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CIMdata News

CIMdata's President, Peter Bilello, to Participate in an Upcoming Webinar on Validating Test Performance

24 October 2019

CIMdata, Inc., the leading global PLM strategic management consulting and research firm, announces that its President & CEO, Peter Bilello, will take part in a webinar to discuss the challenges faced by the Indian automotive industry in meeting the safety standards set by the Bharat New Car Assessment Program (NCAP).

The Indian automobile market is one of the biggest in the world, with that statistic India also experiences a high rate of accidents. In response, the Indian Government introduced the NCAP program meaning that every car manufacturer in the country faces the challenge of meeting the safety standards set by the Bharat NCAP. Towards this end, car companies are looking at effective ways to help reduce the prototype testing and to get the best star ratings for the various tests under the NCAP Program.

This webinar will show how realistic simulation solutions can address a multitude of automotive engineering challenges which helps Automotive OEMs and their suppliers manage competing demands in terms of crashworthiness and occupant safety. You will find out how automotive OEMs and suppliers can meet international standards in terms of crashworthiness and occupant safety.

Mr. Bilello has more than 30 years of experience in the development of business-enabling IT solutions for research, engineering, and manufacturing organizations worldwide. He has participated in PLM analysis, selection, implementation, and training; CAD/CAM/CAE/CIM implementation and management; synchronous and lean manufacturing consulting; software engineering; and general data management strategy development and support. He has authored numerous papers and research reports on PLM, digital transformation, and related topics, and his articles, commentaries, and perspectives have appeared in publications throughout the Americas, Europe, and Asia.

The webinar, Validating Test Performance using Simulation Methods, is sponsored by Dassault Systèmes and will take place on Tuesday, 5 November at 3:00 p.m. IST / 4:30 a.m. EST. To learn more or register, visit <https://www.cimdata.com/en/events/cimdata-supported-events/event/418-webinar-lean-manufacturing-renaissance-enabled-by-additive-manufacturing>.

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Key Sponsors for PLM Road Map and PDT EMEA 2019 Announced

23 October 2019

CIMdata, Inc. and Eurostep AB have today announced the key sponsors for the upcoming PLM Road Map and PDT EMEA 2019 conference. The participating sponsors are Aras, Configit, DPS, ESI, Quick Release, SAP, Share PLM, and Variantum. The event will take place on 13-14 November at La Renaissance Hotel, La Defense, Paris, France.

“We are excited to have these solution providers choose to sponsor PLM Road Map and PDT EMEA 2019,” stated Cheryl Peck, CIMdata’s Director of Marketing. “The vision we have for this event is to create an environment where open collaboration and knowledge transfer can occur between all members

of the PLM ecosystem.”

As part of the PLM Road Map/PDT experience sponsors are featured in an online PLM Collaboration Café™ where they can showcase a selection of their solutions. For more information on the PLM Collaboration Café visit <https://www.cimdata.com/en/education/plm-conferences/plm-road-map-2019-pdt-2019/2019-plmrmna-pdt-sponsors>.

PLM Road Map and PDT EMEA 2019 is a highly relevant event for PLM industry leaders and PLM professionals—providing independent education and a collaborative networking environment where ideas, trends, experiences, and relationships critical to the industry germinate and take root.

For more detail on the agenda and how to register for the event, please visit

<https://www.cimdata.com/en/education/plm-conferences/plm-road-map-2019-pdt-2019/2019-plmrmemea-pdt-agenda>.

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PTC to Acquire Onshape -A CIMdata Highlight

24 October 2019

It's a case of Déjà vu. On October 23, 2019, PTC announced that it has signed a definitive agreement to acquire Onshape, authors of the cloud-based Software as a Service (SaaS) computer aided design (CAD) product for approximately \$470 million, net of cash acquired. Onshape was founded in 2012 by CAD leaders Jon Hirschtick, John McEleney, and Dave Corcoran, inventors and former executives of SolidWorks. The industry remembers very well the dynamic entry of SolidWorks in 1993, led by Jon Hirschtick, with their Windows-based CAD solid modeling solution, only to be later acquired by Dassault Systèmes in 1997.

In the announcement, Jim Heppelmann, president and CEO, PTC, stated “PTC has earned a reputation for successfully pursuing new innovations that drive corporate growth. Building on the strong momentum we have with our on-premises CAD and PLM businesses, we look to our future and see a new growth play with SaaS.” PTC reports that Onshape will operate as a business unit within the company, with current management reporting directly to Jim Heppelmann. CIMdata recognizes the future importance of cloud-based software and sees this acquisition as a positive for PTC. Current Onshape clients will see a broad offering of additional software solutions they could leverage from PTC's portfolio. PTC itself will gain entry into a sizable number of forward-looking companies who are leading their peers into the world of innovative new cloud technology. The industry will continue to closely follow these developments as Onshape technology goes to market side-by-side with PTC's flagship solution, Creo. Whether the Onshape leadership stays with PTC or moves on at some point to found yet another software solution will be debated among industry watchers for some time.

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Acquisitions

Accenture buys Digital Innovation Consultancy Happen

21 October 2019

Accenture has acquired Happen, a privately owned innovation firm that uses proprietary methods, frameworks and digital tools to help clients generate new ideas, products and services that drive business

growth. Terms of the acquisition were not disclosed.

Happen is headquartered in London, with additional offices in Amsterdam and New Jersey, and has a team who possess a wide range of innovation skills, including strategy, design, ideation, insight and research.

Since its establishment in 2007, Happen has helped companies primarily across the consumer goods, food & beverage, retail and life science industries. The firm's key skills include consumer insights where teams identify new opportunities and determine how an organization can commercialize them; and product and service innovation. Happen has developed many technology frameworks, tools and methods — such as StarMaker™, F.I.R.E.®, Asset-Out™ and Vision-Led™ — to help organizations grow and transform, including award-winning technology that can track and measure consumer emotions at scale.

For instance, the firm helped a healthcare company use insights gleaned from consumers to overhaul a strategy to market cough medicine; the new positioning took the product to the number two spot in the U.K., with one pack sold every 10 seconds. Happen also helped a leading grocery chain map how people move around its stores; making small tweaks to the customer journey more than doubled revenue from breakfast cereals and increased snack purchases by 40%.

Happen's employees will join the innovation practice within Accenture's Products Industry X.0 business, which helps clients use advanced digital technologies to reinvent their products, services and business models to achieve higher efficiency and growth in operations across the enterprise — including design and engineering, manufacturing, supply chain management, logistics and customer support.

“Bringing data-driven intelligence to clients' decision-making, Happen helps companies tailor innovative products, services and experiences to create customer-centric businesses,” said Eric Schaeffer, a senior managing director at Accenture who leads its Products Industry X.0 practice and Supply Chain & Operations consulting practice. “The acquisition further enhances the analytics, design and engineering capabilities we use to help clients deliver relevance at scale to a marketplace of millions of individuals.”

Mark Cowan, co-founder of Happen, said, “Joining Accenture will enable us to scale our offerings and capabilities and deliver our services to an even greater range of clients. We're excited to become part of one of the world's truly great companies.”

