APP CHAINING SOFTWARE-AS-A-SERVICE FOR AN ADVANCED MANUFACTURING MARKETPLACE

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ABSTRACT

Advances in the field of cloud computing and networking have led to development of Marketplaces (e.g., Awesim) that support Advanced Manufacturing enterprises consisting of Apps. These Marketplaces host Apps that perform simulation and modeling on specialized designs (e.g., pipes, automobile parts). However, the salient limitation in these App Marketplaces is the lack of a development environment that supports effective runtime capabilities for ‘Agile Manufacturing’ that efficiently and cost-effectively integrates several Apps when building innovative products.

To address this problem, we propose a new Software-as-a-Service based App Runtime for the Marketplace environment that can be utilized for agile development of ‘Apps’ that involve high-performance modeling and simulation. Our solution approach features a web framework for the App runtime that chains together generic set of ‘Apps’ that run complex simulation jobs on Supercomputer and publish customer facing results. We demonstrate how multiple Apps can be chained using our web framework for a product case study viz., ‘WheelSim’ deployed in the NSF GENI Cloud platform. Our results show improved App development convenience via rich UI elements interacting with RESTful web services and through dynamic chaining of workflows. Our study also provides App developers with insights pertaining to estimation of resource cost for App pricing issues in the manufacturing Marketplace.