Multi-agent Control of Manufacturing Systems

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Currently used control systems lack the necessary flexibility in order to deal with a variety of challenges faced by manufacturing companies in daily activities. Machine shutdowns, varying customer demand, and other factors bog down the efficiency of industrial production lines. Thus, the idea of multi-agent systems is presented. These systems have been previously proposed, but have yet to be implemented on a wide scale. Reasons include integration and standardization issues associated with current manufacturing system. In addition to adapting to current industrial standards, future manufacturing technological trends (e.g. cloud computing) will need to be integrated in order to fully recognize the capability of these control frameworks. Utilizing MTConnect can solve these challenges and push manufacturing facilities to address the flexibility challenges faced by the manufacturing sector. Leveraging MTConnect with cloud services, a multi-agent processing and control schematic is presented in this paper. The presented technology can be implemented on the Industrial Automation Testbed at the University of Michigan. With this testbed, multiple scenarios can be run in order to validate the multi-agent framework and investigate how the framework integrates with existing state-of-the-art technology available for manufacturing companies today.