accelerated, cost-efficient means of production, 3D Systems provides its customers a competitive advantage in designing and manufacturing unique and low volume products. At formnext 2016, the company highlighted three key technology innovations driving this shift: Digital Molding, materials innovation and advanced software solutions.

Digital Molding, powered by 3D Systems’ Figure 4 technology, enables the rapid, tool-free, continuous production of plastic parts with improved efficiency, design flexibility and economics as compared to traditional methodologies. It is a modular, scalable additive manufacturing process that simplifies and accelerates the production of plastic parts. This ultra-fast, automated Stereolithography (SLA) system enables manufacturers to go straight from CAD to manufacturing, without tooling, for the rapid production of complex plastic parts. By eliminating the time and money required for traditional tooling, Digital Molding saves upfront costs and enables immediate part revisions without operational downtime.

More information on Digital Molding will be available during the tct introducing @ formnext presentation by 3D Systems’ Senior Researcher Scott Turner, entitled “The Evolution of Stereolithography for the Automated Manufacturing Environment,” held Tuesday, November 15, at 11:10 AM CET in Hall 3.1, Stand K70, of Messe Frankfurt.

In addition to 3D Systems’ Digital Molding demonstration, the company will introduce several new materials engineered for advanced applications across 3D Systems’ MultiJet Printing (MJP), Selective Laser Sintering (SLS) and SLA technologies.

New to the company’s MJP materials lineup is VisiJet® M3 CAST for the ProJet MJP 3600W and 3600W Max. VisiJet M3 CAST is a durable, next generation 100% wax material for the high throughput production of consistent, superior quality patterns for metal casting excellence and efficiency. Ideal for end-use metal part manufacturing, VisiJet M3 CAST joins QuickCast™, 3D Systems’ SLA solution for precision metal casting, as part of the company’s digital casting materials portfolio. Digital casting offers advantages over traditional casting in design complexity as well as the cost and time savings that can be realized from bypassing tooling.

New materials in Selective Laser Sintering (SLS) include:

- DuraForm® ProX GF Plastic, a glass-filled composite Nylon material for the ProX® SLS 500. DuraForm ProX GF offers best-in-class rigidity and stiffness with amazing tensile, flexural and impact strength and advanced thermal resistance.

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- DuraForm ProX HST Composite, a proprietary mineral-filled composite material for the ProX SLS 500. With the highest available temperature resistance among 3D Systems' SLS materials and a high strength to weight ratio, DuraForm ProX HST is excellent for applications requiring lightweight, rigid, load bearing parts.
- DuraForm TPU Elastomer, an abrasion and tear-resistant material for the sPro™ 60 HD-HS. With an excellent recovery memory to maintain original shape, DuraForm TPU enables functional prototypes for wear-and-tear testing and is well suited for applications ranging from footwear and sports equipment to gaskets, weather sealing, and flexible hosing and conduits.

To facilitate visualization applications requiring high temperature resistance, 3D Systems is also introducing Accura® Phoenix for its SLA printers. Offering superior clarity, Accura® Phoenix is also less rigid than existing high temperature materials, enabling improved performance in assembly operations where some flexibility may be required.

3D Systems will also feature demonstrations of advanced manufacturing software solutions engineered to streamline and simplify the design to manufacturing workflow. Visitors to formnext will be able to experience the 3D design, optimization and management tools of 3D Sprint™, the company's revolutionary software for plastic part production, as well as 3DXpert™, the company's all-in-one solution for metal additive manufacturing.

“As 3D printing continues to evolve from prototyping to production, our end-to-end solutions are transforming the way our customers design and manufacture,” said Herbert Koeck, SVP & General Manager, EMEA, 3D Systems. “With innovations such as Digital Molding and advanced new materials, we are helping to make 3D production real.”

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## ***3D Systems Introduces Enhanced GibbsCAM 2016 Education Editions***

15 November 2016

3D Systems announced today the immediate availability of enhanced GibbsCAM® 2016 Classroom and Student Editions, now with free access to GibbsCAM VoluMill™, the popular, high-speed machining (HSM) utility used in manufacturing. GibbsCAM 2016 Education Editions include both VoluMill Wireframe and VoluMill Solids to ensure that students can gain exposure to the utility before entering industry. These new additions enable GibbsCAM 2016 Education Editions to more closely mirror industrial versions of GibbsCAM, which recently began including VoluMill Wireframe as a free option to new licensees. GibbsCAM 2016 Education Editions are now shipping to current educational users who have maintenance contracts.

GibbsCAM Education Editions have the same shop-friendly interface as industrial versions, ensuring that graduating students can be prepared to immediately enter the production environment without having to learn a new or modified interface. The software is designed to be easy to teach, learn and use, making class time more productive for instructors and students alike. GibbsCAM Classroom Edition can be licensed for stand-alone and network implementation, and is operationally and functionally identical to industrial versions of GibbsCAM. Students can complete any CNC programming tasks required in the industrial environment, including the generation of machine-ready programs through post-processing. The Classroom Edition is complemented and augmented by the Student Edition, which enables the student to work off campus, and use the software's bidirectional communication for interaction with the

Classroom Edition.

GibbsCAM VoluMill was developed specifically to achieve the highest material removal rates with maximum cutting-tool engagement, while extending tool life through smooth transitions and constant tool loading. Users have reported cycle time reductions as high as 70% and tool life extension of up to five times. VoluMill Wireframe and VoluMill Solids are integrated within GibbsCAM's traditional, shop-friendly interface. VoluMill Wireframe is geared for GibbsCAM Production Milling, which provides wireframe geometric modeling and toolpath generation for 2-, 2.5-, and 3-axis machining, with 4th axis positioning. VoluMill Solids, an incremental enhancement to VoluMill Wireframe, integrates with the GibbsCAM Solids Option, allowing users to select solids, surfaces and facet bodies to quickly and easily generate HSM toolpaths for ultra-high performance material-removal efficiency.

3D Systems' GibbsCAM software provides full CNC programming, toolpath verification, machine simulation and post-processing for vertical and horizontal machiningcenters, turning centers, lathes, multi-task machines, and 5-axis rotary tables and indexers.

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## ***Altair Semiconductor and Check Point Software Co-Develop IoT Security Solution***

15 November 2016

Altair Semiconductor (altair-semi.com) today announced that it has partnered with Check Point Software Technologies Ltd., to provide a comprehensive security solution for IoT devices.

The partnership entails Altair-enabled IoT devices routing traffic through Check Point's Capsule Cloud solution, screening all data and averting any threats before they reach devices.

"Embedding the Check Point Capsule Cloud comprehensive security capabilities into the Altair cellular-IoT connectivity chipsets enables manufacturers to offer a highly integrated and cost-effective security solution," said Alon Kantor, VP Business Development for Check Point Software. "IoT provides hackers with numerous access points into networks which can potentially pose serious threats - from personal information theft in consumer markets, to vulnerability of mission-critical networks such as connected power grids. The integrated solution developed together with Altair serves as an essential component for defending against such threats."

The enhanced security achieved through routing Altair's 1160 CAT-1 chipsets through Check Point's Capsule Cloud includes advanced threat prevention, adaptive risk mitigation, and information protection.

"The growing IoT industry will continue to present a range of security challenges, exceeding the capabilities of standard Internet security protocols," said Eran Eshed, Co-founder and VP of Worldwide Sales and Marketing for Altair. "This partnership, leveraging Altair's market leading IoT chipsets and Check Point bringing its security expertise to the cloud, will prove integral to combating cybercrime."

Altair's 1160 CAT-1 chipset was developed specifically for IoT and M2M applications, such as wearables, vehicle telematics, smart meters and security applications. The 1160 features best-in-class power consumption, enabling battery life in excess of 10 years and a customizable application layer.

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## ***ANSYS Collaborates With GE to Drive Digital Twin Value and Deliver the Promise of the Industrial***

## ***Internet of Things***

16 November 2016

ANSYS announced today that it will collaborate with GE to create model-based digital twin technology and disruptive commercial business models to deliver on the promise of the Industrial Internet of Things. This builds on an existing relationship between the two companies. ANSYS will demonstrate a variety of industry-specific digital twins at GE's Minds + Machines event in San Francisco, dedicated to building the digital industrial ecosystem.

Simulation technology is no longer solely used by engineers to design better products and reduce the costs of physical testing. Leading organizations are expanding the use of simulation into operations by creating digital twins – virtual representations of individual operating assets whose performance and productivity can be improved dynamically through simulation technology. Coupling the rich sensor data from increasingly smart industrial equipment with the predictive power of simulation, specific operating conditions can be analyzed and failure points predicted, unlocking billions of dollars in production and maintenance optimization.

Digital twins can live with the asset, providing a dynamic self-teaching model used to optimize its performance in conjunction with an Industrial Internet of Things (IIoT) platform. This combination of machine learning, coupled with physics-based modeling, enables organizations to see how their products performed in the past and predict the future simultaneously. Using ANSYS to create model-based digital twins will provide a foundation to scaling the benefits of the IIoT. This is no longer a theoretic concept as ANSYS and GE Global Research are already demonstrating actual implementation of digital twins, like the GuardEon Molded Case Circuit Breaker, a powerful low-voltage circuit breaker designed for global industry applications. By using ANSYS software, GE engineers are able to study and test complex physics at a level of detail that was impossible to achieve through physical testing.

"Pairing physics and analytics models via the digital twin is essential to providing our customers with the 360 degree insights they need to create competitive advantage in a rapidly changing world," said Eric Bantegnie, ANSYS vice president. "We are excited to be taking another step forward in our long-standing partnership with GE."

Through this collaboration, ANSYS will work with GE Digital, GE Global Research and GE's industrial businesses to expand and integrate ANSYS' leading physics-based engineering simulation and embedded software development platform with GE's Predix platform to power digital twin solutions across a wide range of industries. Scaling digital twin solutions from the edge to the cloud will accelerate the value of ANSYS simulation, drive Predix adoption and open new opportunities to explore disruptive business models and commercial relationships.

"We are building the digital industrial ecosystem to drive better outcomes for our customer through the Predix platform," said John Magee, Chief Marketing Officer, Predix. "ANSYS is the market leader in physics-based simulation, and we are pleased to work with them to scale model-based digital twin solutions on Predix to provide our customers with new insights that were not possible before."

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## ***Autodesk Bets Big on Forge Platform to Make Anything***

15 November 2016

At Autodesk University, Autodesk, Inc. announced that developers and customers of all sizes are

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adopting its Forge platform to build and deploy apps and services for making the world around us. The company also introduced new AR/VR capabilities to drive immersive real-time industry experiences and shared its plans to use Forge as its common data environment and engine for simplifying its own product offerings.