Matt Prebble, a managing director at Accenture and head of its Products practice in the U.K. and Ireland, said, “The acquisition of Happen underscores our commitment to innovation. We continue to invest in the U.K. and Europe to grow our talent, creating new opportunities to work on transformative and disruptive projects and to help our clients apply the latest digital technologies to drive their product innovation and growth agendas.”

Happen is the latest in a series of acquisitions Accenture has made recently to expand its Industry X.0 product innovation capabilities. These include the acquisition last month of Pragsis Bidoop, a Spanish company with expertise in big data, artificial intelligence and advanced analytics, and its acquisition in

March of ?What If!, an innovation firm that uses an experimentation-driven approach to help clients incubate new products, services, business models and organizational cultures. Other acquisitions in recent years to drive product innovation capabilities for Industry X.0 include those of hardware engineering firm Mindtribe, strategic design consultancy designaffairs, and product design and innovation firm Altitude.

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ANSYS and Simulation Process Integration and Design Optimization Leader Dynardo Sign Definitive Acquisition Agreement

25 October 2019

ANSYS announced that it has entered into a definitive agreement to acquire Dynardo, a leading provider of simulation process integration and design optimization (PIDO) technology. The acquisition will give ANSYS customers access to a full suite of process integration and robust design tools – empowering users to identify optimal product designs faster and more economically.

Companies are under pressure to develop next-generation products as developments in autonomous vehicles, electrification and 5G continue to advance – increasing design complexity and cost. To meet these demands while still bringing groundbreaking products to market, companies are turning to PIDO technologies that are open and vendor neutral – giving them greater access to more tool choices. The integration of Dynardo’s tools with ANSYS Minerva’s simulation data, processes and knowledge management solutions will further enable customers to integrate and manage critical simulation and optimization results.

Headquartered in Weimar, Germany, Dynardo has more than 60 employees, with locations in Austria and the United States. An existing ANSYS partner, Dynardo develops leading-edge algorithms for optimization, uncertainty quantification, robustness, scenario variation, sensitivity analysis, simulation workflow building and data mining. Its product portfolio includes optiSLang, a leading software platform for process integration and multidisciplinary optimization. Dynardo products are successfully deployed by worldwide customers such as Bosch, ZF, Shell, Lufthansa, Infineon and ArianeGroup across industries ranging from automotive, aerospace, energy and consumer electronics.

"Design space exploration and optimization is key for organizations looking to reduce development time and accelerate the evaluation of optimal product design alternatives for cost and performance," said Navin Budhiraja, vice president and general manager of cloud and platform at ANSYS. "This acquisition will accelerate ANSYS’ pervasive simulation vision, advance our industry-leading platform and will enable our customers to leverage an open ecosystem approach to connect simulation and optimization throughout their product lifecycle processes."

"We are thrilled to become part of the ANSYS family and look forward to enabling a broader set of customers to capitalize on the benefits of enterprise simulation management and to automate simulation and optimization activities across solution areas like autonomous systems, electrification, digital twins and simulation-driven data science," said Johannes Will, managing director and co-founder of Dynardo. "With digitization initiatives increasingly taking hold in virtually every major industry ANSYS serves,

we see exciting opportunities and look forward to helping establish simulation-based design optimization workflows as the standardized process for customers worldwide."

The transaction is expected to close in the fourth quarter of 2019. It is not expected to have material impact on ANSYS' consolidated financial statements in either 2019 or 2020.

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Atos to acquire X-PERION AG in Germany to reinforce its position as a leader in IT services for Energy & Utilities

24 October 2019

Atos announces that it has signed an agreement to acquire X-PERION Consulting AG in Germany to combine it with Atos' fully-owned subsidiary ENERGY4U GmbH, part of its Worldgrid activities. The business combination of both companies will create a leading IT service provider for energy and utility companies in Germany and will strengthen Atos' global vertical strategy for the energy and utilities market.

X-PERION Consulting AG ("X-PERION") is a leading IT consulting company specialized in SAP applications for the energy sector. It will complement the portfolio of ENERGY4U GmbH ("ENERGY4U"), a 100% subsidiary of Atos in Germany which is also focused on the energy market, and a member of the Worldgrid business activity of Atos addressing E&U clients globally. Atos Information Technology GmbH will take over the shares of X-PERION.

ENERGY4U and X-PERION will proceed with a joint go-to-market. Customers from both companies will benefit from an extended product and service portfolio with IT solutions that are specially designed for the requirements of the utilities industry.

The closing of the transaction is expected to take place before the end of the year and is subject to the final approval of Atos governance bodies.

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OpenText statement regarding Micro Focus International plc ("Micro Focus")

21 October 2019

OpenText™ is aware of speculation in the press and confirms that it is not considering a potential acquisition of Micro Focus.

Harry E. Blount
Senior Vice President, Investor Relations
Open Text Corporation

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PTC to Acquire Onshape

24 October 2019

PTC announced that it has signed a definitive agreement to acquire Onshape, creators of the first Software as a Service (SaaS) product development platform that unites robust computer aided design (CAD) with powerful data management and collaboration tools, for approximately \$470 million, net of cash acquired. The acquisition is expected to accelerate PTC's ability to attract new customers with a SaaS-based product offering and position the company to capitalize on the inevitable industry transition to SaaS. Pending regulatory approval and satisfaction of other closing conditions, the transaction is expected to be completed in November 2019.

Located in Cambridge, MA, Onshape was founded in 2012 by CAD pioneers and tech legends, including Jon Hirschtick, John McEleney, and Dave Corcoran, inventors and former executives of SolidWorks. Onshape has secured more than \$150 million in funding from leading venture capital firms and has more than 5,000 subscribers around the world. The company's software offering is delivered in a SaaS model, making it accessible from any connected location or device, eliminating the need for costly hardware and administrative staff to maintain. Distributed and mobile teams of designers, engineers, and others can benefit from the product's cloud nature, enabling them to improve collaboration and to dramatically reduce the time needed to bring new products to market – while simultaneously staying current with the latest software.

"PTC has earned a reputation for successfully pursuing new innovations that drive corporate growth," said Jim Heppelmann, president and CEO, PTC. "Building on the strong momentum we have with our on-premises CAD and PLM businesses, we look to our future and see a new growth play with SaaS."

This acquisition is the logical next step in PTC's overall evolution to a recurring revenue business model, the first step of which was the company's successful transition to subscription licensing, completed in January 2019. The SaaS model, while nascent in the CAD and PLM market, is rapidly becoming industry best practice across most other software domains.

"Today, we see small and medium-sized CAD customers in the high-growth part of the CAD market shifting their interest toward SaaS delivery models, and we expect interest from larger customers to grow over time," continued Heppelmann. "The acquisition of Onshape complements our on-premises business with the industry's only proven, scalable pure SaaS platform, which we expect will open new CAD and PLM growth opportunities while positioning PTC to be the leader as the market transitions toward the SaaS model."

For customers, the SaaS model enables faster work, improved collaboration and innovation, with lower up-front costs and with no IT infrastructure to administer and maintain. For software providers, the SaaS model has been proven to generate a more stable and predictable revenue stream, increase customer loyalty as customers benefit from earlier adoption of technology innovations, and enable expansions into new segments and geographies.

