PTC's LiveWorx 2017

CIMdata Commentary

Key takeaways:

- *PTC continues its evolution in support of IoT, demonstrating the convergence of the digital and physical worlds. Its IoT support, with ThingWorx at the heart, links the physical world to the digital twin while their Augmented Reality capabilities bring data in the digital twin onto the physical world.*
- *PTC clearly described their vision for IoT and PLM, and demonstrated how they support tight connections between digital representations and physical products using their platform.*
- *PTC is building out ThingWorx as a comprehensive IoT platform and is now adding applications that provide focused business functionality and value, e.g., ThingWorx Control Advisor for manufacturers.*

CIMdata attended PTC's LiveWorx 2017, held in Boston May 23 through 25. Billed as a technology conference and marketplace for solutions engineered for a "smart, connected world," the event was staged under the banner "*Shaping the Future of Business*." This year's LiveWorx grew significantly over past years as more and more individuals and companies—manufacturers, service and maintenance providers, technology solution developers, systems integrators, consultants, and others—want to learn more about smart, connected products and systems, and how the Internet of Things (IoT) offers them opportunities for new solutions and business models. According to PTC, there were almost 6,000 individuals from 40 countries in attendance at LiveWorx 2017 with another 5,000 plus logged in to live streaming sessions. Additionally, LiveWorx 2017 had over 80 sponsors and over 200 breakout sessions that covered the entire PTC solution suite, not just IoT. PTC also stated that almost 900 partners participated in the partner day held on May 22nd. CIMdata was among almost 200 analysts, press, and media covering the event.

Mr. James Heppelmann, PTC's President and CEO, kicked off the event, describing how IoT is completing the "lifecycle" part of the product lifecycle management (PLM) story by enabling companies (manufacturers and users) to monitor and control products and production lines as they are being operated or used. He stated that IoT and augmented reality (AR) need CAD and PLM data to deliver the full value of each. Mr. Heppelmann highlighted that PTC has rebranded itself, including its new logo—a combination of the stylized letters **P** for physical and **D** for digital—highlighting the yin and yang nature of the new world and the importance of using the digital twin to span them.

He illustrated how this combining of the physical and the digital is driving the "new frontier of innovation." The highlight of Mr. Heppelmann's keynote was a real-time demonstration of how PTC and a customer are using PTC's extensive solution suite including the digital twin, IoT interconnectivity, and augmented reality, across all aspects of the product lifecycle from design through sales and into operations. CIMdata thinks that this demonstration effectively showed how integration of new technologies is changing the products we develop, how we produce them, the services that can be offered, and the new ways of working that will emerge.

Panelists in a session on Industrie 4.0 (and the similar initiatives, e.g., Made In China 2025 Smart Manufacturing in the United States, India Vision 2020, and Saudi Vision 2030) described how software has become the connective tissue between smart connected products and

platform-based services and is the driving force in the continuing evolution in products, solutions, and the workplace. Software within products is enabling continuous reconfiguration to create value for customers. In a related session, Mr. Eric Schaeffer, Senior Director from Accenture, discussed Industry X.0 and has recently released a book on the same subject. The objective of Industry X.0 is to transform the way companies sell and produce, from product sales into product services, values, and outcomes. Industry X.0 is driven by the Industrial Internet of Things (IIoT) and is disruptive to the status quo. Industry X.0 clearly states the need for current business leaders to embrace IIoT or be left behind on the next wave growth and opportunity. CIMdata agrees that supporting these IoT related initiatives will be key to a company's ability to deliver competitive products in tomorrow's marketplace. To address these issues, PTC stated that they have a three-phase approach to helping companies first "Understand," then "Advance," and finally "Outperform" using IoT to enable and improve their business success.

At the event, PTC announced the release of ThingWorx 8.0; with general availability, later in June. They stated that there is now a community of over 15,000 people globally who have created over 600 ThingWorx based applications. PTC stated that with this release they are beginning to deliver role-based, purpose-built applications. The first three of these applications focus on manufacturing:

- ThingWorx Control Advisor—for control engineers
- ThingWorx Asset Advisor—for maintenance and service
- ThingWorx Production Advisor—for production managers

The intent of these applications is to enable their customers to more quickly receive value when deploying the ThingWorx platform and linking to smart products and machines. Other areas for which PTC stated they will be developing applications include: manufacturing (beyond the announced three), oil and gas, smart cities, and trucking. CIMdata believes that by providing such purpose-built applications, PTC can accelerate adoption and the value of IoT solutions by their customers.

Mr. Peter Bilello, CIMdata President and CEO, led a session on the digitalization of the enterprise and how today's product innovation platforms are closing lifecycle loops. This topic fit well with the event's overall theme, as well as Mr. Heppelmann's keynote speech. Mr. Bilello reminded the audience that digitalization is moving from a fuzzy concept to the newest data-driven derailment of the status quo as new sources of information speed up innovation throughout the product lifecycle. He also pointed out how digitalization is transforming products from physical goods and tangible services into data and metadata that create entirely new capabilities and solutions. In fact, in many cases data is displacing purely physical items as the "product." Mr. Bilello also described how the emergence of the product innovation platform has the potential to enable the end-to-end digitalization required to be successful and thrive in today's highly competitive environment.