Since announced at Autodesk University 2015, Autodesk Forge has expanded to include more robust integrations to manufacturing and construction enterprise systems to streamline collaboration, integrate with manufacturing and BIM workflows and make it easier to get things made. The more than 4,000 apps and services created on Forge span a variety of business needs ranging from part inspection to sub-sea surveying, from managing mines with drones to turning cost estimation into a competitive advantage.

Autodesk has aggressively broadened the Forge platform and ecosystem in the past twelve months. The most recent platform enhancements and future plans include:

- AR/VR – Added Augmented Reality/Virtual Reality support into the Forge 3D browser and mobile viewing experience. Data preparation and connectivity services (similar to what LIVE Design does with Revit data) to connect data and ease the asset pipeline between real-time AR/VR applications and Autodesk’s native design solutions will be available in the future.
- Rendering – The Autodesk Rendering service recently surpassed 50 million renderings. A new Forge Render API will soon be available, which will extend rendering power to any application.
- Data Management – Enhanced to support access projects and files managed in support for BIM 360 Docs and Fusion.
- Security and Reliability – Autodesk is pursuing industry standard security compliance such as SOC2 to maintain robust security and data protection controls, so customers can focus on creating services with high confidence.

“Autodesk relies on Forge as the foundation for its own cloud services like Fusion 360 and BIM 360, and we want both developers and our end customers to benefit from creating lightweight applications that fit their business needs,” said Amar Hanspal, SVP products at Autodesk. “Forge is empowering companies to build and deliver all sorts of industry applications, and we are thrilled to see the range of connected experiences created with our platform in just one year.”

## **Forging the Future Together**

Autodesk invests in and partners with companies developing innovative solutions and services on the Forge Platform. JE Dunn, MakeTime and Seebo are a few of the companies using Forge for building apps and services.

JE Dunn is at the forefront of the digital revolution in construction, and over the past year used Forge APIs to custom build Lens--a model-based estimating application. Lens harnesses and maximizes the value of information-rich models, combined with cutting-edge visualization technology to connect design data to elements of estimates. It brings together advanced functionality delivered through Forge, and integrates with Dunn Dashboard and Autodesk BIM 360, creating a seamless, transparent and connected ecosystem.

MakeTime is an online platform that simplifies the process of getting machined parts made in America. MakeTime matches part orders from manufacturers to available CNC machines at pre-qualified shops across the United States. The result is simplified supply chain management & empowered expansion for

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both manufacturers and machine shops alike. MakeTime is plugged into Fusion 360, Autodesk 360 and the Forge initiative to connect engineers to an expansive network of modern machine shops and on-demand CNC machines.

Seebo provides a Software as a Service (SaaS) platform for developing Internet of Things (IoT) and smart, connected products. Seebo's technology intuitively connects Autodesk design apps like Fusion 360 and enables users to drag and drop components (connectivity, motion and location features, etc.) into a product design framework to transform simple products into smart technology.

“We're very excited about the integration between Autodesk Forge and Seebo, which will provide Autodesk customers with access to some of the most cutting edge IoT development tools available. The joint platform allows manufacturers to tap into the world of IoT efficiently and cost effectively,” said Lior Akavia, Co-Founder and CEO of Seebo.

## **Forge for Autodesk**

Cloud-native and always connected, Forge is the platform in which Autodesk is building three industry specific experiences that span design, make and use for each of our major industries. Each offering is built on a common data environment with a set of lightweight applications and experiences that work across multiple platforms such and personas. Whether used internally by Autodesk for development and simplification or externally by companies to deliver and deploy apps and services, the Forge platform is the backbone to make anything.

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## ***CADFEM GmbH to Resell Modelica Libraries from Modelon***

15 November 2016

Modelon is pleased to announce that CADFEM GmbH has signed an Agreement to resell their Modelica Libraries. CADFEM is among the pioneers of numerical simulation, one of the largest European CAE suppliers, and ANSYS Elite Channel Partner. Since 1985, CADFEM has been a sales partner of the software producer ANSYS. As ANSYS Elite Channel Partner, CADFEM employs more than 120 ANSYS specialists.

“While our customers are building products with ever growing functionality and complexity, their competitive pressure requires smarter development strategies to ensure that they stay competitive”, says Erke Wang, Managing Director, Technology at CADFEM. “Simulations very early in the design process like those enabled by Modelon's libraries will help them to more efficiently bring quality products to market.”

The proven and feature rich family of Modelica Libraries from Modelon enables users to quickly start comprehensive, reliable model based system level simulations. CADFEM is working with Modelon to provide broader access to Modelon's acclaimed industry standard Libraries on the user-preferred Modelica Platform including ANSYS – Simplorer.

Modelica Libraries from Modelon include the following:

- Electric Power Library
- Engine Dynamics Library
- Environmental Control Library

- Fuel Cell Library
- Fuel Systems Library
- Heat Exchanger Library
- Hydraulics Library
- Hydro Power Library
- Liquid Cooling Library
- Pneumatics Library
- Thermal Power Library
- Vapor Cycle Library
- Vehicle Dynamics Library

“We are very excited to have CADFEM as a partner servicing the German ANSYS community”, says Hubertus Tummescheit, CSO of Modelon. “CADFEM’s large customer base is proof of their outstanding simulation competence in many areas and we look forward to our cooperation and bringing new, synergistic solutions to the CADFEM customers.”

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### ***The Computer Aided Technology Family of Companies is Now Offering Free SOLIDWORKS Training for Veterans***

11 November 2016

Computer Aided Technology (CATI) and MCAD Technologies (MCAD) are helping veterans return to the civilian workforce and advance their careers by offering free SOLIDWORKS CAD Software Training Classes.

“We want to do our small part to help those who have given so much for all of us. Our veterans return home from service with valuable skills that employers are looking for – skills like leadership, dependability, integrity, and teamwork. Even with these skills, some of them struggle to re-enter the civilian workforce. We want to help our veterans expand on those skills and ease the transition back into the workforce,” said Rich Werneth, President, Computer Aided Technology (CATI).

CATI and MCAD are inviting U.S. military service Veterans to take the SOLIDWORKS Essentials Training Class at no cost. The SOLIDWORKS Essentials class provides the foundation for building SOLIDWORKS skills. After completing this class, students are ready to make parts, assemblies and drawings, and will be on the path to SOLIDWORKS proficiency. The schedule is now open for registration through 2017 and classes are offered regularly at a CATI or MCAD Training Facility (facilities are located in Indiana, Illinois, Wisconsin, Kansas, Missouri, Colorado, New Mexico, Washington, and Oregon). For more information and to register for classes, visit the CATI or MCAD website.

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***EOS to Integrate EOSPRINT Software into Siemens NX to Build on Siemens’ End-to-End Additive***

## ***Manufacturing Solution***

11 November 2016

EOS, a global technology and quality leader for high end Additive Manufacturing (AM) solutions, has joined the Siemens PLM Software Partner Program to collaborate on extending Siemens' recently announced end-to-end additive manufacturing solution. EOS plans to deliver a seamless integration of the EOS AM software EOSPRINT into Siemens' NX™ software for the manufacturing industry. This solution will be an important part of the Siemens overall additive manufacturing solution offering helping to deliver an integrated and associatively linked additive manufacturing process from design to advanced 3D printing with EOS printing machines.

The integration of the EOSPRINT software into NX, Siemens' flagship solution for integrated computer-aided design, manufacturing and engineering simulation (CAD/CAM/CAE), targets companies wanting to take full advantage of additive manufacturing for parts engineered for performance and 3D printed with repeatable quality. Based on this integration, users work in one single software system. As a result, process steps from digital part design up to the AM part building process are linked together to be performed quicker, easier and more reliably than before.

### Serial manufacturing based on optimized workflows

Based on this co-operation Siemens and EOS take a big leap towards the use of additive manufacturing for industrial serial production. The integration of EOSPRINT into NX will enable design engineers to take full advantage of the additive manufacturing possibilities for industrial 3D printing on EOS machines by connecting previously separate software tools for part design, simulation, and data preparation and build job transfer.

EOSPRINT will plug into the NX environment, enabling design engineers to shape a product for additive manufacturing in one single integrated software setting. This eliminates file conversions between different software solutions and can significantly reduce the investment in time required to learn multiple tools. At the same time it enables an uninterrupted and associatively linked workflow in a consistent software environment. This will allow engineering changes to seamlessly update through the design-to-print preparation process, and the ability to transfer build jobs directly from NX to an EOS machine.

Zvi Feuer, Senior VP Manufacturing Engineering Software, Siemens PLM Software said: „To realize the full potential of our end-to-end additive manufacturing solution, Siemens is committed to working with technology partners like EOS to enable new solutions that drive advances in additive manufacturing capabilities and making the 3D printing of production parts a reality. “

Dr. Adrian Keppler, Chief Marketing Officer (CMO) at EOS concludes: „By simplifying the usability of EOSPRINT, EOS addresses a clear customer requirement to further progress the deployment of our technology. The integration of EOSPRINT into NX is a step in this direction. Now design engineers can use a single integrated additive manufacturing solution to both design and prepare parts optimized for 3D printing.”

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## ***IBM Adds PLM Platform Aras Innovator to Complement Continuous Engineering Solution***

15 November 2016

IBM will offer the Aras Innovator product lifecycle management (PLM) platform to complement the IBM Internet of Things Continuous Engineering solution to deliver end-to-end Internet of Things (IoT) product development.

IBM, the market leader in systems and software development, announces Aras Innovator PLM platform available from IBM. Aras Innovator represents a breakthrough in flexibility, scalability, and upgradability in product data management (PDM) and PLM solutions—even when heavily customized—relative to traditional PDM and PLM systems. Aras Innovator is designed to be used as either as a full PLM solution, or to extend an existing PLM/PDM solution.

The IBM IoT continuous engineering solution supports systems engineering and software development activities throughout the product development lifecycle, helping engineering teams to predictably deliver high quality results and to respond with agility to change.

The IBM Continuous Engineering solution and the Aras Innovator platform govern the process of building complex, connected products. IBM Continuous Engineering portfolio covers the lifecycle of Software development. IoT products include software, firmware, electronics, electrical wiring, and sophisticated mechanical designs, along with connectivity for services. With the Aras Innovator PLM platform, IBM now offers a complete solution that covers the full systems engineering lifecycle for building the Internet of Things. Such products have now become so complex that no single role, such as chief engineer or systems engineer, can understand all the details and interdependencies to manage a product through its design, construction, assembly/manufacture, delivery and in-service update lifecycle.

This complex system of engineering information must be managed across disciplines and throughout the extended enterprise. Managing such a complex lifecycle is challenging—it requires the right tools and the ability to collaborate across multiple disciplines.