"At Onshape, we share PTC's vision for helping organizations transform the way they develop products," said Jon Hirschtick, CEO and co-founder, Onshape. "We and PTC believe that the product development industry is nearing the 'tipping point' for SaaS adoption of CAD and data management tools. We look forward to empowering the customers we serve with the latest innovations to improve their competitive positions."

Onshape will operate as a business unit within PTC, with current management reporting directly to PTC President and CEO Jim Heppelmann.

“I’m very pleased to bring such an incredibly talented team of technical and business leaders into the company and look forward to taking our business to the next level of growth,” concluded Jim Heppelmann.

Barclays acted as exclusive financial advisor to PTC on the transaction.

For additional financial information pertaining to the Onshape acquisition, and for details on how to join the conference call PTC management will host to discuss its earnings for the fourth quarter and fiscal year ended September 30, 2019 and this acquisition, please review PTC’s Q4 2019 press release.

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Company News

Accenture Expands Innovation Hub in Chicago, Adds New Industry X.0 Studio to Accelerate Smart, Connected Products and Services Development for Clients

21 October 2019

Accenture has expanded its Chicago Innovation Hub with a new Industry X.0 studio to help clients accelerate the development of new smart connected products and services from months to weeks. The new studio provides a uniquely equipped environment that fuses design, software engineering, hardware engineering and industry expertise. It is located in the mHUB, the nation’s largest and fastest-growing physical product innovation center.

“Our clients, who are leaders in virtually every industry, are under tremendous pressure to continuously innovate,” said Pallavi Verma, senior managing director at Accenture, who leads its business in the Midwest U.S. “The new Industry X.0 studio, which we call a ‘Forge,’ is part of our ongoing investment in Chicago and our efforts to bring continuous innovation to our clients, helping them reimagine their futures and solve their biggest challenges.”

Forges are part of Accenture’s Industry X.0 practice, which helps organizations apply advanced digital technologies to reinvent products, services and business models, from design and engineering, to manufacturing and support, to supply chain management and logistics.

“No organization today can afford to work 12 to 18 months on an innovation as practiced traditionally,” said Craig McNeil, who leads Accenture’s Industry X.0 practice in North America. “At a Forge, we practice speed to value, meaning we can collapse the innovation timeline to five to six weeks. This is because design, software, hardware and industry professionals – many of which came to us through acquisitions, like Nytec, Pillar Technology and Mindtribe – all work at the same table. A Forge lets them tap the entire stack of equipment and methods needed to take ideas from sketch to final product.”

Accenture currently operates Industry X.0 Forges in Columbus, Ohio; Ann Arbor, Michigan; Des Moines, Iowa; and Jefferson, Iowa. Additional Forges are planned to open across the United States and in Asia in the coming 12 months.

The opening of the Forge builds upon Accenture’s continued growth in Chicago. In July 2019, the company announced it will increase the footprint of its Chicago Innovation Hub located in the 500 West Madison building – which was renamed the Accenture Tower – and add 600 highly-skilled tech jobs and significantly grow its apprentice program.

“Chicago is a manufacturing powerhouse and at our new Forge, we will help our clients create product innovations at speed and at scale,” said Jim Coleman, senior managing director at Accenture, who leads its business in Chicago. “By calling mHUB our home, we’re able to tap into their state-of-the-art facilities and vibrant, entrepreneurial mindset, which is critical in today’s business environment.”

mHUB CEO and Co-Founder Haven Allen added, “Accenture’s Industry X.0 is a key partner for us as we continue to build an ecosystem around physical product innovation and leverage the power of entrepreneurship to solve problems in manufacturing. We look forward to working hand-in-hand with them to drive industry 4.0 right here in the Midwest.”

The Innovation Hub in Chicago is part of a network of 11 Accenture Innovation Hubs in North America, with other locations in Atlanta; Boston; Columbus, Ohio; metro Detroit; Houston; New York; San Francisco; Seattle; Toronto; and metro Washington, D.C. These hubs are connected to more than 100 Accenture locations around the globe to seamlessly bring the best of the company’s global investments and insights to its clients on the ground in North America.

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Atos Chairman Named to EU Commission, Succession Plan Announced

25 October 2019

The Board of Directors of ATOS SE took note of the announcement by the presidency of the French Republic of its proposal to nominate Mr. Thierry Breton as Commissioner representing France in the European Commission.

Consequently, Mr. Thierry Breton will give notice of his resignation from his position as Chairman and Chief Executive Officer of ATOS SE with effect from October 31, 2019.

In accordance with the succession plan proposed by the Nomination and Remuneration Committee, ATOS SE’s Board of Directors intends to separate the offices of Chairman of the Board of Directors and of Chief Executive Officer. Thus, it will appoint Mr. Elie Girard, currently Deputy Chief Executive Officer, as Chief Executive Officer with effect from November 1, 2019 and Mr. Thierry Breton as non-executive Chairman of the Board of Directors of ATOS SE from that date and until such time as his appointment as European Commissioner is confirmed. The Board of Directors would then replace Mr. Thierry Breton by Mr. Bertrand Meunier as non-executive Chairman of the Board of Directors of ATOS SE in accordance with the Company’s succession plan.

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John Alessio Joins PROS as Chief Customer Officer

22 October 2019

PROS®, a provider of AI-powered solutions that optimize selling in the digital economy, today announced that John Alessio, an expert at building successful customer implementation and adoption programs, has joined the company as Chief Customer Officer – a new role responsible for professional services, customer success, and customer and partner enablement – intended to deepen customer engagement and further support the company’s global growth plans.

Serving in global leadership roles at Red Hat and IBM, Alessio brings more than 30 years of customer success, support and enablement experience to PROS. In this role, Alessio reports directly to Andres Reiner, PROS President and CEO, and is responsible for driving end-to-end customer experience, increasing user adoption of PROS solutions and powering partner enablement to drive growth across the company.

“PROS growth strategy is defined by the ability to deliver exceptional customer value at scale,” said Reiner. “John brings significant global experience in exactly that area, enabling us to deepen our relentless focus on customer success. His experience will help ensure we have the right processes in place to enable broader adoption of our AI technology platform, and ultimately greater lifetime value of our solutions. We are thrilled to welcome John to the team.”

“I am really excited to be joining PROS at a time of such exciting growth,” said Alessio. “All sizes and types of organizations are on their own digital transformation journey. The more we can help our customers transform the process of how they sell and engage with their own customers, the greater value they will see from our technology as they embrace the future of digital commerce.”

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Financial News

Cadence Reports Third Quarter 2019 Financial Results

21 October 2019

Cadence Design Systems, Inc. announced results for the third quarter of 2019.

Cadence reported third quarter 2019 revenue of \$580 million, compared to revenue of \$532 million reported for the same period in 2018. On a GAAP basis, Cadence achieved operating margin of 21 percent and recognized net income of \$102 million, or \$0.36 per share on a diluted basis, in the third quarter of 2019, compared to operating margin of 19 percent and net income of \$99 million, or \$0.35 per share on a diluted basis, for the same period in 2018.