PTC conducted a panel titled *Finding Business Value in IoT* in which the panelists described the issues they had to deal with within their organizations to get IoT products and solutions adopted. They all had some similar experiences and provided the following best practices for implementing IoT:

- Develop an overall strategy
- Start small—implement proof of concepts and small projects that deliver value in a short time—this results in both management and user buy-in and support
- Work with customers to understand what they really want

- Educate internally so everyone understands what you are trying to accomplish

CIMdata agrees with and supports these practices. They have been proven to work across all areas of PLM-related implementations and programs.

Among the more than 200 session held during LiveWorx, Mr. Madjid Nakhjirl, Samsung Senior Director of Security Architecture, delivered a session titled *The Mind Map of an IoT Security Architect*. During this session, he discussed IoT security issues and provided some guidelines for addressing them. He stated that IoT security is complex to deal with, comprising not just technical aspects but also legal, public relations, social, and others. Mr. Nakhjirl said that while there are organizations working on standards, e.g., Application Security Verification Standard (ASVS), there currently are multiple approaches and no agreed upon standards across the industry have been consistently adopted. With large amounts of data from many sources maintained in multiple databases and files, companies have to use a variety of standards to manage and protect their data, processes, and intellectual property. Best practice IoT security guidelines Mr. Nakhjirl identified include:

- Establish an executive security sponsor
- Educate all organizational levels on the importance of security and how to enforce it—and continue to update that education as things evolve
- Assess your competition to understand what they are doing for security
- Build a security implementation model—it will need to support a quilt of standards
- Define use levels—determine what level of security is needed for which data and process
- Implement security by design, not by audit

CIMdata believes that security throughout the lifecycle is essential, and that IoT and connected products increase the effort that must be applied. Recent high-profile attacks using IoT bots, devices such as baby monitors are examples, reinforce the importance of security. We also agree with Mr. Nakhjirl that while technology provides security solutions, adoption of standards as well as process and education are important factors in establishing and maintaining the security that is needed.

Dr. Erik Brynjolfsson, Professor at MIT's Sloan School and Director of the MIT Initiative on the Digital Economy, gave a provocative keynote on the impacts of machine learning on society. He reviewed how technology, specifically artificial intelligence (AI) software, is rapidly changing the economic landscape and compounding inequities in wealth distribution. Modern smart, connected products provide the data AI needs to drive changes across all areas and levels of business and society. Additionally, Dr. Brynjolfsson described both the pessimistic and optimistic views of the impact of these AI-related changes, and came down personally as cautiously optimistic. CIMdata was intrigued by the MIT Inclusive Innovation Challenge he announced, challenging participants to develop concepts that can create shared prosperity by reinventing the future of work.

Blockchain, the technology behind Bitcoin was covered in several sessions. A concept leveraging blockchain to support anonymity and compliance within the commercial aerospace maintenance, repair, and overhaul (MRO) market was especially interesting. While not ready for primetime yet, CIMdata enjoyed seeing such thought leading concepts that may have big impacts on the future.

While IoT and the newer PTC capabilities generated a lot of excitement, several of the sessions attended by CIMdata demonstrated the value customers are getting from PTC's established solutions. For example, Mr. Robert Ibe from GE Industrial Solutions reviewed the transformation they have achieved. Over a three-year period, GE implemented model based definitions and digital threads for their products connecting the CAD BOM, EBOM, and MBOM. They consolidating 14 disconnected PDM servers supporting over 10 million CAD models and implemented a global change process. Mr. Ibe stated that at the start of the project users had no confidence in the engineering data, but today they have a single source of truth that is enabling GE to be much more competitive by simplifying their environment and reducing cost.

PTC's flagship CAD product, Creo, also continued to be emphasized. Mr. Heppelmann positioned Creo and Windchill in his introductory keynote remarks as the foundation upon which the full realization closed-loop lifecycle management rests. Numerous sessions presented by PTC staff, and Creo and Windchill users showcased the benefits gained by their adoption. Other areas of major interest to the conference attendees resulting in standing-room-only sessions were Model-Based Design (MBD) and Bill of Material (BOM) sessions.

Even though LiveWorx was primarily focused on IoT, CIMdata thinks that by delivering sessions and information on their other products and technologies (e.g., GE transformation, Creo, MBD, etc.), PTC effectively demonstrated that they are not just being an IoT company, but are continuing to build out their broad PLM suite of solutions.

LiveWorx 2017 showcased strong ongoing growth, as more and more companies are adapting IoT into their connected products and systems, impacting their business and what they can deliver for their end customer experiences. PTC put on a great show at LiveWorx this year. They clearly described and showed how they have assembled a solution platform that can create and operate smart, connected products. PTC recognized this trend early, made investments, and the market is now seeing the impressive results. CIMdata believes that PTC will remain at the forefront of the IoT tidal wave with its already broad IoT-focused product suite and continued investment in this area. They are effectively integrating these solutions with their other PLM-related product suites and delivering a broad, technology rich platform to help their customers create the solutions of the future.

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.