The IBM IoT continuous engineering solution and the Aras Innovator platform together govern the process of building complex, connected products.

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## ***IoT for German Machine and System Builders: T-Systems and Eaton Network Industrial Applications***

16 November 2016

T-Systems and Eaton have collaborated to develop secure Internet of Things (IoT) solutions that allow machine and system builders to network their applications in the Cloud. Electrical and industrial control components from Eaton provide easy connection, based on the OPC UA standard, to the multi-IoT platform of Deutsche Telekom's subsidiary. This will enable machine builders to monitor and carry out predictive maintenance of complete systems directly from the Cloud, as well as optimising control of wear and tear, operating costs and productivity of the machinery by using intelligent data analysis.

The new IoT solutions provide manufacturers with a major advantage. Thanks to the analysis capabilities of extensive machine data throughout the entire life cycle of one or more machines, irrespective of their location, vast and diverse possibilities for productivity and efficiency gains have

been opened up.

Together with pilot customers, the companies are developing IoT service packages that address different use cases based on live data from ongoing production. These will enable machine builders to better manage their operations. Users would, for example, be able to determine when worn parts need replacing. They could also analyse the relationship between production output or individual consumption data and components used, such as filters and raw materials, and/or process data, such as temperatures and pressures, in ongoing production processes.

“Small and medium-sized machine and system builders don't usually have the opportunity and the means to invest in secure, high-performance IoT and Cloud technology. It is a great opportunity for them to join forces with trusted partners who can offer them a simple, holistic and safe way to get their machines IoT ready and help them take advantage of the possibilities related to cloud services,” said Stefan Selke, MOEM Segment Marketing Manager EMEA at Eaton.

Wilfried Bauer, Head of System Integration, Digital Solutions, Cloud, Internet of Things at T-Systems added: “We want to supply German engineering companies with the technology and components to network their equipment via the Cloud as well as support them on their way to Industry 4.0 with digital solutions that can be precisely tailored to their needs.”

Today, only five per cent of the potential of IoT is being used (source: Pierre Audoin Consultants). Reasons for this include the complexity and security of the IoT. T-Systems’ multi-IoT platform makes it easy and safe for mechanical engineers to enter the IoT because it combines and connects all the IoT components that the customer wants – whether platforms, IoT devices or software solutions. The multi-IoT platform is hosted and operated in T-Systems’ German high-security Cloud computer centre, and meets the strict standards of the German data protection act.

At SPS IPC Drives in Nuremberg, Europe's leading trade fair for electrical automation, the two companies will for the first time present their offering to the market. From 22 to 24 November 2016 visitors to the Eaton booth (9-371) can learn more about the customer benefits and see live demonstrations of how machines and systems can efficiently and affordably be made “IoT ready” with Eaton technology and linked directly to Cloud infrastructure with T-Systems.

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## ***Netfabb Doubles-down to Offer Complete Additive Manufacturing Solution***

16 November 2016

Following the major release of Netfabb 2017 in September, Autodesk is doubling-down on its vision of Netfabb as a true end-to-end additive manufacturing solution. The company has bolstered the software with enhanced simulation capabilities, new hybrid manufacturing functionality and collaborative multi-head 3D printing.

The additions further extend Netfabb’s lead as a complete solution for additive manufacturing, allowing customers to test, optimize, prepare and 3D print commercial-quality products.

Autodesk Netfabb helps additive manufacturing professionals move from CAD design to finished part efficiently. With its connected software for additive manufacturing and design, Netfabb provides valuable insight to help businesses large and small improve material selection, process simulation to validate build strategies, optimize designs and drive machines.

# CIMdata PLM Industry Summary

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“Not only is Netfabb easy to use, it does much of the heavy lifting in preparing models for 3D printing.” Said Dan Ko, Strategic Initiatives Lead at Shapeways. “Netfabb streamlines the process of fixing common 3D print file problems for additive manufacturing. If we didn’t have Netfabb to automate a large portion of file preparation process, each build would be substantially more time consuming and labor intensive.”

In this latest update, users get new tools that will help them stay innovative and competitive in the additive manufacturing and 3D printing industry. Key new features include:

## **Cloud-Based Simulation**

The wide-spread adoption of metal additive manufacturing has been historically slow due to the lack of predictability in the manufacturing process, as well as the high costs of iteration. Simulation for Netfabb, which is built on technology from the acquired Pan Computing, helps customers to predict and adjust for deformation, allowing part designers and manufacturing engineers to optimize designs and reduce the number of iterations required for reliable build results.

Simulation for Netfabb has been available in conjunction with a local solver since the September release. From November 30, 2016 to January 15, 2017, active Netfabb subscribers will have access to a tech preview of a new cloud solving option. During this period, subscribers will be able to access cloud solve at no cost. The feedback we receive from our subscribers during this time will help guide the direction of this new solution before we make cloud-based simulation available as a pay-per-use capability in a future release of Netfabb.

## **Hybrid Subtractive and Additive Workflows**

Subtractive manufacturing processes are often required to improve the surface finish and accuracy of features on additively manufactured parts. Extra material must be added to the original design to accommodate these subtractive processes, creating a larger geometry referred to as the near-net shape. Netfabb now includes solid modeling and near-net shape planning capabilities based on Autodesk (formerly Delcam) PowerShape technology.

This new hybrid manufacturing functionality allows users to keep models in solid form and take advantage of solid modeling tools aligned to CAM workflows. It also allows manufacturers to keep sight of the original solid model and easily track the near-net shape as it is built to allow for the subtractive processes. With better visibility of the original model and the near-net shape, Netfabb opens a connected workflow between build preparation and post-processing operations.

## **Collaborative Multi-head 3D Printing**

Also included in this update is technology from Project Escher, breakthrough control technology that powers machines with multiple extrusion-based print heads working together to print a single part. This collaborative 3D printing process makes printing industrial scale parts with greater speed and detail a possibility. In keeping with Autodesk’s focus on advancing the additive industry, the company is also open-sourcing the hardware specifications and the software required to create machines with this new collaborative 3D printing capability. By doing so, hardware vendors will be able to create multi-head printers that can print parts far faster than conventional single-head printers.

“The new production, optimization and simulation tools within Netfabb are very exciting and we are delighted to be working with Autodesk to enable a streamlined additive manufacturing print experience for our joint customers,” said Stephen Anderson, Renishaw Software Director. “We look forward to future integration opportunities with the QuantAM ‘workbench’ – a series of API’s that can be made

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available to those wishing to leverage the power of the Renishaw additive manufacturing platform. This will give users of Autodesk Netfabb the confidence that any toolpaths they generate will be optimized for Renishaw's AM systems, ensuring maximum part quality every time."

"Netfabb helps to accelerate the additive manufacturing design and production process by giving designers and engineers the tools they need to make better parts, streamline their workflows and improve the efficiency of their printers in one comprehensive software solution," said Mark Forth, manager of manufacturing industry strategy at Autodesk. "The addition of cloud-based simulation, subtractive workflow capabilities and collaborative 3D printing means that we are now providing our customers with the most comprehensive and powerful additive solution on the market."

## Price and Availability

These updates to Netfabb will be available on November 30, 2016, with existing subscribers receiving the new version automatically.

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## ***PTC and GE Digital to Expand Strategic Alliance***

16 November 2016

PTC and GE Digital today announced from GE's Minds + Machines 2016 plans to expand their strategic alliance, first established in 2015, to bring integrated solutions to the Industrial Internet of Things (IIoT) market. Specifically, the companies will pursue a 'ThingWorx for Predix' technology suite that will make it easier for joint customers to use ThingWorx to develop custom applications that run on Predix, GE's Industrial Internet operating system. Additionally, PTC intends to sell ThingWorx coupled with GE's Predix technology, and GE intends to sell 'ThingWorx for Predix' together with Predix solutions that it offers to new and existing customers.

The expansion of the collaboration between PTC and GE Digital is based on a shared vision for the Industrial Internet and defines the respective complementary roles of ThingWorx and Predix.

PTC's ThingWorx® application enablement tools allow for rapid drag-and-drop development of IoT solutions that readily incorporate industrial automation connectivity, machine learning and predictive analytics, remote service, and powerful augmented and virtual reality (AR/VR) experiences. GE's Predix provides an edge to cloud distributed operating system for the Industrial Internet, including edge management and analytics, cloud-based connectivity and asset management. The companies plan to leverage PTC technology as an easier means of development on Predix.

Working with GE, PTC plans to develop an optimized version of elements of its ThingWorx technology suite that would integrate tightly with Predix, making it possible for customers to enjoy the full power of ThingWorx with their Predix system. In turn, GE would deploy 'ThingWorx for Predix' together with Predix for its own internal manufacturing and service processes. The collaboration will explore making the complete range of ThingWorx capabilities available in 'ThingWorx for Predix,' including capabilities from PTC's ThingWorx, Kepware®, and Vuforia® solutions, enabling GE and its customers to accelerate the development and deployment of Predix-based solutions. 'ThingWorx for Predix' would leverage the platform capabilities in Predix to store the underlying asset models and run analytics at scale.

PTC would pursue opportunities to sell joint offerings based on GE Digital's Brilliant Manufacturing Suite or use cases where ThingWorx is integrated with Predix. GE would sell 'ThingWorx for Predix'

# CIMdata PLM Industry Summary

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IoT solutions to new and existing customers, with a focus on smart engineering, manufacturing, operations, and service.

"GE Digital is one of PTC's most forward thinking partners, and has been working closely with us to push the boundaries of what's possible with the convergence of the physical and digital worlds," said Jim Heppelmann, president and CEO, PTC. "The intended expansion of our collaboration is yet another great example of what our companies are capable of achieving together, and we will work to bring increased value not just to GE and PTC, but to our respective and mutual customers."

"Tools from ThingWorx with Predix the platform are two of the most powerful offerings across the entire Industrial IoT landscape. By bringing together their complementary capabilities in ThingWorx for Predix, GE aims to bring new levels of intelligence and efficiency to our internal manufacturing operations, as well as extend those benefits to our ever-growing customer base," said Jim Fowler, CIO, GE.

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## ***Stratasys and Siemens Partner to Incorporate Additive Manufacturing into Volume Production***

16 November 2016

Stratasys Ltd. and Siemens today announced a formal partnership to integrate Siemens' Digital Factory solutions with Stratasys' additive manufacturing solutions. The partnership is intended to lay the foundation for the two companies to fulfill their shared vision of incorporating additive manufacturing into the traditional manufacturing workflow, helping it to become a universally recognized production practice which can benefit multiple industries, including aerospace, automotive, transportation, energy and industrial tooling. This announcement also builds on Siemens' recently announced end-to-end solution integrating digital design, simulation and data management with conventional and additive manufacturing.

