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Bridging Service-Oriented Architecture and Industrial Automation for Flexibility and Interoperability

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Abstract:

In recent years, new challenges to fulfil growing requirements for interoperability, flexibility and reconfigurability of complex automation industry applications have increased dramatically. An increasingly important goal of industrial automation systems is the reduction or elimination of environmental pollution. One means of reducing environmental effects is to reduce energy consumption and improve the efficiency of resource management. In order to achieve that goal, industrial automation systems must be able to respond rapidly to changes from both internal systems and external environment. The adoption of service-oriented architectures (SOAs) could be a feasible solution to meeting these challenges. Adopting Service-oriented architecture (SOA) in existing distributed automation systems will enhance flexibility and interoperability. However, a change of software program cannot be made without human intervention for industrial automation systems under existing implementations. Autonomic service management (ASM) conjoint with SOA is introduced to achieve self-manageable and adaptive distributed automation systems. The architecture design of the autonomic service manager is provided and integration with SOA based execution environment is illustrated. Some self-management features such as self-configuration, self-healing and self-optimization are demonstrated.

Biography:

Wenbin (William) Dai received a Bachelor of Engineering (with honours) degree in Computer Systems Engineering from the University of Auckland, New Zealand in 2006. He completed PhD in Electrical and Electronic Engineering at the Department of Electrical and Computer Engineering, The University of Auckland, New Zealand in 2012. He is now postdoc research fellow and associate senior lecturer at Lulea University of Technology, Sweden. His research interests are IEC 61131-3 PLCs, IEC 61499 function blocks, distributed control systems, industrial fieldbus communication protocol, SOA and Internet of Things, cloud-based simulation and emulation in industrial automation. He had been also a software engineer/architect from Glidepath Group – a New Zealand based airport baggage handling system provider from 2007 to 2013.