Using the non-GAAP measure defined below, operating margin for the third quarter of 2019 was 32 percent and net income was \$153 million, or \$0.54 per share on a diluted basis, compared to operating margin of 32 percent and net income of \$139 million, or \$0.49 per share on a diluted basis, for the same period in 2018.

“Major industry trends led by AI and data analytics are driving strong design activity, which coupled with innovation and outstanding execution by Cadence, again led to strong operating results, as Cadence delivered 9 percent year-over-year revenue growth,” said Lip-Bu Tan, chief executive officer. “Our Intelligent System Design strategy enables us to provide more capabilities and value to our customers, while also expanding our total addressable market.”

“I am pleased with our third quarter results and outlook,” said John Wall, senior vice president and chief financial officer. “We are raising our outlook for revenue, operating margin, earnings and cash from operations for the year while we continue to invest in proliferation opportunities with market-shaping customers.”

CFO Commentary

CIMdata PLM Late-Breaking News

Commentary on the third quarter 2019 financial results by John Wall, senior vice president and chief financial officer, is available at www.cadence.com/cadence/investor_relations.

Business Outlook

For the fourth quarter of 2019, the company expects total revenue in the range of \$590 million to \$600 million. Fourth quarter GAAP operating margin is expected to be approximately 20 percent and GAAP net income per diluted share is expected to be in the range of \$0.33 to \$0.35. Using the non-GAAP measure defined below, operating margin is expected to be approximately 30 percent and net income per diluted share is expected to be in the range of \$0.52 to \$0.54.

For 2019, the company expects total revenue in the range of \$2.327 billion to \$2.337 billion. On a GAAP basis, operating margin is expected to be in the range of 21.3 percent to 21.8 percent and net income per diluted share for 2019 is expected to be in the range of \$1.50 to \$1.52. Using the non-GAAP measure defined below, operating margin for 2019 is expected to be in the range of 31.5 percent to 32.0 percent and net income per diluted share for 2019 is expected to be in the range of \$2.18 to \$2.20.

In October 2019, Cadence initiated a series of transactions involving a realignment of its international operating structure. Cadence expects that this realignment may significantly increase its foreign deferred tax assets. This outlook does not include the income tax impact to GAAP net income related to these transactions. Cadence expects to complete its analysis and record the income tax impact in the fourth quarter of 2019.

A schedule showing a reconciliation of the business outlook from GAAP operating margin, GAAP net income and diluted net income per share to non-GAAP operating margin and non-GAAP net income and diluted net income per share is included in this release.

Audio Webcast Scheduled

Lip-Bu Tan, chief executive officer, and John Wall, senior vice president and chief financial officer, will host the third quarter 2019 financial results audio webcast today, October 21, 2019, at 2 p.m. (Pacific) / 5 p.m. (Eastern). Attendees are asked to register at the website at least 10 minutes prior to the scheduled webcast. An archive of the webcast will be available starting October 21, 2019 at 5 p.m. (Pacific) and ending December 13, 2019 at 5 p.m. (Pacific). Webcast access is available at www.cadence.com/cadence/investor_relations.

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Microsoft Cloud Strength Drives First Quarter Results

24 October 2019

Microsoft Corp. announced the following results for the quarter ended September 30, 2019, as compared to the corresponding period of last fiscal year:

- Revenue was \$33.1 billion and increased 14%
- Operating income was \$12.7 billion and increased 27%
- Net income was \$10.7 billion and increased 21%
- Diluted earnings per share was \$1.38 and increased 21%

“The world’s leading companies are choosing our cloud to build their digital capability,” said Satya Nadella, chief executive officer of Microsoft. “We are accelerating our innovation across the entire tech stack to deliver new value for customers and investing in large and growing markets with expansive

opportunity.”

Microsoft returned \$7.9 billion to shareholders in the form of dividends and share repurchases in the first quarter of fiscal year 2020, an increase of 28% compared to the first quarter of fiscal year 2019.

"It was a strong start to the fiscal year with our commercial cloud generating \$11.6 billion in revenue for the quarter, up 36% year over year," said Amy Hood, executive vice president and chief financial officer of Microsoft.

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PTC Announces Fourth Quarter Fiscal Year 2019 Results

24 October 2019

PTC reported financial results for its fiscal fourth quarter and fiscal year ended September 30, 2019.

James Heppelmann, President and CEO said “PTC’s ARR grew 12% in fiscal 2019 reflecting the strength of our technology in the markets we serve and the value we provide to our customers. We also successfully completed the transition to subscription licensing and ended the year strong across key financial metrics including revenue and margins.”

Heppelmann added, “Today, we also announced PTC’s intention to acquire Onshape, creators of the first SaaS product development platform that unites next-generation CAD, data management, and collaboration tools. Onshape’s proven talent and technology are the perfect complement to PTC’s market leading on-premise CAD and PLM solutions, and will dramatically strengthen PTC’s ability to participate in the highest growth part of the market with a unique SaaS-based product offering. Most importantly, Onshape will put PTC in a position to lead the market’s inevitable shift to SaaS.”

Fourth quarter and fiscal year 2019 highlights

Additional operating and financial highlights are set forth below. For additional details, please refer to the prepared remarks and financial data tables that have been posted to the Investor Relations section of our website at investor@ptc.com. Note that all references to revenue and margins are under ASC 605.

- License and subscription bookings in Q4’19 were \$150 million, \$5 million above the high end of our guidance range driven by strong bookings in IoT and AR, including a mega deal with our strategic alliance partner Rockwell Automation. FY’19 license and subscription bookings were \$472 million, up 1% year over year or 4% on a constant currency basis.
 - ARR per the new definition was \$1,116 million, or \$1,134 million at the guidance Fx rate, at the end of Q4’19, in line with the targets we provided in September. This is a 10% increase, or 12% increase consistent with the guidance rate, compared to Q4’18, reflecting the strength of our recurring revenue business.
 - Operating cash flow was \$55 million in Q4’19; FY’19 operating cash flow was \$285 million. FY’19 free cash flow was \$221 million and adjusted free cash flow was \$245 million, increases of 4% and 13%, respectively, over Q4’18. FY’19 adjusted free cash flow excludes \$25 million of restructuring payments related to our workforce realignment and headquarters relocation.
1. We include operating and non-GAAP financial measures in our operational highlights. We revised the definition of ARR on September 5, 2019. The detailed definitions of these items and

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reconciliations of Non-GAAP financial measures to comparable GAAP measures are included below and in the reconciliation tables at the end of this press release.

2. The mega deal from Rockwell Automation was issued to satisfy a portion of expected FY20 demand and will be credited against committed ACV minimums due in FY20 under the parties' strategic alliance agreement, as amended. Excluding the mega deal, bookings for the quarter were within the guidance range.