Stratasys and Siemens have been collaborating on multiple projects including the direct link from Siemens' NX™ software for CAD/CAM/CAE to Stratasys' GrabCAD Print platform - enabling a seamless design-to-3D print workflow - and the recently previewed Stratasys Robotic Composite 3D Demonstrator that incorporates Siemens' product lifecycle management (PLM) software and its motion control and CNC automation technologies, to produce strong, lightweight performance parts.

"Siemens is enthusiastic about this partnership with Stratasys and the opportunity to help our customers adopt a new manufacturing mindset that we believe will result in better products produced more economically and delivered more efficiently," said Zvi Feuer, SVP Manufacturing Engineering Software, Siemens PLM Software. "We are committed to the industrialization of additive manufacturing with all of its unique advantages, including complex part geometries, on-demand production and mass customization. This relationship helps set the course for continued innovation and leadership through the tight integration of our product lines and through collaboration on comprehensive additive manufacturing solutions."

"Siemens' capability and commitment to the digital enterprise vision, along with its close collaboration with Stratasys, can help many industries realize shorter time-to-market, achieve flexibility in operations and improve efficiency in workflows through horizontal (machine-to-machine) and vertical (plant and top-floor to factory floor) integration," added Arun Jain, VP of Motion Control, Siemens Digital Factory US.

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While additive manufacturing technology has made great strides over the past years, additional criteria are required for it to take its place in volume production environments and become as commonplace as CNC. Ideally, additive manufacturing solutions should deliver robust, repeatable and reliable operational performance with predictable properties across a broad portfolio of materials that are certifiable for specific applications and that are driven by a seamless, digital integration from design to production. Together, Stratasys and Siemens plan to address these challenges.

"With our complete 3D printing ecosystem of customer applications, hardware and software platforms, advanced material offerings and consulting services, Stratasys is uniquely positioned to help manufacturers leverage 3D printing to transform their business models," said Dan Yalon, Executive Vice President, Products, Stratasys. "Stratasys is excited to formalize our partnership with Siemens and views it as a major catalyst for the industrialization of additive manufacturing. Together, our companies are joining forces to create a cohesive, best-of-breed technology foundation that enables large-scale manufacturers to enjoy the benefits of additive manufacturing in traditional production environments. We believe that the impact on production practices will begin sooner rather than later with the aerospace, automotive and factory tooling industries expected to benefit first."

## **Next generation of additive manufacturing solutions, featured at formnext 2016**

Stratasys and Siemens are showcasing their next generation additive manufacturing solutions at the formnext 2016 exhibition in Frankfurt. Stratasys' Robotic Composite 3D Demonstrator is being featured in a unique virtual 3D printing experience at the Stratasys booth, Hall 3.1, Stand H40. In addition, Siemens is demonstrating its end-to-end additive manufacturing software solution along with its scalable hardware platform for motion control and relevant manufacturing processes in Hall 3.1, Stand J20.

At the core of the 3D Demonstrator is Stratasys' advanced FDM (Fused Deposition Modeling) Additive Manufacturing technology synchronized to complex multi-axis motion. It features Stratasys' extensible and scalable multi-operation architecture that provides the flexibility to integrate subtractive manufacturing, inline inspection and verification and product finishing. Stratasys engineered materials are employed to produce structures that are optimized for weight and performance. The result is a new hybrid manufacturing approach that is unconstrained by the traditional limitations of composite lay-up and the layer-by-layer limitations and support material requirements of traditional 3D printing.

The new workflow for the Stratasys Robotic Composite 3D Demonstrator begins with Siemens' NX software. NX enables designers to create parts to be produced on the system, simulate and evaluate the design for manufacturability and generate and send all the manufacturing instructions for part production. Throughout the manufacturing process, performance is controlled and communicated directly to the manufacturing operations management systems. The result is a seamless CAD-to-product workflow that streamlines production and ensures end-to-end traceability and part quality.

The motion control for the Stratasys Robotic Composite 3D Demonstrator is driven by the Siemens' Sinumerik 840D sl CNC. The open architecture of Sinumerik control combines the strengths of Siemens' NC with flexible robot kinematics. The integration with Stratasys' extrusion control technologies to execute manufacturing instructions from NX CAM, results in a high degree of freedom for robotic FDM extrusion.

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***TCS Awarded Digital Innovator of the Year***

16 November 2016

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Tata Consultancy Services has been awarded 'Digital Innovator of the Year' in the Ecosystem Excellence category at GE's Minds + Machines event.

The '2016 Digital Innovator of the Year' award recognises TCS innovation and excellent in developing the TCS Digital Store™, an expanding suite of ready-to-use digital solutions that deliver superior customer service, real time data analytics, and organisational agility across multiple industry segments. The award was given at an event held in San Francisco, California.

"I congratulate TCS on such a well-deserved recognition as being an innovative and strategic partner to GE on the Industrial Internet of Things (IIOT). TCS Digital Store is providing a rich customer experience to deliver solutions to GE and its customers," said Denzil Samuels, Global Head of Channels & Alliances, GE Digital.

"This award from GE is a reflection of TCS focus on driving digital transformation for its customers, leveraging our domain and digital capabilities to enrich GE's unique Industrial IoT platform," said Anupam Singhal, Vice President, Tata Consultancy Services.

The TCS Digital Store™ contains more than 150 solutions, including TCS Plant Operations for real time analytics in a manufacturing plant, Environmental Health and Safety Analytics for industrial facilities, Plant Equipment Prognostic Maintenance, and Engine Telematics for tracking and logistics.

More than 50 of these solutions are built on Predix.

As part of the GE Digital Alliance Program, TCS is rapidly expanding its Predix capabilities, having more than 800 Predix trained consultants.

TCS continues to build innovative Industrial IoT applications on GE's Predix platform with an emphasis on transforming the value chain across multiple industries.

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## ***TRUMPF and Siemens are Driving the Industrialization of Additive Manufacturing***

15 November 2016

Laser system manufacturer TRUMPF and engineering technology leader Siemens announced a new partnership to help industrialize laser metal fusion technology and make the additive manufacturing process for metal parts an integral part of the production process. The two companies - who announced their partnership at the formnext trade fair in Frankfurt - are pooling their strengths and working together to develop a software solution for the design and preparation of 3D printed metal parts. The aim is to integrate and streamline the entire powder-bed-based laser metal fusion (LMF) process for TRUMPF printing machines into Siemens NX™ software. The comprehensive offering will address part design and engineering for additive manufacturing as well as 3D print preparation with integrated TRUMPF build processor technology.

"Our combined solution will offer customers a high degree of process reliability thanks to its use of smart product models through all phases of the process," said Tony Hemmelgarn, president and CEO, Siemens PLM Software. "There will be no need for data conversion because the tools for design, simulation, 3D printing and NC programming of metal parts are integrated into one system."

"These are decisive factors in making additive manufacturing a realistic proposition for industrial applications," adds Peter Leibinger, Head of the TRUMPF Laser Technology/Electronics Division. "Our partnership will result in an optimum interaction between machine and software so customers can move forward with designs optimized for additive manufacturing."

Streamlined workflow from design to finished 3D printed part

The solution will integrate the recently announced NX software technology for additive manufacturing with the TRUMPF build processor and be sold with TRUMPF TruPrint Laser Metal Fusion printers. The new software offers a standardized user interface across the end-to-end additive manufacturing process. It addresses the entire digital process chain in a single, integrated associative software environment, eliminating the need to use separate standalone applications for part design and data preparation. This new software package, TruTops Print with NX, brings all the necessary functions together into one new solution for the additive manufacturing of laser metal fusion parts with TRUMPF printing machines.

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## Events News

### ***BOXX Demonstrates Pro VDI at Autodesk University 2016***

14 November 2016

BOXX Technologies today announced it will demonstrate Pro VDI, the world's first overclocked virtual desktop infrastructure (VDI) solution at Autodesk University (AU) 2016 in Las Vegas, NV. BOXX exhibit booth #1817 will also feature GoBOXX MXL VR, BOXX render nodes, and BOXX APEXX workstations hosting both Autodesk modeling and GPU rendering demonstrations including NVIDIA Iray. Held at The Venetian, Nov. 15-17, Autodesk University welcomes design professionals from around the world to attend classes, keynotes, exhibits, product demonstrations, and other events.

"BOXX is leading the way on virtual desktop infrastructure and virtual reality solutions," said Shoaib Mohammad, BOXX VP of Marketing and Business Development. "Our Pro VDI and GoBOXX MXL VR demonstrations offer AU attendees a tremendous opportunity to experience these technologies firsthand and develop a clear understanding of how BOXX virtual solutions can benefit their organizations."

The rack mounted Pro VDI 8401R-V fully supports Autodesk Revit, Maya, and other single-threaded, graphics-intense applications while relying on the same overclocked Intel® Core™ i7 processor found in BOXX APEXX desktop workstations. For immersive virtual reality, the compact, high-performance GoBOXX MXL VR mobile workstation also features an Intel Core i7 processor (4.0GHz), along with NVIDIA GeForce graphics and up to 64GB of RAM. Recommended for applications like 3ds Max and Revit, GoBOXX MXL VR is capable of handling complex 3D CAD assets for development, yet also includes the graphics performance necessary to drive demanding immersive VR experiences in product design or architecture.

In addition to VDI and VR, BOXX will showcase a variety of APEXX workstations and GoBOXX mobile workstations, as well as the renderPRO 2 dedicated rendering node. The ultra compact APEXX 1 will host Revit, 3ds Max, Maya, and Inventor demos, while APEXX 2 features a Revit to VR workflow and APEXX 4 demonstrates GPU rendering with 3ds Max and Revit. APEXX 5, the world's most advanced workstation, demonstrates rendering with NVIDIA Iray and renderPRO 2, the desk side

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rendering solution, highlights the advantages of offloading (3ds Max) rendering—a key component of The BOXX Workflow. Rounding out the lineup is the ultra-thin and ultra-light GoBOXX 15 SLM notebook demonstrating various Autodesk applications.

"For the world's fastest, most reliable and innovative solutions, Autodesk users look to BOXX," says Mohammad. "We truly understand what visualization professionals need to remove bottlenecks, accelerate their workflows, and increase productivity."

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## ***CADsoft Consulting to Present and Exhibit at Autodesk University***

14 November 2016

CADsoft Consulting Inc., a leader in the implementation of design and construction technologies, is excited to announce its showcasing advance design technology this week in at Autodesk University. CADsoft has long been a premier provider of advanced construction and BIM technology, helping professionals within the industry harness the full power of design solutions to accelerate construction and owner operations.

