NIST Smart Manufacturing Workshop April 10-11, 2017

SM Reference Models and Reference Architecture

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| Time | Topic | Participants |
| Apr. 10, 9:30-11:30 | **Opening Plenary** | Joint Session |
| Apr. 10 1:00-5:30 Session 1 Smart Manufacturing Reference Model and Reference Architecture  Moderated by David Noller | | |
| 1:00-1:30 | Review and discussion of the previous workshop results and developments since | Yan Lu and David Noller |
| 1:30-1:50 | A Universal Smart Manufacturing Reference Model | Youichi Nonaka, Hitachi |
| 1:50-2:10 | IEC TC 65 AHG3 Smart Manufacturing Reference Architecture | Ingo Weber, Siemens |
| 2:10-2:30 | IEC SEG7 work on Smart Manufacturing Use Cases and Reference Architecture | Alec McMillan, ANSI |
| 2:30-2:50 | The Rockwell SM reference architecture | Brian Batke, Rockwell |
| 2:50-3:10 | Break |  |
| 3:10-3:20 | ISO TC 184 Smart Manufacturing common reference architecture | Fumihiko Kimura, The University of Tokyo Member |
| 3:20-3:40 | ISA-95 Status and road map toward Smart Manufacturing | TBD |
| 3:40-4:00 | RAMI 4.0 | Martin Hankel, Bosch (TBC) |
| 4:00-4:20 | IIC reference architecture | Edward Griffor, NIST |
| 4:20-4:40 | IEEE 2413 IOT Reference Architecture | Eric Simmon, NIST |
| 5:00-5:20 | The IBM reference architecture for IoT | David Noller, IBM |
| 5:20-5:40 | Enabling Technology for Smart Manufacturing | Rudy Belliardi, Schneider |
| Apr. 11 8:30am - 11:30am Session 2 SOA for Smart Manufacturing System Integration, Bldg 220, AMSANT  Moderated by Yan Lu | | |
| 8:30-8:50 | PLM Standards impacting Service-Oriented Manufacturing | Charles R. Ditchendorf, CIMData |
| 8:50-9:10 | Next-Generation Enterprise Architectures  Common Vernacular and Evolution Towards Service-Orientation | Mohsen Moghaddam |
| 9:10-9:30 | Across System for Smart Manufacturing | Seisuke KANO, JAIST |
| 9:30-9:50 | OPC-UA for Smart Manufacturing | Jim Luth, Schneider-Electric (TBC) |
| 9:50-10:10 | Break |  |
| 10:10-10:30 | MTConnect and SOA for smart manufacturing | Helu Moneer, NIST |
| 10:30-10:50 | Decision based Production Control for Smart Manufacturing using SPWS | Feng JU, ASU |
| 10:50-11:10 | Enabling Technologies SOA based SMS | Michael Hoffmeister, Festo |
| 11:10-11:30 | A Functional Model of Scheduling and Production Planning | Tim Sprock, NIST |
| Apr. 11 1:00pm - 3:30pm: Session 3: Discussions - Challenges and Action Item for SOA based Smart Manufacturing Systems | | All participants of SMRA Session |
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| 3:45pm-4:30pm | **Closing Plenary** | **Joint Session** |
| 4:30pm | **Adjourn** | **Joint Session** |

***Session - SM Reference Models and Reference Architecture***

Chair – Dr. Yan Lu, NIST ([yan.lu@nist.gov](mailto:yan.lu@nist.gov)) and Dave Noller, IBM (nollerd@us.ibm.com).

Abstract:

Future manufacturing must become “smart” – capable of agilely adapting to a wide variety of changing conditions. This requires production plants, supply chains and logistic systems to be flexible in design and reconfigurable “on the fly” to respond quickly to customer needs, production un-certainty, and market changes. Service-Oriented Architecture (SOA) provides a promising approach to achieving such manufacturing agility. It has proven effective for business process adaption and – especially when combined with emerging Internet of Things (IoT) technology and the concept of cyber-physical production systems – is expected to similarly revolutionize real-time manufacturing.

Objective:

This session is intended to bring standards developers, technology providers and manufacturers together to discusses impacts of ICT technologies on the emerging manufacturing system architecture. More specifically, we would like to explore how service-oriented-architecture can help integrate IoT, digital factory and cloud computing technologies into modern manufacturing environment and enable the manufacturing systems to respond in real time to meet changing demands and conditions in the factory, in the supply network, and in customer needs.

Expected Outcome:

The envisioned outcomes of this break-out session are the surveys of existing smart manufacturing reference models and reference architectures from industry and SDOs and a feasibility analysis of applying SOA to integrate shop floor automation systems with enterprise software systems in smart manufacturing environment. Challenges will be identified for implementing SOA-based smart manufacturing systems and standards in support of such implementations.