Fiscal 2020 Operational Outlook

Our fiscal 2020 operational outlook includes the following general considerations:

- ARR guidance:
 - Allows for potential impact of moderate weakening of macroeconomic conditions
 - Onshape contribution of approximately 100 bps of incremental growth
 - Contribution from ramp deals and deals with FY'20 start dates
 - Modest improvement to churn
- FCF and adjusted FCF guidance reflects:
 - Operating cash flow of \$248M - \$268M
 - \$30M of Capex
 - \$37M of restructuring and headquarters relocation charges
 - Short-term impacts of \$65M including:
 - \$25M of incremental interest expense related to the Onshape acquisition
 - \$25M of higher cash taxes driven by the timing of ASC606 revenue recognition
 - \$15M of negative impact due to Fx

<i>In millions</i>	Operating Metrics
ARR	\$1,245 - \$1,280
YoY in CC	12% - 15%
Free cash flow	\$218-\$238
YoY in CC	(1%) - 8%
Adjusted free cash flow	\$255-\$275
YoY in CC	4% - 12%

Fiscal 2020 Financial Outlook

Our fiscal 2020 financial outlook includes the following general considerations:

- The Onshape acquisition (excluding the impact of purchase accounting and acquisition-related costs).
- Operating expenses are expected to grow roughly 9%, slightly elevated due to the Onshape acquisition. We expect the run-rate to decline in the back half of FY'20.

3 We plan to increase the revolving credit facility from \$700 million to \$1 billion in FY'20.

4 Adjusted free cash flow excludes \$37 million of estimated restructuring payments related primarily to our workforce realignment associated with expected synergies and operational efficiencies related to the Onshape acquisition, and headquarters relocation

- Allows for potential impact of moderate weakening of macroeconomic conditions
- Based on Fx rates as of September 30, 2019.

- Sharecount will be roughly flat compared to FY'19. We are suspending the share repurchase program for one year to accelerate debt repayment.
- ASC 606 creates quarterly and annual volatility for on-premise subscription companies due to factors that affect revenue recognition such as:
 - Term length for new and renewal bookings
 - Contract start-date timing
 - Quarterly spread of new and renewal bookings
 - Support to subscription conversions
 - Potential future changes to revenue recognition for certain products as they become further cloud enabledAs such, we are providing a wide range on revenue and EPS.

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SAP Announces Third Quarter and First Nine Months 2019 Results

24 October 2019

SAP SE announced its financial results for the third quarter 2019 ended September 30, 2019.

Double-Digit Growth Across Revenue, Profit and Cash Flow
Operational Excellence Boosts Margins

New Cloud Bookings Up 39%, Software License Revenue Down 1%

Cloud Revenue Up 37%

Cloud Gross Margin Up More Than 5 Percentage Points

IFRS Operating Profit Up 36%; Non-IFRS Operating Profit Up 20%

IFRS Operating Margin Up 4.2pp; Non-IFRS Operating Margin Up 1.7pp

Q3 Operating Cash Flow Up 28%, Free Cash Flow Up 116%

Third quarter results reflect the momentum we've built entering the final quarter of the year and more broadly where we are on our journey of growth and operational excellence. We are excited and energized to write the next chapter in SAP's story alongside the best workforce anywhere in the technology industry.

In April we promised a stronger focus on profits and here we go: Q3 marks yet another milestone in delivering on this commitment. Q3 is also a manifesto of us keeping our second promise: continued strong top line momentum. Despite continued macro uncertainties we couldn't be more confident to make 2019 another stellar year for SAP.

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Implementation Investments

Adopting Digital Twin Speeds Design and Construction of the Morandi Bridge Replacement in Genoa, Italy - Bentley Systems

21 October 2019

Italferr S.p.A is a company of the Italian State Railways Group Ferrovie dello Stato Italiano and has been at the forefront of Italian and international large-scale infrastructure projects for 30 years. The organization specializes in conventional and high-speed rail, metropolitan and road transport, and port facilities. The company's scope includes engineering design, project management, construction site management and supervision, and acceptance testing and commissioning.

After the collapse of the Morandi Bridge in August of 2018, the Pergenova Consortium Company in the city of Genoa, Italy commissioned Italferr to develop the executive design phase of the new viaduct over the Polcevera River to replace the damaged 200-meter section. The bridge collapse, which received worldwide attention, destroyed the buildings below it and resulted in many fatalities. The incident raised concerns about the condition of bridges in Europe, with studies suggesting that many need to be renovated or replaced because of corrosion and structural deterioration.

The project, estimated to cost EUR 20.2 million, is scheduled to be completed in June of 2020. To limit the amount of time that the bridge will be out of service, the project team needed to complete the project as quickly as possible on the same footprint as the previous bridge and meet regulatory adjustments for new Italian standards for the cross-section of the deck and the curvature radii of the junctions and entrances. The new bridge's main deck will include a continuous girder with a length of 1,067 meters, 19 reinforced concrete piers, and 20 spans, compared to the previous bridge, which had eight piers and nine spans.

To meet the tight schedule, Italferr created a digital twin to support all BIM workflows through the executive design phase. Digital twins have broad application in advanced design environments, where fully functioning virtual models are developed that help the design team collaborate and simulate the performance of an asset at any point in its design. The digital twin was enabled through a connected data environment built on ProjectWise that managed the flow of data coming from the multidiscipline project team using Bentley's open modeling and open simulation applications. Utilizing MicroStation, OpenRoads, and OpenBuildings Designer, the project team created digital models of the terrain, road, and related civil works, as well as the mechanical and electrical systems.

To simulate construction, the team used SYNCHRO to understand critical works and other complex situations. SYNCHRO's 4D digital construction environment made it possible to visualize, analyze, edit, and track the evolution of the project dynamically through its various implementation phases. The team linked the iModels dynamically to SYNCHRO to identify and remove potential conflicts, which made it possible to virtually simulate and optimize construction.

Bentley's applications have helped the team accelerate design decisions and improve the quality of design, while at the same time reducing design cost, minimizing changes, increasing the accuracy of data, and improving the efficiency of project team collaboration. The accelerated design will help to restore Genoa's road system, which is essential to the social and economic balance of the city, by June of 2020. The new bridge will restore broken transportation connections within the city, offering a modern structure capable of increasing the flow of goods and vehicles. The design of the bridge will help restore public confidence, greatly improve road traffic safety, and ensure the durability of the bridge structures.

"The BIM methodology used in this project follows the digital twin approach," said Daniela Aprea, project engineer and BIM manager with Italferr. "The visibility and insight it enabled allowed us to significantly change the way in which we deal with the design and management of infrastructure work."

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AMARO Speeds into the Future with Centric Fashion PLM

21 October 2019

AMARO, the Brazilian online womenswear company, has successfully implemented Centric Software's Product Lifecycle Management (PLM) solution, and Centric Software is celebrating with the release of a success story and video. Centric Software provides the most innovative enterprise solutions to fashion, retail, footwear, outdoor, luxury and consumer goods companies to achieve strategic and operational digital transformation goals.

Founded in 2012 in São Paulo, Brazil, AMARO is a pioneering online, direct-to-consumer fashion brand. AMARO sells the latest international womenswear at disruptive prices through www.amaro.com and mobile apps. Its 16 Guide Shops across Brazil allow customers to try on sample clothing in a digitally immersive environment before ordering online.

Growing at a fast pace, AMARO selected [Centric Fashion PLM](#) to replace its spreadsheet-based product development system.

