

Abstract: An Industry Gateway for Rapid Reconfiguration of Manufacturing Processes

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ABSTRACT

Manufacturing is typically the backbone of every economy and one of the oldest and most prominent economic sectors worldwide. Therefore, any positive or negative impact on this sector has significant consequences on the entire world economy. The recent COVID-19 crisis had a major effect on the manufacturing industry. Many manufacturing companies require rapid multidisciplinary assessment to repurpose, adapt and ramp up their manufacturing lines and reorganise their supply network, in light of new challenges, requirements and opportunities raised by the pandemic situation. This recent demand further emphasised and accelerated the process of digitalisation in the sector that is essential to plan and perform flexible and configurable production processes.

While large organisations typically have the capability and resources to perform the required multidisciplinary assessments on-demand, it is much more difficult for small and medium-sized enterprises (SMEs) to address these challenges. The CO-VERSATILE project, funded by the European Commission's H2020 Programme, aims to democratise access to such services and expertise, and make it available and affordable for SMEs.

In order to achieve its objectives, CO-VERSATILE built an industry gateway, called Digital Technopole, a central hub of loosely coupled and decentralised physical and digital services. The Digital Technopole is a single-entry point to access five groups of services, including manufacturing simulation (1), supply network simulation and risk management (2), automation and system integration (3), certification and training (4), and replication and sustainability of manufacturing and supply chain processes (5). These services are offered in various ways, including human provided consultancy services, but also as completely digitalised services that are available either for local execution or on cloud-based platforms as remote services.

Such remote cloud-based platform that is already connected to the Digital Technopole is the Digital Agora, a cloud-based

marketplace developed in the CloudiFacturing H2020 project, that offers a convenient user interface and a corresponding execution environment to publish and access cloud-based simulation services on-demand. The Digital Agora and its associated CloudiFacturing Platform enable independent software vendors and value-added resellers to publish ready to use cloud-based simulation services and SME end-users to access these services as apps from a central marketplace. The complexity and heterogeneity of the cloud-based execution is completely hidden from the user.

In the CO-VERSATILE project seven so called Manufacturing Settings have been implemented. Each Manufacturing Setting represents a scenario where the manufacturing line and process (including also the entire supply network) require fast and efficient repurposing and reconfiguration in order to deliver vital medical supplies demanded by the current pandemic situation. These Manufacturing Settings include the production of silicone facemasks, manufacturing of disinfectant spray systems, ramping up the production of respiratory devices, building reconfigurable mask production machines, and developing resilient automation systems for manufacturing processes. Several of the Manufacturing Settings require cloud-based simulation related either to their manufacturing or supply chain processes. This presentation will illustrate how manufacturing and supply chain simulations in CO-VERSATILE have been implemented as cloud-based services and offered through the Digital Technopole and the Digital Agora in order to support the fast reconfiguration and repurposing of manufacturing processes.

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