Lisa Duncan, Principal at CADsoft and Preston Long, Technical Specialist, of CADsoft, will be presenting on "Mitigating Construction Risks with BIM and Robotic Total Stations", and Jeffrie McDonald, Construction Technology Advisor for CADsoft will be presenting on "How Maintenance Management plus IoT Solutions Can Enable Smart Building for Building Owners". CADsoft will offer demonstrations and information on collaborative construction management with Autodesk BIM 360 solutions, energy management software in Panoramic Power, scanning with Topcon and drone technology and other solutions specific for construction and building owners. Plan to stop by exhibit booth #1785.

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## ***CAM Vendors Meet at Inaugural ModuleWorks Insider Conference – MIC 2016***

15 November 2016

The first ModuleWorks Insider Conference – MIC 2016 – took place on 3-4 November in Aachen, Germany. Over 50 representatives from the world's leading CAM software companies met to learn about the latest software developments and discuss the future of the CAM industry.

ModuleWorks software components for multi-axis toolpath generation and simulation are a core technology used by the majority of leading CAM vendors across diverse business sectors around the world. The MIC is a forum that gives vendors a unique opportunity to learn more about the latest advances in the technology and to discuss and steer the roadmaps for the future development of the components.

The two-day conference consisted of presentations and live demonstrations, for example using a live model to manufacture a human bust using ModuleWorks machining and 3D printing technology. There were also business oriented sessions that focused on the challenges and market opportunities for vendors in the CAM industry. Break-out sessions and one-to-one meetings enabled visitors to focus on key issues in more depth.

Commenting on the inaugural event, Yavuz Murtezaoglu, Managing Director of ModuleWorks says: "The MIC 2016 was a great success in building and strengthening business relationships with our

international partners. It underlines the value and importance of working together to accelerate the development of powerful software solutions that benefit vendors and end-users. We look forward to seeing everyone again at the next MIC event.”

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## ***openBoM Introduces Enhanced CAD Integration for Bill-of-Materials (BOM) using the Autodesk Forge Platform API at Autodesk University in Las Vegas***

14 November 2016

openBoM, the world’s first cloud BOM management tool specifically designed to help manufacturing companies manage and track BOMs across organizational and geographic boundaries, now provides seamless updates of design changes into a BOM. Design documents are one of the main sources of data used to establish Engineering Bill-of-Materials. The new seamless updates for data coming from Autodesk Inventor and Autodesk Fusion 360 reduces manual data entry mistakes and errors which occur when spreadsheets are used to manage BOMs.

The following Autodesk CAD systems include new openBoM integration features:

- Autodesk® Fusion 360™ (using the Forge Platform™ API)
- Autodesk® Inventor™

New features include:

- Part only option.
- Seamless updates of design changes into Bill of Materials.
- Additional configuration support for built-in CAD BOM features.

**Parts List Support.** Allows the creation of multi-assembly part lists by generating BOMs from multi-level assemblies and calculating part lists with updated quantities.

Seamless updates of design changes into bill of materials. openBoM plug-ins now support seamless merge of changes made in CAD to openBoM BOMs. This new feature gives users the ability to make simultaneous changes to a shared BOM between engineering and manufacturing teams whilst at the same time, automatically update changes in the BOM made by design engineers in CAD.

Additional configuration support. Keeping data integration between CAD and BOM simple reduces the chances of costly mistakes and errors. The openBoM seamless integration announced today keeps things simple by offering a variety of CAD BOM configuration options not available to spreadsheet users: Autodesk Inventor BOM structure options, Inventor BOM reports and more. These integration options provide users seamless data transfers between CAD and BOM without requiring additional data mapping and configuration tools.

Autodesk’s vision and support of cloud product technologies align well with openBoM which deploys multi-tenant cloud technologies to share, perform real-time BOM edits and collaborate across distributed networks of engineers, contractors, suppliers, and manufacturers. “Our announcement at Autodesk University expands openBoM existing out-of-the-box CAD integration configurations continuing our drive to make openBoM the ultimate replacement for spreadsheets,” said Oleg Shilovitsky, CEO and Co-founder of Newman Cloud, Inc. “With this announcement, openBoM continues to demonstrate technological leadership on the Autodesk Forge Platform providing our Fusion 360 users unparalleled

management of BOMs in the cloud,” said Jim Quanci, Senior Director Autodesk Forge.

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## ***Optomec to Present at Autodesk University***

14 November 2016

Optomec today announced it will conduct a training session at Autodesk University (AU) 2016, the world’s largest gathering of Autodesk users, which will take place from November 14-17 at the Venetian in Las Vegas, Nevada.

“Additive manufacturing presents new opportunities and challenges that require a tightly connected ecosystem between design tools and 3D printing hardware to spur innovation and collaboration,” said Dave Gleason, Software Development Manager at Optomec. “We’re excited to share our knowledge with Autodesk users on how additive manufacturing technology can extend boundaries to advance the overall design and development of whatever can be imagined.”

The Optomec class, titled "Autodesk is to Additive Manufacturing as Stratocaster is to 'Stairway to Heaven,'" will take place on Thursday, November 17, 2016, at 3:00 p.m. in Zeno 4701, level 4.

This class will describe the workflows that Optomec uses to translate CAD designs into printed features on existing parts or surfaces. It will cover specific additive-manufacturing challenges that are related to 3D printing and how Autodesk software can be used to tackle them. It will also further explore the subtle differences between additive and subtractive manufacturing and how Autodesk addresses these. Attendees will develop a deeper knowledge of the use of Autodesk products for additive manufacturing and how they can be adapted to suit their specific additive requirements. Attendees will also learn about the differences between additive and subtractive methodologies and how they apply to CAD and CAM (computer-aided manufacturing) development as a whole. This session features AutoCAD FeatureCAM software and how it has been extended to enable additive manufacturing workflows for 5-axis tool path generation.

Optomec and Autodesk have a history of working collaboratively in developing software tools that optimize 3D print solutions.

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## ***PTC Demonstrates Industry Leadership in Smart Cities at Smart City Expo World Congress 2016***

14 November 2016

PTC today announced its participation at Smart City Expo World Congress 2016, where it will feature several new smart city solutions that have been built by partners using the ThingWorx® Internet of Things (IoT) platform. PTC will have demonstrations of smart city solutions focused on water, utilities, lighting, city services, and buildings at the ThingWorx booth, F632.

At the ThingWorx booth, the following ThingWorx partners will be showcasing their smart city solutions:

- Itron – Smart energy solution that optimizes solar installations via IoT field area communications and smart sensing infrastructure.
- AquamatiX – Smart water solutions capable of monitoring and optimizing a city’s water and

sewage services.

- Synapse Wireless – The SimplySNAP smart lighting solution enables the development, control, and optimization of a smart lighting implementation.
- Tech Mahindra – Smart city solutions and services to enable offerings such as smart energy management, smart parking, smart waste bins, smart street lighting, and security & surveillance.
- WiseUp – A smart building solution that monitors, analyzes and manages building data to improve energy usage, maintenance, operations, and comfort.

Additional ThingWorx-powered smart city solutions include ThingFarm’s smart water and smart air quality offerings that provide real-time pollution monitoring with alerts, rules, and notifications, available for demonstration at Libelium’s booth, E505. Further, DEPsys’ smart grid solution for monitoring, control, and optimization of the modern low voltage network will be on display at European Utility Week, co-located with Smart City Expo World Congress 2016 at the Fira Barcelona Gran Via.

ThingWorx serves as the foundational platform that these partner companies use to rapidly and economically build robust smart city solutions and complementary IoT applications. The ThingWorx platform enables the rapid creation and deployment of new IoT applications and is well suited to normalize and optimize complex sets of sensors, devices, assets, and software solutions, forging a cohesive group of systems for use in smart city solutions.

“Smart cities represent a unique opportunity to apply the power of IoT to our everyday environments, and to improve the quality of the very roads, buildings, and public services that we use each day,” said Kevin O’Brien, vice president of IoT partner sales, PTC. “We want our ThingWorx platform to be at the core of the infrastructure of smart cities, enabling companies selling their solutions to cities around the world to build their solutions with speed, ease, and quality.”

“We chose the ThingWorx platform because we want to rapidly develop applications that our customers want and scale them at a rate consistent with the interest that we are seeing,” said Dr. Roberto Aiello, managing director, Itron Idea Labs.

“The ThingWorx platform is an essential component of our smart water solution,” said Laurie Reynolds, managing director, AquamatiX. “ThingWorx provides all of the necessary IoT platform components, allowing us to focus on our expertise and applications in clean and waste water management, and deliver the most robust and cost effective solution to the cities, utilities, water service, and industrial companies that we work with.”

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## Financial News

### ***Agilent Technologies Reports Fourth-Quarter 2016 Results***

15 November 2016

Agilent Technologies Inc. today reported revenue of \$1.11 billion, up 7.3 percent year over year (up 6.3 percent on a core basis) for the fourth fiscal quarter ended Oct. 31, 2016.

Fourth-quarter GAAP income from continuing operations was \$124 million, or \$0.38 per share. Last year’s fourth-quarter GAAP income from continuing operations was \$140 million, or \$0.42 per share.

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During the fourth quarter, Agilent had intangible amortization of \$32 million, impairment costs of \$25 million, acquisition and integration costs of \$13 million, transformation costs of \$6 million and \$5 million of other costs. Excluding these items, and a tax benefit of \$12 million, Agilent reported fourth-quarter adjusted income from continuing operations of \$193 million, or \$0.59 per share.

“Agilent delivered a great fourth quarter, capping off a strong fiscal year 2016,” said Mike McMullen, Agilent president and CEO. “Our fourth-quarter revenue was up 6.3 percent on a core basis supported by strength across all businesses, and earnings per share came in well above our guidance range.”

“Key drivers for our better-than-expected quarter were stronger-than-expected growth in pharma and Europe, along with continued strength in China. Looking ahead, we are well positioned to capture market growth with our strong lineup of new offerings recently introduced and in the pipeline for 2017,” McMullen added.

Fourth-quarter revenue of \$548 million from Agilent’s Life Sciences and Applied Markets Group (LSAG) grew 6 percent year over year (up 5 percent on a core basis), with strength in pharma, food and forensics. LSAG’s Q4 operating margin was 22.8 percent.

Fourth-quarter revenue of \$370 million from the Agilent CrossLab Group (ACG) grew 8 percent year over year (up 8 percent on a core basis). Both services and consumables experienced healthy growth across all geographies. ACG’s operating margin was 22.7 percent in the quarter.

Fourth-quarter revenue of \$193 million from Agilent’s Diagnostics and Genomics Group (DGG) increased 8 percent year over year (up 8 percent on a core basis(2)), led by strength in pathology and nucleic acid solutions. DGG’s operating margin for the quarter was 19.6 percent.