"As product volumes increase, it becomes more difficult to control processes and deadlines, and also to determine which areas to optimize and where we are wasting time and energy," says Anay Zaffalon, head of products at AMARO. "We knew PLM would give all teams one point of reference to consult while managing product launches, product development progress, costs and materials. Centric is solely focused on PLM and has historical roots in fashion, so we can be sure the company is putting all of its energy and investment into making its software the best in the industry."

AMARO has just completed its Centric Fashion PLM implementation, and is already experiencing positive results.

"The main benefits of Centric PLM for us are data reliability, revision history, control over who accesses what information and the ease of integration with other systems," says Conrado Depoian, product manager at AMARO. "Centric PLM is helping us to improve the agility of the product development process so that we can continue to provide a high volume of quality products to the customer."

“Today I can see everything in one place,” says Zaffalon. “We have more consistency in information shared across different teams and different products, so we can understand information better internally and communicate more consistently with suppliers.”

“AMARO and Centric are two innovative technology companies with a lot of synergy,” concludes Zaffalon. “I truly believe Centric is the best PLM solution on the market.”

“We’re happy to announce AMARO’s successful implementation of Centric PLM,” says Chris Groves, president and CEO of Centric Software. “Like Centric, AMARO is a future-focused technology company with an innovative outlook, and we look forward to continuing our successful collaboration.”

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From São Paulo to Beijing Pedestrian Simulation for Rail Goes Mainstream

23 October 2019

Pedestrian simulation can help the designers of buildings, stations, stadiums, and other public facilities streamline people movement, avoid congestion, and manage crowds. Simulation is also essential for planning security and emergency evacuations of large and heavily occupied buildings, such as stations, airports, and stadiums. Pedestrian movement is fast becoming a critical design criterion, essential to many decisions during conceptual and detailed design on new buildings. Among this year’s submissions in Bentley’s Year in Infrastructure Awards were six excellent examples of how pedestrian simulation is being used by rail owner-operators to analyze and simulate people movement within existing stations as part of their ongoing operation and for maintenance and upgrade planning.

Faced with the challenge of moving an average of 3 million passengers every business day across the seven lines that service the São Paulo metropolitan region, Companhia Paulista de Trens Metropolitanos (CPTM) is pioneering the use of dynamic pedestrian simulation at railway stations in Brazil since 2013. Using LEGION on São Paulo’s Morumbi Station enabled CPTM to identify the work that was required to solve the challenges that it faced with queueing on platforms and at the turnstiles in its entrance hall. The modeling helped CPTM develop a new design that considered the segregation of embarkation, disembarkation, and transfer flows to manage the capacity saturation within its existing infrastructure.

“CPTM’s use of LEGION is strategic for the development of new station designs and helps resolve passenger flow problems at existing stations and operational situations at major events, making the tool indispensable,” said Fernando Galego Boselli, head of project consistency and innovation with Companhia Paulista de Trens Metropolitanos.

Once the heart of London’s 2012 Olympic Games, Stratford Station is now the seventh busiest station in Great Britain. From 2012 to 2017, the station saw the number of daily passengers increase by approximately 100,000, and with several major nearby developments either planned or under construction, passenger numbers over the next 10 to 15 years is expected to increase. While Network Rail owns most of the infrastructure, overall management of the station sits with Transport for London’s delivery unit London Underground (LU), which operates the Jubilee and Central Lines from the station.

Working with MTR Crossrail, LU first identified that crowding at Stratford Station would require more intervention than the day-to-day management of flows by station staff. Initial attempts to assess pedestrian flows against LU’s own design standards statically, failed to capture the interaction of flows

at key pinch points or adequately distinguish between the options being assessed. Using LEGION, however, meant that LU could capture important factors, such as different train service types, accurate pulsing of demand, and the impact of train capacity on platform crowding. The application also enabled the team to easily identify and visually present the key constraints within the station.

Interventions that LU considered ranged from the short-term lower cost, such as moving a gateline, to the long-term higher cost, such as providing a new wide overbridge. LEGION enabled each option to be modeled in isolation and in parallel with complementary options, to create a prioritized list of interventions. To date, this approach has allowed land required to create a new entrance to be safeguarded and has caused LU to reconsider an already-committed structural intervention. Moreover, LU has been able to examine different options for the management of current day event flows and provide evidence to secure financial contributions from commercial developments in the vicinity of the station.

“LEGION is one of a suite of tools used by Transport for London to assess and quantify station congestion impacts across the network,” said Madeleine Cox, principal planner transport modeling with Transport for London. “It is instrumental in the support of business cases, providing not only visual outputs that identify congestion hotspots, but also outputs that can easily be monetized, directly contributing to the calculation of a benefits cost ratio of a project.”

When completed in 2021, Beijing’s Fengtai High-speed Railway station will be the city’s most important transportation hub and one of the largest stations in Asia. Faced with the challenge of concentrated passenger flows and an innovative double-deck platform design, the client and the design team realized that the planning of passenger movement and layout of facilities within the station would be critical to its safe and effective operation.

Having found it difficult to perform comprehensive and direct assessments of the design using static computation and other software for that kind of complex environment, transport consultancy China Architecture Design and Research Group (CADG) turned to LEGION. CADG conducted pedestrian simulation analysis of the station’s aboveground and belowground floors, as well as functional supporting facilities for national railway, subway, bus hub, taxi ranks, and other traffic transfer. LEGION helped the project team determine a design strategy and, because of its ability to predict the station’s future performance, create a plan for its operational management.

“Bentley software helped CADG simplify the analysis process to demonstrate the optimal design for Fengtai High-speed Railway Station, improving design coordination efficiency and streamlining the production of deliverables that enabled us to help the design team successfully pass the relevant design reviews,” said Pingyi Ye, deputy director of the transportation planning and research center for the China Architecture Design & Research Group.

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Lockheed Martin Selects Dassault Systèmes' 3DEXPERIENCE Platform to Support Digital Engineering Initiatives

24 October 2019

Dassault Systèmes announced that Lockheed Martin is deploying the 3DEXPERIENCE platform to support its digital engineering initiatives. Through this multi-year collaboration between the two companies, Lockheed Martin aims to build a digital thread that extends from design through manufacturing for its next generation airplanes and helicopters.

Lockheed Martin is using a variety of industry solution experiences based on the 3DEXPERIENCE platform as part of a larger suite of digital engineering tools. The company's Aeronautics and Rotary and Mission Systems business areas are utilizing the platform for 3D design software, 3D Digital Mock Up and Product Lifecycle Management (PLM) solutions in a comprehensive digital environment intended to enhance collaboration, agility and speed.

"The 3DEXPERIENCE platform will facilitate Lockheed Martin's digital engineering goals and help optimize their product engineering with an integrated platform approach," said David Ziegler, Vice President, Aerospace & Defense Industry, Dassault Systèmes. "This approach lends flexibility to extremely complex programs and drives the advances in sophisticated aircraft innovation that are defining the 21st century of the aerospace industry. Companies like Lockheed Martin can quickly execute comprehensive, multidisciplinary processes to help speed timelines and improve efficiencies on major program deliveries."

