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Demo

The Industrial Internet of Things

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Abstract

The application of the Internet of Things to manufacturing is the driving force of the new industrial revolution (Industry 4.0). In fact, most activities in the manufacturing industry can benefit from the data collected in the context of the industrial process. The Industrial Internet of Things (IIoT), whose pillars are the usage of IP communication between the devices and making the devices accessible through the Internet, can maximize the benefits of the information by the integration between multiple data sources, and by the ubiquitous fruition of the information itself. It is common belief that IIoT will transform companies and countries, opening up a new era of economic growth and competitiveness, since it has great potential for improving quality control, sustainable and green practices, supply chain traceability, and maintenance of the user in the loop. Anyway, a number of challenges arise in this context, related for example to adaptability and scalability, real-time communication and QoS, and system deployment and management. A communication middleware can support the IIoT vision by coping with these issues. This talk introduces the IIoT, discusses its benefits and challenges, and presents communication middleware developed in different sub-areas of IIoT (service-oriented industrial informatics [1], smart grids [2], maintenance of industrial machines [3]) that enable the IIoT vision.

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References

- [1] J. Delsing et al, "The Arrowhead Framework architecture", chapter 3 of book "IoT Automation: Arrowhead Framework" – ISBN 9781498756754, CRC Press Publisher, pp. 45-91
- [2] M. Macarulla, M. Albano, L.L. Ferreira, C. Teixeira, "Lessons learned in building a middleware for smart grids", Journal of Green Engineering, River Publishers, vol.6, n. 1, pp. 1-26, January 2016. DOI 10.13052/jge1904-4720.611
- [3] Jantunen, E., Zurutuza, U., Ferreira, L., Varga, P., "Optimising Maintenance: What are the expectations for Cyber Physical Systems", The 3rd International IFIP Workshop on Emerging Ideas and Trends in Engineering of Cyber-Physical Systems (EITEC' 16)