Agilent expects first-quarter 2017 revenue in the range of \$1.04 billion to \$1.06 billion. First-quarter non-GAAP earnings are expected to be in the range of \$0.48 to \$0.50 per share.

For fiscal year 2017, Agilent expects revenue of \$4.35 billion to \$4.37 billion and non-GAAP earnings of \$2.10 to \$2.16 per share. The guidance is based on Oct. 31, 2016 exchange rates.

To read the full report, [please click here](#).

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### ***Koch Agrees to Invest Over \$2 Billion in Infor***

16 November 2016

Infor today announced it has reached a definitive agreement in which Koch Equity Development LLC (“KED”), the investment and acquisition subsidiary of Koch Industries, Inc., has agreed to make an investment of more than \$2 billion in the company. The investment will provide Infor access to additional growth capital to accelerate innovation, expand distribution, and continue disrupting the enterprise applications industry.

KED's investment is strong validation of Infor's strategy and growth - a journey fueled by product investment, innovation, and an entrepreneurial culture. Koch Industries is an American multinational corporation that employs 100,000 people globally and is estimated by Forbes to be the second largest privately-held company in the United States with annual revenue of approximately \$100 billion. The investment by KED significantly strengthens Infor's capital base and provides an entrée into a large ecosystem of businesses contemplating digital transformation.

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Infor became the first company to move mission critical industry applications to the cloud, and now counts more than 66 million users of its cloud applications. The company's double digit revenue growth in its most recent quarter was fueled by a 130% annual increase in SaaS revenue; more than half of Infor's software revenues are now derived from cloud applications.

Infor's unique cloud strategy uses Amazon Web Services, enabling the company to invest in deep industry functionality with capital that would otherwise be needed to maintain its own data center infrastructure. Infor's broad set of applications running on a hyper-scale cloud with cutting-edge data science and design provide a foundation for modernizing companies in healthcare, fashion, retail, distribution, public sector, and discrete and process manufacturing.

The Infor management team is headed by Chief Executive Officer Charles Phillips, who is leading the company into a new phase of growth, investment, and innovation.

"Koch is one of the largest private companies in the world with diversified holdings and immense resources to support the next exciting phase of growth at Infor and we are thrilled to have their support," said Charles Phillips, CEO of Infor. "Some of the largest companies in the world have approached Infor looking for a modern alternative to the legacy options available for mission critical business applications. Infor has the scale and capital to provide a digital platform for the Global 5000."

Under Phillips' leadership, Infor invested approximately \$2 billion in product design and development over the last five years and delivered more than 400 new products, 1,700 integrations, and 16,000 industry features in its CloudSuite product line. Infor now has 15,000 employees and operates in more than 170 countries. Key milestones include:

- **First Industry Cloud Company** - By building deep industry features directly into its applications instead of leaving that critical content to third party consultants, Infor became the first company to run mission critical applications in the cloud for healthcare, manufacturing, retail, and public sector organizations. Companies no longer want the expensive consulting engagements that were historically required to add industry enhancements to generic software products. By putting thousands of micro-vertical industry features into the applications, all customers in that specific industry can share those features in a multitenant cloud environment. Applications rich in industry domain lower the cost and time of deployment and make future enhancements and upgrades far easier. By enabling mission critical processes to be managed and integrated with applications for CRM, HCM, Marketing, and more in the cloud, Infor delivers a complete CloudSuite for its target industries, which has led to significant growth and larger deal sizes.
- **Dynamic Science Labs** - Just off the campus of M.I.T. in Kendall Square, Infor built a data science team with more than 70 PhDs and former professors to deliver predictive analytics, machine learning, and optimization for use-cases specific to select industries. Recent innovations around retail assortments, inventory optimization, and pricing segmentation were made possible because of Infor Dynamic Science Labs and access to data on a hyper-scale cloud with unlimited compute power.
- **Creative Agency** - Infor was the first enterprise applications company to build a captive creative agency in New York. The agency, dubbed Hook & Loop, focuses on user experience and design, a historical weakness for enterprise applications. By leveraging the vast pool of design talent in Manhattan, Hook & Loop has re-defined user experience in the business application category. Infor recently launched H&L Digital, customer-facing consultancy for digital transformation projects.

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- Global Commerce Network - Infor ION, a next generation middleware platform that is far simpler and more open than traditional middleware, leverages the open source Apache ESB and a simple XML-based publish-and-subscribe model using OAGIS standards. The ability to quickly integrate Infor and non-Infor applications led to ION becoming one of Infor's fastest growing products ever. Infor is the only business applications provider with a direct commerce network. The company's GT Nexus network connects over 28,000 businesses, banks, logistics providers, brokers, and carriers to process transactions and enable collaboration and visibility among these trading partners.

## Leadership Quotes

"Over the last 15 years, Infor has grown from a small company to one of the most significant enterprise software companies in the world and it's been an amazing thing to be a part of," said Infor Board member Jim Schaper.

"The support we are providing to Infor marks one of the largest investments KED has ever made and demonstrates the confidence we have in Infor's technology, team and business model," said Matt Flamini, KED's President.

"Infor's demonstrated capability to help companies across a wide spectrum of industries automate and improve efficiency is relevant to our broad portfolio of invested companies and we look forward to exploring co-innovation opportunities," said Brett Watson, Senior Managing Director of KED.

"We are extremely pleased with the progress the Infor team has made in scaling and executing into the massive opportunity in enterprise technology applications," said David Dominik, Managing Director of Golden Gate Capital, which made its first investment in Infor in 2002. "KED's investment is a tremendous endorsement and we look forward to working together with them and supporting management as they continue delivering industry-leading software applications to a growing list of world class customers."

"We remain a meaningful investor in Infor and will continue to support the company in the years ahead," said Rishi Chandna, Managing Director at Golden Gate Capital.

## Transaction Overview

This transaction, which is subject to customary closing conditions and regulatory approvals, is expected to close in early 2017. The KED investment will be a combination of preferred and common equity.

Infor's existing shareholders, including Golden Gate Capital, Summit Partners, and Management will maintain control of the company. KED will have the right to appoint four of nine directors on the board of Infor's parent company.

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## *Stratasys Releases Third Quarter 2016 Financial Results*

15 November 2016

Stratasys Ltd. announced financial results for the third quarter of 2016.

Q3-2016 Financial Results Summary:

- Revenue for the third quarter of 2016 was \$157.2 million, compared to \$167.6 million for the same period last year.

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- GAAP gross margin was 46.9% for the third quarter, compared to a GAAP negative gross margin of 47.7% for the same period last year.
- Non-GAAP gross margin was 54.0% for the third quarter, compared to 50.8% for the same period last year.
- GAAP operating loss for the third quarter was \$19.4 million, compared to a loss of \$931.3 million for the same period last year.
- Non-GAAP operating income for the third quarter was \$3.3 million, compared to non-GAAP operating loss of \$10.0 million for the same period last year.
- GAAP net loss for the third quarter was \$20.8 million, or (\$0.40) per diluted share, compared to a loss of \$901.3 million, or (\$17.35) per diluted share, for the same period last year.
- Non-GAAP net income for the third quarter was \$0.1 million, or \$0.00 per diluted share, compared to Non-GAAP net income of \$0.7 million, or \$0.01 per diluted share, reported for the same period last year.
- The Company maintains \$239.3 million in cash and cash equivalents as of the end of the third quarter.
- Net R&D expenses for the third quarter amounted to \$24.0 million, representing 15.3% of net sales.
- GAAP EBITDA for the third quarter amounted to \$3.5 million.
- Non-GAAP EBITDA for the third quarter amounted to \$12.0 million.

To read the full report, [please click here](#).

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## Implementation Investments

### ***KBR Selects Intergraph Smart 3D for Offshore Projects***

14 November 2016

US engineering, procurement and construction company KBR has selected Intergraph Process, Power & Marine's Smart 3D solution to enhance implementation and execution of key offshore projects.

This technology will be used to design and develop offshore platforms and large LNG liquefaction plants. KBR selected Smart 3D and Intergraph's SmartPlant Enterprise to improve data quality and design consistency for customers.

Intergraph's solution offers an integrated, collaborative design with a fabrication knowledge management environment solely prepared for offshore design and fabrication.

KBR vice-president of engineering M.L. Morrow said, "We aim to optimise design efficiency and ensure that KBR is meeting the needs of our clients in the highly competitive offshore market. This is the reason why we opted for Intergraph's enterprise suite covering the full project lifecycle from engineering, procurement and project planning to fabrication, construction and project completion."

Intergraph Process, Power & Marine President Gerhard Sallinger said, "We are pleased to further extend

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our partnership with KBR and honoured it chose the world's most advanced 3D design solution for the design and construction of its large and complex projects around the world, both offshore and onshore.”

Smart 3D is an advanced and productive 3D design solution intended to optimise design, boost safety, quality and productivity, while reducing project schedules.

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## ***Systemx Corporation Selects Aras PLM to Streamline Research & Development, Manufacturing***

15 November 2016

Aras® today announced Systemx Corporation, a leading international manufacturer of laboratory testing instruments and reagents for medical laboratories worldwide, has selected Aras Innovator® PLM platform. The company will standardize product design information as electronic master data and streamline data management between development and manufacturing. The implementation will help the company meet compliance requirements for medical instrument manufacturers.

After evaluating several document management systems and Bill of Materials (BOM) solutions, Systemx selected Aras for its native Web platform technology, solution flexibility, and out-of-the-box BOM management capabilities. Systemx will use Aras as an integral part of its transfer of design information among product development and manufacturing processes, in order to ensure compliance with medical instrument regulations.

“Systemx has a long history of providing leading laboratory testing instruments and reagents for medical organizations worldwide,” said Peter Schroer, CEO of Aras. “Aras will provide Systemx with the control and flexibility to improve collaboration and unify the product development process across their expanding business units.”

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## Product News

### ***Announcing Altair PBS Cloud™; Altair's Latest Technology to Further HPC Appliance Solutions***

14 November 2016

Altair is excited to announce the upcoming availability of Altair PBS Cloud, its latest appliance solution to further cloud computing for organizations. Altair PBS Cloud is the solution to build and run high-performance computing (HPC) appliances for both public clouds, private clouds, and bare-metal infrastructure. Altair will release Altair PBS Cloud in the first quarter of 2017 following conclusion of a private preview.

Altair PBS Cloud allows IT administrators and managers to model, create, deploy, manage and monitor HPC appliances. They are able to build complex architectures graphically and deploy HPC stacks everywhere securely within minutes. Altair PBS Cloud provides tremendous cost savings to an organization as it allows optimized consumption of resources and automates cloud bursting to handle peak workloads through IT-controlled policies.