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The Juilliard School and Rutgers Tap Oracle Cloud to Manage Educational Back-office System

22 October 2019

To manage complex environments globally, leading higher education institutions The Juilliard School and Rutgers University are turning to Oracle Cloud. Both institutions, looking to accelerate student success through more efficient operations across multiple schools and campuses, have chosen Oracle Enterprise Resource Planning (ERP) Cloud, Oracle Human Capital Management (HCM) Cloud, and Oracle Student Cloud.

Founded in 1905, The Juilliard School is a world-famous leader in performing arts education. The school's mission is to provide the highest caliber of artistic education for gifted musicians, dancers, and actors from around the world. Located in New York City, Juilliard offers undergraduate and graduate degrees in dance, drama and music. Beyond its New York campus, Juilliard is now defining new directions in global performing arts education through its new branch campus in Tianjin, China, The Tianjin Juilliard School, and the global K-12 curricula.

Adopting a global operating model created challenges and complexity for Juilliard's IT staff. Oracle Cloud provides a unified platform that will enable Juilliard to deliver an exceptional experience in both English and Chinese, and importantly, can be managed with existing IT resources. Once deployed, the Oracle Student Cloud solution will support approximately 2,000 Juilliard students across both campuses and 800 faculty and staff using the ERP, Student, and HCM Cloud solutions in New York.

"The opening of The Tianjin Juilliard School will broaden access to Juilliard's world-class performing

arts education across China and Asia,” said Carl Young, CIO of The Juilliard School. “With Oracle Cloud we will be able to provide our campuses in New York and Tianjin with unified, modern, multi-lingual systems that will have a significant impact on information management, which will ultimately help us better serve our students.”

Rutgers is a leading national research university and the state of New Jersey’s preeminent, comprehensive public institution of higher education. Established in 1766, the university is the eighth oldest higher education institution in the United States and home to more than 150 undergraduate majors, more than 400 graduate programs, and 300 research centers and institutes.

The daunting scale of Rutgers—with more than 70,000 students across 29 different schools and colleges at several campus locations—means it faced different, yet similarly formidable, issues of complexity. As part of a bold five-year plan to modernize and unify its key systems, Rutgers chose Oracle Cloud.

“We strive to provide new and better experiences for our students,” said Michele Norin, senior vice president and chief information officer at Rutgers University. “The size and scale of Rutgers presents many difficulties as we work to manage and develop our systems. Oracle Cloud helps us meet our goals, stay on the forefront of higher education as it evolves, and enable our students to be more successful.”

Oracle Student Cloud is an integral component to an institution’s efforts to reduce educational costs while enhancing student outcomes and success. Oracle SFP Cloud streamlines the financial aid processes and delivers invaluable, data-backed insights into student successes, freeing administrators to focus more on supporting the academic needs of its students. Oracle ERP Cloud provides the financial solutions needed for institutions to enhance productivity, reduce costs and improve controls. Oracle HCM Cloud supports the changing business requirements around talent management and talent acquisition while furthering workforce productivity.

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Product News

Astera Labs Accelerates PCI Express 5.0 System Deployment in Collaboration with Intel and Synopsys

25 October 2019

Astera Labs Inc., in collaboration with Synopsys, Inc. and Intel announced an industry-first demonstration of a complete PCI Express® (PCIe®) 5.0 system, delivering 32 GT/s speeds for next-generation server workloads. The end-to-end solution showcases system-level multi-vendor interoperability between Intel's PCIe 5.0 test chip, Synopsys' silicon-proven DesignWare® Controller and PHY IP for PCIe 5.0, and Astera Labs' industry-first Smart Retimer SoC for PCIe 5.0. The companies will demonstrate the solution at the PCI-SIG Developers Conference in Taipei, October 28-29.

"We're excited to collaborate with Synopsys and Intel to prove to the industry that we are ready for PCIe 5.0 customers and we are actively sampling our retimer SoC now," said Jitendra Mohan, chief executive officer, Astera Labs. "We've delivered the world's first PCIe 5.0 Smart Retimer that provides backwards compatibility, enabling developers to future-proof their systems by leveraging the solution for PCIe 4.0 now and having a pin-compatible solution for PCIe 5.0 when systems are available in 2020. Collaborating with Synopsys and Intel helped accelerate our development process."

"Synopsys, Astera Labs, and Intel are collaborating to help the PCI Express ecosystem to meet their advanced requirements for networking, storage, and machine learning applications that require extremely high-speed interfaces," said John Koeter, vice president of marketing for IP at Synopsys. "By providing a complete IP solution for PCI Express 5.0, Synopsys enables companies like Astera Labs to get an early start on their designs and benefit from Synopsys' proven expertise in PCI Express to achieve first-pass silicon success for their SoCs."

"PCIe 5.0 technology adoption is crucial as the industry adds accelerated, heterogenous computing architectures and workload-optimized platforms to support the next generation of data-centric platform," said Jim Pappas, director of Technology Initiatives at Intel. "Intel is a staunch proponent of PCIe 5.0 architecture and we are racing to deliver robust solutions that deliver faster speeds and lower latency to meet data centric workload requirements. We are pleased to collaborate with Astera Labs and Synopsys on pioneering this new ecosystem."

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Bentley Systems' New ProjectWise 365 and Comprehensive SYNCHRO Offerings Advance 4D Digital Twins for Project Delivery

21 October 2019

Bentley Systems, Incorporated today announced new capabilities for its industry-leading *ProjectWise* collaboration platform and comprehensive expansion of its *SYNCHRO* 4D construction environment. Together, these robust offerings extend the value of project digital twins across the entire project delivery ecosystem, improving design and constructability coordination workflows. New *ProjectWise* 365 cloud services, leveraging Microsoft 365 technology and office productivity tools, extend the reach, affordability, and accessibility of BIM and infrastructure design data for organizations of all sizes. In addition, with Bentley's new *SYNCHRO* cloud services, contractors can 4D-visualize design data and construction models for project and field management, advanced work packaging, and Microsoft HoloLens 2 augmented reality solutions.

Noah Eckhouse, senior vice president, project delivery for Bentley Systems, said, "Project digital twins for infrastructure engineering and construction surge forward with these announcements, particularly with our new cloud services. Users of *ProjectWise* have made Bentley one of the largest ISV users of Azure. We are expanding our instant-on, web-based *ProjectWise* 365 cloud services; making *iTwin* cloud services broadly available for both practitioner- and project-level design reviews; and comprehensively expanding the scope of *SYNCHRO* through cloud services. Infrastructure project delivery is fundamentally about time, as well as space. Bentley's 4D project and construction digital twins are driving digital advancement for infrastructure engineering, today, worldwide!"

In *Engineering News Record's* 2019 *Top Design Firms* report, 43 among the top 50 firms rely upon Bentley's *ProjectWise* for work sharing and design integration, and more than half of the top 640 firms are *ProjectWise* users.

