

PRESS RELEASE

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WZL cooperates again with BCG Digital Ventures, Amazon Web Services and Kuka for re:Invent 2017 in Las Vegas

Innovative Edge Computing Demonstrator Shows Potential for Resilient and Self-optimizing Production

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The Industrial Internet of Things (IIoT) promises disruptive solutions for today's production technology. The use of cloud technologies opens up new possibilities, such as increasing overall plant efficiency (OEE) through resilient and self-optimizing production plants. However, these new potentials cannot yet be fully exploited due to a lack of integrated communication and control concepts, existing delays in data transmission and excessive data volumes.

Edge computing is a key technology for new control concepts to combine the powerful cloud with distributed local edge devices. While cloud services perform higher-level analysis and optimization tasks, local events can be responded to in real time. Cloud and edge device are in continuous data exchange for this purpose. There is particular potential in outsourcing the execution logic from established industrial controls to the edge. If correlations are identified or optimizations calculated in the cloud, they can be executed directly on the Edge in the form of new programs.

In the collaborative demonstrator "ICECAT - Industrial Control by Edge Computing for Automation Technology", Amazon Web Services (AWS) Edge Technology "Greengrass" will once again be used to illustrate the possible new potential in an industrial application scenario for the automotive supplier industry.

Following the successful cross-company collaboration on "EPIC - Edge-Powered Industrial Control (EPIC)" at the Hannover Messe 2017, BCG Digital Ventures, Kuka Robotics, Amazon Web Services (AWS) and the Laboratory for Machine Tools and Production Engineering (WZL) at RWTH Aachen University once again joined forces. BCG Digital Ventures provided software for intelligent business and user applications as well as AWS support in the area of IoT & Edge technologies. KUKA uses the latest robot technologies and the Laboratory for Machine Tools and Production Engineering (WZL) at RWTH Aachen University completes the portfolio with many years of expertise in industrial end devices, processes and automation technology. The joint demonstrator "ICECAT" could thus be realized in just a few months.

In robot-based processes, external and internal influences, such as geometric product variations, lead to system downtimes and high manual effort. In ICECAT, a sensitive Kuka robot (KUKA LBR iiwa) records the specific deviations. These are stored in a digital shadow of the respective product. By means of intelligent logic on the Edge, the subsequent robot programs are adapted to real-time capability and instance related and in turn made available via the Edge. Finally, an optical quality check to determine the actual process step enables comprehensive optimization in the cloud in order to adapt offline planning to the desired process result in just a few production steps.

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In ICECAT, all industrial terminal devices (sensors, actuators and robot controllers) are connected exclusively via edge devices, cost-effective single-board computers, in combination with AWS Greengrass technology, and integrated into the overall process, which is also controlled via edge devices.

With this approach, plant downtime based on process variations can be significantly reduced and overall productivity significantly increased.

"It is to be expected that in the future more and more control tasks will be realized by edge devices in combination with powerful cloud applications. For one year now, we have been following the strategic top technology trend 2018 'Cloud to the Edge', which Gartner only presented at the beginning of October. We see edge technology as a disruptive key technology for designing resilient and (self-)optimizing production systems," says Dr.-Ing. Markus Obdenbusch, head of automation and control technology at the Laboratory for Machine Tools and Production Engineering (WZL) at RWTH Aachen University. "We have used digital shadows, microservices and edge devices to present a completely new approach to distributed automation technology. We are thus already taking a major step towards the Internet of Production.

Laboratory for Machine Tools and Production Engineering (WZL)

The Laboratory for Machine Tools and Production Engineering (WZL) of RWTH Aachen University has stood worldwide for more than 100 years for future-oriented research and successful innovations in the field of production technology.

Under the leadership of four professors Christian Brecher, Fritz Klocke, Robert Schmitt und Günther Schuh, the WZL is conducting research in six areas – production technology, machine tools, production systems, transmission technology, production metrology and quality management - on the future-oriented design of production in high-wage countries. Together with industry partners from various sectors, the WZL develops solutions for a wide variety of production scenarios in both publicly funded and bilateral projects. These activities are being consolidated on the RWTH Aachen Campus in the Cluster Production Engineering.

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Attachment



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Team f.l.t.r.: Jonas Kulesa (BCG DV), Melanie Buchsbaum (WZL), Nicolai Hoffmann (WZL) and Dr. Tilman Buchner (BCG DV). © BCG Digital Ventures