“Altair provides solutions that democratize technology for organizations of all sizes to continuously push the boundaries of innovation,” said Sam Mahalingam, CTO, Altair. “With Altair PBS Cloud,

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creating and maintaining HPC appliances in the cloud is made easy and possible whether or not you have IT resources."

Altair PBS Cloud provides extensive benefits to customers beyond just controlling costs. It also increases the efficiency of an organization by expanding its computational power, giving it, for example, the ability to perform design of experiments (DOE). Engineers and scientists will enjoy shorter wait times to complete their work and can run a greater amount of simulations, consequently creating more robust products faster.

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## ***Geometric Americas Launches CAMWorks® 2017***

14 November 2016

Geometric Americas, Inc. today released CAMWorks 2017 with significant additions to the software focusing on customer needs and worldwide manufacturing initiatives, such as Smart Manufacturing and Industrie 4.0. The new capabilities in CAMWorks 2017 are a result of more than 60 customer-driven enhancements.

“The additions to CAMWorks 2017 reinforce our vision of providing customers with a level of CNC programming automation well beyond the industry norm. As the design and manufacturing world continues to adopt SOLIDWORKS® Model Based Definition (MBD), Product Manufacturing Information (PMI), and worldwide initiatives like Smart Manufacturing and industry 4.0, CAMWorks will lead in providing faster Design-to-Manufacturing solutions,” said Jim Foster, CAMWorks Vice President Channel Sales and Marketing.

Some of the most significant enhancements to CAMWorks 2017 include:

**Tolerance Based Machining (TBM)** – Uses tolerances and non-geometric data in a 3D CAD model to select optimal machining strategies and create toolpaths automatically. CAMWorks unique TBM capability leverages SOLIDWORKS MBD and DimXpert information to read annotations from a SOLIDWORKS 3D model and use the annotations to, automatically selects the tools, feed and speed required to develop optimal toolpaths. TBM can increase productivity by as much as 70% or more over traditional CNC programming methods while providing the ability to capture and re-use best practices. It also improves quality by automatically selecting the best machining strategy to meet the required quality requirements.

**CAMWorks High Speed Machining, VoluMill™ Milling Advisor** – Provides recommended feed and speed parameters to maximize the performance of VoluMill high-speed machining. **Chuck and Fixture Definition** – Provides the ability to use chucks and fixtures designed using SOLIDWORKS parts and assemblies or STL files for toolpath simulation and collision detection in MillTurn and Turning. The chucks and fixtures can be moved or rotated in x, y, and z directions with respect to the Fixture Coordinate System (FCS) of the current part, ensuring that the chuck or fixture is properly aligned with the current part. SOLIDWORKS configurations of the chucks and fixtures are also supported.

**3D Interconnect in SOLIDWORKS and CAMWorks Solids** – Provides a continuous path of associativity from 3D model changes in all leading 3D CAD formats through automatic updating of toolpaths that dramatically speeds up re-programming as parts change.

**SOLIDWORKS Integration** – Tighter integration with SOLIDWORKS ensures that the design and

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manufacturing models are one and the same. SOLIDWORKS and CAMWorks are fully associative in all aspects including API Automation with SOLIDWORKS partner products such as DriveWorks, Configurations, MBD, and DimXpert annotations, meaning that any change made to a 3D model in SOLIDWORKS on the design side will automatically be reflected in CAMWorks on the manufacturing side. With this strong connection, machining strategies in CAMWorks are based on annotations from the MBD data provided by DimXpert in SOLIDWORKS. 3D Interconnect in SOLIDWORKS provides associativity to all major CAD formats, from geometry level changes through toolpath generation, dramatically reducing CNC re-programming efforts.

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## ***Mentor Graphics Signs Agreement with ARM to Accelerate Early Hardware/Software Development***

16 November 2016

Mentor Graphics® Corporation has signed a multiyear license agreement with ARM to gain early access to a broad range of ARM® Fast Models, Cycle Models and related technologies. Mentor® will have access to all ARM Fast Models for the ARMv7 and ARMv8 architectures across all ARM Cortex®-A, Cortex-R, Cortex-M cores, GPUs and System IP, in addition to engineering collaboration on further optimizations. This builds on agreements already in place to ensure that the validation of ARM models is completed ahead of mutual customer demand.

"Our collaboration with Mentor has resulted in one of ARM's broadest modeling partnerships," said Javier Orensanz, general manager, development solutions group, ARM. "With this agreement, our mutual customers can utilize ARM's entire model portfolio to speed system execution and debug issues with complete accuracy."

As a result of this agreement, ARM Fast Models can be combined with the Veloce® emulation platform, for example, to enable faster verification and earlier software development. Moving the modeling of the CPU and GPU out of the emulator and into the ARM Fast Models allows software execution performance orders of magnitude faster than a traditional approach that relies on a complete RTL description to be ready. This enables software tasks to be executed quickly, such as Android boots and application execution. Verification teams can now validate more than just boot code and drivers. They can also run complete software stacks to exercise the system in a realistic manner and flush out hard-to-find bugs, which would otherwise have gone undetected until physical prototypes were available.

"This second agreement with ARM clearly indicates our strategic alignment toward providing a complete hardware/software development platform," said Brian Derrick, vice president of marketing, Mentor Graphics. "Our mutual customers benefit from early access and validation of state-of-the-art Mentor technology working with the most current ARM models."

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## ***New Arena Verify Adds Collaborative Requirements and Defect Tracking to Create All-In-One Product Development Platform***

15 November 2016

Arena Solutions today announced the immediate release of Arena Verify as part of its 2016 Fall Release. With this release, Arena Solutions adds requirements and defect management to their product offering, resulting in a comprehensive, cloud-based product development platform that unites engineering,

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quality, and operations disciplines in the creation of innovative connected products.

Arena Verify plays a key role in bringing this comprehensive product development platform together. When defects are discovered, the entire process is captured within the product record, unlike stand-alone solutions which trap information within a silo accessed by only a few key people. As a result, Arena Verify provides internal stakeholders and the extended supply chain with complete information on the issue. Requirements management is integrated within the product record so that this critical information can be shared with all relevant stakeholders.

“The complexity of products, supply chains, and demand will continue to increase, so the platform on which products and customer experiences are designed, enabled, and serviced will need to evolve as well,” said Jeffrey Hojlo, program director, product innovation, IDC Manufacturing Insights. “A product innovation platform, connecting PLM, ALM, QMS, and other enterprise systems, provides that foundation for the global team of internal and external constituents responsible for product success...Cloud-based PLM systems have become more prevalent to address the need for rapid design, development, introduction, and improvement of products and services.”<sup>[1]</sup>

Arena’s product development platform links collaborative development to the product record for a continuous improvement process that brings unprecedented visibility, clarity and flexibility to all the participants in the development process. Uniting the efforts of software, firmware, mechanical and electrical engineers allows them to innovate together to identify requirements, integrate designs and improve product quality to deliver products to market faster.

"Developing new features and functionality without first finding and fixing issues and bugs that already might exist is a recipe for product disaster and failure," said Kim Khoe, director of quality assurance & regulatory affairs at Apical Instruments. "Arena Verify’s capabilities, as part of an all-in-one product development solution, is what the manufacturing market has been waiting for."

“Our goal is to provide those OEMs with complex electronics an all-in-one platform for product development, because there’s no reason these systems should live in separate silos,” said Steve Chalgren, executive vice president of product management and chief strategy officer, Arena Solutions. “Engineers, designers, quality managers, operations, manufacturing and stakeholders throughout the extended supply chain all need access to product data so they can work together to produce the highest quality product in the shortest amount to time. The introduction of Arena Verify brings together this unified solution.”

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## ***Planview Trough 13 Strengthens Enterprise Architecture Solution and Advances Vision of Connecting EA and PPM***

15 November 2016

Today, Planview® announced Trough 13, featuring an updated user experience across the product line that streamlines core enterprise architecture (EA) use cases and allows a broader set of users to manage application and technology portfolios. The release also enables customers to tailor Microsoft Power BI visualizations to their specific EA business needs. Advancing Planview’s integrated portfolio management vision, Trough 13 empowers EA and project management office (PMO) leaders to create cohesive strategic, operational and technology plans through an advanced integration with Planview Enterprise.

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“We have worked closely with the Trous customer community to deliver on the highest impact enhancements – investing in the user experience across the core product and analytics,” said Patrick Tickle, chief product officer of Planview. “At the same time, this release represents a significant step in our vision to help organizations accelerate their digital transformations by bring together the EA and PMO teams.”

Partnering with the Trous customer community, Trous 13 introduces updated visual styling across the product line, global search and interactive application portfolio management (APM) grids. The streamlined navigation is the first step in a UX transformation to modernize and consolidate the Trous product line.

With Trous 13, customers can visualize their specific data elements through Microsoft Power BI. Customers can create dashboards to perform self-service analysis of their technology and capability data to more quickly identify issues and potential resolutions.

Trous 13 delivers the latest integration of Planview Enterprise and Trous which provides EA and PMO teams with a shared approach to roadmapping to understand the impact of programs and projects on applications and technology. Leveraging Trous as the system of record for applications and Planview Enterprise for projects, the integration brings key technology information into strategic planning, capacity planning and project execution.

Additional customer-driven enhancements available in Trous 13 include:

- Standardized access control layer security across the product lines
- Streamlined administration with user interface for custom content import and export
- Productized LDAP and single sign-on (SSO) support simplifies setup and upgrades

The changing workforce, digitization and pace of innovation demand a broader definition for connecting strategy and execution to incorporate a comprehensive approach to Work and Resource Management.

Planview’s full spectrum Work and Resource Management Solutions includes:

- Planview Enterprise – enterprise-wide portfolio and resource management
- Trous® – enterprise capability and technology management
- Innotas® – IT PPM for midsized and maturing enterprises
- Projectplace® – collaborative work management for projects and teams

Find out more about Trous for enterprise capability and technology management online.

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## ***Pluralsight Introduces Learning Paths for Autodesk 3D Design, Engineering and Fabrication Software***

15 November 2016

Pluralsight today introduced five new Autodesk learning paths: Autodesk Fusion 360, Autodesk Revit, Autodesk AutoCAD, Autodesk Maya, and Autodesk 3ds Max.

Available on Pluralsight’s technology learning platform, the new, expert-recommended learning paths outline sequential trainings that provide creative and design professionals with the most direct route to

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increased proficiency in Autodesk technologies. The paths will be showcased at Pluralsight's Autodesk University booth #2972, at The Venetian on November 15-17, 2016.

"The road to Autodesk expert status is now efficient and clear. With technical software, just knowing where to start is a common issue that holds many people back," said Andy Rahden, vice president of creative, design and engineering at Pluralsight. "With Autodesk learning paths, creative and design professionals won't have this problem. In as little as five minutes, they can take a skill assessment that will reveal the best learning path for them. It's that easy.