New ProjectWise 365 Cloud Services

Purpose-built for design teams, *ProjectWise* 365 is an innovative, 100 percent SaaS-based offering enabling teams involved in design and engineering, from practitioner and design leads to stakeholders, to readily store and find designs, accelerate content sharing and collaborative workflows, and manage feedback, for maximum team productivity. The new *ProjectWise* 365 cloud services will be generally

available by the end of 2019.

iTwin Design Review (for practitioners) enables ProjectWise 365 users to initiate ad hoc design reviews in a 2D/3D environment. It provides workflows to markup and comment directly on elements of 3D models and to immersively link between 2D and 3D views.

iTwin Design Review (for projects) enables project teams using ProjectWise Design Integration services to capture engineering changes throughout the lifecycle of project digital twins, providing a record of who-changed-what-and-when. Multi-discipline design reviews can be conducted continuously and comprehensively, for design coordination through “4D” visualization.

New *SYNCHRO* Cloud Services for Construction

In 2019, Microsoft named Bentley as a finalist in the Mixed Reality category of its Partner of the Year awards for Bentley’s SYNCHRO/HoloLens 2 solution for 4D visualization of project digital twins. New SYNCHRO cloud services comprehensively extend SYNCHRO’s market-leading 4D construction modeling to span construction project management and execution, and to assimilate ConstructSim advanced work packaging. The new SYNCHRO cloud services, released in September 2019, are further advancing innovation in construction. Learn more about SYNCHRO.

SYNCHRO Field offers task, plan, model, and map views to accelerate field data capture for timely progress updates and issue identification.

SYNCHRO Control provides a single web interface for construction teams to capture, manage, access, and collaborate on design and construction data. It enables easier and faster design document access from ProjectWise 365, and complete submittal and RFI management and issues resolution capabilities.

Completions accelerates and validates project system readiness through collaborative workflows expediting closeout items for construction and commissioning teams.

Digital Co-ventures for *Project Delivery*

(With Siemens) *Teamcenter for Capital Asset Lifecycle Management (CALM)*, available exclusively from Siemens, works within Siemens’ Teamcenter across the enterprise to advance and improve capital program decision making. Using Bentley’s services, it enables users to extend project advancement to the enterprise level.

(With Topcon Positioning Group) *Digital Construction Works* is a joint-venture “digital integration” company newly launched by Bentley Systems and Topcon Positioning Group. Digital Construction Works provides, for constructor enterprises and supply chains, digital automation, integration, and “twinning” services around a portfolio of fit-for-purpose software and cloud services from Topcon, Bentley, and other software vendors, to realize the breakthrough potential of constructioneering, for industrializing construction.



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LASEA and AEROSINT collaborate to develop a hybrid process combining laser melting with in situ laser ablation

25 October 2019

A research grant from the regional government of Wallonia has been awarded to LASEA, a company specializing in systems for precision laser micromachining, and Aerosint, a startup company developing selective powder deposition technology for Additive Manufacturing (AM). The 2-year project, which will have a total budget of nearly €1 million, aims to lay the groundwork for building a hybrid AM

system that combines metal powder laser melting with in situ laser ablation.

The two companies bring complementary expertise needed to investigate the feasibility of such a hybrid process. LASEA will investigate the powder melting and ablation process conditions. Aerosint will be focusing on powder handling and deposition control of the metal powders in the scope of the project.

This hybrid process is aimed at applications in the traditional markets of LASEA, namely the watch & jewelry, electronics, and medical devices industries. For these industries, the part surface quality and dimensional tolerances obtained with existing metal AM technologies are often insufficient. Through its customers' requests, LASEA sees a clear advantage in a process that combines the geometrical freedom offered by L-PBF with the fine details and surface finish quality possible using laser ablation.

We always seek synergies with other companies in our market niches and we are convinced that the collaboration with Aerosint will be pleasant and fruitful. At LASEA, we have been developing subtractive laser systems for many years for applications such as cutting, drilling, engraving, marking... based on ablation with ultrashort pulse lasers, a technology in great expansion and for which the advantages have been demonstrated over the past decades.

At the same time, we are seeing attraction around laser additive manufacturing. As a laser integrator, we are seeing this as an opportunity to enter this domain in an innovative way. Thanks to the collaboration with Aerosint and its innovative powder management system, we are convinced that their approach combined with LASEA knowhow on ultrafast laser micromachining will lead us to promising results.

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Synopsys Launches New ARC VPX DSP Processor IP for High-performance Signal Processing SoC

23 October 2019

Synopsys, Inc. today announced the new DesignWare® ARC® VPX5 DSP and VPX5FS DSP Processor IP that is based on an extended ARCv2DSP instruction set and optimized for a broad range of high-performance signal processing applications, such as RADAR/LiDAR, sensor fusion, and baseband communications processing. The new ARC VPX5 DSP processors implement a configurable, energy-efficient very long instruction word (VLIW)/single instruction-multiple data (SIMD) architecture that combines scalar and vector execution units to enable a high degree of parallel processing. The Synopsys ARC VPX5FS DSP processor offers safety monitors, lockstep capabilities, and other hardware safety features that help designers achieve the most stringent levels of functional safety and fault coverage without significant impact on power or performance. The ARC VPX5 and VPX5FS DSP processors are supported by the ARC MetaWare Development Toolkit, which provides a comprehensive software programming environment including optimizing vector compiler, debugger, instruction set simulator, and libraries with DSP and math functions.

"We have been impressed by the ARC processor's signal processing performance, which is integrated on top of Arbe's proprietary real-time Radar Processor Unit," said Noam Arkind, founder and chief technology officer at Arbe. "We look forward to the features in the ARC VPX DSP processors that will enable us to further extend our programmable solution coupled with our unique hardware accelerators. Enhancements like linear algebra acceleration and high-performance vector floating point help us develop accurate algorithm implementations."

The ARC VPX5 and VPX5FS processors support single-, dual-, and quad-core configurations. Each VPX core contains a scalar execution unit and multiple vector computation units that support 8-bit, 16-bit, and 32-bit SIMD computations within a 512-bit vector word. The new DSP processors are highly configurable, allowing developers to optimize for power and area by selecting only the hardware features and vector resources needed to meet the required performance level. Neural network algorithms used in machine learning (ML) and artificial intelligence (AI) applications can be efficiently processed by the ARC VPX processors using the 8-bit data type, as well as 16-bit and 32-bit floating point data types.

To address the growing use of floating-point calculations in complex DSP algorithms, up to three vector floating point pipelines are available in each core. The Synopsys ARC VPX5 and VPX5FS support half-, single-, and double-precision floating point data types. Each VPX core also provides dedicated hardware acceleration for linear algebra and math instructions, delivering ultra-high performance for equation-based computations. The ARC VPX DSP processors can deliver 512 FLOPs and 32 math operations per cycle.

To accelerate software development, the Synopsys ARC VPX DSP processors are supported by the ARC MetaWare Development Toolkit with optimizing C/C++ compiler. An auto-vectorization capability enables the compiler to efficiently map all supported floating point and non-floating-point data types onto the respective SIMD execution units with full MAC unit saturation. The compiler is able to efficiently map VLIW operations to all vector computation units, enabling highly parallel execution.

"The tremendous complexity in DSP-intensive algorithms for sensor fusion, LiDAR, and RADAR applications requires higher levels of computation and parallel processing," said John Koeter, vice president of marketing for IP at Synopsys. "By providing a range of high-performance, configurable VPX DSP Processor IP solutions, Synopsys enables designers to address the massive signal processing requirements, while meeting the energy efficiency of their SoCs."



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