Pluralsight's Autodesk learning paths, in combination with adaptive skill measurement tests, provide Pluralsight members an easy way to upskill. Developed by industry experts, the new paths join several other recently released Autodesk learning paths, including:

- 3ds Max: Environment Modeling
- AutoCAD: Core Skills
- Fusion 360: Core Skills
- Maya: Character Modeling, Maya: Environment Modeling and Modeling
- Revit Architecture: Core Skills and Modeling Families

"We're pleased to see Pluralsight continuing to expand the breadth of high-quality online training available to Autodesk customers for our products like Fusion 360, Revit and 3ds Max. The learning paths provide a clear and confidence-inducing way to ensure customers are gaining and mastering core skills and mastering and foundational skills within Autodesk tools. It's also great to see that Pluralsight is expanding the depth of industry and profession-specific training to help our customers in supporting the growth and development of their workforce," said Tom Williams, Director, Autodesk Knowledge Network.

Pluralsight is an Autodesk Authorized Publisher and is committed to helping creative and design professionals master new technologies.

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## ***PTC Announces Creo 4.0 for Smarter Design***

15 November 2016

PTC today announced the release of the latest version of its Creo® 4.0 3D CAD software. Creo 4.0 introduces new capabilities for Internet of Things (IoT), additive manufacturing, augmented reality, and model based definition (MBD). Creo 4.0 enables smarter design and greater productivity with a vast array of core modeling enhancements and new functionality that allow designers to create the products of the future.

In the era of IoT and smart, connected products, product development is changing and Creo 4.0 represents the future of product design. With this latest release of Creo, product designers can design smart, connected products and capitalize on new technologies, such as additive manufacturing and augmented reality.

"I'm really excited for the Creo 4.0 launch. With PTC's commitment to enabling model-based design, my customers can focus on the 3D model without having to generate any 2D drawings," said Scott Carmichael, CEO of NxRev, a PTC partner serving customers in Silicon Valley. "PTC's vision and

leadership around augmented reality and ‘Design for IoT’ has a powerful impact on my customers. These customers are developing the next generation of smart, connected products and want to take advantage of these emerging technologies throughout all phases of design."

Key enhancements in Creo 4.0 include:

## **Smart Connected Product Design**

With Creo 4.0, product developers can take advantage of the IoT to better understand how products are used and behave to improve design decisions. The solution provides the ability to pull real-world information back into the design process. It also enables a design for connectivity strategy where developers proactively design products with custom data streams by integrating sensors into the design process.

"PTC is pushing the boundaries with 3D CAD applications again, this time with capabilities that are innovative in the Internet of Things era," said Chad Jackson, Lifecycle Insights. "Connecting Creo's 3D model with ThingWorx's sensor model is key, as it allows organizations to virtually prototype sensor placement and emulate data streams without having to build anything physical. PTC is pioneering functionality that is new to the world."

## **Additive Manufacturing**

Creo 4.0 removes barriers to efficient design of production parts built with additive manufacturing techniques. It delivers "design for additive manufacturing," enabling designers to design, optimize, validate, and run a print-check in a single environment, Creo. With the ability to create parametrically controlled lattice structures, it enables designers to optimize models to meet multiple design objectives or constraints.

## **Augmented Reality**

Creo 4.0 allows for more engaging and informative visual experiences of designs by bringing the digital product into the physical world. With Creo 4.0, designers can seamlessly reuse CAD data to easily create engaging and informative visual augmented reality experiences of a design with a realistic sense of size, scale, and context.

## **Model Based Definition**

Creo 4.0 enables designers to successfully implement MBD and increase efficiency in product development by reducing dependency on 2D drawings. Creo 4.0 enables designers to reduce the errors that result from incorrect, incomplete, or misinterpreted information by guiding and educating designers in the proper application of Geometric Dimensioning and Tolerance (GD&T) information. Creo 4.0 also validates that the GD&T is captured in the 3D CAD model in a fully semantic way, that the model is compliant with ASME and ISO standards, and that it constrains model geometry to enable efficient and error-free downstream use in manufacturing and inspection.

“Realizing the potential of the IoT is not just about getting more product usage data, it means you can use, refine, and analyze that data to design better and smarter,” said Brian Thompson, senior vice president, CAD segment, PTC. “Creo 4.0 enables designers to replace assumptions in the design process with real-world data to make better product design decisions and along with model-based definition helps give designers a more complete digital definition of a product. The enhancements in Creo 4.0 not only enable designers to increase productivity, but also help designers leverage the IoT to support their digital engineering journey.”

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## ***Renga Software Releases Model Explorer Plug-in***

11 November 2016

Renga Software is pleased to announce the release of its new Model Explorer plug-in. It can be used as a programming example for development work using the Renga SDK and Qt interface kit. The Model Explorer plug-in browses Renga models, obtains object parameters and quantities, and changes the values of user-defined attributes.

The plug-in is not meant so much for end-users, as it is designed to be more of interest to programmers and developers. The code created by developers at GitHub under MIT license is posted online.

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## ***User Experience and Piece Management Are Top Latest VISI Enhancements***

16 November 2016

Significant developments in CAD and CAM functionality in the latest release of VISI, from Vero Software, give users additional speed and quality throughout their design and machining processes.

VISI Brand Manager Massimo Vergerio says CAD updates in VISI 2017 R1 are focusing on the user experience and adding enhancements to allow customers to speed up their design process.

Examples of these include:

- Speed improvement to the picking process with support for dynamic ‘drag & drop’.
- Dynamic zoom to and from an area on the screen by holding down the space bar. “This is particularly valuable to zoom in on a particular aspect of a large component on screen.”
- Intelligent chaining for joining wireframe elements together.
- Single right hand mouse click to confirm commands, instead of ticking a box with a keystroke.

For CAM, an update to geometry management means individual pieces are no longer limited by a specific project. “It gives greater freedom in picking the piece, obstacle or stock, allowing any combination. This is also used for picking faces and face lists, all managed in a much more user-friendly interface, and driven inside the operation itself. Everything is now linked to the operation, not the project, and all geometry is managed interactively, picking the specific pieces or faces that we want to machine.”

CAD Updates:

Amongst dozens of individual updates to VISI’s CAD functionality:

Several auto ballooning enhancements have been made within the Assembly Manager, providing additional control when adding BOM ballooning within the plotview. These include automatic positioning using multiple axis and removal of duplicated balloons, providing clearer results.

The creation of manufacturing drawing data has been improved by the addition of a number of additional view property settings. To simplify the creation of cut away views of complex geometry “outbreak section depths” can be automatically measured and edited by on screen selection.

Model properties can be set during the Modelling process. VISI Product Support Manager John Cockerill says: “Any model manufacturing and purchasing data can be added and controlled by simply

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selecting the model geometry from the working environment. Added data is automatically inserted into the Assembly Manager interface, providing a more interactive method of controlling modelling data.”

New functionality has been added to the Mould Design module, allowing the user to validate the effect of a cooling channel circuit. Size and positioning can be effortlessly extracted from model geometry and inserted into the Cooling Validations step-by step workflow for a thermal analysis of a mould’s temperature conditioning system.

For VISI Flow modules, the precision of warpage calculations has been enhanced by adjustments within the filling & holding algorithms. These adjustments take advantage of additional data within the material database, which has been increased with the addition on new material grades.

For VISI Progress users, a number of Strip enhancements include the ability to manipulate a strip’s width, height and component angle from the graphics area, which simplifies the strip layout process. In addition, calculated Shear / Bending / Flange stress data is provided for every individual step of a strip’s development.

Also added for Progress users, is a new function for automatically creating wire points for tooling punches. The diameter / position and multiple start points are all managed from the graphic area interface. All created wire data is automatically recognized within the CAM and Wire modules.

Improvements to the CLS License Manager now give the ability to create specific profiles and options for each user operating across a multi-seat network.

## CAM Updates:

Vero Software’s powerful and game-changing Waveform roughing technology is included for VISI Machining. Waveform’s proven cutting strategies increase material removal rates and productivity, while prolonging tooling life. The high speed machining strategy maintains a constant tool cutting load by ensuring consistent tool engagement with the material.

On Rest Roughing, instead of having to create separate dynamic incremental stock based on the previous operation, VISI 2017 R1 handles the process automatically. “The user simply picks the previous operation, and the system automatically creates this stock within the operation.” This is invaluable for 3+2 work knowing that the correct stock will be used on the tilted operations.

Again, specific Vero Group technology – this time a new, specially-developed engine – is creating a new profiling strategy for 2D milling. John Cockerill says it improves reliability and output, and provides multiple options for cornering, used for keeping or removing sharp corners on profiles. Old profiling will be converted automatically, and there are improvements to speed, obstacle and cutter compensation management, along with intelligent collision checking.

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## ***VCollab Drives Simulation Information with 2016 R1 Release of VCollab Suite***

15 November 2016

Visual Collaboration Technologies Inc. (VCollab) is proud to announce release 2016 R1 of the VCollab Suite. VCollab has been pioneering the intelligent transformation of simulation data and results into Simulation Information and this release of the VCollab suite clearly establishes VCollab as the leading technology for extracting meaningful Simulation Information that can be shared not only within the engineering process but also across the entire enterprise.

# CIMdata PLM Industry Summary

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The ability to intelligently convert simulation results into Intelligent Simulation Information provides the following benefits to organizations that are using simulation as part of the design process:

- Significantly enhances productivity of CAE analysts and efficiency of simulation processes
- Dramatically improves collaboration between design and analysis teams enabling more informed design decisions
- Allows effective enterprise wide access to Simulation Information

“Simulation is rapidly becoming a strategic asset for many organizations,” said Prasad Mandava, CEO of VCollab. “VCollab 2016 R1 enables the ability to make Simulation Information readily available for improved design decision support. The smart extraction and sharing of Simulation Information provides benefits to everyone in the product development process”

The VCollab 2016 R1 Release provides the following enhancements and more to the VCollab Suite for improved smart extraction and sharing of Simulation Information:

- Smart Batch extraction of Simulation Information with VCollab Pro and python scripts
- Enhanced “hot spot” finder
- Enhanced meta-data extraction for CAD models and CAE data and results
- Extraction of boundary conditions from CAE input files with the option to display them as symbol plot
- Enhanced Iso-Surface and section cut capability
- Extended display options.
- CSV file reader update to support nCode csv file exports
- Expanded CAE data and results reading
- Groups of parts can easily be searched and operated on
- Tracer option to create trace curve for a selected node (for transient results)
- Element result support for XY plot & symbol plot
- Unicode Support

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